BIOLOGY OF ESSENTIAL HUMAN DISEASES

PROFESSOR V.K.GANESALINGAM

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TITLE	:	Biology of Essential human Diseases
LANGUAGE	:	English
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ADDRESS	:	Kanda Udaiyar Lane, Point Pedro, Sri Lanka
PUBLISHERS	:	Sri Lanka Red Cross Society, Jaffna Branch.
PAGES	:	viii + 238
FIRST EDITION	:	2010
COPY RIGHT	:	Author
ISBN	:	955 98185 3 8
PRINTERS	:	Andra Digital Image, K.K.S.Road, Kondavil.
PRICE	:	Rs. 400.00 (SL)

This is dedicated to my elder brother

Mr. V.K.Subramaniam

B.Sc.,Dip.in Ed. (Former Principal)

Contents

Forward

It gives me great pleasure to write a forward for this book entitled "The Biology of Essential human Diseases ", prepared by Emeritus Professor V.K.Ganesalingam, Visiting Professor of the University of Jaffna, Sri Lanka and the Chairman of the Sri Lanka Red Cross Society of Jaffna Branch.

Professor Ganesalingam was attached to various universities in Sri Lanka, teaching and carrying out research and directed the research of the postgraduate students. He has taught in several Universities in Sri Lanka since 1961, such as University of Colombo, University of Peradeniya, University of Jaffna and South Eastern University. In the University of Jaffna he had served for 26 years. Still he is active in his field. Apart from his university service, he was attached to the Red Cross Society where medical care and health care are the major part of the service to the under-privileged. His work shows that he was involved in his academic matters while interested in the welfare of the general public.

The information of diseases dealt in this book is very valuable for every body to understand the biology and the life histories of causal agents of such diseases. It is true that the

diseases are carried by pathogens, behavioural factors or 'wear and tear' of organs concerned. The author has got interested in these matters and discussed them well in this book. More over, he has explained them in a simple way so that all could understand the diseases. He also explains the ways to prevent them or direct them for proper medical treatment, if they are suffering from such diseases. This book is a good product which has been prepared in a methodological way to understand the diseases, so that a person can understand more about diseases he or she has got, before going for medication or surgery, to save life.

I congratulate Professor Ganesalingam for making such an excellent product which will be of great use for all who need to know about the diseases, and to take appropriate actions either to take precaution to prevent them or to take further action for the benefit of the patient.

I wish the book every success.

Thank you.

Dr. N. Sivarajah, M.B.B.S., DTPH. M.D. (Community Medicine),
(Board Certified Consultant in Community Medicine),
WHO Consultant, Coordinator for
Jaffna field unit of the WHO,
Jaffna.

Introduction

In order to understand the diseases of man and to take steps to avoid them, one should have the knowledge with regard to the biology of the diseases. This will make one to understand the malfunction of the body due to the infection by the pathogens, parasites and other reasons.

The brief description of the cause and formation of various diseases given in this book, may explain the progress in the human and life history of the disease-causing agents affecting the human body.

The main idea of this book is to make readers to know about the diseases and their effects in a simple way. This will help them, especially when they are experiencing such diseases. The knowledge of the diseases will be more helpful when prescription is offered or when an operation is planned to cure the problem. In this knowledge-based world, the nature of the disease should be understood to prevent it and to have a disease-free life.

I have dared to prepare a book of this sort, because I was teaching the subjects, like Anatomy, Physiology, Microbiology,

Parasitology, Genetics, and Entomology etc. for a long period in my professional career. I too was interested in diseases, therefore I had to develop my knowledge well in the field of human diseases from time to time. Such a combination has made this book to contain most of the essentials of diseases that a student, learner or a patient should know. However they have to gather more information about the diseases with the amount of knowledge that have been obtained at the moment.

It is hoped that this book would be of some use to the readers to achieve some benefits for better health, wealth and happiness

The diseases caused are categorized in groups in the "Contents" for easy reference. In addition, all the diseases under each category are discussed according to the alphabetical order of the diseases concerned.

I am glad that Dr. N.Sivarajah M.D of the WHO, Jaffna was very good enough go through this book critically and to kindly provide a forward to this book for which I am most grateful.

Although the materials found in this book are obtained from my own reading it is supplemented with various information obtained from books and publications listed in the 'Literature cited', found at the end of this book.

It is gratifying to thank the Canadian Red Cross in Sri Lanka for providing a part of the financial assistance (under the OD programme) for printing this book. I thank Mr. E Myooran and Miss V. Vinojah for their good assistance given for the completion of this book. I also thank Dr.V.Thiagarajah and Dr.S.Jamunananda for critically reading the manuscript.

I am also thankful for my dear readers, who, I am sure, will appreciate the matters that are given in this book.

I wish them well for their good future.

Professor V.K.Ganesalingam
Kanda Udaiyar Lane,
Point Pedro,
Sri Lanka

1. Cancerous diseases

Cancer - the malignant tumour

Cancers were named as such because of their 'crab like' growth pattern. Cancers are also known as malignant tumours or malignant neoplasms. Cancers are characterised by uncontroiled growth, invasion of normal adjacent tissues and spread to distant sites to cause secondary cancers (metastasis). Cancers, if untreated will lead to death of the patients harbouring them. However, it is very difficult to treat cancers. The survival rate in affected people show positive signs. It is a fact that the increased incidence of cancer may be related to (1) the altered environment, (2) the peculiar habits of the people in an area and (3) any chemical adulterations of food or water. The threshold of carcinogenesis may be increased with the accumulated stress among the people and consequent reduction of immunity levels. The main causes are: Chemicals, Fungus (Aflatoxin-*Aspergillus flavus*), Radiation, Virus (example: Hepatitis B virus), Food (example:fat), infectious diseases (HIV), damaged Ozone layer, Drugs, Habits (smoking, alcohol), Environment, Hormones, Carcinogenic materials, unhealed deep wounds etc. Certain types of abnormalities in the genetic material (genes) within cells lead to cancers.

However different factors or a combination of factors may lead to the abnormalities in the genes which lead to cancerous growth. The abnormalities of activation of antioncogenes can allow activation of oncogenes and lead to cancer. Only a minute fraction of cells that mutate in the body lead to cancer .The question arises why a few cells are prone to cancerous growth. The answer is that the incredible precision with which the DNA chromosomal strands are replicated in such cells before mitosis takes place. This process too would repair and make straight any abnormal DNA stands before the mitotic process is allowed to proceed. In spite of all the inherited cellular precaution, the newly formed cell in every few millions has significant mutant characteristics. The cancer cell does not obey the usual growth limits. The reason for this is that cells presumably do not have the required growth factors that are followed by the normal cells. In addition to this, the cancer cells are far less adhesive to one another than the normal cells. This makes them to enter any organ through the blood stream and form numerous new cancerous growths somewhere else. Some cancers are capable of producing angionic factors that cause many new blood vessels prone to cancerous growth, supplying the nutrients required for cancerous growth. The cancer tissue completes with the normal tissue for their nutrients. As the cancer cells continue to proliferate fast, their numbers increase every day. They make use of nutrients of the body almost to the fullest

extent that normal tissue is subjective to death due to lack of nutrition. Little is known of cause of cancer. It is well known that ionizing radiation such as X - rays, gamma rays, and particle radiations from radioactive substance and even ultraviolet light can rupture the DNA strands to cause mutation. Chemical substances that cause cancer are called carcinogens. They are produced from chemical plants. Such substances have a special predisposition to cancer. Physical irritant, such as continued abrasion of the lining of the intestinal tracts lead to rapid mitosis and mutation. In many families, cancer may be produced through hereditary, presumably one or more of the genes are already mutated in the inserted genome. In laboratory animals, certain types of viruses can cause cancer, such as leukaemia, resulting by inserting DNA strand of the DNA viruses into one of the chromosomes, thereby cause mutations that leads to cancer. RNA virus causes with them an enzyme that causes DNA to be transcribed from the RNA. The transcribed DNA inserts itself into the animal cells genome, thus leading to cancer. The term benign is used most frequently with reference to tumours, meaning not harmful. Cancer is more threatening to the host than benign tumours. Both types may cause by location and impingement on adjacent structures, functional activity such as hormone synthesis, bleeding and secondary infection and initiation of acute symptoms caused by either rupture or infection. The malignant cells invade blood vessels and

lymphatics and are carried to the liver and lymph nodes, to form secondary tumours (metastases). The presence of inhibitory gene was postulated. The tumour suppressor genes are categorized according to their mechanism of action. Caretaker genes maintain the integrity of the genome by repairing DNA damage. 'Gate keeper' genes inhabit the proliferation or promote the death of cells with damaged DNA. Inhibition, promotion and persistence undergo in multiple steps. Latency is represented by the time interval between exposure to the initiating agent and the growth of a detectable neoplasm. Most benign tumours grow slowly over a period of years. Most cancers grow rapidly, sometimes at an erratic rate, and eventually spread and kill their host. Hence no benefits would be achieved on the patient than taking methods to prevent spreading it to other organs. Treatment depends upon the site of the cancer involving radiotherapy, chemotherapy and surgery. Early cancer is also treated by cryosurgery, diathermy, laser treatment and electro coagulation, identifying the causes and living according to them. Seven warnings signals are as follows: A sore that does not heal; unusual bleeding or discharge; thickening or lump in breast or elsewhere; indigestion or difficulty in swallowing; obvious change in wart or mole; nagging cough or hoarseness. Any part of body may get cancer (Fig:01).

Commom sites for oral cancer

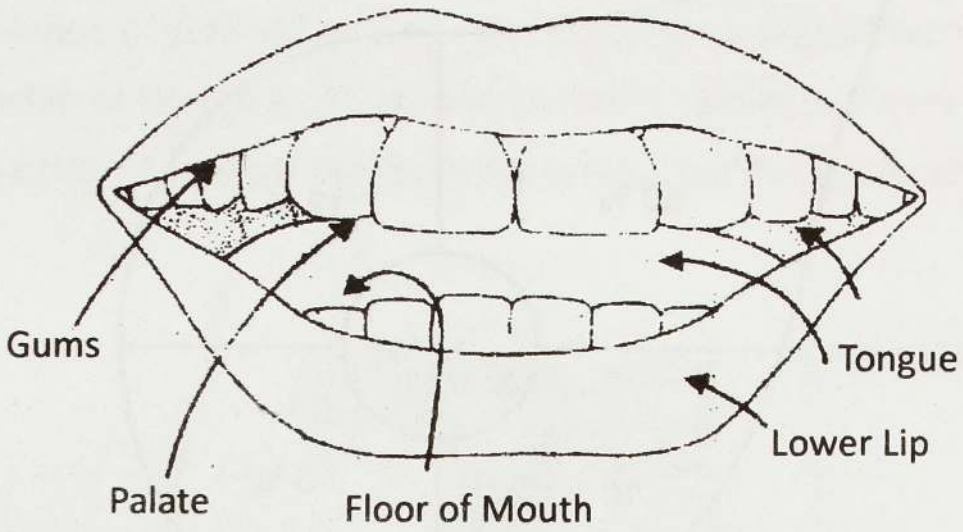


Fig: 01 Cancer inside the mouth

Breast cancer

This is a common cancer in women (Fig:02). A malignant growth in the breast mainly attacks women over 40 years of age. Incidence of breast cancer is low when women's breast feeding persists and in those whose animal fat intake in the diet is low. First, it appears as a lump in the breast or armpit and later spreads to the lymph nodes. Early detection will lead to its removal and prevent spreading. However recurrence may be possible even after removal because, metastasis may be hidden and cannot be removed fully, although after removal of the localized tumours surgically. In addition, radio, chemo and hormone therapy can form part of the treatment.

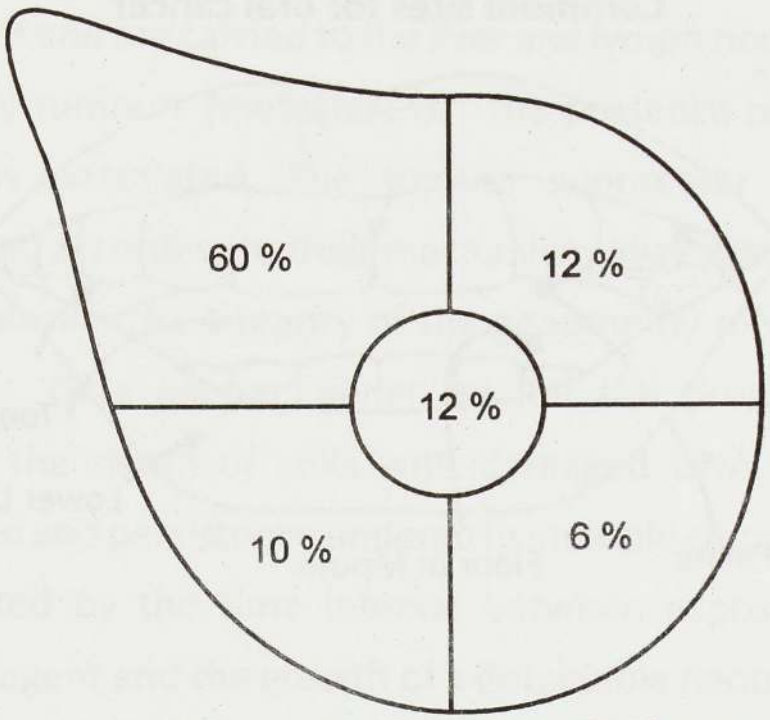


Fig: 02 Sites for Cancer in the breast

Cervical cancer

Cervix is the neck of the uterus in the womb. It is partly within the uterus and partly in the vagina. It connects the uterus and vagina by cervical canal. The cancer of cervix (Fig:03) is one of the most common cancer affecting women. Early detection can be determined by the changes taking place in the cells lining the surface in the cervix. This is done by examining the cervical smear. Prevention and cure rate by this way are encouraging, and has reduced the death due to cervical cancer. Early treatment of cervical cancer includes cryosurgery, diathermy, laser treatment and electro coagulation .The sexual behaviour of women plays an important part in developing cervical cancer. Early sexual intercourse, number of sexual intercourse and

different sexual partners are now known to increase the incidence of cervical cancer. Circumcision (surgical removal of foreskin or prepuce of the penis in male sexual partner) causes reduction of cervical cancer in the female partners concerned.

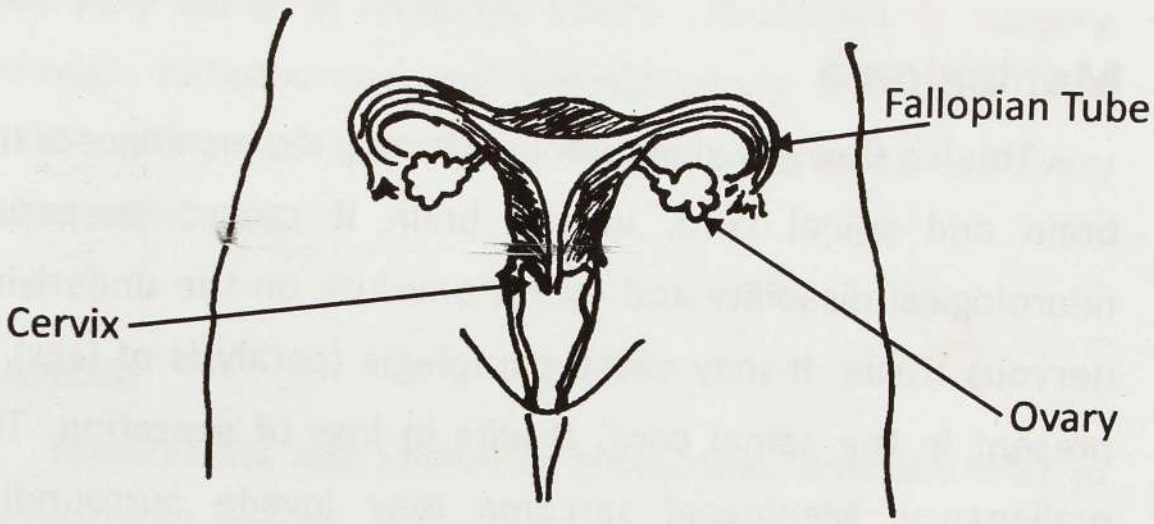


Fig: 03 Cancer in the cervix

Hepatoma

This is a malignant tumour of the liver. It is common in parts of the far East and Africa and rare in Western countries. It is common in those who have cirrhosis (disease of the liver due to damage and death of cells), or aflatoxin (the poison produced by an alpha fetoprotien in the blood). These are the indicators of the presence of tumours in the victim.

Lymphoma

This is the tumour of the lymph nodes, which become enlarged. If much lymphoid tissue is involved, liver and spleen may be enlarged. The symptoms include fever, anaemia,

weakness and weight loss. Treatment is with drugs and by radiotherapy. They may show a marked response. The life expectancy is very low. Hodgkins disease is also a malignant disease affecting the lymphatic system.

Meningioma

This is a slow growing tumour affecting the meninges of the brain and spinal cord. In the brain it causes increasing neurological disability and exerts pressure on the underlying nervous tissue. It may cause paraplegia (paralysis of legs). If present in the spinal cord, results in loss of sensation. The malignancy, Meningeal sarcoma may invade surrounding tissues and cause malignant elsewhere. The usual treatment is surgery and radiotherapy.

Myeloma

This is a malignant disease of the bone marrow, found in more than one bone at the same time. The affected bone marrow may show "holes" due to typical deposits. There are certain deposits and certain abnormal proteins present in the blood and urine. Myelomastosis moves and invades other organs, causing fatality. Treatment is by chemotherapy and radiotherapy.

Osteosarcoma

This is a malignant tumour of bone. It affects particularly the long bones of arms and legs of older children. The femur is usually affected, but the metastases are common. Swelling and pain may occur in affected bones. Treatment is surgery, although radiotherapy and chemotherapy are usual ones initially. It is considered to be a serious form of cancer with very poor survival rate.

Tumour

Tumours are also known as neoplasms. Tumours refer to uncontrolled growth of tissues. Tumours are further divided into either benign or malignant. Malignant tumours are more commonly known as cancers. Malignant tumours are different from benign tumours owing to their property to invade adjacent tissues and their ability to spread to another part (metastasize) of the body to form metastases.

Wilm's tumour

This is a tumour of the kidney in infant children (nephroblastoma). Treatment involves radiotherapy and chemotherapy. Early removal of affected kidney confers a high survival rate.

2. Deficiency diseases

Beri beri

This is a vitamin deficiency disease caused by lack of a component of vitamin B, (thiamine). It occurs mainly in countries where staple diet is polished rice. It is due to loss of bran in rice during processing. Beri beri is most prevalent in south East Asia, China and Japan where rice eating is the main food habit of the inhabitants. Symptoms are fever, paralysis, palpitation, pain from neuritis, muscular wasting, progressive oedema (accumulation of body fluid), mental deterioration and finally heart failure. Prevention of Beri Beri is to take in vitamin B, in the form of food, drink or vitamin B capsules.

Dehydration

This is a condition produced by loss of water or deprivation of water from the body tissue. Dehydration may be caused by inability to take in water due to illness or disease, or by loss of water by vomiting or diarrhoea, or by uncontrolled secretion of urine or excessive sweating. The dehydration too will cause loss of essential salts from the body. If the dehydration is not controlled, death of the patient may result in matter of days.

Kwashiorkor

The most widespread and serious human nutritional disease is by acute protein starvation. Protein deficiency is a special form of malnutrition. It arises when the diet contains enough energy but not enough protein. This happens when the quantity of starchy food such as maize or cassava are eaten, and protein-rich food such as peas, wheat, cereals, fish or meat are not added in the diet. The condition is known as protein energy malnutrition. Kwashiorkor is serious among children in Africa. It occurs when a child is weaned from the breast on to an adult diet, which is insufficient in protein. The result is loss of appetite, diarrhoea, oedema, anaemia and other conditions. The symptoms are impaired growth, skin ulcer, swollen hands and feet and enlarged liver. Initially the condition improves with high protein food.

Marasmus

Marasmus in western societies may be seen in infants who are severely undernourished, or after severe chronic illnesses, particularly affecting the bowel. In poorer communities, nutritional marasmus commonly occurs due to failure of location in people who just cannot afford artificial milk. Thus it is more common in low-birth-weight infants, twins and in infants after infection, particularly gastroenteritis. The infant's survival

depends on the mother's ability to maintain lactation, even if infant is unable to suckle for a few days. If food can be found, the prognosis of these infants is good. The famine children of all ages may become marasmus and the recovery of older children may take longer. The risk of death or infection during recovery phase is also higher. This is a protein energy malnutrition. The child has a low body weight, lesser than 75% of the normal weight. The symptoms are, thinness and poor muscle development, so that bones are seen through skin. Various disorders can be caused including prolonged vomiting, diarrhoea, disorders in kidneys and lungs, infections, parasitic diseases, malabosorption, poor mental development and reduced resistance to disease. Treatment is by gradually providing more protein nourishment and fluids.

Night blindness

The retina is the inner most layer of the eye. The retina contains the photoreceptors, containing rods and cones which convert light energy into nerve impulse. The outer segment of the Rods contains the pigments, the Rhodopsin. The Rhodopsin consists of protein, Opsin and Retinal which is a derivative of vitamin A. If a person has vitamin A deficiency, he is not able to synthesize much Rhodopsin and hence suffers from poor light-dark vision and is said to have night blindness. Therefore, the night blindness (nyctalopia) is the poor vision in dim light or at

night due to deficiency in the Rhodopsin responsible for such vision. Symptoms include poor night vision, drying up of the skin, the cornea of the eyes and the moist membranes and bronchial tubes. There is a tendency to get skin and throat infection; and in severe cases damage to the retina of the eye may take place. Many plant foods such as carrots can be converted by the body into vitamin A. This vitamin is stored in the liver.

Pellagra

This is a deficiency disease caused by a lack of nicotinic acid, which belong to vitamin B complex. Nicotinic acid or Niacin is one of the twelve different types of vitamins and one of the seven essential vitamins of human nutrition. This vitamin is present in maize, but it does not contain the amino acid, tryptophan which the body can use to produce nicotinic acid. This vitamin is necessary for the release of energy from food. The symptoms are dermatitis, diarrhoea and depression. This disease is caused by deficiency of Niacin (Nicotinic acid), which is a part of the vitamin B complex. Niacin is converted into Nicotinamide in the body, becoming incorporated into NAD (Nicotinamide adenine dinucleotide). NAD is a coenzyme that readily accepts or gives up hydrogen. NAD acts as an energy carrier in the cell. Reduced NADH transports electrons to the electron transport system during aerobic respiration. Niacin is

found in meat, yeast, whole-wheat, eggs, vegetables and fruits. Symptoms are, reddening of exposed skin, loss of appetite and irritability, muscle weakness and mental disturbance, glottitis, dermatitis, peripheral neuritis, spinal cord changes, and anaemia. The condition is common among alcoholics. This could be improved by intake of vitamin B comlex.

Pernicious anaemia

This is a type of anaemia caused by vitamin B12 deficiency. Cyanocobalamin (B12) is involved in the formation of protein, fat and glycogen in the body. The deficiency symptom is that the body fails to produce sufficient red pigment haemoglobin in red blood cell. The work of the English biologist William Castle and others has shown that this disease occurs in people whose stomach digestive juice lacks a substance now called Castle's intrinsic factor. This substance is necessary for the absorption of B12 by the intestinal wall. Pernicious anaemia can be cured by including a little intrinsic factor in the diet. If not treated, the condition can be fatal, producing poor colour, weakness, gut disorders, decrease of red blood cells together with growth. size.

Scurvy

This is a deficiency disease caused by a lack of vitamin C (Ascorbic acid) due to dietary lack of fruit and vegetables. Vitamin C is important in the formation of connective tissue that

seals wounds. The activation of enzymes is important for healing, and the prevention of clotting. More serious symptoms such as anaemia, general weakness, internal haemorrhage, stunted growth bruised skin, soft pulpy gums with loose teeth and a failure of wounds to heal. Almost all animals except man can manufacture their own vitamin C. Adult humans need up to 0.06g daily in their diet. This is very soluble in water and is destroyed by prolonged cooking. It is also lost when food is stored for a long period. This vitamin can deteriorate and disappear altogether. Now days, it is easy to prevent or to cure scurvy by giving correct diet or administration of the vitamin C to the patient concerned.

3. Diseases of digestive system

Appendicitis

Appendix is a blind - ended tube, which is about 9 - 10 cm long, projecting from the caecum of the large intestine, refers to as the vermiform appendix (Fig: 04). In man it has no known function, except it accumulates some unnecessary materials. Sometimes due to either infection or putrefaction the appendix undergoes inflammation and can burst with serious consequences. It is most common in young people. It bursts, thus, spreading the contents in the peritoneal cavity. If not treated, it will end up in peritonitis (inflammation of membrane) lining the abdominal cavity (Fig: 05). Symptoms include abdominal pain, loss of appetite, sickness and diarrhoea. The treatment requires appendectomy at an early stage. This results in complete cure.

Intestinal pain may indicate the following

Appendicitis	Mesenteric adenitis
Obstruction	Strangulated hernia
Gastroenteritis	Intussusceptions
Bowel disease	Volvulus
	Tuberculosis

Fig: 04 Appendicitis
(Appendix is finger shaped)

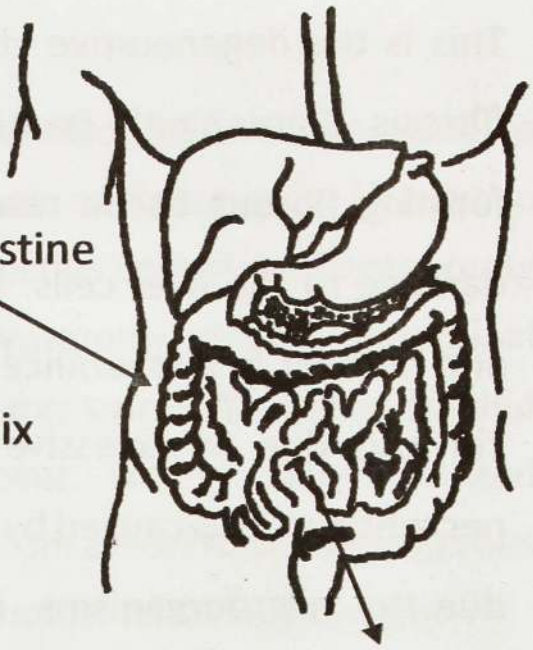


Fig: 05 Abdominal cavity

Cirrhosis

This is a disease of the liver in which healthy cells are destroyed and replaced by fibrous tissue. The liver becomes yellowish and nodular in appearance. Cirrhosis is the result of attempts by the liver to make it correct the damage occurred after sudden massive infection (hepatitis). Long period of chronic hepatitis, blockage of bile duct, long period of alcohol abuse are most common cause of cirrhosis. The disease can be halted if the disease is identified and the cause is removed with regard to alcoholic cirrhosis. The consumption of alcohol has to cease in the patients concerned.

This is the degenerative change in the tissues with resulting fibrosis (hardening). Damage to liver cells can be serious forming fibrous tissue resembling scar tissue as a result of damage to the liver cells. The liver becomes yellow-coloured and nodular in appearance. There are various types; alcoholic cirrhosis due to excessive alcoholic consumption and post-necrotic cirrhosis caused by viral hepatitis. Cirrhosis also may be due to microorganisms or toxic substances and dietary deficiencies interfering with nutrition of liver cells. Associated irregularities are ascites, obstruction of blood circulation through portal veins with haematemesis, jaundice and enlargement of the spleen.

Coeliac disease

Normally the products of fat digestion are absorbed by the lacteals of the villi of the intestine. In coeliac diseased patients, especially the children, the intestine is unable to absorb fat. This is due to the damage of the intestinal lining caused by the protein gluten which is found in wheat and rye flour. As a result, excess of fat is excreted and the child fails to grow and thrive. This disease can be treated by giving the child concerned strictly gluten-free diet throughout life.

Colitis

This is caused by the inflammation of the colon due to infection caused by organisms such as *Entamoeba histolytica* (amoebic colitis) and bacteria (infective colitis). It affects young and early middle aged adults. Symptoms include abdominal pain and diarrhoea. Symptoms are; sometime blood-stained stool, abdominal discomfort, fever, watery diarrhoea and anaemia. It may vary in severity, from a mild form to dangerous illness. The condition may be fatal unless it is arrested early.

Constipation

This is a condition in which the bowels are opened too frequently and the faeces become dry, hard and difficult and painful to pass. Lack of roughage is a major cause of constipation. Roughage is indigestible material in the food consisting of cellulose and plant fibres. Its presence in food is important because it stimulates the muscular movements called peristalsis which propels food through the digestive system. This is due to insufficient food or fluid intake, sluggish or disorderly action of the colon musculature, problem in nerve supply or habitual failure to empty the rectum. The constipation also may be due to a blockage of the bowel by tumours. Laxatives and enemas are also used to alleviate the condition. In order to avoid constipation, regular food and more exercise are needed in addition to provide to more fluid and roughage in the daily diet.

CONSTIPATION MAY INDICATE THE FOLLOWING DISORDERS

Colonic carcinoma	Diabetes (autonomic neuropathy)
Hyperparathyroidism	Myxoedema
Extrinsic compression (pregnancy, ovarian tumours)	
Fissure	Anxiety/depression
Perianal abscess	Irritable bowel syndrome
Strangulated haemorrhoids	Codeine phosphate

Diabetes mellitus

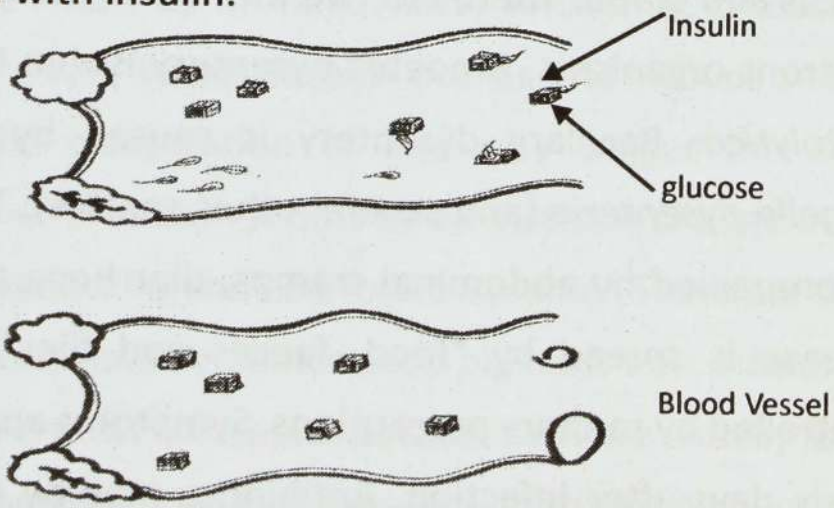
This is a condition in which the body is not able to satisfactorily process the digested sugar. The accumulation of sugar in the blood and urine is due to a lack of insulin produced by the pancreas. As such the sugar is not broken down to release energy. The regulation of blood sugar (glucose) level by insulin, which is a pancreatic hormone, produced in the (beta) cells of the Islets of Langerhans. Insulin initiates the uptake of glucose by the body cells and thereby controls the level of glucose in the blood. Glucagon, a hormone also plays an important part in maintaining the level of the body's blood sugar. It works antagonistically with insulin, by the breakdown of glycogen (polysaccharides stored mainly in the liver) to glucose in the liver. Glucagon is produced by the alpha cells of the Pancreas. Insulin is a peptide consisting of 51 amino acids. An increase in

glucose level in the blood stimulates the release of insulin, which causes the following effects: It changes the permeability of the cell membrane to glucose so that the diffusion of glucose is accelerated. It stimulates glycogenesis (conversation of glucose to glycogen) in liver and muscle. It inhibits glycogenesis (the breakdown of fats and proteins to carbohydrates) in the liver; and it promotes uptake of amino acids into the cells for protein synthesis. The insulin release also takes place due to the presence of food in the stomach, which stimulates the vagus nerve. Glucagon causes the following effects: The major site of action of glucagon is in the liver cells where it promotes the breakdown of glycogen by deactivating glucagon, acts as a hormone, having the opposite effect to insulin, in causing the breakdown of liver glycogen and the release of glucose into the blood. The control of blood sugar, where a change in its level automatically brings about the opposite effect is a good example of a negative feedback mechanism. Positive feedback mechanism is a disruptive process where product of a process causes further activation which causes even death. Underproduction of insulin causes diabetes, resulting in an increase in blood sugar (hyperglycaemia) and sugar appearing in the urine (glycosuria), which is one of the symptoms of diabetes. If glucose concentration of the tissue fluid is higher than the normal level of glucose in the blood (about 10 m mol. dm^{-3}) water would be lost from the tissue cells by osmosis. A blood glucose level below 03 m mol.dm^{-3} results in a decrease in blood

sugar (hypoglycaemia). The normal level of glucose in the blood is about 05 - 05.2 m mol. dm^{-3}. It is vital that level is maintained for the body to receive a constant supply of glucose for respiration. Both hyperglycaemia and hypoglycaemia can occur in people with diabetes mellitus. The major symptom of diabetes (hyperglycaemia) is a massive increase in glucose level in the blood. First, glucose from digested carbohydrates is no longer converted into glycogen or fat. Second, without insulin both fat and protein in the body cells tend to be broken down, yielding even more glucose. Fat breaks down into fatty acids and these are further broken down into poisons such as acetone and acetic acid. Some of the excess glucose in the blood is excreted from the body by the kidney as a part of urine. This also requires large amount of water and so the diabetic develops an almost insatiable thirst. In addition to these, many body cells can no longer absorb glucose and so their respiration rate slows down. Further symptoms include polyuria, loss of weight and the use of fats can produce ketosis and ketonuria. Unless the victim of diabetes is treated with insulin, he may become unconscious as a result of dehydration, acetic acid poisoning and a slow cellular respiration. The major symptoms of hypoglycaemia are: nausea, loss of concentration and cold sweats, leading eventually a loss of consciousness (coma). Type I or insulin dependent diabetes mellitus is that when a person is unable to synthesize insulin. It can be controlled by administrating insulin. There is a suggestion that diabetes may be due to viral infection that

causes the destruction of the beta cells in the Ilets of Langerhans. It appears that an inherited predisposition to this condition may be involved. Type II or non- insulin dependent diabetes mellitus in which the level of insulin and blood glucose are both high, suggesting that a high dietary intake of glucose leads to a level of insulin secretion. This can be controlled by reducing the carbohydrates in the diet, which in turn reduces both the glucose and insulin levels in the blood. It is probably due to the insulin secreting cells do not respond to the levels of glucose in the blood or that their ability to secrete insulin is reduced. In such cases, drugs can be taken to stimulate insulin secretion or to make the body cells more receptive to insulin. Treatment relies upon dietary control with doses of insulin or suitable drugs (Fig: 06). Long-term effects include thickening of the arteries, and in some cases the eyes, kidneys, nervous system, skin and circulation may be affected.

1. Glucose will enter the body tissues only when it is bonded with insulin.



2. Glucose will not enter the body tissue in the absence of insulin.

Fig: 06 Importance of Insulin

Duodenal ulcer

The commonest type of peptic ulcer, which is an infection in any part of the digestion tract exposed to pepsin (an enzymes secreted by the peptic cells of the stomach and which breaks down proteins into peptides). The ulcer or open sore formed due to abrasion or a break in the duodenum epithelium by the action of digestive juices, particularly the gastric juice. The ulcer causes pain in the upper part of the abdomen after the meal. Fried foods or spices, strong coffee or tea may cause such problem. This may occur in men after an age of 20, particularly in smokers. Drugs are available which heals the ulcer. Surgery is required only if there is no response to the treatment.

Dysentery

This is an infection and ulceration of the lower part of ileum and colon that causes severe diarrhoea with the production of mucus and blood. There are two forms of dysentery caused by different organisms. Amoebic dysentery is due to *Entamoeba hystolytica.* Bacillary dysentery is caused by the bacteria *Shigella dysenterie* (and several other species). This disease is accompanied by abdominal cramps, diarrhoea and fever. The disease is spread by "food, faeces and flies", and can be controlled by sanitary precautions. Symptoms appear from one to six days after infection. Antibiotics may be given and the recovery usually occurs within one or two weeks.

Gall stones

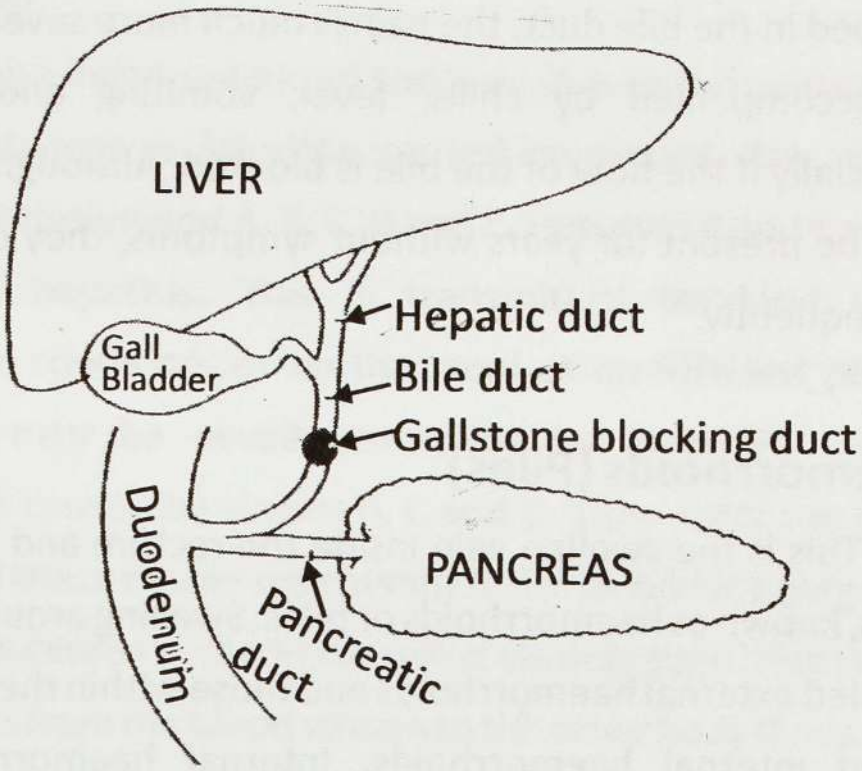


Fig: 07 Gallstones pass into the intestine and are excreted

These are the hardened stones of various sizes and composition that usually occur in some parts of the body. The gallstones are made up of mainly fatty substance, cholesterol and pigments, bile, blood, foreign bodies and various salts. A change in the composition of bile may trigger the stone formation. The formation seems to be due to a change in bile composition rendering cholesterol less soluble. There are three types of stones, namely cholesterol, pigment and mixed; the latter being the most common. Calcium salts are usually found in varying proportions. Sometimes the gallstones pass into the

intestine and are excreted (Fig: 07). If the stones become trapped in the bile duct, the pain is much more severe and may be accompanied by chills, fever, vomiting and jaundice, especially if the flow of the bile is blocked. Although gallstones may be present for years without symptoms, they can be fatal subsequently.

Haemorrhoids (Piles)

This is the swollen vein inside the rectum and around the anus, known as haemorrhoids or piles. Swelling around the anus is called external haemorrhoids and those within the rectum are called internal haemorrhoids. Internal haemorrhoids that protrude outside the anus are known as prolapsing haemorrhoids and can be especially painful. They are commonly caused by constipation or diarrhoea, especially in the middle and older age people, and may be exacerbated by a sedentary life style. They are more common in women, during pregnancy and after child birth. Symptoms are bleeding and painful. The treatment is by means of creams, injection and suppositories. In serious cases, they may be treated with sclerotherapy in which the affected area is injected with a solution that causes to shrink. In severe cases; surgery to remove the hemorrhoids may be necessary. Haemorrhoids reoccur, although treatment is usually successful.

Hepatitis

This the inflammation of the liver due to the presence of toxic substances or infection caused by viruses. The hepatic viruses are designated A, B, C, D and E. Hepatitis A and E causes infectious hepatitis. This is transmitted by food under unhygienic condition, or by the stool of an infected person. Recovery may be usually complete by immunity. Serum hepatitis is caused by viruses B, C and D. They enter the blood stream. All these viruses may persist in the blood for a long time. Hepatitis B causes a condition called chronic type. Hepatitis B virus enters from the blood stream to the other body fluids, such as saliva, semen, urine and tears. As the disease progresses, the liver may enlarge and become tender. The characteristic jaundice is caused by the accumulation of bile pigment in the blood that turns the skin and the white of the eyes yellow. The disappearance of jaundice generally signals the commencement of recovery from hepatitis A. But Hepatitis B virus however may persist for years or even lifetime. Acute hepatitis produces abdominal pain, jaundice, itching, nausea, and fever. Chronic hepatitis develops the same symptoms which may persist for long and lead to cirrhosis. Alcohol abuse, drugs treatment or overdose of drugs may cause these viruses to attack man. Various drugs are used to combat viral hepatitis including interferon.

Hernia

This is the protrusion of a bit of the intestine through a weakened muscle. Obesity and lifting heavy weights may be the risks factor. Most commonly, a hernia involves part of the bowel. Different types are named according to where they occur. Inguinal hernia occurs when a portion of the intestine pushes through into the inguinal canal, which is a weak spot in the abdominal muscle wall. The hernia causes a visible bulge in the groin or scrotum. This hernia affects men rather than women. Femoral hernia occurs in the part of the groin. Women of high obesity and those who had several pregnancies may have it as their abdominal muscles become weakened. Babies may be born with umbilical hernia, which develops behind the naval due to a weakened abdominal wall, the Umbilical hernia. Epigastric hernia: develops in the midline between naval and breast bone and more common in man. Incisional hernia may develop after abdominal surgery if there is a weakness around the scar. Hiatus Hernia: The stomach passes through the hiatus (a hole allowing passage of the oesophagus), from the abdomen into the chest. Reducible hernia is freely moveable and can be returned by manipulation into its rightful place. Irreducible hernia is opposite situation of the above. Incarcerated hernia is one which has become swollen and fixed in its position. Obstructed hernia is one involving the bowel. The contents of the hernia are unable to pass further down and are held up and obstructed. Strangulated hernia is the most dangerous type of hernia in which the blood supply has been out off, due to the

protrusion itself. This becomes painful and eventually gangrenous and requires immediate surgery as it is life-threatening. Although some measures are taken to control hernia or reduce its size, the usual treatment is by surgery - hernioplasty surgery, which is an operation to repair a hernia. Surgery depends largely on the size of the hernia, age and general health of the patient.

Peptic ulcer

Any erosion or open sore in the area of the digestive tract exposed to pepsin is said to be peptic ulcer. The peptic ulcers are the result of excessive secretion of pepsin that irritate the wall of the stomach (gastric ulcer), or duodenum (duodenal ulcer) or jejunum (jejunal ulcer). Natural weakness due to heredity symptoms in the wall of the stomach may contribute to this problem. Further more, it is caused by a break or distortion of the mucosal lining due to the action of acid and pepsin, either due to their high concentration or other factors affecting the mucosal protective mechanism.

Tonsillitis

Tonsils are the two small masses of lymphoid tissue situated on either side at the back of the mouth (the palatine tonsil). There are another pair occur below the tongue; they are referred to lingual tonsil. All these tonsils are part of body's

protective mechanism against infection. The inflammation of the tonsils caused by bacterial or viral infection is called tonsillitis. The symptoms include a severe sore throat causing pain during swallowing, along with fever, earache, especially in children. Treatment is by means of antibiotics, especially penicillin and erythromycin, along with analgesics for pain relief.

CAUSE OF SORE THROAT

Infective

Tonsillitis

-Bacterial, e.g. Sterptococcus, Gonococcus

-Viral, e.g .glandular fever

Pharyngitis

Fungal

Neurological

Gloss pharyngeal neuralgia

Referred pain

Angina

Oesophageal spams

Inflammat

-Thyroiditis (rare)

Neoplastic

Carcinoma

Tonsil

Posterior third of the tongue - Larynx

Lymphoma

Blood dyscrasias

Other

AIDS

Reflux oesophagitis

Ulcer

Ulcer is the presence of an erosion, or open sore in the area of mucous membrane (Fig.08). It is inflamed without the protective cover. If it penetrates a blood vessel, bleeding ensures. If the ulcer is in lining of a hollow organ, it can perforate through the wall. Ulcers may occur as bedsore on the lower back in those who are confined to bed for a long period. It may occur in the feet or legs associated with diabetes or varicose veins and in the digestive tract.

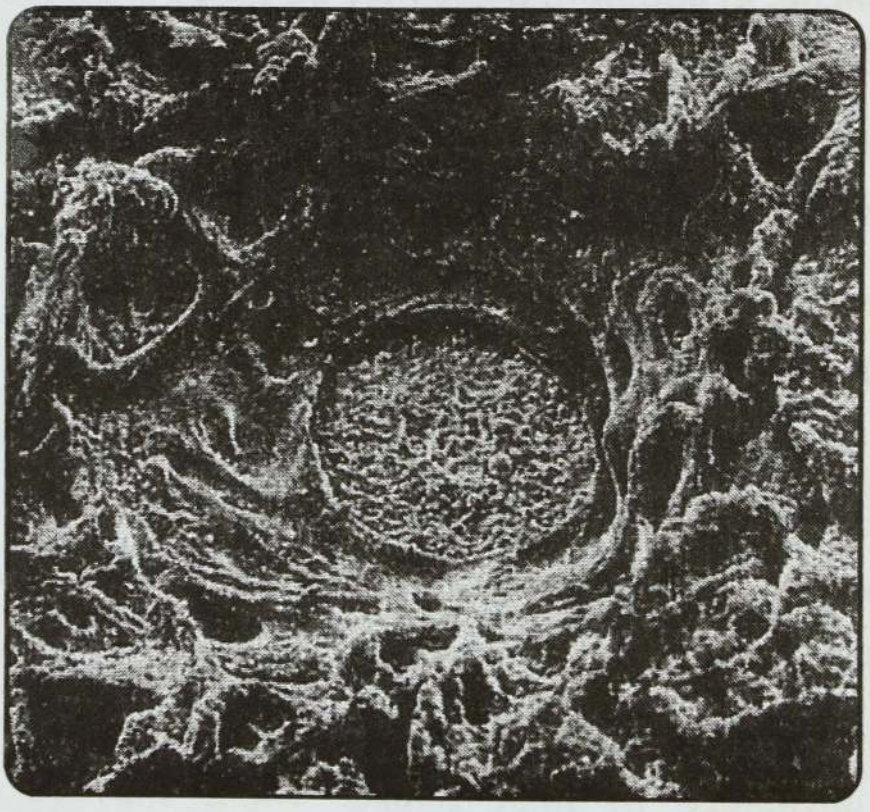


Fig: 08 Ulcer in the stomach wall

4. Environmental diseases

Heat exhaustion

This is a condition where a person is exposed to a hot environment for long period of time, causing loss of water, salt by sweating leading to electrolyte imbalance in the body fluids. The symptoms are pale and clammy skin, rapid and shallow breathing, rapid and weak pulse, nausea, weakness, dizziness or headache. In addition, there may be blood pressure and there may be muscular cramps. Treatment involves taking drinks of salt solution. This may be given intravenously to bring about acclimatization to the normal temperature.

Heat stroke (heat hyperpyrexia)

This is a state of collapse following exposure of the body to excessive heat characterized by a rise in temperature and failure of sweating and temperature regulation. Heat is a hidden onset of illness from exposure to high temperature, often by direct rays of sun. Physical exertion and high humidity contribute to the incidence of heat stroke. There may be a loss of consciousness, followed by coma and death, if heat stroke continues. The patient can be saved if he is taken back to mild temperature condition and by provision of suitable medication.

Sweating

The sweat glands produce sweat. The main function of sweating is regulation of body temperature. The sweat glands are found in the dermis of the skin and they project into the dermis. They are under the control of the sympathetic nervous system. They are abundant in the forehead, palm of hands and sole and feet and under arms. Sweat is produced by two types of sweat glands. The endocrine glands are found mainly in soles of the feet and palms of the hands. The apocrine glands are found in the armpits, around the anus and genitals. They produce sweat in response to stimuli such as fear and sexual arousal.

SWEATING ABNORMALITIES

Excessive sweating

Hypoglycaemia

Systemic infection

Malignancy

Brain tumours

Hodgkin's lymphoma

Deficient sweating

Heat stroke

Hypohidrotic ectodermal dysplasia

Sympathetic tract lesions

Endocrine

Phaeochromocytoma

Thyrotoxicosis

Carcinoid syndrome

Diabetis

Autonomic neuropathy

Menopause

Psychiatric

Anxiety states

5. Fungal diseases

Afla- toxic cancer

This is due to carcinogenic metabolites of certain strains of *Aspergillus flavus* which infect peanuts and carbohydrate food materials stored in warm humid climatic conditions. This is the cause for this cancer. Four major afla toxins are B1, B2, G1 and G2. Human liver cells contain the enzymes necessary to produce the metabolites of afla toxins, which predispose to liver cancer.

Athlete`s foot (ringworm)

This is a fungal disease caused by *Epidermophyton floccosum.* The fungus can cause irritation of any part of the body skin particularly occurring between toes often due to ringworm. They are parasitic or pathogenic on nails and skin in general. Athlete's foot is most common in adolescent males and infection is caused usually by walking bare foot on infected floor. Fungal diseases are spread by air bone spores by contact with infected floors and mats on which people walk bare-foot.

Candida

This is a fungal infection of mouth, intestine or vagina caused by an imbalance of the body by natural fungi. In the mouth it causes pimples and pustules. On the skin it causes

irritation. Itching is caused in vagina accompanied by cheese-like discharge. *Candida (Monilia) albicans* is a commensel of gastrointestinal tract of man. It causes infections and systemic disease due to the physiological and pathological status. Disease can result from distributed flora due to use of wide-spectrum antibiotics, steroids, immunosuppressive and/or cytotoxic drugs. Infection can occur in males and females and cause diseases such as diabetes mellitus or Cushing's syndrome. Oral infections can be due to poor oral hygiene, including caries teeth and ill-fitting dentures.

Ringworm infection

This is a contagious, fungal infection of skin. Ringworm often appears as round patches that forms red rings, and hence its name. The fungus is transmitted by direct contact with an infected person or by contact with contaminated object (especially clothes). Although ringworm is more of an inconvenience than threat, it is similar to other skin infections. It is more serious and therefore should be referred to a physician.

Thrush

This is a fungal infection caused by fungus *Candida albicans* which affects the mucous membrane of the mouth and vagina producing white patches. In children it forms a white patch and ulcer on the mouth and throat. Popular name given to a group of infection is known as Candidiasis.

6. General diseases

Alkalosis

This is due to the presence of an excessive concentration of alkali or bicarbonate in the body fluids. There will be an increase in the alkalinity (decrease in pH) of the body fluids, especially in the blood due to failure of the mechanisms which regulate the acid-base balance in the body. It may be due to the acid loss by vomiting, taking large amount of drugs or the formation of ulcer. Alkalis forms due to deep respiration after exerting heavy exercise. Symptoms are: muscular cramps and fatigue.

Euthanasia

This is instantaneously hastening the death of a person who is suffering from a disease that is painful, incurable and inadvertently fatal. But it should be of inducing or bringing a gentle and an easy death - a death without suffering. It is a form of "mercy killing", used deliberately by drugs to accelerate death. Deliberately taking off a life of another person, whether a person is dying or not, constitute manslaughter. On studying a number of cases in medical intensive care unit, it shows that different patients request for cessation treatment of their life with dignity. When a doctor switches off the life-support machine, it could be liable for aiding and abetting a suicide. If a patient voluntarily requests help to die, should doctors be

authorized to give such help directly by injecting the patient with lethal dose of morphine. The patient and/or their relatives should consent to euthanasia. However, it may be legal/illegal in the countries concerned.

Obesity

This is the results from excessive fat around the body, particularly in the subcutaneous tissue. Obesity results from the intake of food which is in excess of body's energy requirements. Obesity is the most prevalent form of diseases in affluent societies. Obesity is a medical and public health problem for people of any age-groups in developed countries. Obese people suffer an excess mortality. Obesity causes cardio-vascular disease, diabetes, hypertension, gall bladder problem, hernia and many other diseases. The most accepted means of determining what is a normal body weight or obese, is to use the 'Body Mass Index' (BMI) which is the body mass in kg divided by square of the height in metres. A BMI of 25 + (23+for eastern countries) indicates that a person is overweight and 30 + indicates obesity. Treatment involves a low energy diet. More drastic measures such as, stapling of the intestine may be useful.

Swelling

An organ or part of the organ becomes larger in quantity, increase in volume; resulting in expansion enlargement and bigger. The swollen part increases in mass inside, causing pain and sometimes irritation. The cause for swelling is varied, but

the functioning of the organ is not normal, due to some irregular physiological malfunction, tissue damage, trauma or allergy. Swelling indicates that the organ or part of the organ is not functioning as usual.

CAUSE OF LEG SWELLINNGS

Acute swelling

Trauma

DVT (Deep Vein Thrombsis)

Chronic swelling

Venous

Varicose veins

Obstruction to venous return, eg. pregnancy,

Pelvic tumours, IVC(Inferior vena cava)

Obstruction, postphelibitic limb

Lymph oedema

Congenital malformations, e.g. arteriovenous fistulae

Paralysis (failure of the muscle pump)

Dependency

General

Congestive cardiac failure

Hypoproteinaemia. in liver failure, nephritic syndrome, malnutrition

Renal failure

Fluid overload

Myxodema

7. Genetic diseases

Colour blindness:

This is a condition in which certain colours cannot be distinguished due to a lack of one or more colour absorbing pigments in the retina. There are three types of cones in the human retina; each possessing a different pigment, which absorbs light of a different wave length. These are red, green and blue cones. Different colours and shades are produced by the degree of stimulation of each type of cone by light reflected from an object. Equal stimulation of all cones produces the colour sensation. Colour vision is a result of differential stimulation of the three types of cone so that the colour seen results from differential excitation of the three types of cone so that the colour seen results from differential excitation of the three types of cone. This is according to the trichromatic theory of colour vision which suggests that all colours can be produced by mixing of blue, green and red. In human the most common example is red/green colour blindness which can be considered as being controlled by locus on the X-chromosomes (although at least two closely linked loci are known to influence the character). The "normal vision" allele is dominant to the "colour blindness" allele, colour blind females must therefore be homozygous for the colour-blindness allele while male will be

affected, if they carry only one colour-blindness allele. Consequently, colour blindness is more common in males than females.

Down's syndrome (formally called Mongolism)

This is a syndrome created by a congenital chromosome disorder, in which there is generally severe mental sub-normality and facial characteristics, resembling the Mongoloid races. The chromosome abnormality is of two types: (1) abnormal division of chromosomes 21. This results in an extra chromosome instead of normal pair, producing 47 chromosomes in each body cell. The infants of 47 chromosomes are often borne in elder mothers. (2) Structural abnormality involving chromosome 21, with a total number of 46 chromosomes, one of which has an abnormal structure as the total of special translocation. Such infants are usually born to young mothers and there is a higher rise in recurrence in subsequent pregnancies. The main features of the syndrome are: mental retardation, short stature with stubby fingers, characteristic slanting eyes (hence "Mongolism") and heart effects. The abnormality arises in mother's egg as a rule, with older mothers having a far high chance of producing abnormal ova than younger mothers. This may be because the mother's eggs have been part-way through Prophase 1 of Meiosis since birth. This results in the eggs of older mothers at a risk of non-disjunction (failure of chromosomes to go to opposite poles

during nuclear division, leading to an unequal number of chromosomes in the daughter cells). Then the non-disjunction produces abnormal numbers of both autosomes. Non-disjunction takes place in elder mothers than those of the younger mothers. Down's syndrome occurs once in about 600 to 700 births. Some may live beyond middle age, but many may die at infant stage. Thus their life expectancy is reduced. The incidence increases with the age of the mother from 0.04% of children to women under 30 years of age to 3% to women at the age of 45.

Edward's syndrome

This is a human genetic abnormality in which there is multiple congenital malformations; such as elongated skull, low-set ears, webbed neck and severe mental retardation. This condition is caused by Trisomy of chromosome 18. (Trisomy is a state in which a diploid organism has three chromosomes of one type in a cell or in all cells). The condition is related to maternal age; 90% of cases die in the first six month after birth.

Favism

This is a condition in which there is a deficiency of the enzyme glucose-6- phosphate dehydrogenase found in the red blood cells. The trait is being controlled in a X- linked gene. This is rare in most caucasian population but more common in black

population. This disease is characterized by destruction of red blood cells, resulting in severe anaemia. The disease is triggered by the consumption of raw broad bean *(Vicia faba)*, inhalation broad bean pollen or several other chemicals such as Naphthalene (found in moth balls). Since the condition is sex-linked, it is more prevalent in males, although heterozygous females can be shown to have a deficiency of dehydrogenase enzyme. The defective gene responsible for this character appears to persist in populations where it occurs. As such the defective gene confers increased resistance to Malaria. Favism is found in American Negroes, Yemenite Jews in Isreal and in some people living in the Mediterranean region and Iran.

Genetic disorder

This is a disease or malformation that may be passed from one generation to another. In some cases, the link is clearly established. In others, the association is established only by observation, as the tendency of a particular condition to occur in succeeding generations of the family. In some cases the allele of same gene carried on homologous chromosomes do not bear a simple dominant/recessive relationship to each other. Sometimes they exhibit incomplete dominance or co-dominance. In some cases more than one gene affects a single phenotypic character. In these cases genetic interaction occurs. Genes that are found on the same chromosomes are said to be

linked, as such the genes cannot assort independently in the normal way. In chromosomes translocation (transfer of genetic material between homologous chromosomes), inversion (gene order changes), deletions (lose of segment of chromosomes), duplication (portion of chromosomes duplicates) are present in multiple copies. When genetic disease occurs in a family or an individual it is important that the relevant members of the family receive Genetic counseling. The counsellor's main task is to establish or confirm the diagnosis; assess the genetic implications of this and compute the risk of the disorder to off-springs or siblings. The individuals concerned must be made aware of the options for dealing with the risk and should be helped to choose an action which seems appropriate to them. To be really successful the counsellor must also be very sensitive to the difficulties in imparting medical information in a non-directive way and must be aware of the psychological consequences of genetic disease. Effective communication between the counsellors and those counseled is obviously essential and it is important that the problem is dealt with in a sympathetic and unhurried manner. When prenatal diagnosis is under consideration the genetic risk may become secondary to the concern about the interruption of a pregnancy and the emotional, religious or ethical price to be paid for this. The counsellor must try and help families come to terms with this uncertainty and the counseling, although remaining non-directive must be tailored to meet individual needs.

Haemoglobinopathy

This is an inherited disease in which there is an abnormality in the formation of Haemoglobin A. In 300 million molecules of haemoglobin occur in each red blood cell with each molecule binding to a maximum of four oxygen molecules. In mammals the foetal haemoglobin (H b F) has a different polypeptide combination from that in postnatal haemoglobin (H b A), consisting of two alpha and two gamma chains, with different oxygen carrying capacity (up to 30% at low oxygen tension). An altered beta chain in H b A produces sickle-cell anaemia, in which defective Haemoglobin molecules (H b) cause the red blood cells to have a twisted sickle shape. Likewise, Thalassaemia or Cooley's disease, is a type of human anaemia in which deficiency of either alpha or beta Haemoglobin chains occur. This causes severe anaemia, bone marrow abnormalities and enlargement of the spleen.

Haemophilia

This is a rare human blood disorder in which the blood clotting is deficient, resulting in prolonged bleeding from wounds and from other tissues. There are two types of haemophilia due to a deficiency of either one of the two coagulation factors in the blood. Haemophilia A is caused by deficiency of factor VII (Antihaemophilic globulin AHC). Haemophilia B is caused by deficiency of factor IX

(chromosomes factor, plasma thromboplastin). It is a sex-linked recessive condition carried on the X- chromosome and hence it affects males with females being the carriers. In the past the survival rate was rather poor. However the condition is improved by infections or infusion of plasma containing the missing coagulation factor. By this way the sufferer can live for longer period. Haemophilia A is by far the most common form of disease (about 80%) and can be treated by transfusion of AHG.

Klinefelter's syndrome

This is a genetic imbalance in males in which there are 47 chromosomes rather than 46. The extra is an X chromosome producing a genetic make up of XXY instead of XY. The affected individuals are male showing sex determination role of Y chromosomes. About one in 1000 males are affected by this condition. This arises from non-disjunction in one or other parent, more probably the female where there is a distinct positive age effect (as in Down's syndrome). The physical manifestations are: much reduced fertility, small testis (which atrophy resulting in lack of sperm production), and a number of female secondary sexual characteristics, such as absence of breasts, absence of facial or body hair and with long thin legs. They may be associated with mental retardation and pulmonary disease.

Linkage problem

Genes that are found on the same chromosome are said to be linked if they occur close to each other. These genes are thus likely to be inherited together with the characteristics that they represent. This is because the linked genes are more likely to be together. Such genes cannot assort independently in the normal way. When considering the inheritance of two pairs of contrasting character we would expect a 9:3:3:1 dihybrid ratio (according to the Law of Independent Assortment). However, when the two pairs of contrasting characters are carried on one pair of chromosomes, the 3:1 monohybrid ratio is obtained. All the alleles (one of the alternative forms of gene) on the same chromosome are said to be linked; when they move together from generation to generation. Linkage is the association of two or more alleles so that they tend to be passed from generation to generation as an inseparable assortment. Common examples of recessive alleles linked to the X chromosome are red/green colour blindness, haemophilia and premature balding. The female who are heterozygous for a characteristic carried on the X chromosome are carriers of sex- linked traits. They appear phenotypically normal but half of their gametes carry the recessive genes.

Marfarn's syndrome

This is an inherited disease affecting the connective tissue producing defects in the skeleton, heart and eyes. Due to effect on skeleton, the person is abnormally tall and thin, having spindle shape elongated fingers, toes; spine and chest show deformities with weak ligaments. Heart defects include a hole in the septum separating the right and left atrium, artrial septal defects and narrowing of the aorta. The lens in the eye becomes partly dislocated.

Sickle-cell anaemia

This is a type of inherited, haemolytic anaemia that is genetically determined and which affects people of African ancestry. It is caused by a recessive gene and is manifested when this gene is inherited from both patients. The condition is controlled by a single autosomal gene on chromosome 11, with two alleles S and s. The mutant haemoglobin has one amino acid alteration in its beta chain; number six having changed from Glutamic acid to Valine, possibly as a result of substitution mutation. Sickle cell anaemia has S/s genotype, while heterozygote (S/s) has a condition called sickle cell "trait" with a tendency for their blood to sickle at low oxygen tension. A sickle cell contains a mutant gene which crystallizes heamoglobin in the erythrocytes of human blood and distorts them causing the blood vessels to clog. There are large areas of Africa and Asia

where the gene occurs-single dose in 15-20% of the population and even with 40%. Clearly the gene is not being removed from the population. It is concluded that in some way H b S confers an advantage over the normal H b s gene. The answer lies in resistance to malaria. Children with H b S have been shown to have a 25% better chance of surviving malarial attacks than those with normal genes. Therefore it is thought of offering some resistance to the development of malarial parasite.

Turner's syndrome

This is a genetic disorder affecting female in which there is only one X chromosome, instead of the usual two. In this chromosomal abnormality the individuals has 45 chromosomes; 44 autosomes and one X chromosomes. The main features of syndrome are: (a) a female phenotype but little or no secondary sexual characters - infertile, ovaries are absent, menstruation is absent, breast and body hairs do not develop, (b) broad shield like chest with shortness, webbed neck, affected heart, deafness, and (c) slight mental retardation. This suggests that in sex determination in a single X - chromosome produces a female and the normal maleness (with XY) is not due to the possession of a single X chromosome but rather to the presence of a Y - chromosome. In normal cases, X chromosome is the sex chromosome present in the male and female although women have a pair and men just one with Y chromosome. Y chromosome carries a dominant gene having 22 matched

chromosome pair and one unattached pair comprising one X and one Y chromosome. During sexual reproduction the mother contributes one X chromosome, but the father contributes one X and Y chromosomes; XX produces a female offspring, XY male. But during disorders the chromosomes may vary.

Von recklinghausen's disease (Neurofibromatosis)

This is a congenital disorder in which soft tissue tumours form along nerves and beneath the skin. In addition to these, other anomalies such as decalcification of bones, fibrosis of the lungs and formation of kidney stones may occur.

8. Hormonal diseases

Acromegaly

Excessive secretion of growth hormone of the anterior pituitary gland during the early years of life, produces a condition called gigantism; the child grows to giant size. The individual's bones - particularly face, hands and feet enlarges gradually but strikingly, often changing the person's appearance enough to make him almost unrecognizable. Excess growth hormone tends to produce blood glucose (hyperglycaemia or "Pituitary diabetes"). Acromegaly involves growth of connective tissue, including bones, after the epiphyseal plates have ossified. The effect mainly involves increased diameter of all bones and is most strikingly apparent in the face and hands. Many pituitary patients also develop acromegaly later in life. If the over secretion of the growth hormones takes places after maturity (that is when the bones have ceased to grow in length), the enlargement of the hands, feet, lower jaw and some of the internal organs will take place. Normally, the growth-hormone secretions are controlled by heredity and some racial groups or families to be taller than others.

Addison's disease

This disease is caused by a deficiency of adrenocorticosteroid hormones (cortisone and osterone) produced by cells of the Adrenal gland cortex. This is named after Thomas Addison (1793- 1860) an English physician. In mammals there is a pair adrenal gland situated anterior to the kidneys. The adrenal gland is consisting of a medulla (central part) secreting adrenaline and noradrenaline and a cortex (outer zone) secreting adrenal cortical hormones. The activity of medulla is controlled by the sympathetic nervous system and that of the cortex by Adrenocorticotropic hormone secreted by the Pituitary gland. Cortisone, a glucocorticoid hormone secreted by adrenal cortex, whose function is to combat stress. Aldosterone, the other hormone of the cortex of adrenal gland is responsible for the relative concentration of sodium and potassium ions in the body. Addison's disease is caused by failure of adrenal cortex to secrete adrenocortico hormone because the adrenal cortex has been damaged. The symptoms of the disease are wasting, weakness, low blood pressure and dark pigmentation of the skin. Further symptoms may include weight loss, dehydration and nausea. A complete care can be affected by replacing the deficient hormones with hormone replacement therapy.

Cretinism

Hyposecretion of thyroid hormone during the early years of childhood leads to a disease called cretinism; congenital hyperthyroidism and malformed dwarfinism are victims of cretinism. Their metabolic rate is slow, and frequently shows the signs of retarded mental, physical and sexual development and coarseness of skin and hair. Early diagnosis and treatment with thyroid extract (thyroxine) greatly improves this condition in the development of intellectual and other abilities. Usually the blood serum from new born babies is tested for thyroxine level to detect this condition.

Cushing's syndrome

This is a metabolic disorder which results from excessive amount of corticosteroids in the body due to an inability to regulate cortical or adrenocorticotropic hormone secreted from anterior lobe of the Pituitary. The commonest cause is a tumour of the Pituitary gland or a malignancy elsewhere in lung or adrenal gland. Symptoms include obesity; reddening of face and neck, growth of body. The most noticeable features are the so called moon face and buffalo hump that develop due to redistribution of body fat. In addition, there is growth of facial hair, osteoporosis, and high blood pressure and possible mental disorder. This requires expensive corticosteroid drug therapy. For some reasons, many more women than men develop Cushing's syndrome.

Diabetes insipidus

This is due to insufficient secretion of the antidiuretic hormone by the posterior pituitary gland. It causes an excess secretion of urine. This is diuresis, the characteristics of the disease called Diabetes insipidus. Symptoms: increase in the amount of urine excreted.

Dwarfism

This is a form of body malfunction in which the adult does not reach the normal height and sometimes have other abnormalities. There are several causes including malfunction of Pituitary and Thyroid glands. Rickets also may be responsible for dwarfism. If Pituitary dwarfism is diagnosed sufficiently early, treatment with growth hormone can help. If there is a defect in Thyroid gland secretion, this can be alleviated accordingly.

Gigantism

This is the abnormal growth which is a rare human condition in which excess production of growth hormones by the anterior Pituitary gland takes place during childhood and adolescence. It causes over-elongation of bones, and producing Pituitary tumour. Control of excessive production of growth hormone from anterior pituitary gland can remedy the situation.

Goitre

This is the swelling of the neck due to Thyroid gland, the enlargement during Iodine deficiency. The Thyroid gland tries to counteract the lack of dietary iodine, necessary to produce the Thyroid hormone by increasing the out put, thereby becomes larger. Hyperplasia and auto-immune diseases arise when antibodies are produced against antigen in the Thyroid gland.The enlargement of the thyroid gland as a swelling at the side or front of the neck. Enlarged gland secretes an excess of thyroid hormone. The swelling is the result of futile attempt of the gland to produce more hormone by enlarging the cells within the gland. The patient is nervous; experiences loss of weight, and often has palpitation. Among the chief symptoms are increased metabolic rates, a very rapid heart beat and nervous excitability. Goitre may be caused by a diet deficiency in iodine which is necessary for the production of thyroid hormone; or by excess of foods that inhibit the production of thyroid hormone, such as cabbage or Soya or by a cause unknown.

CAUSE OF GOITRE THYROID GLAND ENLARGEMENT

Simple (non-toxic) goitre	**Neoplastic goitre**
Simple hyperplastic goitre	Adenoma
Multinodular goitre	Papillary
	Follicular

Toxic goitre

Diffuse goitre (Grave's disease)

Toxic nodule

Toxic multinodular goitre

Anaplastic

Medullary

Inflammatory

De Quervain's thyroiditis

Riedel's thyroidditis

Autoimmune

Hashimoto's thyroiditis

Grave's disease

This is a disorder typified by the over activity of the thyroid gland or secretion of excess of thyroxine (Hyperthyroidism) due to enlargement of the gland. This is an example of antibody production and probably an auto-immune response (resulting from the production of antibody by the body which attacks its own tissues). The patients commonly exhibit high metabolism, nervousness, tremor, hyperactivity, rapid heart rate, an intolerance of heat and breathlessness etc. Treatment involves taking up drugs to control thyroid's hormones, surgery to remove a part of the thyroid, or radioactive iodine therapy.

Hyperthyroidism

This condition indicates any of the disorders that involves over activity of the thyroid gland. Hyperthyroidsm occurs when the thyroid is no longer sensitive to this regulatory mechanism. This is to say that thyroid hormone is produced even in the absence of thyroid stimulating hormone, thyrotrophic hormone secreted by the anterior lobe of the pituitary gland. Excess of thyroxine inhibits the production of TSH - an example of a negative feedback mechanism. It may be caused by the presence of a tumour or due to Grave's disease. Over production of thyroxine (hyperthyroid) results in exophthalmia goitre, where the thyroid and the neck swell and the eye balls protrude. Those who are affected become restless and overactive, lose weight and have an accelerated heart rate. Deficiency or excess of iodine in the diet causes malfunction of the thyroid gland. Hyperthyroidism can be treated with a variety of medications, depending on the specific condition.

Hypoglycaemia

This condition is due to lack of sugar in the blood. This occurs during starvation and during the disease, Diabetes mellitus, when too much insulin is given or less carbohydrates is eaten. Symptom includes weakness, sweating, light headache and tremors and can lead to comma. The condition can be improved by taking in more glucose either by mouth or injection.

Hypothyroidism

This is a condition caused by the under activity of the thyroid gland. The insufficient production of thyroid hormone is due to congenital defect, inflammation of the thyroid gland or a deficiency of thyroid-stimulating hormone. Hyposecretion of thyroid hormone during the early years of childhood leads to a disease called Cretinism. If the thyroid functions normally during the growing years and then it starts to produce too little of its hormone, the disease Myxoedema results. Symptoms are, low metabolic rate, lessened mental and physical and hair fall. Those who suffer from hypothyroidism tend to be overweight, easily tired, intolerant to cold, and suffer dry hair and dry skin.

Myxoedema

This is a condition occurring in the adults due to under secretion of thyroxine. Symptoms are, decrease of metabolic rate, an increase in subcutaneous fat, a coarsening of the skin and mental and physical sluggishness. This condition is caused by deficiency of thyroid hormones. Treatment consists of giving thyroid hormone in suitable amounts.

9. Immunity diseases

Allergy

This is hypersensitivity due to a particular substance (allergy) in man. The antibodies present in the blood stream destroy the particular antigens (allergens). In affected person this reaction causes cell damage, releasing histamine and bradykin, which causes allergy reaction. It is activated against the antigens which would not normally produce an adverse response. This altered or exaggerated susceptibility is due to various foreign substances or physical agents such as drugs, insect bite, urticarial reaction, hay fever or asthma.

Autoimmune disease

This is a condition resulting in production of antibodies of the body which attacks its own tissues. For reasons not understood fully, the immune system loses the ability to distinguish between "self" and "non-self". The immune system thus mistakenly interprets their body's own tissue as foreign and attacks their tissue and destroys them. Example: glomerulur nephritis, rheumatoid arthritis in the joints. Treatment: use of immunosuppressants and corticosteroids to block the antibody production. Non-steroid anti-inflammatory

drugs can treat symptoms, such as pain and stiffness. Another example: Systemic lupus erythromatosis (SLE) is an auto immune disease that can attack many different parts of the body and produces a great variety of different symptoms such as joint and muscle pain.

Food allergy

Excessive sensitivity to a particular food is referred to as food allergy. In a normal person, antibodies present in the blood stream and destroy their particular antigens (allergens). A food allergy exists when the immune system reacts to a particular food or to a substance in the food by manufacturing antibodies. The foods that most commonly trigger an immune system reaction are dairy products, sea food, chocolate, tomatoes, strawberries and citrus fruits. The food reaction is usually manifested by the disorder of the digestive system are, cramps, nausea, vomiting or diarrhoea. In addition to these, rash, nasal congestion; headache or severe response anaphylaxis, shock may also be the symptoms.

Hay fever

This is an allergy reaction to pollen of grasses, trees and many other plants. Hay fever causes watery eyes, sneezing, etc. due to inflammation of the mucous membrane of the eyes and

nose. Treatment is by means of injecting antihistamine drugs. Treatment is also by means of injecting or exposing the individual to be controlled and gradually increasing doses of the allergen until antibodies are built up.

Immunodeficiency disease

Immunodeficiency disease is the complete or partial failure of the immune system, which is the natural defence system against diseases. Immunity is the way in which the body resists infection due to the presence of antibodies and white blood cells. Antibodies are generated in response to the presence of antigens of a disease. Active immunity takes place when the body produces antibodies and continues to do so, during the course of a disease whether occurring naturally (also refer to as acquired immunity) or by deliberate stimulation by the use of treated antigens (vaccination or inoculation). Passive immunity is short-lived and due to the injection of ready made antibodies from someone who has already the immunity. Cell mediated immunity is when T lymphocytes-dependent responses, which cause graft rejection, immunity to some infectious agents and tumour rejection. Humeral immunity from immunoglobulin is produced by B-lymphocytes. Immunity can be innate (from inherited qualities), or it can be acquired actively, passively, naturally or artificially. Passive immunity is acquired naturally when maternal antibody passes

to the child via placenta or by the milk or artificially administrating sera containing antibodies from animals or human being. Whenever the body is exposed to a foreign element, an antibody is fashioned and designed to surround and disable it. Once the antibodies have been produced; they not only fend off the attack, but also remain in the blood to protect against the next attack. So effective are these antibodies, that a second attack seldom occurs. Some diseases require so called 'booster shots', because antibody are known to lose effectiveness after a time. In the case of transplant, there is an attempt to destroy the intruder, making it necessary to introduce drugs to suppress the immune system. Such drugs present an additional hazard of leaving the body open to infection by other organisms that are not beneficial. Transferred blood must be of the same type as the same as the recipient's blood so that the immune system will not destroy it. Infection such as measles or flu reduces the white blood cells involved in fighting the infection. Usually this type of immunodeficiency is mild, and the immune system returns to normal once the infection is overcome. A mild form of immunodeficiency may develop in some chronic disorders including Diabetes mellitus and Rheumatoid arthritis. These diseases put stress on the immune system, reducing its ability to resist other diseases. Certain type of cancer, particularly tumours of lymphatic system (lympomass) may cause a more severe form of immunodeficiency by damaging the cells of

immune system and has inevitable effect of causing immunodeficiency. Chemotherapy can damage the bone marrow, where the majority of blood cells are made, and may also lead to the development of acquired immunodeficiency. Immunodeficiency may also develop after removal of spleen, an organ in which some of the white blood cells are produced. The effect of immunodeficiency can usually be controlled by low doses of antibiotics, antiviral and\or antifungal drugs and various immunization. In acquired immunodeficiency Syndrome (AIDS), the virus (HIV) destroys a particular type of white blood cell, the T cell and this causes progressive weakness and vulnerability of immune system.

Myasthenia gravis

This is a serious and chronic condition which may be an auto-immune disease. There is a reduction in the ability of the neurotransmitter, acetylcholine to effect muscle contraction. There is a weakening which affects skeletal muscles and those organs used for breathing and swallowing etc. It seems the body produces antibodies which interfere with acetylcholine receptors in the muscle, and that the Thymus gland may be the original source of these receptors. Surgical removal of the Thymus gland is one of the treatments, or to use of some drugs to suppress the production of antibodies which interferes with the receptors.

10. Microbial diseases

AIDS

This refers to Acquired Immune Deficiency Syndrome. This disease was first recognized in Los Angeles (U.S.A.) in 1981. The causal agent was identified in 1983 as the Human Immunodeficiency Virus (HIV) (Fig. 09). This is a Ribonucleic acid (RNA) - Retrovirus. The virus has been found in semen and cervical secretions of the affected person. The virus is mainly transmitted by sexual activity. The HIV virus affects the T-Lymphocytes of immune system and leaves the patient increasingly unable to resist certain infections and tumours which are particularly associated with AIDS. Thus the AIDS is a serious human disease that can destroy the body's natural defence system and cause death through the body by becoming unable to fight any infection. The level of response to infection varies between different people. It is not everyone who carries the virus develops AIDS. However all infected individuals can pass it on to others. There are three main methods of infection namely, through sexual intercourse, by blood transfusion or by needles or blades contaminated with infected person's blood. At present there is no vaccine against the AIDS virus or any drug to destroy it. To avoid AIDS infection, one should be sure that he/she has sex with an unaffected person or to use male sheath (condoms) during sexual intercourse.

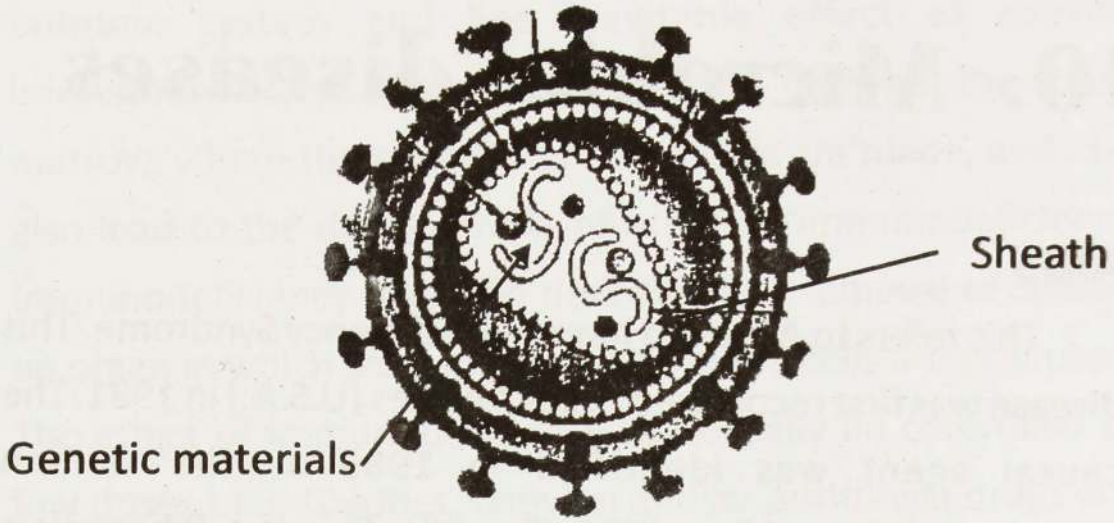


Fig: 09 HIV

Anthrax

Anthrax is a rare bacterial infection by the anthrax organism, which produces patent toxins (poisons). Transmission is through direct contact with infected animals. It usually occurs in farmers, butchers and dealers of wool and animal hides. The spores of the organism which are extremely hard and withstand extremes of temperature and humidity, can be ingested (swallowed) or inhaled. The disease affects the skin, respiratory and/or gastrointestinal systems. The problem is that symptoms of anthrax are often difficult to distinguish from those of cold, flu or food poisoning. There a is vaccine against anthrax, The vaccine is reported to give 93% protection against anthrax. This is a serious infectious disease of cattle and sheep, but can be transmitted to man. It is caused by a bacillus

Bacillus anthracis. This is transmitted to man by inoculation, inhalation and ingestion, causing malignant pustule. The spores of this organism which is extremely hardy and withstand extremes of temperature and humidity can be ingested (swallowed) or inhaled. The disease affects the skin, respiratory system and/or gastrointestinal system. It affects the spleen in cattle and sheep, caused by toxins released from the bacterium. The disease can spread to human when infected animal products such as wool and bristles are inhaled, giving rise to malignant skin lesions and pustules. The disease takes two forms in man. It affects the lungs when spores are inhaled causing pneumonia (Woolsorter's disease) or affects the skin if infected through a cut. In either case, they grow as a malignant pustule, a severe ulceration. Treatment: Anthrax patients can be cured with antibiotics, but provided the diseases is spotted quickly enough, especially in respiratory or intestinal infections It is fatal, although it is usually successfully treated with Penicillin and Tetracycline antibiotic drugs. There is a vaccine against Anthrax, but it does not give permanent protection. Booster shots are needed, and can have side effects. Pregnant women should only be vaccinated if absolutely necessary. Preventive measures also include prophylactic immunization of cattle and man.

Bird flu (Avian flu)

This is a serious bird's disease particularly in Vietnam and adjoining countries. H5N1 virus is the cause for this disease. This disease appears in man after eating the birds (chicken) infected by the virus. The spread is very much prevented by strictly preventing import and export of birds and chicken. If the avian flu virus, mutates, a new pandemic flu virus would be formed, that can be transmitted from human to human. There have been less than 200 cases of death from Avian Flue in Asia. However, The World Health Organization has warned that a worldwide pandemic is imminent and that up to 7.4 million people will die from it. The warning that a human-to-human type of avian flu is emerging and it could affect millions. The health authorities worldwide have prompted many governments to stockpile drugs that can treat the diseases. As more cases of avian flu are reported, and the public's concerns increase, one can expect more demands made on governments to ensure supply of the drug, and for local production or importation of local production or importation of cheap generic versions. However, supply cannot match demand, and there is renewed concern over the role of patents in restricting access to badly needed medicines.

Bronchitis

This is due to the inflammation of the bronchi. Primary infection is by virus, occurring in children. Secondary infection occurs with bacteria, commonly *Streptococcus pneumoniae or*

Haemophilus influenzae. In simple chronic bronchitis the bronchial mucous glands are hypertrophied and the patients only complain of cough of mucous sputum. Acute bronchitis is usually an acute exacerbation of chronic bronchitis. In chronic obstructive bronchitis, the bronchial mucous membrane has so hypertrophied, that the bronchial lumen is narrowed, causing air flow obstruction, resulting in wheezing and leading to respiratory insufficiency. The acute form is typified by symptoms of the common cold initially, but develops with painful coughing, wheezing, throat and chest pains and the production of purulent (pus containing) mucus. If the infection spreads to bronchioles (bronchiolitis) the consequences are even more serious, as the body is deprived of oxygen. Antibodies and expectorants can relieve the symptoms. Chronic bronchitis is identified as a common cause of death among elderly. The additional causes are; excessive smoking, cold, damp climate, obesity, respiratory infections. Such complications in bronchi give rise to constant breathlessness. Drugs are ineffective in treatment of the chronic form.

Chicken pox

This is a highly infectious disease, which mainly affects children. This is caused by *Varisella zoster* virus. Symptoms appear within 24 hours as an itchy rash appearing on the skin, consisting of fluid-filled blisters. The childhood attack gives life long immunity that the disease is uncommon in adult hood. The disease is spread by contact with infected person or by contact

of anything that has been contaminated by an infected person. The blisters that appear throughout the body burst and form a crust that disappear eventually. Treatment is not required except to minimize the pain by chemotherapy and by use of Calamine lotion to reduce itching.

Chikun - gunya

This is a disease caused in man, caused by vector, *Aedes* mosquito. It causes high temperature, unless, joint pain and fatigue.

Cholera

This is an infectious disease of small intestine caused by bacterium, *Vibrio cholera.* The disease causing organism is spread through contaminated drinking water, by flies landing on infected material and by affected person's faeces. The incubation period is from one to five days. The symptoms are fever, vomiting, abdominal cramps, diarrhoea and dehydration. Up to 15 litres of fluid may be lost from the gut resulting in extreme dehydration and even death. Overcrowding and unsanitary conditions may promote the disease, especially in rural areas. Cholera is endemic in certain third world countries where the natural resistance of the inhabitants is impaired, particularly by malnutrition. Treatment involves bed rest and the replacement of lost fluids and salts by mouth or

intravenously. Tetracycline or other Sulphonamide drugs are given to kill the bacteria. The death rate is low (5%), if prompt treatment is adhered; however the risk is greater in children and elderly. Vaccination against Cholera is available, but effective only for about six months.

Cystitis

A painful inflammation of the bladder caused by infection with gut bacterium, *Escherichia coli.* Symptoms include, pass of urine frequently, accompanied by a burning sensation, cramp like pain in the lower abdomen with dark urine which contains blood. There is a danger that the infection may spread to kidneys. The condition is common in females. Treatment is by means of antibiotics and by drinking lot of water. As the urethra is much shorter in women than in men, the gut bacteria which are harmless in the bowel, are able to gain access to the urinary tract and vagina.

Dengue

This is caused by a virus. This is transmitted by the bite of an infected mosquito, *Aedes aegipti.* The dengue mosquito usually bites the man during day time especially in the morning and evening. The virus is present in the peripheral circulation during the initial stages of the disease, that is 3-5 days, also for about a day previous to onset. Hence the mosquito vector must bite the

patient during this period of time in order to become infective. Symptoms of Dengue fever are high fever, headache, rash on the face, trunk and extremities, muscle and joint pains, nausea and vomiting. The symptoms subside in about 3-4 days and patients recover subsequently. Some may progress to Dengue haemorrhagic status. Symptoms of Dengue haemorrahgic fever (DHF) are: Symptoms similar to Dengue fever, haemorrhagic manifestations, petechial rash, bleeding from nose, bleeding gums, brown and black coloured vomitus or faeces, severe and continuous stomach pain and enlargement of liver. If these symptoms appear, immediate hospital treatment is necessary. The fever may suddenly go down in a patient with DHF. But if the patient still feels ill, it may be a sign of shock. In the patient of Dengue shock syndrome (DSS), the following symptoms can be observed: Coldness of body, paleness of the body, restless and drowsiness, acceleration of breathing and increase in pulse rate. These indicate worsening of diseases. The patients should be given full rest, and plenty of fluid to drink, refrain from giving Asprin or any drug containing Salycilates, but can be given only Paracetamol in correct dosage, and the patient should take treatment immediately from a hospital/qualified medical practitioner. Eliminating the breeding places of mosquito, such as containers, stagnant water, water storage etc. could prevent dengue fever.

Diarrhoea

Loose motion of the bowel with unusually soft faeces. Diarrhoea may be caused by food poisoning, colities (inflammation of the colon), microbes, or irritable bowel syndrome. If it is severe, lot of water and salt may be lost and they have to be replaced immediately in the patient. Epidemic diarrhea is highly contagious. The gastroenteritis, probably the result of virus infection. If serious medical attention is necessary.

MICROBIAL CAUSES OF DIARRHOEA

Bacterial	**Fungal**
Campylobacter spp.	*Cryptosporidium spp,*
Salmonella spp.	**Protozoal**
Escherichia coli	*Giardia lambila*
Staphylococci	*Entamoeba histolytica*
Vibrio cholerae	
Clostridium difficile	

Diphtheria

Diphtheria is now very rare in countries where vaccination is practiced. It is caused by one of three strains of *Corynebacterium diphtheriae.* The infection usually in the throat, is spread by droplets and may be caught from infected individuals or healthy carriers. The incubation period is 2-7

days. The child presents with sore throat and inflamed tonsils. This is commonest in children. The infection causes destruction of the outer layer of the mucous membrane in throat or larynx, characterized by grey adherent, false membrane growing as a mucous surface. It also attacks the upper respiratory tract. Locally there is a pain, swelling and suffocation leading to sore throat, hoarseness, a rasping cough and fever. The disease may become serious by toxin produced by the bacteria and become complicated by inflammation of heart, muscles or nerves. This is commonest in children. It also attacks the upper respiratory tract. Locally there is a pain, swelling and suffocation leading to sore throat, hoarseness, a rasping cough and fever. The disease may become serious by toxin produced by the bacteria and become complicated by inflammation of heart, muscles or nerves. It can be fatal if not treated properly. The pharyngeal exudate may spread with epithelial destruction and membrane formation leading to upper airway obstruction. Exotoxin released by the bacterium may cause myocarditis (second week) and neuritis with paralysis (third to seventh week). The vaccine, a modified exotoxin, gives protection. The Schik test detects immunity to diphtheria. Now, DPT & DT Vaccination entirely prevent Diphtheria among Children. Diphtheria can be immunized. Treatment of the disease itself requires diphtheria antitoxin to counteract its effects and erythromycin to eradicate the microorganisms.

Endocarditis

This is the inflammation of the endocardium, heart valves and muscle, caused by a bacterium, virus or rheumatic fever. In these patients some damage to the endocardium cause due to congenital deformity or alteration of the immune system by drugs. Symptoms are fever, heart failure and/or embolism. Treatment: use of antibiotics and surgery. If not treated properly the condition is fatal. The elimination of Bacteria may take place by virus, the Bacteriophage (Fig:10).

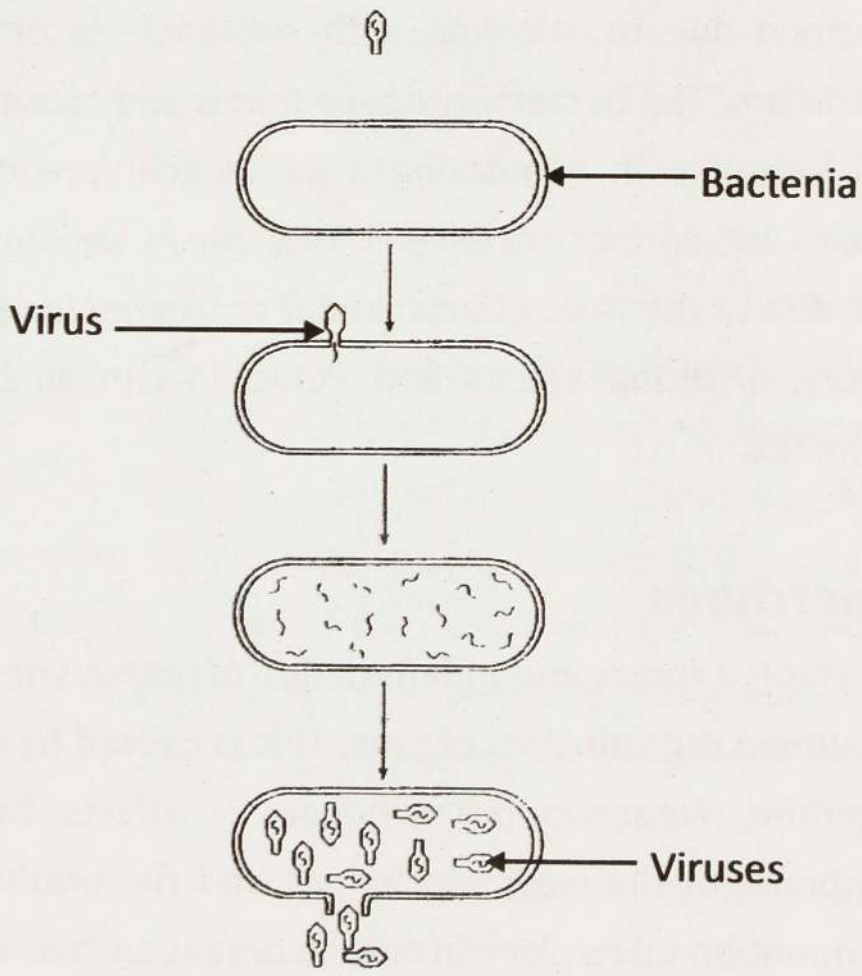


Fig: 10 Bacteriophage

Gangrene

This is the death of tissue in a wound due to stoppage of blood supply or by bacterial infection. In dry gangrene the blood supply is lost. This is during the late stage of Diabetes mellitus and atherosclerosis. The affected part turns brown and black and there is a demarcated line between living and dead tissue. The gangrene is due to a bacterial infection. The infection leads to putrefaction and produce fluids from the tissues along with obnoxious smell. The patient may develop fever and ultimately die due to blood poisoning. Gas gangrene is formed due to infection with soil bacteria of the genus *Clostridium.* The bacteria produce toxins and cause decay and putrefaction with generating a gas which spreads into the muscles and connective tissues. This causes swelling, pain and fever due to the toxic effects, and if untreated leads to death. Surgery, oxidizing agents and Penicillin can all be used in treatment.

Gonorrhoea

This is a contagious inflammation of mucous membrane of the human reproductive organs. This is caused by gonococcal bacterium, *Neisseria gonorrhoeae.* It affects the mucous membrane of the vagina in female and the urethra in male. Inflammation takes place in nearby organs such as testicle and prostate gland in male and uterus, fallopian tube and ovaries in

women. Prolonged inflammation of urethra may lead to formation of fibrous tissue causing stricture. Joints may also be affected. Late complications include endocarditis, arthritis and conjunctivitis.

Herpes

This is the Infectious inflammation of skin and mucous membranes characterized by the development of small blisters, caused by different Viruses. *Herpes simplex* virus (HSV) consists of two biologically and immunologically distinct types designated Type I, which generally causes oral diseases and lesions above the waist, on lips, mouth and face. Type II most commonly associated with genital disease and lesions below the waist. Recurrent episodes are common as the virus remains latent in nerve ganglia after initial infection. In females ulcers and vesicles can occur in cervix, vagina, vulva and labia. In male it occurs on glans, prepuce and pineal shaft and less commonly in scrotum. The virus is usually acquired in childhood and once present persists for life. It does not give any symptoms but tend to produce the symptoms in the form of cold sores, time to time. *Varicella zoster* virus that causes the chicken-pox may remain within the system and become active later as Shingle's *Herpes zoster* which is characterized by itching, painful blistering and infects the nerves. The other Herpes viruses are Cytomegalovirus and Epstein-barr virus.

Infection

Bacteria or virus causes harmful effects of infection and is successful in gaining entrance to the body. The infection may take place through, water, air, faeces, flies, alternative hosts or bite. Influenza virus causes influenza; Rhinovirus causes common cold; Measle virus causes measles; HIV virus causes Aids; *Salmonella typhimuim* causes Typhoid; *Vibro cholera* causes cholera; *Corynebacterium diphtheria* causes tetanas; *Bordatella pertussis* causes wooping cough; *Mycobacterium tubercle* causes tuberculosis; *Varisella zoster* causes chicken pox; Hepatitis virus causes hepatitis, mumps, measles. Poliomyletis, yellow fever, Japanese encephilitus is caused by virus. Protozoa, *Plasmodium vivax* and *Plasmodium falciparam* cause Malaria; *Tryponosoma gambiense* causes Africanm Sleeping sickness; *Trypanosoma cruzi* causes chagos; *Trypanosoma brucei* causes Sirra; *Leishmania donovani* causes Kala azar, *Giardia intestinalis* causes Diarrhoea; nematode *Wucheriria bancrofti* causes Filariasis.

Influenza

This is a contagious viral infection of the upper respiratory tract. Sometime there is complication by this infection. There are three main strains of influenza virus, designated A, B and C. This epidemics occur periodically. Symptoms include headache, weakness, fever, appetite loss, general aches and pain. Influenza outbreaks occur frequently and have a world

wide distribution, often being associated with secondary bacterial complications. Once the population has been infected, the structure of the virus changes so that existing antibiotics are not effective in fighting the next attack. Because, influenza spreads so rapidly in a community, it is concluded that the influenza virus is transmitted by air brake particles from an infected person.

Jaundice

This is a disease causing yellowing of the skin and the whites of the eyes. The bile produced by the liver passes into the blood stream instead to the intestine. The bilirubin of the blood gives the yellowish of the body. The type of Jaundice depends on the mode of action caused by various ways. There are three basic causes of jaundice, namely haemolytic, hepatocellular, and obstructive. "Obstruction jaundice" is due to the bile not reaching the intestine due to an obstruction in the bile duct caused by gall stone. Haemolytic jaundice is caused due to the blood cells being destroyed by haemolysis. Heptacellular jaundice is due to liver disease - a viral disease such as hepatitis. Neotonal jaundice is in new borne infants, in which the liver is physiologically immature but it usually lasts only for a few days. The infant can be exposed to blue light to convert bilirubin to biliverdin (harmless bile pigment). But most cases are due to: (a) Acute viral hepatitis, most of these patients are not admitted to hospital unless they are very ill, recovery is

unduly prolonged, or intrahepatic cholestasis persists.(b) Bile duct obstruction from gallstones or carcinoma of the head of the pancreas. (c) Multiple secondary deposits of carcinoma in the liver.

Leprosy

This is a serious disease, caused by bacterium *Mycobacterium leprae,* that attacks the skin, nerves and mucous membrane. It has an incubation period of several years. This is a chronic disease characterized by mutilating and disfiguring lesions, with loss of sensation in fingers and toes, caused by infection. If not treated, Leprosy can cause paralysis, muscle atrophy and deformity. There are two forms. Tuberculoid leprosy produces discoloured patches of skin with some numbness but is generally benign and often heals untreated. Lepromatous leprosy is much more serious and progressively destructive form of the disease, creating lumps in the skin and nerves, inflammation of the iris, numbness of the skin with muscle weakness and paralysis. This is also an intermediate form with symptoms of both types. About three million people are affected world-wide. The disease is transmitted by contact between an affected person and unaffected person, although it is not highly contagious. With regard to control, drug therapy is effective, with a combination of antibiotics. Both bacteria develop resistance to one of the sulphone drugs commonly used.

Measles

This is an extremely infectious virus disease, characterized by the presence of rash. Incubation period is 10-15 days. Symptoms are cold, cough, sneezing and high fever. This disease spreads from one child to another during this stage, developing red spots in the mouth, cheeks, spreading from behind the ears and face and other areas. When the rash and spots are reduced, the child may make a good recovery. However complication may occur, such as pneumonia and the middle ear infections which can result in deafness. Vaccine is available.

Mumps

Mumps is caused by a *Paramyxo* virus. Sub clinical infection is common. A long incubation period of 16 to 21 days is followed by fever, malaise and enlargement of one or both parotid glands, which develop over a period of 1 to 3 days. The child may complain of ear ache and difficulty in swallowing, and the glands may be painful and tender. The submandibular glands may also be affected. The swelling settle in 7 to 10 days and there is no specific treatment. The virus enters through respiratory tracts. Symptoms are fever, headache, sore throat and vomiting. The swelling of parotid gland may be confined to one side or both sides. Infection may enter the submaxillary and sublingual salivary glands. After a few days, the swelling subsides and the child recovers, but the child remains infective. The infection may spread to Pancreas and to 15 to 30% of males

to testicles. In adult it leads to sterility. In females it rarely affects ovaries and breasts and may cause Menningitis. A protective vaccine is now available.

Parathyroid fever

This is a bacterial infection caused by *Salmonella paratyphi* A, B, C. Symptoms resemble those of typhoid fever, diarrhoea, a rash and mild fever. It can be treated with antibiotics. Temporary immunity against the A and B forms are gained by vaccination with TAB vaccine. Good nursing care is essential, for patients who are often desperately ill and mentally uncooperative on first admission, and need attention to all their bodily needs. A high quality of food supportive medical care, as in the maintenance of fluid and electrolyte balance, is vital to achieve good survival rates. But the main part of treatment is effective antimicrobial chemotheraphy.

Plague

This is a bacterial disease. The vector is Flea *(Siphonaptera sp.)*. The causative agent, is the bacilli, *Pasteurella pestis.* It is essentially a disease of rodents, usually transmitted by rodent flea, but it may cause serious epidemics among human beings. The term, Bubonic plague is applied when inflammation of lymph glands results from the infection. The plague infection follows a standard course in human body: Lymphatics and

Lymph nodes, blood stream, liver and spleen. When the liver and spleen cannot cope up with invaders, the infection enters the blood stream and becomes septicemic plague. The role of flea *(Xenopsylla cheopis)* in plague transmission follows a schematic system. A flea might receive as much as many 5000 *Pasteurella pestis* while imbibing blood from a plague rat. After digestion, the blood in the stomach passes into the rectum and is ejected as a dark red tarry droplet, containing a virulent plague bacilli which if rubbed onto recent flea bite, resulted in infection of the animal. The flea therefore, accomplished the actual inoculation indirectly. The bitten person scratching or rubbing the site of the bite after infected flea has discharged its faecal material upon the skin. After an incubation period of two to six days, the symptoms occur as headache, weakness, fever, aches in the lymph nodes (especially in groin) swelling and become painful (hence bubonic) and may burst, releasing pus. In other cases, the infective fluid may not be released and there may be subcutaneous haemorrhage with creation of black patches (gangrenous) on the skin, leading to ulcers (hence the old term, 'black death'). If the bacteria enter the blood stream (septicemic plague) and death follows rapidly. The most serious is pneumonic plague, which appears when the lungs are affected. Preventive measure is to eliminate the carriers. The disease can be treated effectively with antibiotics and Sulphonamide.

Pneumonia

This is bacterial infection of the lungs resulting in inflammation and filling of the alveoli with pus and fluid. The lung becomes solid and air cannot enter. Pneumonia may be caused by bacteria, virus or fungi, but bacterial infection is the commonest. Pneumonia is classified according to the location affected. Lobar pneumonia affects the whole lobes of the lungs; double pneumonia affects both lungs; bronchial pneumonic affects bronchi. If infective organism is known, more specific treatment is effective. Symptoms very much depend upon how much the lung part is affected. Normally there will be chest pain, coughing, breathlessness, fever and possibly cyanosis. Antibiotic treatment is usually effective.

Rabies (Hydrophobia)

This is a fatal infection in man caused by a virus. This is a very severe and dangerous disease affecting the nervous system which occurs in dogs, wolves, cats and other canine animals. Human beings are affected through the bite of a rabid animal, usually dog. Entry of the virus usually is by a wound or skin abrasion caused by a rabid animal. The incubation period is usually 3-8 weeks. The first sign being increased muscle tone and extreme difficulty in swallowing. The symptoms are: patient becoming irritable and depressed, difficulties in breathing and swallowing, great mental excitement, increased salivation and

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muscular spasms of the throat. Eventually, even the sight of water causes severe muscular spasms (contraction), convolutions and paralysis. Usually the victim develops an aversion to water, unable to drink water despite an irrepressible thirst. The untreated patient is usually fatal in three or ten days. Whatever is done, the patient will die, with irreversible brain damage. Intensive care can prolong life, by taking over vegetative functions, but not for recovery. In developing countries the option does not present for the prolonged use of life-support systems. The most humane approach in these conditions is to relieve the agonies of the patient with effective analgesia and sedation, such as a combination of a phenothiazine, a barbiturate, and heroin. In developed countries, the choice between heroic supportive measures and symptomatic treatment can only be made by the clinician in charge, after evaluation of the evidence.

Relapsing fever

This is due to the Louse borne or Tick-borne infection caused by Spirochaete of the genus *Borrelia.* The symptoms are fever and headache, joint and muscle pain and nose bleeding. The first attack lasts for about two to eight days and further milder bouts occur after 3-10 days. Treatment is by bed rest and with Erythromycin drug. It was believed that infection might

result from the insects regurgitating the contents of its gut into the wounds in the act of feeding. On the basis of experiments it was concluded that infection results from Spirochaete which are collected under the finger nails and finger tips of an individual after he/she has crushed Lice on the skin. During scratching he/she inoculates them into the excoriated skin. In this way the infection is successfully effected. Historically, epidemics have been reported from Eastern Europe, Africa, Iraq, India and China. Great epidemics occurred during and after the war and it is stated that in Russia in 1920, there were over one million cases. It was a serious epidemics indeed.

Rheumatic fever

This is due to bacteria known as *Hemolytic streptotococci* in children and young adults. Nodules develop beneath the skin over bony protuberance such as the elbow knee and back of the wrist. The symptoms include fever, joint pain and arthritis which progresses from joint to joint and characteristic red rash will develop, in addition to ischorea and inflammation of the heart including the muscle, valves and membranes. There may be a need for heart valve to be replaced in later life. Treatment includes destroy of Streptococci with antibiotics such as Penicillin. Non-steroidal anti inflammatory drugs and Corticosteroids are also used.

Rubella (German measles)

A highly infective viral disease, and is likelihood of causing defective when virus is contacted during pregnancy. The virus can be transmitted from mother to foetus and may cause serious damage in many foetal tissues and even death. The major period of risk to the child in the first three months of pregnancy when there is at least a 30% risk of abnormality. For the reason many western countries have a routine immunization programme for young females, either babies or between age of 10-14 years. Symptoms are: headache, shivering, and sore throat with slight fever, one set of rash of pink shots appears on face and/or neck and subsequently spreading over the body. The condition is highly contagious being spread by direct contact via nasal secretions. Precautions against Rubella are important during first twelve weeks of pregnancy. Care should be taken to avoid any contact with people infected with Rubella. If there is a Rubella infection going on in a school, among children and pregnant mothers, they should be kept at home. If a pregnant mother has a chance of contact with Rubella she should get immunization which prevents the disease development.

Salmonella infections

This is a common infection that occurs by *Salmonella,* a genus of bacteria, where sanitation is primitive and transmitted by faecal-oral route. The genus *Salmonella* is gram negative

rods, parasitic in many animals and human beings, in whom they are often pathogenic. Some species such as Salmonella *typhi* are host specific, infecting only man in whom they cause typhoid fever. Others such as *Salmonella typhimurium* may infect specific wide range of host species usually through contaminated foods. *Salmonella enteritides,* a motile, widely distributed in domestic and wild animals, particularly the rodents, and sporadic in man as a cause of food poisoning. Food poisoning in man is due to eating food, such as meat, chicken or eggs that have been contaminated with bacteria. Symptoms are cramps, nausea, and diarrhoea. Although they are mild, they last only a few days. *Salmonella* can be extremely serious in very young, elderly and those who are ill. If not treated with antibiotics the patients get complications.

Septicemia or blood poisoning

This is an infection of blood stream by a variety of microorganisms, such as *Salmonella* and *Pseudomonas.* It causes fever, lesions in the body organ and cause even death.

Shigella infection

This is an acute inflammation of the large intestine characterized by diarrhoea with blood and mucus in the stools. Two main types are bacillary dysentery (Shigellosis) and amoebic infection (Amoebiasis). There are four main pathogenic groups and majority of cases of bacillary dysentery are caused by *Shigella sonnei.* Bacillary dysentery occurs in

epidemic form where there is a crowded and poor sanitation spreading takes place by contaminated food or flies. Bacillary dysentery is due to *Shigella flexueri* causes severe diarrhoea with blood in stools. Shigella dysentery causes severe diarrhoea with profuse blood in the stool. Symptoms are fever, dehydration and weakness. Arthritis or iritis may occur. Treatment is by oral dehydration therapy. Anti-diarrhoeal drugs such as Immodium could be avoided and Ciprofloxacin is of some use for dysteriae and flexueri strains.

Syphilis

This is an infectious sexually transmitted disease in human, caused by the Spirochaete bacterium *Treponema palladium* that is spread normally by sexual contact. There are three steps. Bacteria enter the body through mucus membrane during sexual intercourse and an ulcer appears there in first instance. This primary stage appears 4-5 weeks (or later) after infection when a primary ulcer associated with swelling of local lymph gland appears. Then in the second stage appear in which the lymph nods locally and all over the body enlarges and hardened and skin eruption (Syphlidae) appears. Symptoms appear in about two months, including fever, pains, enlarged lymph node and a faint rash on the chest. The bacterium is found in enormous numbers in primary sores and the skin lesion on the

secondary stage. The final stage may not appear until many months or years after infection and comprises the formation of numerous tumour-like masses throughout the body (in skin, muscle, brain, spinal cord and other organs such as liver, stomach etc.). The final stage can cause serious damage to the heart, brain and spinal cord resulting in blindness, nervous system failure, general paralysis, cardio vascular wasting and destruction of aortic valves. The bacterium can be transmitted from an infected mother to her foetus, resulting in congenital syphilis. If the baby does survive, it can develop deafness and defected vision later in life. It is essential, therefore, that any one who develops the symptoms described above after a sexual relationship, should seek immediate medical attention. The early stages are easily treated with antibiotics.

Tetanus

This disease is caused by bacteria *Clostridium tetani*, an anaerobic bacteria, commonly found in ruminants and manure. The species of *C. tetani* enter the wound and undergo rapid multiplication. The bacteria produce a toxin which affects the nerves resulting in rigidity and spasm of muscles. There will be high temperature, and cause extreme agony. If respiratory muscles are involved, death may occur by asphyxia. Effective

antitoxin is available against it. Antibiotics such as Penicillin are also effective against bacteria. Preventive measures such as prompt cleaning of punctured wound, and immunization with tetanus vaccine are useful.

Tuberculosis

This infection is caused by bacillus (bacterium) *Mycobacterium tuberculosis* (Koch's tubercle bacillus), of which pulmonary tuberculosis of lungs (consumption or phythisis) is the best known form. Tuberculosis usually acts on the lungs. It can infect other parts of the body too. The pulmonary disease is acquired through inhalation of air containing the organisms from an infected persons, or dust laden with bacteria. In lungs, the infection causes formation of a primary tubercle which spread to lymph nodes to form primary complex. The bacteria may enter the blood stream and spread throughout the body, setting up numerous tubercles in the other tissues such as kidney, spine or digestive tract. In many cases, the tuberculosis lie dormant and become active only when the body is weakened by some other diseases. Symptoms are coughing and sneezing, fever, fatigue, and weight loss. Later, there may be chest pain, shortness of breath and spots of blood in coughed up sputum. But the majority of those infected by tuberculosis will not experience symptoms as the bacterium remains dormant in the body. Avian tuberculosis endemic in birds is rarely seen in man.

Bovine tuberculosis is endemic in cattle and transmitted to man via infected cow's milk. Human tuberculosis is the usual cause of pulmonary tuberculosis. Military tuberculosis, is the acute form of tuberculosis, scattered throughout many organs in the body. Tuberculosis has been in the existence for the past 8000 years. It was invisible until 24th March 1882, when Robert Koch discovered that it was due a bacterium *Mycobacterium tuberculosis,* a human type. However it was until 1943 that a successful treatment was found, by Samuel Waksman who discovered the powerful antibiotic Streptomycin, against it. Since then effective and widely available drugs have been developed to cure the disease successfully.

Typhoid fever

This is a severe infectious disease of the digestive system which is caused by bacterium, *Salmonella typhi.* An infectious fever usually spread by contamination of food, milk, or water supplies either directly by sewages, indirectly by flies or by poor personal hygiene. Symptoms are rise in temperature, rash on the abdomen and chest, headache and nose bleed. A rise in temperature occurs in a characteristic fashion, known as a step-ladder temperature. In severe cases there may be ulceration of the intestinal wall leading to peritonitis. If an ulcer bursts, hacmorrhage from the bowels, inflammation of lungs, spleen, and bone may take place. Drug treatment is by antibiotics.

Viral myocarditis

This is heart muscle inflammation which is usually caused by viral infection. (Myo:muscule, card: heart, tis: inflammation). Myocaditis is characterized by enlargement of the heart and poor function in heart contraction, leading to heart failure. In some affected people sudden death occurs. Usually, 30 - 70% death occur in children; even in children of those who are lesser than one year of age. The viruses involved are *Coxsackia* (Type A and B), especially *Coxsackia* B 3h, Adenovirus type 2 and 3, Echovirus, Cytomegalovirus, Epstein - Barr virus, Herpes virus, Human immune-deficiency virus, Measles, Mumps and *Varicella virus.* Coxsackia refers to a collection of viruses (entero-viruses), which cause infection orally with contaminated food or water, then multiply in the intestine (entero-intestinal). There are two major subgroups of *Coxsackia* viruses, namely subgroups A and B. There are 23 known *Coxackia* A virus that cause only enteric diseases. There are 6 known *Coxackia* A virus, that cause only enteric diseases. There are known *Coxsackia* B viruses. *Coxsackia* B 3 has been found to be one of the main causes of certain life-threatening diseases such as viral myocarditis. In viral myocarditis heart muscle becomes inflamed and weakened, causing symptoms of heart failure and ultimately becomes a heart attack. Symptoms are viral illness, fever, chest pain, joint pain, fatigue, dysphoea

(shortness of breath), leg oedema, orthopnoea, irritability, lethargy, anorexia (loss of appetite), periodic episodes lack energy and general malaise. Additional symptoms are syncope (fainting), decreased urine out put and other symptoms such as viral infection namely headache, muscle, diarrhoea, sore throat and rashes. Myocardities may be caused by exposure to chemicals or allergic reactions to certain medications and it can be associated with auto-immune diseases. Treatment is by use of antibiotics, reduced level of activity and low salt diet, steroid and other medications may be used to reduce inflammation; diuretics to remove body water via urine. Q 10 and Taurine are used in the treatment of myocardities. Use of additional medications, may be useful. The disease may be resolved even without any treatment.

Yellow fever

This is an acute infectious viral disease in tropical areas, caused by a group of arbovirus and spread by mosquito *Aedes aegypti.* It causes tissue degeneration in the liver and kidneys. Symptoms include headache, back pains, fever, jaundice, black vomit and anuric. Vaccine (attenuated virus variant known as 17D) causes immunization. This vaccine will prove effective and anyone recovering from an attack has immunity conferred. About 10% cases die. Control of this disease is by the control of the mosquito vector.

11. Muscular diseases

Convulsions

This is the involuntary and sudden contraction of muscle resulting from abnormal cerebral stimulation. There are many causes. They occur with or without loss of consciousness. Chronic convulsion shows alternate contraction and relaxation of muscle group.

Cramp

This is the sporadic muscular contraction of the limbs but can affect certain internal organs (colic or gastralgia). Cramp is the result from a salt imbalance. It can be alleviated by an increase of salt intake. Occupational cramp results from continuous use of particular muscle most of the time. Examples: writer's cramp, travelling cramp etc. Night cramp also takes place during sleep. This is common in elderly people, diabetic patients and pregnant women. Salt going out during heavy perspiration may cause such effect.

Muscular distrophy

This is a disease characterized by the progressive wasting of muscles and eventual death. This is due to hereditary factor of

the generation. The disease is classified according to the groups of muscles which are affected and the age of the person concerned. The affected muscles eventually loose all power of muscular contraction, resulting in great disability. The cause is not fully understood but Duchenne muscular dystrophy is sex-linked and recessive. Hence it mainly affects the boys, with mother as a carrier and appears in early childhood. The disease first shows in children of 1-6 years and make eventually to be confined to wheel chair by early teens. Death results by late teens in most affected patients; other forms of MD are controlled by autosomal genes (both dominant and recessive) and they are equally frequent in males and females.

Paralysis

This causes muscular weakness or total loss of muscle movement. Paralysis is the symptoms of another disease such as brain disease, cerebral haemorrhage or thrombosis causing hemiplegia (partial paralysis). The disease or injury of the spinal cord leads to paraplegia (paralysis of legs). The poliomyelitis causes infantile paralysis. In addition to these, there is the paralysis associated with motor neuron disease.

Shin splints

This is a painful condition caused by swelling and inflammation of the membrane that joins the muscle along the

lower leg bone. Shin splints are commonly a runner's affliction caused by running on a hard surface or failing to warm up properly.

Strain

An injury to a muscle or a tendon could be stretching or over exertion. It is commonly caused by suden, unusual or unaccustomed movement.

12. Diseases of nervous system

Amnesia

This is a condition of loss of memory partially or totally. This is due loss of memory cells in the brain. Anterograde amnesia is the loss of the memory of recent occurrence due to a trauma. Retrograde amnesia is the inability to remember the events prior to trauma. In addition to these, there is post-traumatic amnesia and hysterical amnesia involving mental disorders. Treatment is by means of psychotherapy.

Autism

This is the mental disorder in the childhood. There is a failure in the emotional development and inability to communicate. The autistic individuals exhibit stereotyped patterns of behaviour. They may or may not be intellectually impaired. They need intensive and prolonged education to improve their status.

Alzheimer's disease

This is a disease in which there is a progressive deterioration in mental ability due to degeneration of brain tissue. Severe impairment of short-term memory may be the sign of Alzheimer's disease in which brain cells gradually

degenerate and deposit an abnormal protein build up in the brain. As a result, the brain tissue shrinks with progressive loss of mental abilities known as dementia. The condition can progress to severe degradation or total destruction of intellectual powers, deprivation of emotional control, and a complete personality transformation. The cause is unknown, although genetic factors are certainly involved. In women lack of oestrogen after menopause probably play a role of this type. Symptoms are impairment of memory, gradual loss of intellect, difficulty in conversation, emotional outburst, poor concentration, difficulty in understanding and neglecting personal hygiene. Treatment: no cure, but drugs such as Donepezil may slow the loss of mental function in mild and moderate cases. Eventually fulltime care of the patient is probably necessary. Most people with Alzheimer's disease survive for 5-10 years from the time of diagnosis.

Brain stem death (brain death)

This is a condition in which there is a complete and continuous absence of vital reflexes controlled by nerve centres in the brainstem, such as breathing, papillary responses etc. The sensory area of brain is demarkated (Fig: 11). Examinations are repeatedly done to confirm death for a considerable period after the brain death. During this period organs from the body may be removed provided permission is obtained before death.

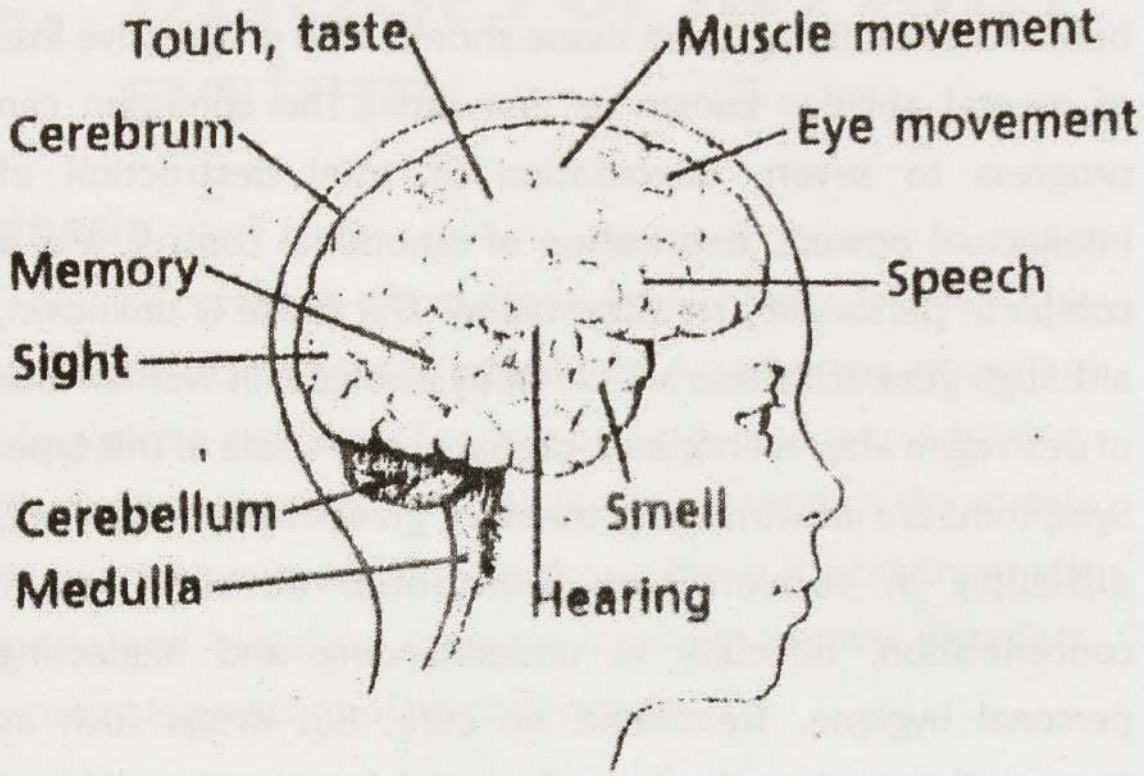

Fig: 11 Sensory areas of Brain

Brain tumour

This is an abnormal growth that may develop in brain tissue or in the menings (the membranes that cover the brain). The seriousness of the brain tumour depends on location, size and rate of growth. The brain tumour can compress the nearby tissue, causing pressure to build up inside the skull. The tumours that arise from brain tissue or from menings are called the primary tumours. The secondary brain tumours (metastases) are more common than the primary tumours. They are always cancerous, having developed from cancer cells, that have

spread to brain from tumours in the other parts of the body, such as breast. Certain type of brain tumours, such as neuroblastomass affect only children. Symptoms are headache, nausea, vomiting, blurred vision, slurred speech, difficulty in reading or writing, change in personality, numbness and weakness. Diagnosis is done by CT (Computerized Tomography) and MRI (Magnetic Resonance Imaging) to look and determine the location and size. If it has spread elsewhere, tests such as mammography or chest X-ray to check for tumours in breast or lungs. Further MRI scan may be necessary to show the tumour and the surrounding tissue in more detail. Brain biopsy has to be done to identify the type of cell from which the tumour has developed. Treatment: Radiotherapy, Chemotheray, Surgical and Physiotherapy.

Cataract

This is a condition in which the lens of the eye becomes opaque, resulting in a blurring of vision. The cloudiness of lens of the eyes degrades the vision by the diffused light that causes blurring of vision. Hard cataract contains a hard nucleus; as a result it tends to be dark in colour. This type of lens may occur in old age. Soft cataract, is one without a hard nucleus occurring at any stage in young. But cataract usually develops slowly and when matured, it is called ripe cataract - cataractious. It may arise from a number of different causes, including injury to the eye, congenital condition (due to Down's syndrome) or as a

result of certain disease such as diabetes. However, the commonest cause is advancing age. During old age, changes take place in the lens involving protein components. To correct the condition, the defective lens is removed and replaced with an artificial lens, special glasses or contact lens, using micro-surgery.

Chorea

This is a nervous disorder characterized by uncontrollable involuntary actions of the body or limbs. It causes jerky movements of the muscles mainly of the face, shoulder and hips. Sydenham's chorea or St. Vitus Dance is a disease that mainly affects children and is associated with acute rheumatism or in children having rheumatism elsewhere in the body. This causes heart ailment which affects girls than boys. If the heart is affected, this will cause problems in the later life. Huntington's chorea is an inherited condition which appears after the age of 40 and be accompanied Dementia. Senile Chorea affects some elderly people but without Dementia.

Coma

Coma is a state unconsciousness from which the affected person cannot be aroused. There may be no papillary and corneal reflexes. Even powerful stimuli will not respond. It may be accompanied by deep and noisy breathing and strong heart action. This may take place during cerebrovascular accident,

high fever, brain injury, diabetes mellitus, carbonmonoxide poisoning and drug overdose. A person bearing coma may eventually die, but possible recovery depends upon the nature of the coma.

COMA MAY INDICATE THE FOLLOWING DISORDERS

Diffuse axonal injury
Extradural haemorrhage
Subdural haemorrhage
Hypothermia
Hyperglycaemia
Hypoglycaemia
Hyponatraemia
Hypernatraemia
Diabetic Ketoacidosis
Toxin/drug induced Alcohol
Overdose
Epilepsy
Carbon monoxide poisoning
Cardiac/circulatory failure
Respiratory failure
Liver failure (Encephalopathy)
Renal failure (uraemic coma)
Hypothyroidism
Stroke
Subarachnoid haemorrhage
Meningitis
Encephalitis
Brain tumour
Brain abscess
Cerebral malaria

Concussion

This condition is due to an injury to the brain caused by sudden shock happened as a sharp blow to the head. This causes brain striking the inner side of the skull resulting in bruising the brain tissue. Bleeding inside the skull and unconsciousness may last for few minutes or hours. When the

person regains consciousness, he gets headache and irritability. Even after a mild unconsciousness the person gets a marked giddiness, confusion and headache. Under the circumstances, the person has to take rest and should be kept under observation.

Convulsion (Fits)

This is due to voluntary, alternate, rapid, muscular contractions and relaxations in throwing the body and limbs into contortions. They are caused by disturbance of brain function. In adults it results in epilepsy. They are caused by the presence of disease or infection. The patients have to be treated to prevent this disease. The disease is rarely life-threatening.

Deafness

This is partial or complete loss of hearing. The deafness may be temporary or permanent; conductive or sensory congenital or acquired. In many cases, the deafness is due to problem in the cochlea, auditory nerve, brain or nerve defect. The fluid in the inner ear increases time to time and this raises pressure in the inner ear. This disturbs hearing and balance (Meniere's disease). Bone overgrows around one of the ear bones (ossicles), preventing transmission of sound vibration to the inner ear and cause deafness (Otosclerosis). If the inner ear, known as the labrinth is inflamed it is referred to Labrintis. The wax in the outer ear too may block the sound. These are

common condition in the elderly, although no particular cause can be identified. Other causes include exposure to industrial noise or explosion. This may cause hearing loss, due to poor transmission of sound waves to the inner ear. However, the deafness can be treated to a certain extend by surgery or by the use of hearing aid.

Dementia

This is an irreversible organic brain disease causing memory and personality disorders, deterioration of personal care, impaired cogitative ability and disorientation and lessening of intellectual capacity. Dementia occurs in several forms, such as Sensile dementia, Alzheimer's disease and Multinfarct dementia. The causes are many, including vascular disease, brain tumour, subdural haematoma, hydrocephalus and hyperthyroidism. Symptoms occur in people of 50 and 60 years of age. It is due to early degeneration of both the median and small cerebral blood vessels.

Depression

This is a mental state of extreme sadness dominated by pessimism and in which normal behaviour patterns such as sleep, appetite, working etc. are disturbed. Depression is the most common serious psychiatric illness and it becomes more common with age. Women are particularly vulnerable because of their hormone production. The causes for this are varied but

complex, but probably related to a reduction in the level of certain chemicals in the brain called neurotransmitters, which stimulate brain cells. The best known of these mood elevator is Serotonin. The occurrence such as sad events or loss or sudden unfortunate incidents may be responsible for depression. Symptoms are tiredness, sleep problem, worry, weepiness and sadness, loss of interest in life, sex drive and absence of self confidence. Treatment: Use of drug, Serotonin uptake, antidepressants and psychotherapy. It is advisable to avoid patients being left alone; they should be in company of others. It is better to approach any voluntary organization for improvement of the patient and assistance.

Encephalitis

This is the inflammation of the brain caused by viral infection and sometimes occurs as complication of some common infectious diseases, such as measles, chicken pox, mumps, sleeping sickness etc. This causes swelling in the basal ganglia, cerebrum and brain stem that may result in tissue destruction. Children are the main victims. There is no treatment readily available.

Encephalomyelitis

This is the virus infection with inflammation of the brain and spinal cord. Symptoms are headache, fever, stiff neck and back pain with vomiting. Encephalomyelitis may cause paralysis, personality change, coma or death.

Epilepsy

This is a nervous disorder due to abnormalities of the brain cortex. This causes seizures ranging from a sense of numbness in certain body parts to extreme muscular convulsions and fits. Epilepsy exhibits large, abnormal brain waves, which can be detected on an EEG. Usually the epileptic attack occurs without warning with complete unconsciousness, and muscle contraction and spasms. Epilepsy has no apparent cause, although in some cases it may be traced to a source, such as tumour that forms pressure on the brain or an injury in the brain, cerebral trauma, brain tumour, cerebral haemorraghe and metabolic imbalance as in hypoglycaemia. Epilepsy may be treated by correcting any physical disorder by prescribing medication. Epilepsy cannot be prevented, but the seizures may be controlled by correcting, allowing the epileptic to lead a normal life. Some drugs are used in treatment, although little can be done for fits. Major epilepsy causes loss of consciousness with generalized convulsions. Flickei epilepsy causes one or more fits occurring as a result of exposure of flickering light, particularly liable to occur with multi coloured light. Focal epilepsy (Syn Jacksonian epilepsy) causes motor seizure, begins in one part of the body, can spread to other muscles so that the fit is similar to chronic stage of major epilepsy. Psychomotor epilepsy/temporal lobe epilepsy causes warning fits consisting of feelings of unreality. Minor epilepsy is characterized by transitory interruptions of consciousness without convulsions.

Glaucoma

This is a disorder of the eye, caused by increase in pressure with in the eye ball. Normally the fluid that is secreted into the front of the eye, flows out through the pupil and drains away through the sieve-like meshwork behinds the drainage angle at the outer rim of the iris. When fluid fails to drain and maintain a constant pressure, this builds up cause damage to the structure. In acute glaucoma, the iris bulges forwards and closes the drainage angle, so that fluid is trapped within the eye. As a result, the pressure inside the eyes rises as more fluid is secreted and the pressure rises. It may damage the optic nerve, which carries nerve signal to the brain. This causes reduced vision. Treatment: Eye drops or oral anti allergy. Glaucoma may be linked to other diseases of the eye. The use of certain drugs are recommended.

Headache

The commonest cause is migraine or severe headaches with one-sided numbness, nausea and vomiting, secondly sinusitis or infection of the sinuses. This is a pain felt within the head which is thought to be caused by dilation of intracranial arteries or pressure upon them. Headache may indicate the presence of disease or disorder in the brain due to an infection such as meningitis, tumour or aneurysm and also as a result of injury and concussion. A severe headache with fever, stiff neck and rash may be due to the membranes covering the brain and

spinal cord become inflamed. A sudden headache feeling below the back of head could be subarachnoid haemorrage in which occurs between the covering membranes of the brain. In elder people the headache with tenderness of the scalp or temple may be due to temporal arteries in which the blood vessels in the head become inflamed. Cause: about three out of four headaches are caused by tension in the scalp or neck due to stress. The other common causes of headache include a hangover, irregular meals, long journeys, noise, stuffy atmosphere, thundering weather, too much sleep, too much excitement, fever, sinusitis and toothache, stress, tiredness, cold, excessive work involving eyes, dyspepsia, rheumatic diseases, high blood pressure and uraemia. Drinking too much coffee or wine, eating chocolates, cheese, strawberries, and anxiety are aggravating factors which should be prevented. There are efficient medications to totally cure migraine.

Hydrocephalus ("water in the brain")

There is an excess collection of cerebrospinal fluid within the skull due to obstruction of the cerebrospinal fluid circulation. The cause for this is an increase in size of the head in children. This is due congenital condition, meningitis or presence of tumour. The external hydrocephalus is due to accumulation of fluid in the subarachnoid space. Internal hydrocephalus is due to excess fluid mainly in the ventricles of the brain. Treatment involves surgery. About 5% of children survive and enjoy a normal life.

Hysteria

This is an excessive emotional state of psychiatric condition in which one responsible to anxiety or threat with uncontrolled emotional or physical reaction, by extreme emotional outbursts, blindness or loss of speech etc. Symptoms are paralysis, seizures and spasms of limbs swelling of joints, mental disorders and amnesia. There are two types, namely Conversion hysteria, characterized by physical symptoms and Dissociate hysteria, characterized by hysteria and marked mental changes. Mass hysteria affects a group of people who are together under conditions of emotional excitement. Recovery is possible if the affected people are separated. Treatment for hysteria is by means of psychotherapy.

Korsakoff's syndrome

This is a neurological disorder described by Russian neuropsychiatrist, Sergei Korsakoff (1854-1900), characterized by short-term memory loss, disorientation and confabulation. The condition is caused primarily by alcoholism and a deficiency of thiamine (which is vital for converting carbohydrate to glucose).

Meningitis

This is the inflammation of meninges. This is an epidemic form known as cerebral fever. The infecting organism is Neisseria meningitides (Meningocaccus). Inflammation of

membranes (cerebral meningitis), spinal cord (spinal meningitis), dura mater (pachy meningitis), arachnoid mater (surrounding the brain) and pia mater (lining the brain) jointly called pia-arachnoid or leptomenigitis. The causal organisms are virus or bacteria. Treatment is by antibiotic drugs and Sulphonamides.

Migraine

This is a very severe throbbing headache, usually on one side of the head, which is often result in disturbance in vision, nausea and vomiting. The causal factors are anxiety, fatigue, watching television, video, loud music or noise, flickering lights and certain food such as cheese, chocolate and alcoholic drinks. It may be due to a constriction followed by dilation of blood vessels in the brain and outpouring of fluid into the surrounding tissues. The attack can last up to 24 hours and treatment is by means of bed rest in a darken room and pain-relieving drugs.

Multiple sclerosis

This is the chronic disease of the brain and spinal cord which affects the myelin sheath of nerves, as a result, the function of the nervous system is disrupted. The harden patches are scattered throughout the brain and spinal cord as sclerotic connective tissue. When the nerve sheaths break down and is absorbed leaving bare nerve fibres and connective tissue is laid. Symptoms are unsteady gait and apparent clumsiness, tremor,

of limbs, involuntary eye movements, speech disorders, bladder dysfunction and paralysis, which become more marked. Multiple sclerosis usually affects young adults, causing weakness or paralysis in parts of the body, blurred vision, muscle spasms or incontinence.

Neuralgia

This is the pain along the course of a nerve (Fig: 12), without any physical change in the nerve. It occurs in different forms, namely, sciatic-trigeminal neuralgia affecting face and intercostals neuralgia affecting ribs. Treatment is by applying ointment and by pain-killing drugs. It can also be destroyed partly by the surgery.

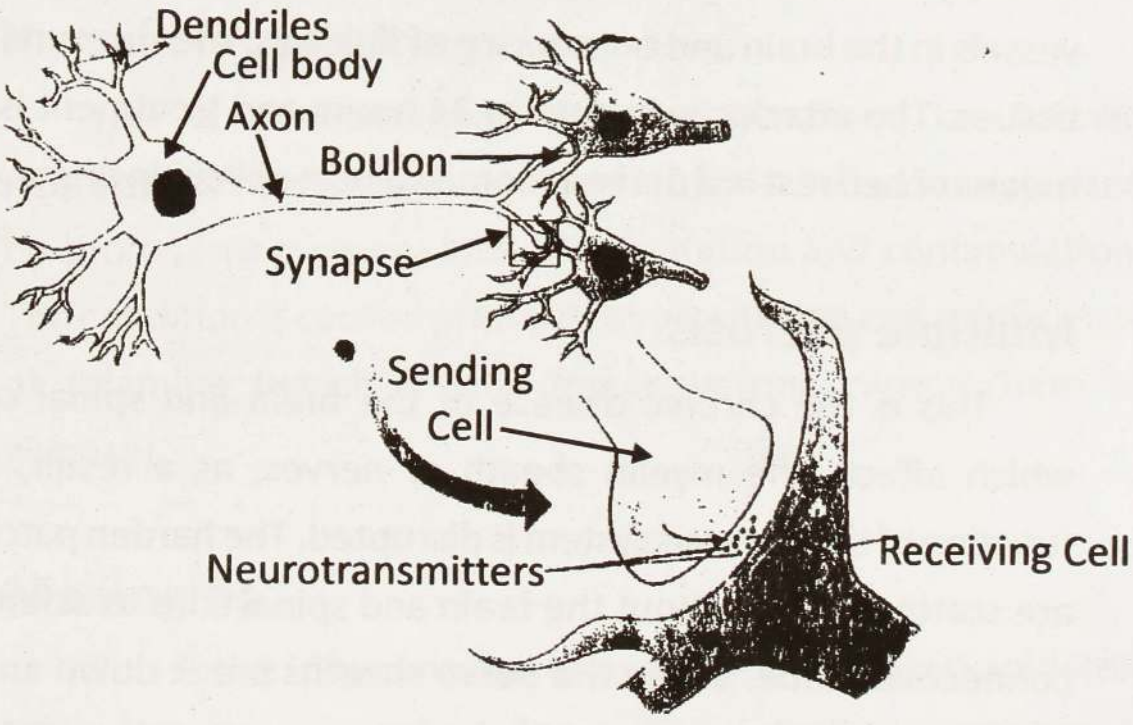

Fig: 12 Nerve to nerve connections

Neuritis

This is the inflammation of a nerve or nerves (Fig: 13). This is due to inflammation of nearby tissues or the degeneration of nerve, infection, pressure on the nerve, exposure to toxin, and loss of blood supply or lack of vital substances in the diet. The later stage, polyneuritis is due to systemic poison such as alcohol or long term exposure can cause discomfort, severe pain, a loss of sensation and muscle control or even paralysis.

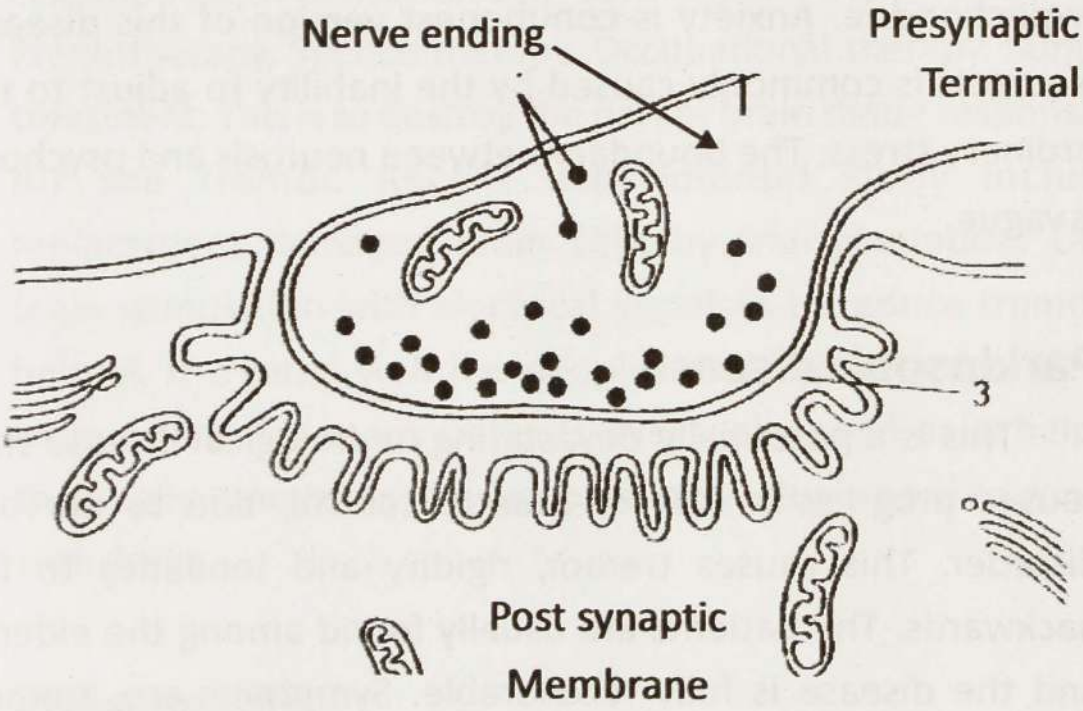

Fig: 13 Neuromuscular junction

Neuropathy

This is a disease that affects the peripheral nerves (net work of nerves running through the body connected with the central nervous system). A single nerve may be affected (mononeuropathy) or a group of nerves may be affected (polyneuropathy). The symptoms depend upon the type and the nerves affected.

Neurosis

This is an emotional or psychological disorder, usually manifested by anxiety, depression, phobia, hysteria or hypochondria. Anxiety is commonest version of this disease. Neurosis is commonly caused by the inability to adjust to the ordinary stress. The boundary between neurosis and psychosis is vague.

Parkinson's disease

This is a potentially devastating neurological disease that causes progressive loss of muscle control, due to nervous disorder. This causes tremor, rigidity and tendency to fall backwards. The patients are usually found among the elderly, and the disease is fully recoverable. Symptoms are, tremor, muscle rigidity and jerky gait, uncontrollable shaking, difficulty in starting to move, stooped posture and expressionless face, tremor on hand, arm and leg, constant trembling on both hands, develop dementia and depression. In later stages, speech, eating and writing become more difficult. Parkinsons's

disease is a progressive brain disorder resulting from a lack of Dopamine, the Neurotransmitter that smoothen the muscle movement. The disease appears due to the degeneration of the basal ganglia, which produce Dopamine, a chemical that acts with Acetylcholine to function in the muscle movement. In Parkinson's disease as the level of Dopamine in relation to acetylcholine is reduced, the muscle control is lost. The cause is not known, although genetic factors are probably involved. Certain drugs, including antipsychotic drugs (used to treat psychiatric illness as well as antisickness) and antivertigo drugs may cause Parkinsonism. Medical treatment: Drugs, such as Amantodine, Trihexyphenidyl, Carbidopa. Physical treatment: Physiotherapy, Speech therapy, Occupational therapy. Surgical treatment: This is to destroy the part of brain tissue responsible for the tremor. Recent experimental study includes replacement damaged brain cells by transplantation. Deep brain stimulation with electrical impulses to reduce tremor is helpful. If treated well the people can lead an active life for many years. But many patients eventually need daily help as their daily symptoms may become increasingly hard to control with drugs.

Poliomyelitis

This is an acute viral illness affecting males and females at any time of life, though most commonly before the age of ten. The Polio virus probably moves from gastrointestinal tract through nerve trunks to the central nervous system. Thus, it

may affect any part of the larger motor neurons in the brain stem and spinal cord, with subsequent loss of nerve supply to the muscle, causing muscular discomfort or cramps, sore throat and a stiffness in the neck. Proximal muscles, such as that of shoulder-arm or hip-thigh are involved more often than distal muscle, of the extremities. The leg muscles are affected more often than that of the arms. If the neurons of lower brain stem and the spinal cord at the throat level and above are affected, the patient develops paralysis of muscles used in swallowing and breathing. Obviously, it is life-threatening. Symptoms: The patient may complain of headache, fever, coryza (upper respiratory infection), head cold or running nose, loose stools, malaise, irritable, apprehensive and lethargic. Some have muscle paralysis with onset of symptoms; others become aware of loss of muscle function several weeks after the onset. Patients experience a muscle spasm or stiffness, and may complain of muscle pain, particularly if the muscle is stretched. Treatment: There is no specific treatment for acute Poliomyelitis. Muscle spasm has been treated with hot as well as cold compresses, and no one method has been universally beneficial. Today vaccination is accomplished with either the Salk vaccine (killed virus), which is given intramuscularly, or the Sabin (live attenuated virus) given orally. Now it is a routine immunization for all children.

Psychological problem

Psychological management includes: Promoting the patient's self-esteem by encouraging him to see that he still has a role to play and that he is valued. Promoting his emotional comfort, by reducing unnecessary distress such as anxiety, guilt, shame and depression is necessary. Promoting key relationships between the patient and his relatives and friends is also necessary so that they can be mutually supportive. Although patients may use denial to fend off the reality of their predicament, virtually all of them appreciate at one stage or another that their lifespan will be shortened. To cope up with the patients active listening is a very important therapeutic measure. Among other benefits it lets the patient know that he is accepted and valued and that he is not abandoned. An appropriate use of humour is an important aspect of management.

Psychosis

This is due to very serious state of mental ill-health, causing insanity. The sufferer loses touch with reality and may suffer delusions and hallucinations. This is a very personality disorder in which contact with reality is seriously impaired. Psychosis is the result of malfunction of the mind caused by brain injury or disease. The treatment of such mental disorders or psychological ailment is by concentrating upon and working through mind. There are several approaches of treatment including psychoanalysis, group therapy and behavioural therapy.

Schizophrenia

This is a typical mental illness characterized by withdrawal from reality. It is typified by gross distortion of reality, disturbance in language and breakdown of thought processes, perceptions and emotions. It generally begins in adolescents or young adults, and may be evidenced by withdrawal, hallucinations or discussions. No single cause is known but genetic factors are probably involved. Drug therapy has improved this situation markedly over recent years.

Senility (Senile dementia)

This is the condition of being old, specially a decline in the mental faculties, due to generalized atrophy of the brain. The result is a gradual deterioration with loss of memory, impaired judgment, confusion, emotional outbursts and irritability. In addition, senility may be characterized by slow speech, inability to concentrate, lack of concern about personal appearance, not doing the routine daily tasks, loss of appearance, anxiety, insensitivity to others and irritability or withdrawal.

Stress

Stress is a condition in which a force or influence tends to distort the normal physical or mental state of a person. Stress is recognized as the state when it is sufficiently intense as to be

beyond the ability of the body's regulating mechanism to cope with it. It follows that if one is in constant state of fear, he/she is in constant state of stress. He may get ill too. This is the stress-related illness. When faced with a stressful situation, the brain and the body respond by increasing production of certain hormones such as Cortisol and Adrenaline. These hormones lead to changes in heart rate, blood pressure, metabolism and physical activity, design to improve overall performance of the body. This activity makes the person to stay motivated and makes the body to be ready to "fight or flight". It is good to handle the stress confidently and successfully. Strees is not a disease. It is a reaction to the environment. It will induce the creation of the energy to succeed in competition. But excessive stress may be harmful. When stress exceeds physiological demand, it becomes pathological. Its means when stress exceeds certain limits it causes disturbances. During stress, brain signals for the release of the stress hormones and make a series of response that gives body extra energy. So blood sugar level rises, heart beat speeds up and blood pressure increases. The muscles tense for action.

THE FOLLOWING IS THE TARP METHOD TO ALLEVIATE THIS SITUATION:

T is for "Tune in" - Get into the habit of noticing early signs of stress.

A is for "Analyze" - Think about the source or causes of your stress.

R is for "Respond" - Deal with the causes of your stress and its effects on you.

P is for "Prevent" - Develop good stress-reduction habits.

Stroke

This takes place when a sudden disruption of blood supply takes place to an area of brain. Stroke may take place when there is a block in the artery leading to the brain or due to bursting of an artery in the brain. A cerebral heamorrage is most likely to occur when a patient has atherosclerosis in combination with hypertension. Haemorrage is also a danger when an aneurysm (blood filled pouch that balloons out from a weak spot in the artery wall) forms in a blood vessel. Sometimes the pressure from a mass of tissue (a tumour) can produce a stroke by squeezing a nearby brain vessel shut. When the blood supply is cut off injury to the brain cells occurs. The parts of the body controlled by this part of the body will undergo paralysis. This is usual in legs or arms. Symptoms: Headache, numbness, faintness, lapse of memory, slurring of speech or sudden clumsiness. Treatment includes assessment and nature of brain damage, intensive rehabilitation and to recover it even partially by physiotherapy. Smoking, high cholesterol levels are both significant contributing factors.

13. Parasitic diseases

Ancylostomiasis (Hookworm disease)

This is a human disease in which the lining of small intestine becomes heavily infested with adult hook worm, *Ancylostoma* sp., causing lethargic anaemic state. The worm inhabits duodenum and upper jejunam. Clinical significance will be seen when infestation is moderate or heavy. Eggs are passed out with stools. They hatch out in moist soil and produce the larvae. They can penetrate the feet of the victim and infect. The young parasites then penetrate the walls of the bowel, enter the blood stream, and finds its way to the intestine.

Elephantiasis

This is due to Nematode infection. Most likely sites for the symptoms of filariasis are the legs, producing the swollen skin and subcutaneous tissues is known as elephantiasis. Such enlargement of skin and underlying connective tissues due to inflammation and blocking vessels is due to parasitic worms filariae *Wuchereria bancrofti* (Nematode), which are carried to man by mosquitoes. The blockage of the lymph ducts causes gross swellings of the surrounding tissues results in forming the limb to appear like an elephant leg. Diagnosis of the disease confirmed by finding tiny worms in the lymph at certain times at night, preferably by mid night. Treatment and prevention are by proper medication and eradication of the mosquitoes.

Filariasis

Filariasis is caused by parasitic worms (Nematoda) namely, *Wucheraria bancrofti* and *Wucheriria malayei* of family Filaridae. The vectors are: *W. bancrofti* is essentially transmitted by *Culex pipiens fatigens (Culex quinquefasciatus)* and also *Anopheles* sp. The principle vector mosquitoes of *W. malayi* are members of *Mansonia* group. In the life cycle, the male (40mm in length) and female (80-100 mm in length) are found in the peripheral circulation of the lymphatics. Here, great number of minute micro filarial worms are born. The microfilariae manifest a nocturnal periodicity and they are present in the peripheral blood of infested persons, principally during the hours from 8.00pm to 2.00am. The microfilariae successfully reach the stomach of the mosquito; they undergo development and leave the stomach and settle in the region of head and labium of the mosquitoes, awaiting for an opportunity to slip down. Symptoms: Low-grade fever with chills and sweating, headache, nausea and muscle pain. The patient also may feel sensitive to bright lights. The appearance of red swollen skin areas with tender spots indicate the spread of thread like worms through the lymphatic system. Treatment: An oral medication, diethylcarbamazine, is available to kill the larvae in the system. The drug has limited value in destroying the adult worms. Other therapeutic measures include bed rest, and use of antibiotics to control secondary infections. Occasionally surgery is carried out, but interfere with the activities following recovery.

Giardiasis

This disease is caused by the parasitic flagellates, *Giardis lamblia* and *Giardia intestinal,* which inhabit the small intestine. Although, they are usually harmless, they may cause diarrhoea. They are contacted from untreated drinking water. The disease is treated by medication.

Leishmaniasis

This is a tropical disease (in Africa, Asia, South America and the Mediterranean) caused by the parasitic Protozoa, *Leishmania* which is transmitted by sand flies by biting. There are several forms of Leishmaniasis. A major type is found in tropical and subtropical areas. Severe pimpling and ulceration can occur on face, arms and legs and may include nose and throat. Another species of *Leishmania* causes a lethal "visceral" form of disease in Africa and Asia, in which infection of the spleen, liver and other organs occur producing symptoms of "Kala - azar" and "Dim - dim fever".

Loiasis

This is third variation of filariasis called Loiasis. It is carried from man to monkey or from monkey to man by a biting fly. The larvae develop into adult worms that migrate under the skin and sometimes through the eye. Migration of a worm through the skin causes swelling, irritation, and redness. The disease is

treated with drugs to kill the larvae, as well as by antihistamines and, occasionally, surgery has to be performed to remove the adult worm.

Malaria

Malarial infection takes place by the vectors *Culex* and *Anophelis* species of mosquitoes. The developing stages of malarial parasites, *Plasmodium vivax* attack the liver and carried in the blood before inoculating to another host. Tropical disease caused by one of the genus *Plasmodium* and carried by infected mosquitoes of the genus *Anopheles. Plasmodium falciparam* causes malignant tertian malaria. *Plasmodium vivax* causes benign tertian malaria and quartan malaria. Signs and symptoms are caused by the presence in the blood cells of the Erythrocyte stages of the parasite. In the *falciparam* malaria only the blood shows the parasite existence. There is persistent infection in the liver (the extra erythrocytic or EE form) in the *Vivax* malaria. It is a factor responsible for relapse. The clinical features are recurring rigors, anemia, toxaemia and splenomegaly. Malaria disease is transmitted by *Anopheles* mosquito which takes in *Plasmodium* gametocytes when feeding on man. The gametocytes develop into male and female gametes in the mosquito stomach wall, encyst, and give rise to thousands of sporozoites which then migrate to the salivary glands. The sporozoites are transferred to man at a subsequent blood meal during which anticoagulants are injected with the

saliva to prevent blood clotting. The sporozoites invade human liver and give rise to bouts of fever "malaria". Gametocytes arise from the merozoits which invade the red blood corpuscles, grow within them, and are withdrawn by the mosquito during feeding to complete the life cycle. Once injected into the blood the organisms concentrate in the liver where they multiply and then re-enter the blood stream, destroying the red blood cells. This releases the parasites, causing shivering, fever, sweating and anaemia. Drugs are used both to prevent infection, although these may not be totally effective. The drugs are used to prevent the development of the blood parasitic stages, which are causing the illness, are called schizonticides. The most widely used schizonticide is Chloroquine, which is a synthetic compound of the '4-aminoquinoline' group, Amediaquine which is a 4-aminoquinoline with a molecule which has some resemblance to chloroquine and some to quinine which is powerful as chloroquine. Efforts to control malaria have centered on destruction of the mosquito and its breeding sites.

Onchocerciasis

This is a type of filariasis that causes blindness, This is transmitted by a species of black fly that introduces or pick up the worm larvae while biting. The worm works their way through the skin to the lymphatic system but tend to migrate to eye structures. Black fly filariasis, also called Onchocerciasis, occurs most frequently in Africa and Southern America.

Old world cutaneous leishmaniasis

This is milder form, occurs in India, west ward to the Mediterranean countries and north Africa. An ulcer appears at the site of the Sandfly bite, usually several weeks after the bite, but it heals during the period from three months to a year. The American cutaneous Leishmaniasis usually begins with one or more skin ulcers, resulting from Sandfly bites. Therapy for Lishmaniasis includes medication.

Round worm infection

This is due to *Ascaris lumbricoides,* parasitic on man. The adult lives in intestine. Eggs are passed with the stool of the infected person. Taking of food contamination with eggs, or using unclean food to eat, results in infestation. Heavy infestation is unpleasant and frightening. Heavy infection can produce pneumonia. A tangled mass can cause infestational obstruction or appendicitis. The best drug for treatment is mebendazole.

Schistosomiasis or Bilharziasis

This is a parasitic infection caused by blood fluke, *Schistosoma*. This enters through the skin from infected water. The adult then settles in blood vessels of the intestine or bladder. The fluke can live in one part of the body, depositing eggs frequently for many years. *Schistsoma* has water snail as a secondary host.

Transmission is effected via urine. Heavy infection can produce pneumonia, body pain followed by dysentery and anaemia, leaving the patients weak and highly susceptible for infection. Subsequent release of eggs causes anaemia, diarrhoea, dysentery, enlargement of the spleen and liver and cirrosis of the liver. Prevention of this disease is by chlorination of drinking water, proper disposed of human waste and eradication of fresh water snails. The disease can be controlled with drug Praziquantal. *Schistosoma haematobium* is found mainly in Africa and the Middle East. *Schistosoma japonicum* is found in Japan, the Phillippnines and Eastern Asia. *Schistosoma mensoni* is indigenous to Africa, Middle East, the Caribbean and South America.

Sleeping sickness

This is the infection of the genus *Trypanosome* including African seeping sickness. The Tsetse flies, Dipteral (Muscidae) *Glossina palpalis* (vector)-*Trypanosoma gambiense* (causal agent) ; *Glossina palpalis* (vector) *Trypanosoma rhodesians* (causal agent). Gambian sleeping sickness tends to be mild and endures for months. As a result man becomes of great importance as the reservoir of the disease. In Rhodesian sleeping sickness, the progress is much more rapid and the patient is too sick to leave this village, assumes less importance

as a reservoir. In the life cycle, the ingested *Trypanosomes* (5% only) undergo propagative development within the Arthropod to form the Crithidial forms and then into short Metacyclic forms. These are the infective forms. They keep on arriving from the proventriculus to the salivary glands by way of Hypopharynx. The infection may take place directly from the buccal cavity or from the salivary secretion at the time of biting. Then after some time (possibly years) sleeping sickness itself develops. This is due to parasites occupying minute blood vessels in brain resulting in damage, drowsiness and lethargy. This fatal infection of nervous and lymphatic system that is endemic in certain part of Africa. The major difference between Gambian and Rhodesian forms of African sleeping sickness is that Rhodesion variety, which has similar symptoms, is more acute and progresses more rapidly than the Gambian. Even with the intensive treatment Rhodesian sleeping sickness patients have only a 50 - 50 chance of survival while, 90 - 95 present of the Gambian sleeping sickness patients recover when properly treated for the disease. Several chemotherapic agents are available for treatment of sleeping sickness.

Taenia infection

This is due to parasitic worm, Cestodes or Tape worms. When swallowed partially cooked pork, the eggs develop into larvae in man's intestine, *Taenia solium* lives in the intestine

using the nutrients of the man. Pig is the intermediate host. *Tania saginata* larvae present in infested, undercooked flesh. In man (definite host) they develop into the adult tape worm in the intestinal lumen. They develop four suckers which help itself to get attached to the gut wall. *Taenia solium* resemble *Taenia saginata,* but *Taenia solium* has hooklets as well as suckers.

Thread worm infection

Tiny thread-like worm, *Enterobius vermicularis* infest man's intestine. Female migrate to anus to lay eggs: Thus makes re-infestation and spread easily with much possibility. When infected, treatment should be done to the entire family. The hygienic condition should be improved to prevent infestation. A further course after 10 day interval is necessary.

Toxocariasis

This disease is caused by the larvae of round worms which normally infect the domestic dog *(Toxicare canis)* and cat *(Toxicare cati)*. They are passed to man by swallowing materials contaminated with eggs in infected faeces. The most affected are the children. Once they are swallowed, the larva hatch out from eggs, travel around the body. It can do considerable damage to lungs and liver. The larva may produce an inflammation in the retina and produce an abnormal granulated tissue called granuloma. Symptoms: muscular pain, fever, skin rash, respiratory.

Trichinosis

A disease caused by eating undercooked pig meat infected with *Trichinella spiralis* (the trichia worms). The female worms living in small bowel produce larvae, which invade the body. It forms cysts in skeletal muscles. The symptoms are, diarrhoea, nausea, colic fever, facial muscular pain and stiffness.

Trichomoniasis

Infectious disease caused by a protozoan organism which either attacks the digestive system causing dysentery *(Trichomonas hominis)* or causes vaginal inflammation and discharge *(Trichomonas vaginalis).* In the later case the infection can be transmitted to a male sexual partner.

Whip worm infection

This is due to the infection of round worm which infests the intestine of man in humid tropics. Eggs are excreted in the stool. The worms do not normally produce symptoms, but produce heavy infestations, of over 1000 worms. It causes bloody diarrhoea, anaemia and prolapse of the rectum. Treatment is not always successful but recently Thiabendazale has cleared the infestation in about 50% of patients treated.

14. Reproductive diseases

Abortion

This is the forcing out the incompletely developed embryo or foetus (Fig: 14) from the mother's uterus or womb. In complete abortion, the tissues surrounding the embryo or foetus are also expelled. Abortion can occur in pregnant women between the time fertilized egg attaches itself to the wall of the uterus and the time the foetus is 28 weeks old. Naturally occurring abortion is spontaneous abortion or miscarriage, in which the abortion occurs because the uterus has rejected the abnormal embryo or foetus, due to mother having an injury, a disease or a deficiency of a certain hormones. An induced abortion is one that is caused deliberately. It is called a therapeutic abortion which is performed by a physician because the life or health of the mother would be endangered if the pregnancy were to continue. Induced abortions are also legal in a number of other countries, where they are often considered as one of the birth control measures. Criminal abortion is the intentional evacuation of uterus by other than trained personnel or when abortion is prohibited by law. Habitual abortion, the recurrent abortion takes place when abortion recurs in successive pregnancies. Inevitable abortion is that in which the termination of pregnancy cannot be prevented.

Missed abortion takes place when the foetus dies. Septic abortion is associated with uterine infection and the rise of body temperature. Threatened abortion is due to slight blood loss through vagina whilst cervix remains closed, accompanied by abdominal pain. Tubal abortion is an ectopic pregnancy in which the foetus dies and is expelled from the fallopian tube. The termination of pregnancy cannot be prevented.

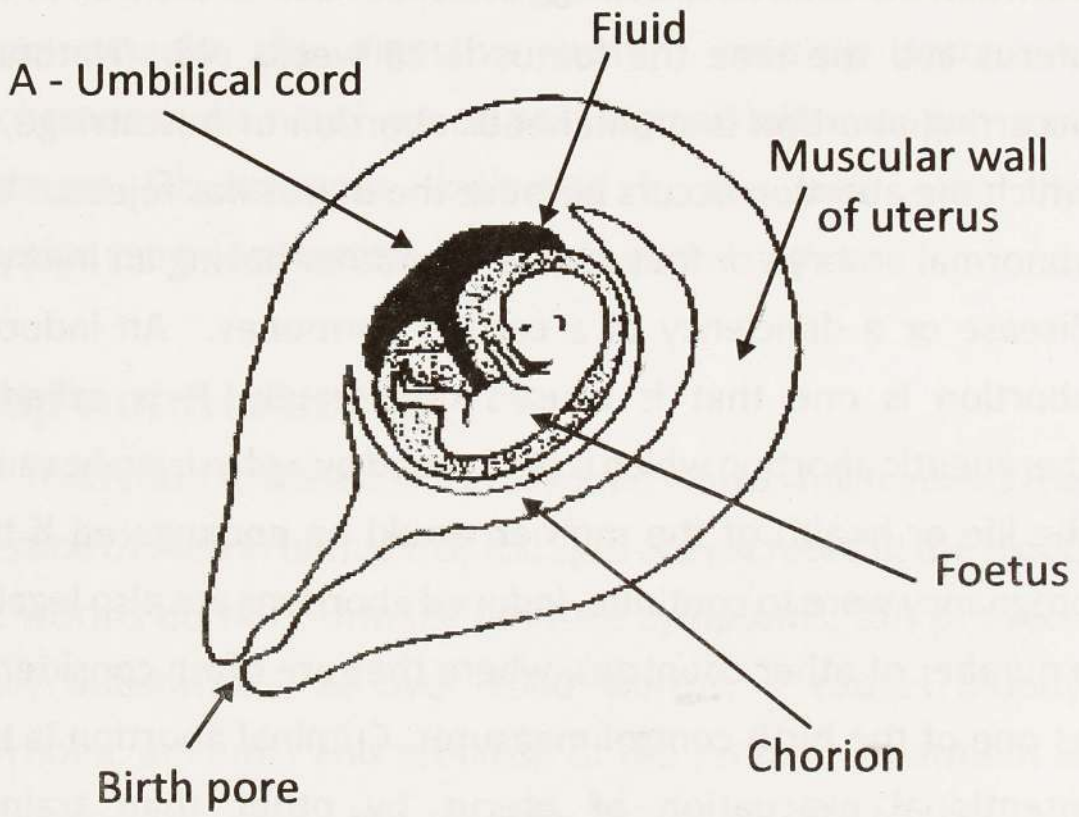

Fig: 14 A foetus

Amenorrhea

Primary amenorrhea is a condition in which menstruation has never occurred. Secondary amenorrhea refer to a cessation of menstruation in women who has previously been menstruating. The mothers who fully breastfeed and maintain frequent, intense feedings are less likely to ovulate. Women may experience lactational amenorrhea as far as brief as 2 to 3 months or as long as 2 to 3 years. If a women is completely breast-feeding and has no return of bleeding, lactational amenorrhea can be used for contraception for 6 months with a 2 percent risk of pregnancy.

Birth defect

This is due to abnormality at birth that causes physical or mental disfunction. Such abnormalities and diseases are called congenital. Such birth defects include mongolism, cleft palate or presence of extra finger. Some of them are not apparent until months or years after birth, such as cystic fibrosis, diabetes mellitus, phenylketonaria, hemophilia, sickle cell anaemia, heart disease and deafness. The causes for such defects are unknown, but the majority have been found to be the result of heredity, unfavourable condition in the foetal environment, or of a combination of both heredity and environment. For unknown reasons, women more than 40 years old are more likely to give birth to babies with birth defects than younger women. Apart from the genes that are passed from parent to

offspring, which controls the physical appearance conditions affects the foetus, when the mother has nutritional deficiency, chronic illness (such as tuberculosis; viral infection; German measles), exposed to x-rays, taken drugs such as tranquilizers, sleeping pills and pain killer without proper medication. These are harmful during for the first three months of pregnancy. A tragic example is that, the use of sedative called thalidomide resulted in thousands of babies rendered deformed; many without arms or legs. By proper testing of the newborn having such defects can be treated medically by special diets and drugs or by surgery to make repairs. Screening test for about one minute is a quick assessment of the newborn's status.

Breech birth

The head of the foetus acts as a wedge and assists in cervical dilation. If another part of the baby's body instead of the head is against the cervix, the result is called a breech birth and the cervix is less effectively dilated. If the body approaches the cervix feet first, the cervix may not dilate enough to permit the head's passage. If a breech birth or some other complication arises, the baby may be delivered by Caesarean operation, which involve cutting directly into the abdomen and uterus to remove the baby. It is said to be named after Caeser, who is supposed to have been born in this way. When delivery is accomplished extra-peritoneally, the term "low cervical caesarian section" is used.

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Ectopic pregnancy

This defined as the pregnancy that results from the implantation of an embryo outside the uterine corpus. It is life-threatening because of their typically delayed diagnosis and its potential for intense haemorrhage with rupture. Ectopic pregnancies occur in between 1 in 80 and 1 in 300 of all pregnancies. Tubal damage which usually results from tubal infection is probably the biggest single risk factor for ectopic pregnancy. Infections mostly by *Chlamydia trachomatis* or *Neisseria gonorrhoeae,* can lead to intraluminal tubal scaring, fibrosis or narrowing with destruction of normal ciliary function. The changes are often associated with peritubular adhesions that further increase the risk of an ectopic pregnancy. The sites of ectopic pregnancies are: Cornual (interstitial) 2%; abdominal 0.5%; ovarian 0.5%; cervical 0.1%; tubal 97% (ampullary 55%, isthmic 25%, infundibulum and finbria 18%; interstitial 2%). The major problem of abdominal pregnancy is the placenta, which is often attached to bowel mesentery. Because of the risk of severe, the placenta is haemorrhage associated with attempted removal; the placenta is drained of blood and left intra-abdominally in these cases. Treatment: Surgical intervention is the standard treatment of ectopic pregnancies.

Impotence

This is the inability to participate in sexual intercourse due to lack of erection of the penis or premature ejaculation of semen. Erection is achieved by parasympathetic nerve-induced vasodilatation of arterioles that allow blood to flow into the corpora cavernosa of the penis. Erection is controlled by two portions of the central nervous system-the hypothalamus and the sacral portion of the spinal cord. The erection may not take place due to some reasons of this nature. The approximate volume of semen for each ejaculation is 1.5 to 5.0ml. 45%-80% of the bulk of this fluid is produced by the seminal vescicle and 15%-30% is contributed by the prostate gland. The sperm concentration below about 20 million per milliliter is termed oligospermia (oligo=few) and is associated with decreased fertility. A total sperm count below about 50 million per ejaculation is clinically significant in male infertility. In addition to low sperm count as a cause for infertility, some men and women have antibodies against sperm antigens. Such antibodies do not appear to affect health, but do reduce fertility.

Infertility

This is the condition in which a couple are unable to produce offspring naturally. In female, the infertility (30%) is due to under active condition of pituitary gland or polycystic

ovary syndrome which produces no ova. The ova are not matured or mature ova are not able to be released. More important problem (50%) is the transport of ova, which causes due to abnormalities of fallopian tube, pelvic disease, previous surgery or endometriosis. It is due to any one of the reasons, as such the ova cannot reach the uterus. The next reason is (10%) the uterine problem, of developing fibroid in the uterus, abnormality of the uterus or adhesions nature of the uterus. It is due to these reasons, that the fertilized ovum would not be able to develop properly. The male partner may also contribute to infertility due to low sperm count or other deficiency in spermatozoa or due to his impotence which is unable to have sexual intercourse due to no penile erection or due to ejaculation taking place before erection. These disorders may be due to a condition of disease (Diabetes or endocrine gland disorder or due to psychogenic, psychological or emotional problems such as anxiety, fear or guilt). Treatment for infertility may be by drug therapy, surgery or more recently by in vitro fertilization (test tube baby or cloning).

Leucorrhoea

This disease is the discharge of a white or yellow coloured mucus from the vagina. It may be a normal condition, increasing before and after menstruation. But large discharge probably

indicates as infection somewhere in the genital tract. A common cause is the infection due to thrush but it may also be due to Gonorrhea in which case the treatment will differ.

Paraphimosis

The skin of the penis, specially the glans of penis, is well supplied with sensory receptors. A loose fold of skin called prepuce or foreskin, covers the glans of penis. In the case in which the prepuce is "too tight" to be moved over the glans of penis, the foreskin contracts on the penis behind the glans, and cannot be easily moved up and down (Paraphimosis). Under the circumstance, circumcision is necessary. Circumcision is accomplished by surgical removal of the prepuce. There are a few compelling reasons for circumcision, which are medically related. Uncircumcised males have a higher incidence of penile cancer, but the underlying cause appears to be related to chronic infection and poor hygiene.

Pelvic inflammatory disease (PID)

This is a bacterial infection of the female pelvic organs. It usually involves the uterus, uterine tubes or ovaries. A vaginal or uterine infection may spread throughout the pelvis. PID is commonly caused by Gonorrhea or Chlamydia, but other bacteria can also be involved. It is due to infection carried

elsewhere. For example, infection of appendix may spread or as infection carried by the blood to pelvic region. Early symptoms of PID include increased vaginal discharge and pelvic pain. Early treatment with antibiotics can stop the spread of PID, but lack of treatment results in life-threatening infection. PID can also lead to sterility. But surgery may sometimes necessary to remove disease tissues.

Salpingitis

This is the inflammation of a tube, usually the fallopian tube by bacterial infection. It may originate in the vagina or uterus or be carried in the blood. Tubal damage, which usually results from Salpingitis is probably the biggest single risk factor for ectopic pregnancy. Severe cases may cause a blockage of the fallopian tubes resulting in sterility.

Vaginitis

This is the inflammation of the vagina due to infection or deficiency of diet. The inflammation may obliterate the vaginal canal. This is due to a ciliated protozoa, *Trichomonas vaginalis*, which normally inhabits the bowel. This causes itching, discharge and pain on urination.

Venereal disease (VD)

This is one of several highly contagious diseases contracted by sexual intercourse with infected persons. Syphilis and Gonorrhea are the most common venereal diseases. *Treponema pallidium* (a Spirochaete bacterium) causes Syphilis. Within a few hours after exposure the syphilitic germs penetrate the skin or mucous membranes and enter the blood stream and tissues. The first sign of infection is a sore. It appears in about three weeks after contact at the entrance. The sore heals in two weeks time but the germs remain in the body. Two months later, secondary stages appear. In its later stages syphilis may lead to degeneration of the brain, paralysis due to spinal damage or destruction of any part of the body. Symptoms: Mental retardation, skin eruptions, eyes inflammations and poorly developed teeth and bones. Syphilis can be cured if treated in its early stages with penicillin.

15. Respiratory diseases

Acute bronchitis

Upper respiratory viral infection frequently spreads down the airway to involve the mucosa of the bronchi. The child has a troublesome cough which is initially dry but becomes productive after a few days. There is little to find on examination apart from a mild pyrexia. If the child is obviously wheezing, this is almost certainly an asthmatic attack precipitated by a viral infection in a susceptible subject. Primary bacterial bronchitis, with the exception of whooping cough, is rare in childhood and antibiotics are not indicated unless secondary infection is suspected. Night time cough suppressants, for example, linctus codeine, are useful particularly in the early stages of the illness.

Adult respiratory distress syndrome

This is a condition of severe respiratory failure, brought about by a number of different disorders. This is due to a lack of oxygen in the blood, which exhibits a blue tinge to the skin. In addition there will be rapid breathing and pulse rate. The syndrome may be caused by physical damage to the lungs, by infection or by an adverse reaction; following surgery or transfusion. It is often fatal. Artificial respiration and artificial heart beat (Cardio Pulmonary Resuscitation) is necessary for normal functions (Fig: 15).

Fig: 15 Process of Cardio Pulmonary Resuscitation

Asphyxia

This is a respiratory disorder, characterized by difficulty in breathing. This is a condition in which breathing eventually stops and oxygen fails to reach tissues and organs. It occurs as a result of drowning, strangulation and breathing poisonous fumes. It can result from obstructing the air passage either by strangulation or a foreign body.

Asthma

This disease is characterized by wheezing and difficulty in expiration because of muscular spasm in the bronchi (Fig:16). Recent advances in immunology reveal that the most cells in bronchial walls produce immunoglobin in encouting pollen grains, when another grain is inhaled, the alveolar mast cells burst producing as asthmatic attack. The common inciting factors are pollens, hair from pets, house dust, moulds and certain food (especially shell fish). Although reaction initially occurs within the blood stream, major effect is felt within the lung which is the target organ. Usually two types of asthma are distinguished; namely allergic and infectious. The infectious asthma resembles bronchitis, with cough and much wheezing as well. Most allergic asthma is seen in children.

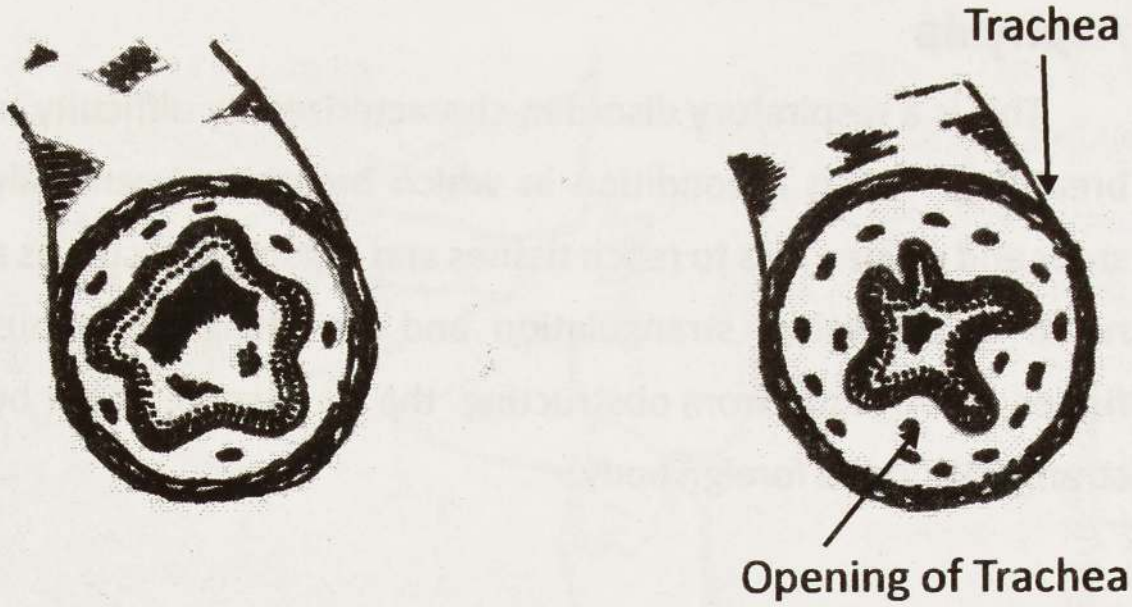

Fig: 16 Cause of Uncomfortable Breathing: narrow opening of the trachioles (Dyspnoea)

CAUSE OF UNCOMFORTABLE BREATHING (DYSPNOEA)

Sudden:

Pneumthorax

Pulmonary oedema

Plumonary embolism

Aspiration

Anaphylaxis

Anexiety

Chest trauma

Acute (hours days)

Asthma

Respiratory tract infection

Lung tumours

Pleural effusion

Metabolic acidosis

Chronic (months-years)

Chronic airflow limitation (CPOD)

Cardiac failure

Fibrosing alveolitis

Anaemia

Arrhythmia

Valvular heart disease

Chest wall deformities

Neuromuscular disorder

Cystic fibrosis

Pulmonary hypertension

Croup

This is a group of diseases characterized by a swelling, partial obstruction and inflammation of the entrance to the larynx. This mostly occurs in children. The breathing is harsh and strained resulting in a typical crowing sound accompanied by coughing and feverishness. Complete block is rare and is not always dangerous. Croup is the inflammation of the larynx

Cystic fibrosis

This is a hereditary disease affecting mainly the respiratory system and sweat glands. It develops in children only. The cystic fibrosis produce abnormally a sticky mucous which clogs the air passage, causing frequent respiratory infections.

Dyspnoea

This indicates the difficulty in breathing; both inspiration and expiration. Breathing process becomes uncomfortable for the patient concerned. The speed of onset is a useful indicator of the disease process. Many cardiac or respiratory diseases of sufficient severity produce dyspnoea. When approaching a patient with dyspnoea, it is important to ensure the air way, breathing and circulation (ABC) are attended to before continuing with the diagnostic process. Dyspnoea resulting from cardiac failure may be relieved by sitting upright. If due to asthma, beta agonists may be useful.

Emphysema

This condition is due to an abnormal condition of the lung's walls which are over inflated and distended and change their structure. The inflammation is due to swelling and excessive mucus production associated with bronchitis and other diseases that traps air in the lungs. This results is loss of effectiveness in moving air in and out of the lungs. This causes extra strain on the heart. This condition appears due to whooping cough, bronchopneumonia and chronic bronchitis.

Hiccup

This is due to sudden intake of air in the throat with closure of the glottis causing a sound which is peculiar. The hiccup originates with irritation to a nerve that causes an involuntary spasm of the muscle of the diaphragm. The spasm causes a sharp intake of air that is stopped by sudden closure of the glottis at the back of the throat. The irritation to the phrenic nerve is usually caused by eating or drinking too fast. Unless an attack persists, the hiccup is of little significance.

Hyperventilation

This is the process of breathing at an abnormally rapid rate when at rest. This is due to the response to stress. This may result in unconsciousness because the concentration of carbondixide level in the blood is abnormally high. This is due to impaired gas exchange in the lungs, causing Pulmonary oedema ('water logging' of the lungs), pneumonia and hyperventilation. Ultimately, this may cause serious consequences.

Hypoventilation

This is the abnormal slow rate of shallow breathing which may result from injury or effects on drugs on the respiratory centres of the brain, leading for an increased carbondioxide in the blood and decrease in oxygen. Eventually this leads to death due to a lack of oxygen supply to cells and tissues.

Hypoxia

This is a condition of lack of oxygen in the body. Lack of oxygen in the body may be caused by a lack of sufficient oxygen in the air breathed,(as in mountain climb or flying at a high altitude) and disease of the lungs. That prevents oxygen from reaching the blood, a reduction in blood circulating to the lungs due to heart failure or an obstruction of the blood vessel in the lungs.

Laryngitis

This is inflammation of the larynx due to infection of the larynx. This may cause hoarse or grating voice, or occasionally a complete loss of speech. Laryngitis may be caused by infection accompanying cold or flu from irritation of the mucous membrane on the larynx, as by smoking, dust, air pollution or from straining voice. Acute laryngitis accompanies infection of the upper respiratory tract. Chronic laryngitis may be due to recurrence of acute form.

Laryngo-tracheobronchitis

This is the acute inflammation of the major parts of the respiratory tract. This causes shortness of breath, a croup-like cough and hoarseness. It occurs usually through viral infection especially in young children. This may cause severe obstruction in breathing. Treatment is by antibiotics.

Pleurisy (Pleuritis)

The lungs obtain from the air, and the oxygen is absorbed by the oxyhaemoglobin of the blood and pass to the entire body organs. Sometimes the inflammation of the pleura, the membrane that covers the outer surface of the lungs and the inner surface of the chest cavity may take place. This results in shortness of breath. The pleurae lubricated by pleural fluid, serve to reduce the friction of chest membranes moving against one another as the lungs expand and contract. Dry pleurisy describes the condition where the infected pleurae rub against each other. Wet pleurisy is characterized by a condition in which fluid from the infected tissue fills the space between the pleural cavity or, effectively, between the lungs and the wall of the chest cavity. In either case, breathing is painful and difficult. Pleurisy is often due to pneumonia and is always associated with disease in the lung, diaphragm, chest wall or abdomen, such as tuberculosis, abscesses, bronchial carcinoma etc.

Pulmonary embolism

This is condition rivalling the blocking of the pulmonary artery or a branch of it by embolus (usually a blood clot). The seriousness of the attack relates to the size of the clot. Large pulmonary embolus can be immediately fatal. Smaller ones may cause death of a part of lung. Several embolisms may produce pulmonary hypertension. Anticoagulant drugs are used in minor cases.

Pulmonary hypertension

This is a condition in which due to an increase in blood pressure in the pulmonary artery (Fig: 17), there is an increase of resistance of the flow of the blood. The cause is usually disease of the lungs such as Bronchitis, Emphysema, Pulmonary embolism etc. The result is that the pressure increases in the right ventricle. When this enlarges, there will be a pain with possibility of heart failure.

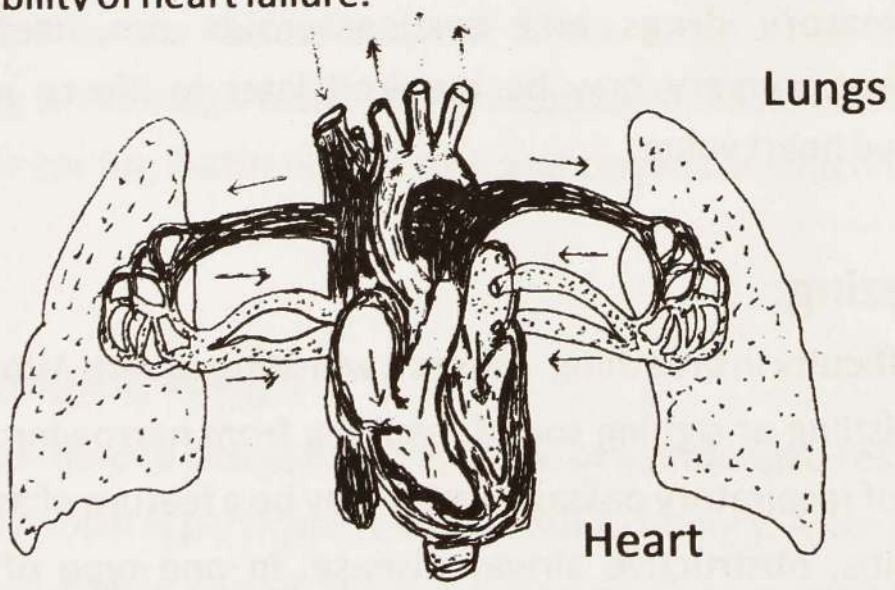

Fig: 17 Circulation of blood between heart and lungs

Respiratory arrest

This is the cessation of breathing. The most common causes of respiratory arrest are overdose of narcotics, electric shock (which can cause paralysis of the nerve centre that control breathing), stop or alter the regular beat of the heart, suffocation or drowning.

Rheumatic fever of respiratory tract

This is a severe disease affecting children and young adults. The upper respiratory tract is infected with bacteria known as Hemolytic streptococci. Symptoms: fever, joint pain and arthritis which progress from joint. The condition may lead to rheumatic heart disease in which there in scarring and inflammation of heart structures. There is sometimes a need for heart valves to be replaced in later life. The initial treatment consists of destroying the Streptococci which cause the disease. The antibiotic drugs such as penicillin, non-steroidal anti-inflammatory drugs and corticosteroids are useful. In treatment, surgery may be required later in life to replace damaged heart value.

Wheezing:

Difficulty in breathing causes a whistling sound. Wheezing is a whistling or sighing sound resulting from narrowing of the lumen of respiratory passageway. It may be a feature of asthma, bronchitis, obstructive airway disease, in one type of heart

failure and rarely in tumours, foreign obstruction and allergy. What really happens in wheezing condition is, that tiny tubes leading to the lungs become narrowed due spasm of the muscles of the bronchioles, swelling of the inner lining and excessive secretions of mucus plugging those tubes. Hence, there is difficulty in breathing during an attack. Most of the sufferers had their first attack in childhood. Many young children are prone to wheezing in the early years, but outgrow this as they mature. Wheezing can be caused by three factors, namely allergy, emotional factors and infection of the respiratory tract. Treatment: Long term treatment includes breathing exercises Isolation from any allergies (allergy producing agent), for example, a change of the environment, occupation etc. Specially in case of children, teaching of good breathing habits, by fully expanding their lungs with each breath, swimming is also a beneficial exercise because breath control is important in this activity. Prevention: This must be directed by the factors relevant to the onset of an attack. If allergy is the major factor, as far as possible, avoid contact with dog or cat fur, feathers, soft toys and carpets in which the mite lives.

Whooping cough

Bordetella pertussis is the cause of a prolonged respiratory illness which is particularly dangerous in infancy. After a seven-day incubation period, there is a 'catarrhal'stage lasting one to

two weeks, during which the child is unwell, with signs of upper respiratory tract infection. A cough develops which becomes increasingly severe and paroxysmal. Spasms of coughing may be followed by an inspiratory 'whoop', especially in older children. Vomiting may occur, and the child can become cyanosed or abnoeic during coughing spasms there may be no obvious respiratory difficulty and the lungs are clear on examination. This phase lasts four to six weeks, and the cough gradually improves over another two to three weeks. The causative organism is cultured in early cases from a nasopharyngeal swab using Bordet-Gengou medium, but is difficult to isolate once the cough is established. A striking lymphocytosis supports the diagnosis. The treatment is largely symptomatic and careful nursing. Oxygen, suction and tube-feeding may be necessary. Erythromycin given in the catarrhal stage may abort or modify the illness but the result is often disappointing. Its use in infants contacts is justifiable. No drugs prevent the spasms once the disease is established.

16. Skleletal diseases

Arthritis

This is a disease of connective tissues causing inflammation of one or more joints and related tissues (Fig: 18). Movement of the afflicted joint usually causes pain. The tissues around the joint are red, warm, swollen, painful and tender. Arthritis can lead to destruction of bone or surrounding tissues, which can result in deformity and loss of movement. The most painful Rheumatoid arthritis is in the knuckles and finger joints. The soft tissues that line the joints become inflamed. Weakness, fatigue and stiffness of the entire body are noted especially upon arising in the morning. It can attack any man, woman or child and it is a chronic on long term disease. The cause is unknown. Treatment: rest, exercise, heat treatment and use of selected drugs such as cortisone or related drugs and aspirin. Osteoarthritis is usually mild but sometimes painful, occurs with advancing age. The cause is not known, heredity is believed to be an important factor. The weight bearing joints in knees, hips and spine, joints nearest finger tips are affected. The cause is a roughening and thinning of cartilage (a hard flexible tissue). Symptoms include painful joints that have hard or bony swellings. It usually does not cause weakness or generalized body pain. Even the heat and redness of the affected joints are

uncommon. Treatment: application of heat to the joints, mild exercise, pain reducing drugs, cortisone or related drugs and connective bone surgery. Infectious arthritis is caused by those that cause tuberculosis, pneumonia, gonorrhoea, and streptococcal and staphylococcal infections. This arthritis can be usually cured by the use of antibiotics. Rheumatic fever can result in arthritis, but this type is seldom permanent. Gout is a type of arthritis characterized by an excess of uric acid in the blood. There are various types of arthritis, but they are relatively uncommon. A chronic arthritis called still's disease, affects children causing arthritis in several joints with fever and red rash.

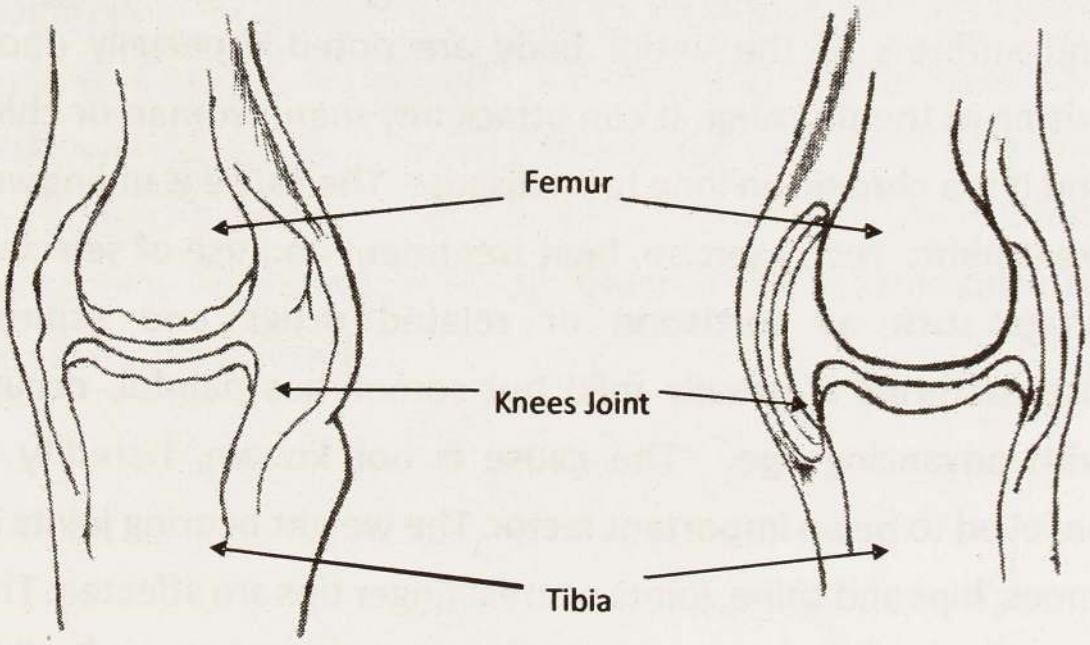

Fig: 18 Inflammation of knee joint

Back Pain

This is the pain in the back, which is due to mechanical/ structural problems including fractures, muscle strain or pressure on the nerve. The most common type is in the lower part of the spine, especially at the sacroiliac joint (the region where the spine joints the pelvis). This is due to constant strain on the spine. Primarily the pain is due to the strains of ligaments around the back joints. Sometime one of the discs of cartilage that lie between the vertebrae is ruptured and protrudes into the spinal cord. This condition is commonly called "slipped disc", which may give severe pain. If the disc presses upon the sciatic nerve (that leads to the thighs, legs and feet), sciatic neuritis (popularly called "sciatic"), a condition of extreme painfulness along the nerve results. The other causes may include tumours, bone disease such as osteoporosis, pain from ulcer, inflammation and spondylitis (inflammation of one or more vertebrae). Treatment: Surgical, heat treatment, ultra sound medication etc.

Dislocation

A bone that is dislodged from its joint is said to be dislocated. This is also due to twisting of the normal position of the bone. When one or more of the bones forming a joint, slip out of the normal position, the ligaments holding the bones are stretched and sometimes torn loose. A dislocation may be caused by a blow or by twisting the joint. Due to the danger of the damage to the muscles, blood vessels, ligaments and nerves, a dislocation should be treated only by a physician.

Fracture

Any break or crack in the bone is said to be a fracture. Fractured or broken bones may also result from blows or twists. In a simple fracture, the skin is not broken. In a compound fracture, the broken ends of the bone come out through the skin. A green stick fracture is a simple fracture in which the bone is not completely broken. Green stick fractures occur most commonly in children, whose bones are more flexible than those of the adults. The broken bones may cause the sharp edges to cut into blood vessels, nerves or muscles. Careless or improper movement can convert closed fracture into an open fracture causing damage to surrounding blood vessels or nerves. A physician will generally set a broken bone by moving it back to its normal position. If possible, he will then encase the injured area with splints or a plaster cast to hold the broken ends together until new bone grows across the break.

Head injury

Head injury leads to the damage of the cranium (Fig: 19). Most consequent to this, the brain may be injured. This can occur primarily due to the incident of trauma (localized or diffuse injury) or secondary to hypoxia, hypovolaemia, raised intracranial pressure, or infection; the latter causes are more readily preventable.

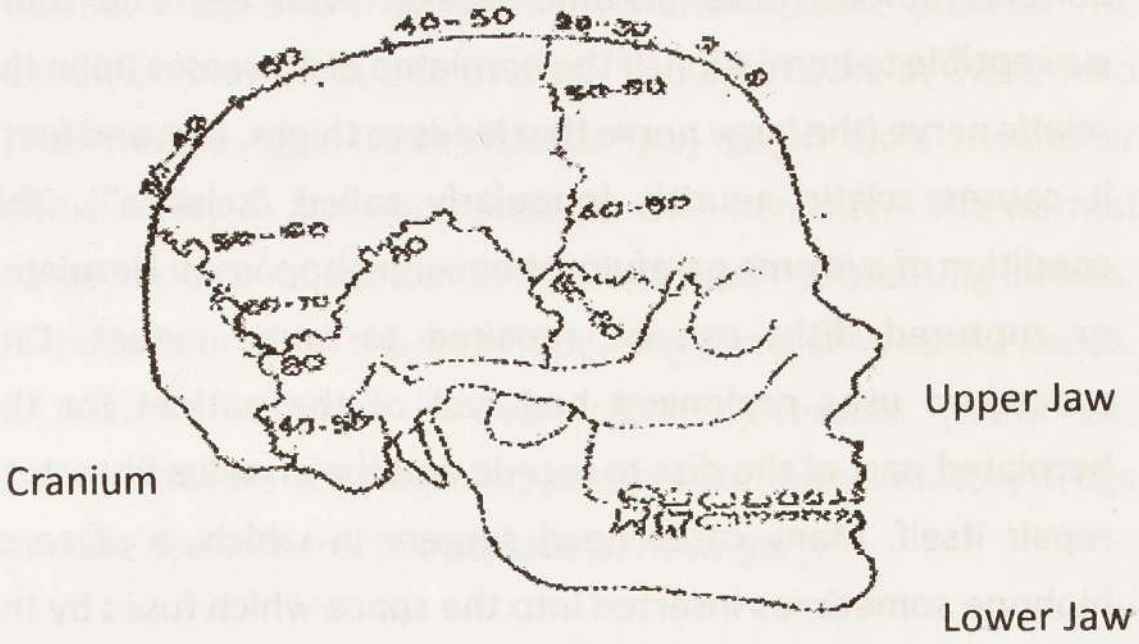

Fig: 19 Cranium with fusion of component parts with age.

Herniated disk

This is the protrusion of any of the discs that separate and cushion the vertebrae or bones of the spinal column. The intervertebral discs of fibro cartilage are located between the bodies of adjacent vertebrae and it provides additional support and prevents the vertebral bodies from rubbing against each other. The intervertebral discs consist of an external anulus fibrosis (fibrous ring) and an internal gelatinous nucleus pulposus (pulp). The disc becomes more compressed with increasing age so that the distance between vertebrae and therefore the overall height of the individual decreases. The

annulus fibrosus also become weaker with age and more susceptible to herniation. If the herniated disk presses upon the sciatic nerve (the large nerve that leads to thighs, legs and feet), it causes sciatic neuritis (popularly called "sciatica"). This condition of extreme painfulness becomes apparent. Herniated or ruptured disks can be repaired to some extent. One procedure uses prolonged bed rest of the patient for the herniated part of the disc to recede and the annulus fibrosIs to repair itself. Many cases need surgery in which, a piece of hipbone sometimes inserted into the space which fuses by the bone across the gap.

Osteitis

This is a condition of inflammation of bone, caused by damage, infection or bodily disorder. Symptoms include swelling, tenderness, aching pain and a redness covering at the affected area. Excessive secretion of parathyroid hormone results in Osteitis fibrosa cystica, in which excessive osteoclast activity causes resorption of both mineral and organic components of bone, which are then replaced by fibrous tissue.

Osteoarthritis

This is a degenerative disease of the joints, which is caused by loss of cartilage that protects the ends of bones. As the space between the bones narrows they may grate to cause wear or displacement of the bone. The function of the joint (most often

thumb, knee and hip) is affected and become painful. The condition may be due to overuse and affects are in those who pass middle age. Osteoarthritis may begin as a molecular abnormality in articular cartilage, with heredity. The normal 'wear and tear' of the joint is the important contributing factors. It tends to occur in the weight bearing joints such as the knees. It is more common in overweight individuals. Treatment: Administration of Analgesics, possibly anti-inflammatory drugs and the use of corrective replacement surgery.

Osteomyelitis

This is the bone marrow inflammation caused by infection. This may happen after a compound fracture or during bone surgery. In acute osteomyelitis, bacteria attack a bone through the blood and cause pain, and a long lasting high fever. The bacteria destroy part of the bone, and much pus is formed in the area. In rare instances, bacteria remain in the bone, causing chronic osteomyelitis. In this stage, the bacteria attack repeatedly over a period of years, and surgical removal of the infected areas becomes necessary. Treatment: Use of antibiotics is successful and disease is cured from three to four weeks. Large dose of penicillin and other antibodies are useful. In serious cases damaged bone may be removed surgically.

Osteoporosis

Osteoporosis means a loss of bone tissue or bone mass density which in turn leads to the impairment of the bone structure. Up to the age of 30 years this bone mass density is at its peak in women. From then onwards there is a decline especially in women who has less bone mass density than men. This is the formation of porous bone, resulting from reduction in the overall quantity of bone tissues. It occurs when the rate of bone reabsorption exceeds the rate of bone formation. Thus the loss of bone mass makes bones so porous and weakened that they become deformed and prone to fracture. Osteoporosis is 2.5 times more common in women than men. The occurrence of osteoporosis also increases with age. In both men and woman, bones mass starts to decrease at about age 40, and continually decreases thereafter. Women can eventually lose about one half, and men one quarter, of their cancellous bone (resembling latticework, light and spongy, like honeycomb). A common cause of osteoporiosis is decreased production of the female sex hormone, oestrogen in postmenopausal women. Following menopause, oestrogen production decreases, resulting in degeneration of cancellous bone, especially in the vertebrae of the spine and bones of the forearm. Collapse of vertebrae can cause a decrease in height or, in more severe cases, produce kyphosis or 'dowagers hump' in the upper back. The causes, other than menopause, are such as removal of ovaries before menopause, extreme exercise to the point of amenorrhoea

(lack of menstrual flow), anorexia nervosa (loss or impaired appetite for food), and cigarette smoking. In males reduction in testosterone levels can cause loss of bone tissue. Inadequate dietary intake or absorption of calcium can contribute to osteoporosis. Absorption of calcium from small intestine decreases with age. Individuals with osteoporosis often have insufficient intake of calcium, vitamin D and vitamin C. Drugs that interfere with calcium uptake or use can also increase the risk of osteoporosis. Osteoporosis can also result from inadequate exercise or disease caused by fractures or paralysis. Treatment: This is designed to reduce bone loss and/or increase bone formation. Oestrogen therapy (oestrogen increases the risk of uterine cancer), increased dietary calcium and vitamin D, increased calcium uptake and reduced amount of oestrogen needed. For this reason it is important for adults, especially women in their 20s and 30s to ingest 1500 mg of calcium a day. Finally, exercise appears to be effective not only in reducing bone loss, but also in increasing bone mass.

Rheumatoid arthritis

This is due to loss of cartilage and bone in joints. At first there is a swelling of the joint and inflammation of synovial membrane (the membranous sac which surrounds the joint), followed by an erosion and loss of cartilage and bone. In addition, the blood test reveals the presence of serum rheumatoid factor antibody, which is characteristic of this

condition. The condition varies greatly in its degree of severity but at its worst can be progressive and makes the patient seriously disabling. It affects the feet ankles, fingers and wrists. In some people, after an initial active phase, there may be long period of remission. A number of drugs are used including analgesics and antiflammatory agents. A combination of heat treatment, rest, exercise and the use of selected drugs such as cortisone or related drugs and aspirin are useful.

Rickets

This is a disease of infants and early child hood, caused by lack of vitamin D. The parathyroid glands, which regulate the use of the body of calcium and phosphorus, are unable to function normally in the absence of vitamin D. Consequently insufficient calcium salts are deposited in the bones, and the bones become soft and deformed. Vitamin D deficiency can also be caused by the body's inability to absorb fats in which vitamin D is soluble. This condition can occur in adults who suffer from digestive disorders and can cause rickets, which is the softening of bones as a result of calcium depletion. Symptoms: bowed legs, protruding breast, enlarged wrists, angles, elbows and knees, and lumpiness of the ends of the ribs along the chest. The head is likely to become bulky and square, the pelvis deformed and the spine bends, poor teeth. Ricket is prevented by a diet containing adequate vitamin D and calcium, and by exposure to ultraviolet rays of sun light to create vitamin D in the body. Cod-liver oil and vitamin D concentrate can help to avoid rickets.

Slipped disc

This happens when one of the discs of cartilage that lies between the vertebrae is ruptured and protrudes into the spinal cord. The disc is actually herniated in that it bulges out from between the vertebrae. It can cause severe pain. Treatment: use of pain killer, surgery is necessary.

Spondylosis

This is the deterioration of the discs that separate the vertebrae of the spines. This is a condition of aging. It produces pain in the neck and lumbar region where the joints may actually restrict movements. Although spondylosis causes little or no discomfort, it can result in fusion and ultimately immobilization of some of the bones in spinal column. Osteophytes (bony out growths) are commonly formed and the space occupied by the discs reduced. Treatment: Physiotherapy may help the sufferers. Colous or surgical belts can prevent movement and give support. Surgery may be required occasionally to relieve pressure on nerves or to fuse the joints.

17. Skin diseases

Acne

This is the inflammation of sebaceous glands of the skin, manifested by eruption of hand and inflamed pimples. Increased production of androgens or male sex hormones in both males and females during puberty causes sebaceous glands to become especially active and secrete large amount of sebum. The sebum has a tendency to block the glands and hair follicles. When this occurs, the follicles become clogged with sebum and cellular debris. This causes infection and inflammation.

Albinism

A condition characterized by a lack of natural pigment of the skin, causing an unnaturally pale appearance. The victims have a low tolerance for the exposure to light and may exhibit sensitiveness to bright light. Albinism is an inherited condition found in many organisms whose chief feature is lack of melanin pigment in structures that are normally coloured. In humen the syndrome of albinism comprises, a) pinkish skin in which the pigment containing cell (melanophores) are present but contain little or no melanin. The pinkish coloration comes from the under lying blood vessels; b) eyes with a deep red pupil and pink

iris, both due to a lack of normal pigmentation and heavy vacularization; c) photophobia (fear of light) brought by excess light entering the eye and reflecting onto the retina. Albinos usually wear dark glasses; d) presence of pale yellow hair. Albinism is an in borne error of metabolism produced by a blockage in tyrosine metabolism due to the absence of a functional tyrosniase enzyme. The condition is controlled by a single recessive gene on an autosome. Approximately one in 20,000 of the population is albinos.

Bed sore

This is the sore and uncleaned skin caused by constant pressure on an area of the body. Bed ridden, unconscious patients are at a risk and their body position has to be changed time to time to relieve the prone areas. The healing may be slowed down by reduced blood supply.

Boil

This is a painful inflammation of the skin caused by bacterial infection. When the bacteria enter the skin through a hair follicle, they multiply producing toxins. They in turn are attacked by white blood cells or Leukocytes; whose function is to protect the body from such invasion. As the white blood cells consumes the bacteria and destroy the infection, a pustule that comprises the centre of the boil may form. The pustule is made

up of white blood cells and the cells destroyed by the bacteria that are trapped in the hair follicle. When the pustule pushes to the surface of the skin and erupts, the boil will drain and heal. When a group of boil connects below the surface of the skin, carbuncle (acute inflammation) is formed. The infection is often due to bacterium, staphylococcus, but healing is generally quick upon the release of the pus and by administration of antibiotics.

Burns

Burns may be caused by hot or boiling fluids, steam, chemicals and other hot sources. Small burns can easily be treated by First-aid methods. The degree of injuries caused by burn is indicated by the extinct of burn on the body (Fig.20).The body area forms 100 times (100%) of the persons' hand palm. Accordingly, the percentage burn can be recognized for treatment. Normally simple burn may only affect the epidermis. If dermis and internal parts are affected, it is serious and medical attention is essential.

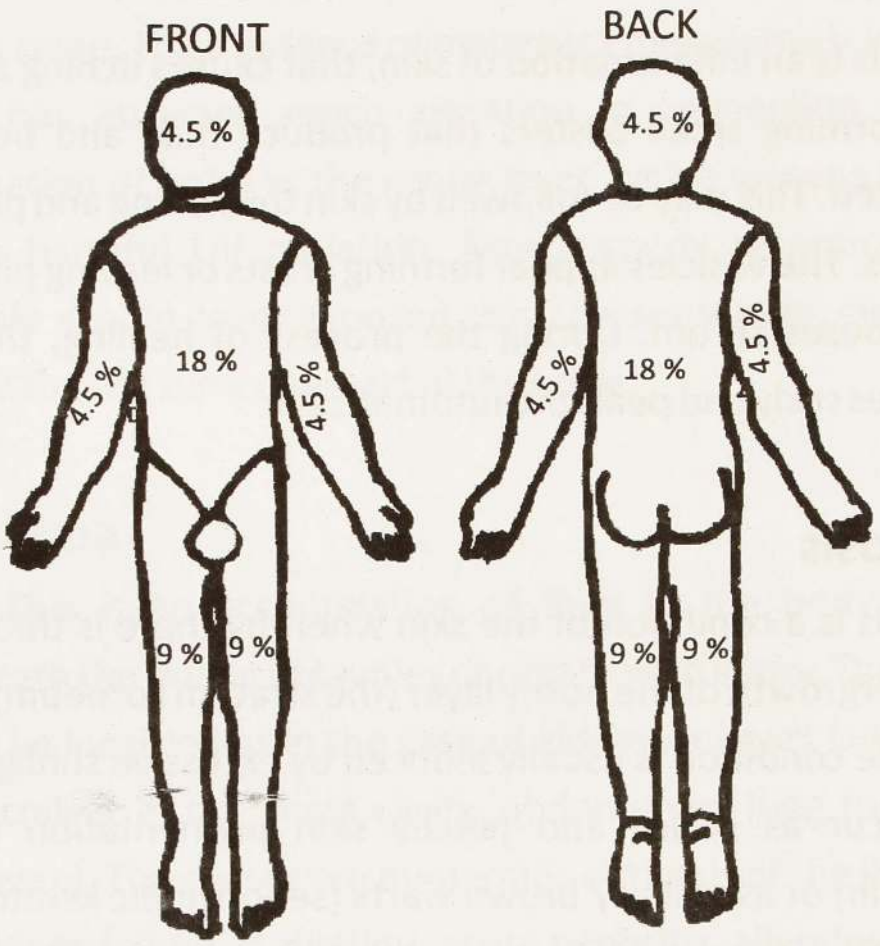

Fig: 20 Degree of burns in skin may indicate seriousness

Dermatitis

This is an inflammation of skin which is similar in many respects to and often interchanged with eczema. It is due to the redness formed by dilation of capillaries near the surface. Several forms of dermatitis can be identified. Contact dermatitis caused by the skin coming into contact with a substance to which the skin is sensitive (irritant). A large range of compounds and materials may cause such reactions. External application of ointment is helpful.

Eczema

This is an inflammation of skin, that causes itching and red rash, forming small blisters that produce fluid and becomes encrusted. This may be followed by skin thickening and peals off in scales. The vesicles appear forming crusts or leaving pits from which oozes serum. During the process of healing, the area becomes scaly and peals off automatically.

Keratosis

This is a condition of the skin whereby there is thickening and overgrowth of the horny layer (the stratum corneum) of the skin. The condition is usually induced by excessive sunlight and can occur as scales and patchy skin pigmentation (active kerotosin) or as yellow/ brown warts (seborrhoeic keratosis). It is essential for a person to avoid over-exposing the skin to sunlight. If the condition is too bad treatment is necessary.

Melanoma

Melanin is a dark brown pigment found in the skin and hair and also in the choroid layer of the eye. Melanin is contained and produced within the cells known as melanocytes in the dermis layer. When the skin is exposed to hot sunshine, more melanin is produced giving "suntan". It helps to protect the skin from harmful ultra-violet radiation. Melanoma is extremely malignant tumour of the melanocytes. Melanoma can be

successfully treated by surgery if it is superficial and caught at an early stage. The incidence of malignant melanoma is increasing and has attracted much attention in connection with the formation of holes in the ozone layer, which screens the earth from harmful UV radiation. Most experts recommend that people should cover exposed skin, use sunscreen, creams and avoid the hot sun in any part of the body.

Oedema

This is an accumulation of fluid in the body, possibly beneath the skin or in cavities or organs with injury. The swelling may be localized as in the case of kidney or heart failure. Fluid can collect in the chest cavity, abdomen or lung (pulmonary oedema). The causes are numerous: cirrhosis of the liver, heart or kidney failure, starvation, acute nephritis, allergies or drugs. To alleviate the symptoms, the root cause has to be removed. Subcutaneous oedema commonly occurs in woman before menstruation or swollen legs or ankles, but does not subside even if the legs are in rested in a raised position.

Psoriasis

This is a chronic skin disease characterized by reddish patches of skin with adherent scales. Psoriasis is not contagious. It is a skin disease for which the cause is unknown and the treatment is palliative. The affected skin appears as itchy, scaly red areas, starting usually around the elbows and knees. In

patients skin may be colonized with hospital strains of *Staphylococcus aureus*. Hospital management is required to protect others in the hospital. It may be associated with anxiety, commencing usually in the childhood or adolescence. Treatment involves the use of ointments and creams with some drugs and vitamin A.

Scabies

This is a contagious skin disease caused by a burrowing mite. Intense itching is induced by the mite burrowing into the skin to lay her eggs. This takes place generally in the area of the wrist, fingers, genitals or feet. The disease may be spread by close contact with affected person. Therefore, anyone associating with an infested person and already infested person should be treated for the condition.

Wart

This is the small, dry out growth of the skin. The wart is not malignant or in most cases, harmful in many ways. The condition is caused by virus that causes enlargement of the cells of the skin.

18. Urinary tract Diseases

Albuminuria

Albumin forms 60%-80% of the plasma protein in blood plasma. As blood passes through the kidneys, some of the constituents of plasma are removed and excreted in the urine. During glomerular filtration, water, together with dissolved solutes (but not protein), can thus pass from the blood plasma to the inside of the capsule and the lumina of the nephron tubules. Albuminuria is the presence of albumin in the urine. This is often a kidney malfunction.

Aminoaciduria

This is a condition characterized by an increase in the concentration of amino acid in the urine. This indicates the malfunction of the kidneys.

Anuria

This is a disease of lack of urination caused by kidney failure or by a blockage. The failure of the kidney to produce urine may result from a number of disorders which cause a prolonged drop in blood pressure. Anuria is typical of increase of uremia (a condition where there is urea in blood due to kidney disease or failure). Haemodialysis may be necessary.

Calculus

This is a solidified mass, as a stone, that may be formed in kidney, gall bladder or other organs of the body. Concretion is a hard inorganic mass in the body as a kidney stone, a calculus.

Creatinuria

This is a disease in which an excess of nitrogenous compound, creatine is produced in the urine. This occurs under the condition in which muscle is rapidly broken down. Urine contains creatinine (196 mg/100ml). If creatinine is more than this, it is Creatinuria. Symptoms: acute fever.

Diuresis

This is an increase in urine production due to disease, drugs or hormone unbalance. ADH (anti diuretic hormone) is secreted from the posterior pituitary, or neurohypopysis. Increased ADH increases permeability of the distal convoluted tubule and collecting duct to water; and thereby increases the movement of water from the distal convoluted tubule and collecting tubule by osmosis. This causes increased production of urine. This results in the reduced volume of concentrated urine; decreased blood osmolabity and increased blood pressure.

Gout

This is a disorder caused by unbalance of uric acid in the body. The sufferers of gout have an excess of uric acid in their blood stream which is deposited in joints as salts, urates of acid. This is because of too much synthesis or decreased removal through the kidneys. The limited solubility of uric acid salts in the body results in precipitations of mono-sodium urate crystals in various tissues, including kidneys and joint capsules. The earliest symptoms of gout are transient arthritis resulting from urate crystal accumulation and irritation which can ultimately lead to an inflammatory response in the joints. Both the crystal deposition and inflammation can become chronic. Any joint may ultimately be involved, and damage to the kidney from crystal formation occurs in almost all advanced cases. Kidney failure may occur in untreated cases. Kidney may be damaged with formation of stones. Treatment is by a drug that increases the excretion of the urate salts or to slow down their formation. With modern medications, these complications seldom occur. Weight control and reduced alcohol consumption can help prevent gout.

Haematuria

This is a condition in which erythrocytes are found in the urine. The source of erythrocytes in the urine can be outside the kidney; such as kidney stones, tumours in the renal pelvis, ureter, urinary bladder, prostate, or urethra. Infections of the

urinary tract such as cystitis (bladder), prostatitis (prostate gland), and urethritis (urethra) can also cause Haematuria. Conditions inside the kidney include those that affect the filtration membrane or other areas of the kidney. Inflammation of the glomeruli called glomerulo-nephritis can increase the permeability of the filtration membrane and allow blood cells to cross. Other areas of the kidney can be a source of blood in response to inflammation of the nephron due to infections, tumours in the kidney tissue, and infarcted areas of the kidney, where an artery is blocked, resulting in necrosis of the part of the kidney tissue.

CAUSE OF HAEMATURIA (PASSAGE OF RED BLOOD CELLS IN THE URINE)

Kidney

Glomerular disease

Polycystic

Carcinoma

Stone

Trauma (including renal biopsy)

TB

Embolism

Renal vein thrombosis

Vascular malformation

Schitosomiasis

Prostate gland

urethra

Ureter

Stone

Neoplasm

Bladder

Carcinoma

Stone

Trauma

Inflammatory sinusitis,

TB

Benign prostatic hypertrophy	**General**
Carcinoma	Anticoagulant therapy
Thrombocytopenia	
Urethra	Haemophina
Sickle cell disease	Malaria
Stone	Strenuous exercise
Urethritis	
Neoplasm	

Haemoglobinuria

This is the presence of haemoglobin in the urine caused by disintegration of red blood cells, conferring a dark or brown colour. It can sometimes result from strenuous exercise or after exposure to cold. It is also caused by the ingestion of poisons such as arsenic. It may be a symptom of some infections, particularly black water fever, and a severe fatal form of malaria.

Ketonuria (Acetonuria or Keto-aciduria)

Ketone is a class of organic chemical compounds that are either pleasant-smelling liquids or colourless solids. A Ketone always contains the carbonyl group (CO), made up of one atom of carbon and one of oxygen. During starvation, dieting and in diabetes mellitus, and when food intake is insufficient, fat is mobilized for energy and the blood concentrations of fatty acids increases. The increased liberation of free fatty acids from adipose tissue results in an elevated production of Ketone

bodies by the liver. The secretion of abnormality of high amounts of Ketone bodies into the blood, produces ketosis or ketogenesis which is one of the signs of lack of carbohydrates for metabolism or failure to use fully available carbohydrates or resulting in fat breakdown. Ketonuria is the presence of Ketone bodies in the urine under such condition. A person in this condition may also have a sweet smelling breath due to the presence of acetone, which is volatile and leaves the blood in the exhaled air. Normally the blood contains only small amounts of Ketone bodies. The increased number of Ketone bodies can exceed the capacity of body's buffering system, resulting in acidosis, a decrease in blood pH. Ketonuria in a way produces the Ketone in the urine.

Kidney failure (Renal failure)

When the kidney ceases its normal function, building up of toxic substances occur. Acute renal failure occurs when kidney damage is extensive and leads to the accumulation of urea in the blood and to form acidosis. In complete renal failure death can occur in 1 to 2 weeks. Acute renal failure can result from acute glomerular nephritis or it can be caused by damage to or blockage of the renal tubules. Some poisons such as mercuric ions or carbon tetrachloride that are common to certain industries cause necrosis of the nephron epithelium. Severe ischemia associated with circulatory shock resulting from sympathetic vasoconstriction of the renal blood vessels can

cause necrosis of the epithelial cells of nephron. Chronic renal failure can result from glomerular nephritis, trauma to the kidneys, and absence of kidney tissue caused by congenital abnormalities or tumours, urinary tract obstruction by kidney stones, damage resulting from pyelonephritis, (an infection of urine collecting parts of the body) and severe arteriosclerosis (plague occluding the renal arteries). When the kidney is unable to excrete excess excretory products, including electrolytes and metabolic waste products, this results in accumulation of solutes in the body fluids, water retention and oedema. Potassium level in extra-cellular fluid is elevated and acidosis occurs. Acidosis elevated potassium levels in the body fluids, and the toxic effects metabolic waste products cause mental confusion, coma and finally death, when chronic renal failure is severe. The most common symptoms of kidney failure are a reduction in the output of urine that causes an accumulation of fluids in the tissue. As the body accumulation of toxic substances is more, the patient experiences constant fatigue, loss of appetite, diarrhoea, nausea and difficulty in breathing. If the condition remains untreated, coma and death will follow.

CAUSE OF KIDNEY SWELLING

Congenital	**Obstructive**
Polycystic kidney	Hypernephroma
Pyonephrosis	Pyonephrosis

Acquired	Degenerative
Infective	Hypernephroma
Perinephric abscess	Nephroblastoma
TB	

Kidney stones

This is a mineral formation of hard objects usually found in the pelvis of the kidney. About 65% of all kidney stones are composed of calcium oxalate mixed with calcium phosphate, 10% are uric acid or cystine. In all cases about 2.5% of kidney stone is composed of mucoprotein. Kidney stones are formed when excess minerals, such as calcium are present and concentrate into hard lump. Uric acid may crystallize into stones. They are normally 2-3 mm in diameter with either a smooth or jagged surface. Occasionally a large branching kidney stone called a staghorn stone forms in the renal pelvis (Fig.21). When a stone passes into the ureter, there will be a pain down the back side, and groin area. The ureter contracts around the stone, causing the stone to irritate the epithelium and produce bleeding, which appears as blood in the urine, a condition called Haematuria. In addition to causing intense pain, kidney stones can block the ureter, cause ulceration in the ureter and increase the probability of bacterial infections. Symptoms: It may cause considerable pain in the area, painful during urination, blood in the urine, nausea, chills and fever. Kidney stones that are too small to be noticed may still cause damage to the delicate tissues in the urinary tract. The cause of

kidney stones is usually obscure. Predisposing conditions include concentrated urine and an abnormally high calcium concentration in the urine, although the cause of the high calcium concentration is usually unknown. Magnesium ammonium phosphate stones are often found in people with recurrent kidney infection. The uric acid stones often occur in peoples suffering from gout. Severe kidney stones must be removed surgically. However, instruments that pulverize kidney stones with ultrasound or lasers have replaced most traditional surgical procedures.

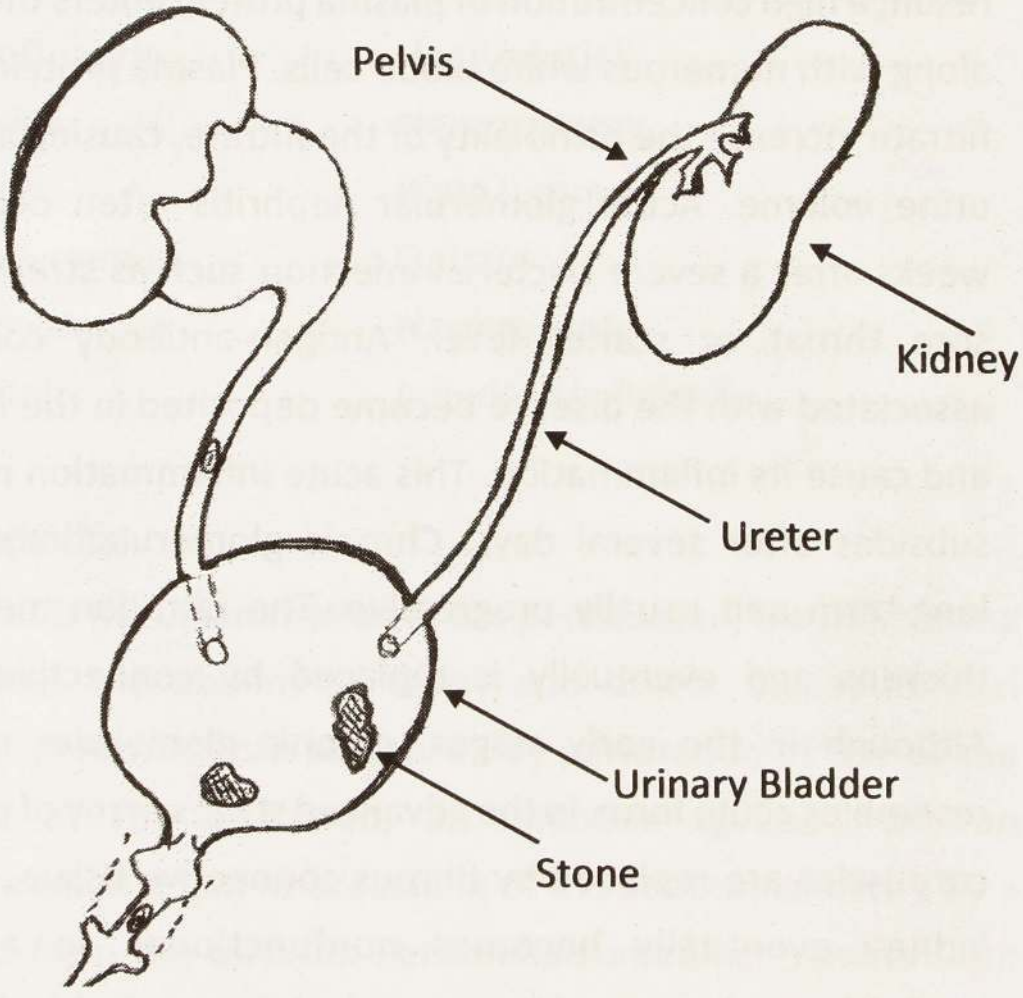

Fig: 21 'Stone' deposits in the urinary tract

Nephritis

This is a kidney disease. Formerly nephritis was referred solely to an inflammation disease of the parts of the kidney that filter the blood; the glomerulus, the tubules and the blood vessels that supply them. Now nephritis has more general meaning that covers several kidney diseases. Glomerular nephritis results from inflammation of the filtration membrane within the renal capsule. It is characterized by an increased permeability of the filtration membrane and the accumulation of numerous blood cells in the area of filtration membrane. As a result, a high concentration of plasma protein enters the filtrate along with numerous white blood cells. Plasma proteins in the filtrate increase the osmolality of the filtrate, causing a greater urine volume. Acute glomerular nephritis often occurs 1-3 weeks after a severe bacterial infection such as streptococcal sore throat or scarlet fever. Antigen-antibody complexes associated with the disease become deposited in the filtration and cause its inflammation. This acute inflammation normally subsides after several days. Chronic glomerular nephritis is long-term and usually progressive. The filtration membrane thickens and eventually is replaced by connective tissue. Although in the early stages, chronic glomerular nephritis resembles acute form, in the advanced stages many of the renal corpuscles are replaced by fibrous connective tissue, and the kidney eventually becomes nonfunctional. In addition, nephritis may be caused by poison, by injury, or by blockage of a

ureter. Symptoms: protein or blood in the urine, fever, headache, high blood pressure, poor appetite and oedema, Nephritis can lead to uremia, a serious poisoning of the body by wastes normally removed by the kidneys. Treatment of nephritis is by bed rest, antibiotics and dietary restrictions.

CAUSE FOR POLYURIA (MORE URINE OUT PUT)

Diuretics	**Diabetes insipidus**
Therapeutic	Idiopathic deficiency of ADH production
Frusemide	Inherited (dominatant recessive)
Bendrofluazide	Head injuries
Amiloride	Neurosurgery
Osmotic	Brain tumours
Hyperglycaemia	Opiates
Hypoglycaemia	**Nephrogenic**
Mannitol	Inherited (x-linked)

Peritonitis

This is the inflammation of the peritoneum, the membrane that lines the abdominal cavity and covers the abdominal organs. Peritonitis can be caused by perforation of one of the organs of the abdomen, an infection spread from an inflammation organ or breaching of the abdominal cavity by a wound from the outside. Peritonitis sometimes results from physical irritation, such as deep bruise. In most cases it is caused

by infection, usually by streptococcus bacteria. The bacteria may reach the peritoneum from a ruptured appendix, gall bladder or stomach or intestinal ulcer. Occasionally peritonitis is associated with pneumonia, tuberculosis, venereal disease. It also causes abdominal pain, nausea, vomiting and dehydration. It is treated successfully, in most cases, by antibiotics drugs.

Polyuria

Besides water, urine consists of chemicals such as urea, chloride, sulphate, phosphates, uric acid and other substances. Urine analysis gives a person's health, functioning of the body and the presence of disease. Polyuria is the passing of larger than normal quantity of urine which is also usually pale in colour. The amount of urine released in 24 hours varies with the amount of fluid drank. In response to ADH (anti diuretic hormone) the collecting duct becomes more permeable to water and more water is reabsorbed. A decrease in ADH results in less reabsorption of water and results in excretion of a larger volume of more dilute urine. In diabetes mellitus, due to insulin insufficiency, sugar exceeds the normal level in the blood and it is eliminated in great amount by the kidneys. Due to osmosis more water is absorbed in the uriniferous tubules and more water passed out. Polyuria also may take place due to kidney disorders that is not functioning properly. Treatment: The cause is identified and medication is adopted accordingly.

Prostatitis

In males the Prostate gland (Fig: 22) is important in producing substances which are added to the semen. Prostatitis is the inflammation of the prostate gland due to bacterial infection. This is also due to growth of the prostate gland due to old age. The symptoms tend to be similar to the urinary infection. Chronic form of Prostatitis may necessitate Prostatectomy. A man can make an important contribution to his own health by having a rectal exam each year and watching for the following signs that may cause the possible prostate cancer problem: (1) painful urination, (2) difficulty in urinating, (3) pain in the pelvic area that lasts several weeks or more, (4) loss of appetite or unexplained weight loss, (5) needing to urinate more often, especially at night. Surgery: Removing that organ may solve the problem. The main drawbacks to this operation are the possibility of incontinence (inability to control the bladder) and importance (inability to have an erection). However, there are treatments to help overcome these problems. Treatment: Radiation: An alternative to surgery for cancer is radiation. During this treatment the patient may experience fatigue, diarrhoea, and bladder irritation and impotence is also a possibility. Hormone therapy: Drugs that block the production of male hormones can shrink the tumour because this type of cancer needs these hormones to grow. This therapy is often combined with radiation to treat cancers. Possible side effects include sterility, loss of sex drive and impotence.

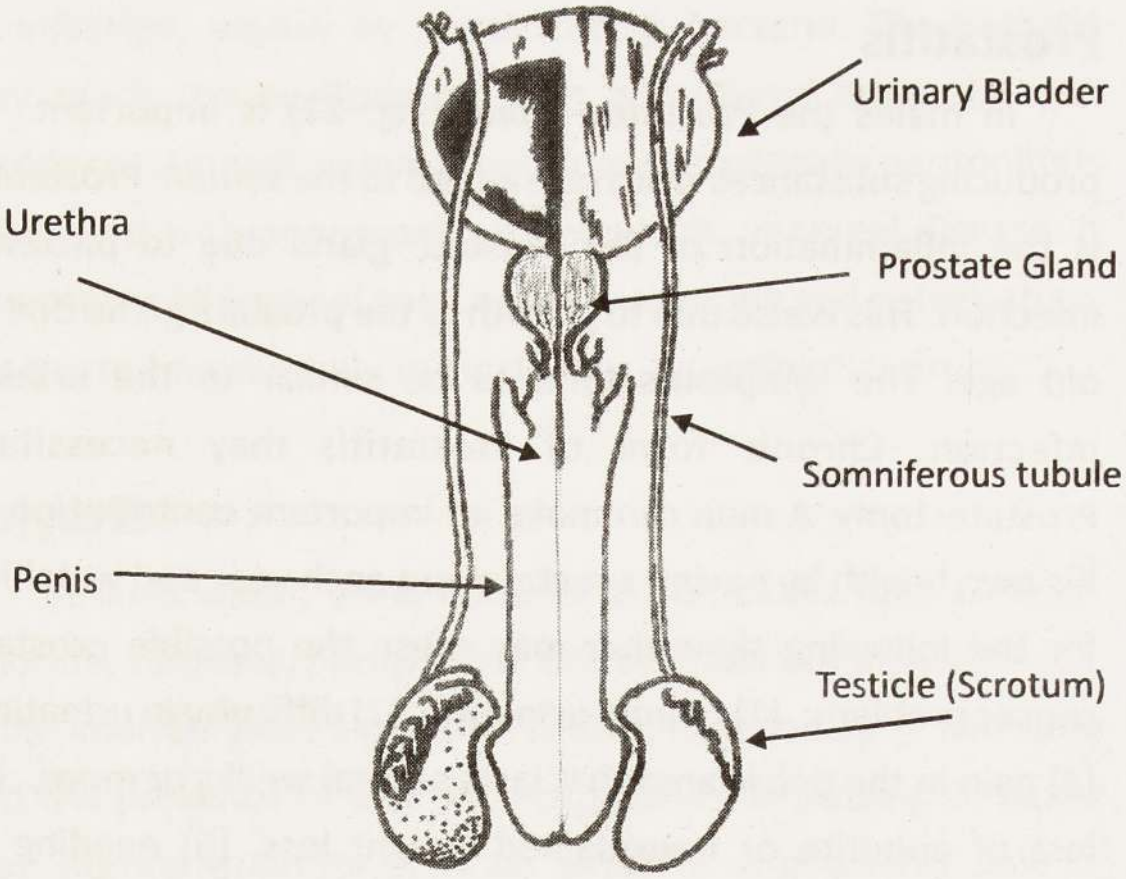

Fig: 22 Problem of Prostate glands in Prostatitis

Proteinuria

This is the presence of protein in urea. Albuminuria is virtually the same as proteinuria, since albumin is the only protein detected in significant amounts in urea. Plasma contains plasma protein and albumin. The presence of these proteins in urine may signify the heart or kidney disease. Symptoms: Fever and severe anaemia. It may accompany with intake of drugs and poisons. Medical attention is essential for such disorders.

Pyelonephritis

This disease is the inflammation of the renal pelvis, medulla and cortex. It often begins as a bacterial infection of the renal pelvis and may affect kidney by several types of bacteria including *Escherichia coli*. Pyelonephritis can destroy nephrons and renal capsules. As the infection starts from pelvis, it affects medulla more than cortex. This makes the ability of the kidney to produce concentrate urine and kidney is dramatically affected. This causes hypertension, primarily due to retention of salt and water and leads to uremia (high plasma urea concentration). Uremia coma may appear in those who are going to develop uremia. They are often placed on dialysis machines-the "artificial kidney machine" for haemodialyisis. The essential substances are prevented from diffusing through the membrane by including them in the dialysis fluid. Haemodialysis is commonly performed three times a week for several hours during each session.

Uremia

The retention of urea and other products of protein catabolism take place; as a result of inadequate kidney function. This clinical syndrome is due to renal failure resulting from either disease of kidney themselves or from disorder or disease elsewhere in the body. This induces kidney dysfunction resulting in gross biochemical disturbance in the body, including retention of urea or other nitrogenous substances in the blood

(Azoturia). Depending on the cause it may or may not be reversible. The fully developed syndrome is characterized by nausea, vomiting, headache, hiccough, weakness, dimness of vision, convulsion and coma. Haemodialysis or a kidney machine may be necessary or even a renal transplant is necessary.

Ureteritis

This refers to any inflammation of the urethra that is not caused by gonorrhoea (nongonorrhoeal or nongonococcal). Factors such as trauma or passage of a nonsterile catheter through the urethra can cause this condition, but many cases are acquired through the sexual contact. Inflammation of the ureter usually occurs with bladder inflammation.

19. Vascular system

Anaemia

This is due to deficiency in the number of red blood cells (corpuscles) in the body and in the amount of haemoglobin in the red blood cells, or in both. In anaemia the size and shape of the red blood cells can also be affected. The cause of anaemia are (a) formation of an inadequate number of red blood cells or of defective red blood cells; (b) increased rate of destruction of red blood cells; (c) loss of blood of red blood cells which are formed in red marrow of the bones. A number of materials are needed for their production, namely iron, vitamin B12 and folic acid. If these are not available in diet, or if the digestive system is unable to absorb them, the marrow cannot produce enough red blood cells or the marrow produces defective ones. In addition, certain drugs or other chemicals, various chronic infections, bone cancer, leukaemia, and over exposure to x-rays and radium, interfere with the proper function of the red bone marrow. The most common type of anaemia is deficiency in iron which is an essential component of the haemoglobin molecule. In Permicious anaemia there is an inadequate availability of vitamin B12, which is needed for red blood cell production in most cases. The results from atrophy of the glandular mucosa of the stomach, which normally secretes a substance, called

intrinsic factor. In the absence of this factor, the vitamin B12 obtained in the diet cannot be absorbed by the intestinal cells. Aplastic anaemia appears due to the destruction of the bone marrow, which may be caused by chemicals (including benzene and arsenic), X- ray, or by chemotherapy for cancer. Sickle-cell anaemia is a type of Haemolytic anaemia that results from an inherited defect in the molecular structure of haemoglobin. Haemorrhagic anaemia occurs when large amounts of blood are lost from the body, reducing the amount of circulating red blood cells. This may be caused by injury, surgical operation, cancer or tuberculosis of lungs. Treatment: In nutritional deficiencies, a corrected diet, doses of needed substances, such as iron are given orally or by injection. In pernicious anaemia, large doses of vitamin B12 are injected early in treatment. Blood transfusions are used in treating anaemia resulting from acute haemorrhage and from Rh incompatibility in infants. Sometimes the spleen is removed to control a haemolytic anaemia.

Aneurysm

This disease is due to a blood-filled sac or pouch that protrudes from the wall of a blood vessel, especially an artery. This occurs due to the weakening at a particular spot in the wall of the blood vessel, by the pressure of the blood flow. An aneurysm can be caused from injury, inborn defect, arteriosclerosis, hypertension or an infection of the wall of the

blood vessel. Aneurysm causes rupture and bleeding to death. The majority of the traumatic aortic arch ruptures during automobile accidents and result from the great force with which the body is thrown into the steering wheal, dashboard, or other objects. The arteries around the brain are common sites, and hypertension can cause an aneurysm to burst or leak, causing haemorrhage around brain. Due to haemorrhage, blood may enter the epidural space (epidural haematoma), subdural space (subdural haematoma) subarachnoid space or the brain tissue. Blood in the subdural or subarachnoid space can apply pressure to the brain, causing damage to the brain tissue. Blood is toxic to brain tissue, so that blood entering the brain can directly damage the brain tissue. Ruptured aneurysms in the blood vessels of the brain or in the aorta often result in death. If an aneurysm is large and pressing against bone or other tissue, pain can be felt. Many aneurysms go unnoticed, unless examined by x- ray. Treatment: Reduce pressure on the aneurysms by various methods. Sometimes the portion of blood vessel that has the aneurysm can be removed surgically and replaced with a plastic tube. If the weakened aortic wall leaks blood slowly into the thorax, the aneurysm must be corrected surgically.

Angina Pectoris

This is the indication in which the heart muscle is not getting enough oxygen due to narrowing of the coronary artery

of the heart because of atherosclerosis (thickening and hardening of the artery wall and narrowing of the lumen). A tissue is said to be ischemic when it receives an inadequate supply of oxygen because of an inadequate blood flow. Myocardial ischemia is associated with increased concentration of blood lactic acid produced by anaerobic respiration of the ischemic tissue. This condition often causes substantial pain, which may be referred to Angina pectoris that can be felt in the left shoulder and arm as well other areas. The pain receptors are stimulated by the lactic acid. This is a symptom of inadequate flow of blood through the coronary arteries (that supply blood to the heart muscle). Arteriosclerosis is the most frequent cause of adequate blood flow. Other diseases such as Diabetes mellitus and Syphilis can also result in decrease of blood supply to the heart muscle. Persons afflicted with this Angina pectoris usually feel pressing or squeezing pain at times of physical or emotional stress. The pain results because the heart is not supplied with the additional blood needed during a period of stress. Treatment: Angina pectoris is frequently relieved by rest and by drugs such as Nitroglycerin, dissolving the tablets under the tongue. This usually brings temporary relief. Nitroglycerin causes blood vessel dilation. Consequently, it reduces the workload of the heart and the need for oxygen, because the heart has to pump blood against a smaller pressure. Also, the heart pumps less blood because the blood tends to remain in the dilated blood vessels and less blood is

returned to the heart. The drugs mainly used to prevent or treat angina are nitrates, beta-blockers, and calcium antagonists. If the condition worsens, coronary-artery-by-pass surgery (Angioplasty) may need to be performed. Angioplasty is a surgical method used to widen or reopen a narrowed or blocked blood vessel or heart valve. A balloon is inserted and inflated to clear the obstruction.

Aortic stenosis

This condition is referred to the narrowing of the opening of aortic valve resulting in the obstruction of the blood flow from the left ventricle to aorta. The valve between the left ventricle and the aorta, which pumps blood to whole part of the body, is called the aortic valve. This valve is the cause for the aortic stenosis. A common cause of this is calcium deposits formed on the valve associated with atheroma (thickening of the blood vessel) or damage may have been caused by previous rheumatic fever. The symptoms of aortic stenosis include Angina pectoris, breathlessness. Treatment: The condition is treated surgically by valve replacement.

Arteriosclerosis

This is a pathological condition in which there is an increase in the thickness of arterial wall that causes a reduction in the elasticity of the vessel, resulting in the constriction of diameter. This affects the blood flow. Arteriosclerosis is characterized by a

thickening of the tunica intima (endithelium and basement membrane) and a chemical change in the elastic fibres of the tunica media (elastic tissue and smooth muscle) making the tunica media less elastic. Fat generally accumulate between the elastic and collagen fibres to produce a lesion that protrudes into the lumen of the vessel and eventually can hamper normal blood flow. In advanced forms, calcium deposits are formed in the form of calcium carbonate, accumulate in the walls of the blood vessels. Arteriosclerosis greatly increases resistance to blood flow. Advanced sclerosis adversely affects normal circulation of blood and greatly increases the work load of the heart. Recent evidence suggests that arteriosclerosis may be an autoimmune disease. The following matters increase the rate of development of arteriosclerosis. Obesity, high dietary cholesterol and other fat consumption, and smoking are some of the factors correlated with premature development of arteriosclerosis.

Atheroma

This is due to the deposition of hard yellow plagues of lipoid material in the internal lumen of the arteries (Fig: 23). This may be related to high level of cholesterol in the blood or excessive consumption of refined sugar. Atheroma is great importance in predisposing of coronary thrombosis. The fatty deposit is called plague or atheroma accumulate, in the internal layer of arterial wall. They narrow the internal diameter of the artery and the volume of blood that passes through the artery is decreased.

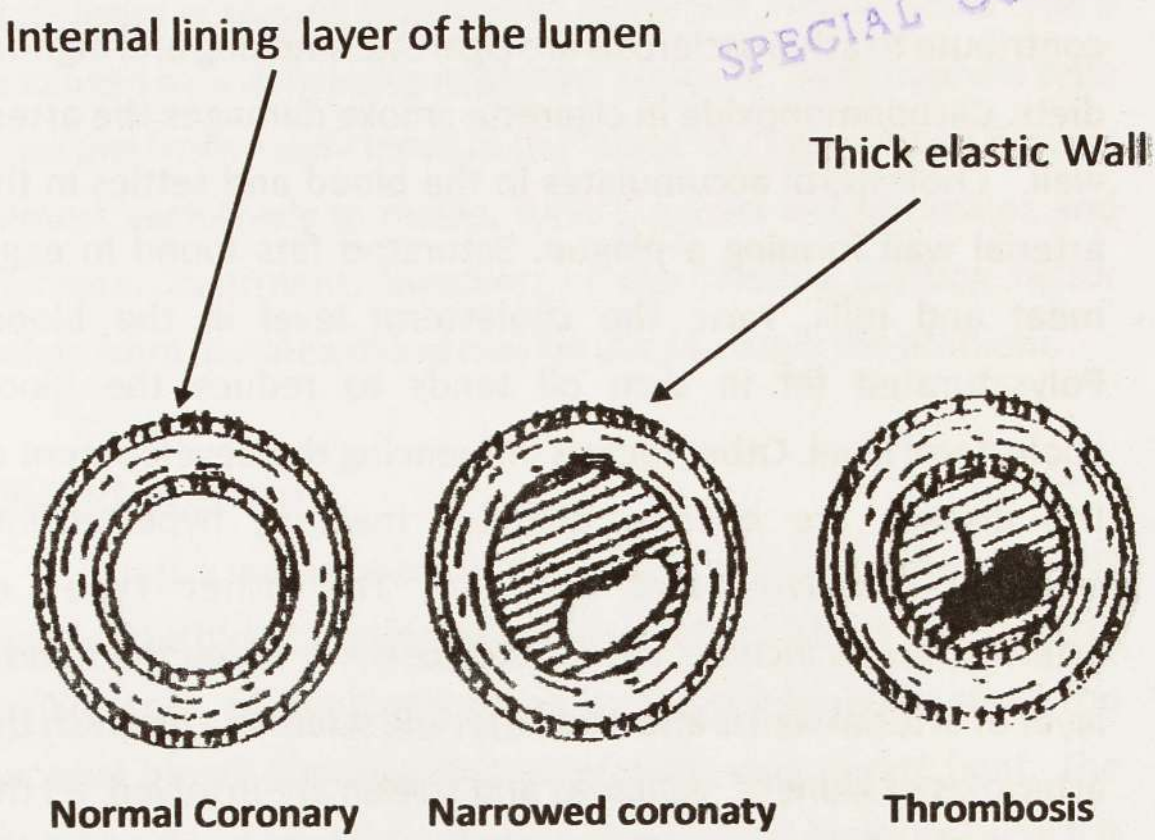

Fig: 23 Arteries with plagues of lipoid material (cholesterol 'block')

Atherosclerosis

This is a condition in which the inner layer of the arterial wall is affected. In the atherosclerosis, fatty deposits called plague, or atheromas, accumulate on the inner layer of the arterial wall. They narrow the internal diameter of the artery and the volume of blood that passes through the artery is decreased. Atherosclerosis most commonly affects the aorta and arteries in the brain, kidney and leg, Angina pectoris, hypertension (high blood pressure) and pain and gangrene in the legs. Atherosclerosis is not entirely curable and it usually accompanies the old age. Symptoms: Risk factors that

contribute to atherosclerosis are cigarette smoking and high-fat diets. Carbonmonoxide in cigarette smoke damages the artery wall. Cholesterol accumulates in the blood and settles in the arterial wall forming a plague. Saturated fats found in eggs, meat and milk, raise the cholesterol level in the blood. Polysaturated fat in corn oil tends to reduce the blood cholesterol level. Other factors influencing the development of the disease are obesity, diabetes mellitus, hypertension, physical inactivity and heredity. The other types of arteriosclerosis include, medial sclerosis - in which the middle layer of arterial wall is affected; arteriole sclerosis - in which the arterioles of kidneys, pancreas and spleen are involved, all the layers of the arteriole walls are affected and the functioning of the organs may be impaired.

Bleeding diseases

This is a disease in which the people do not have the normal clotting of blood as it occurs in the normal people. Persons suffering from such conditions may be in danger of bleeding to death even from the slightest wounds. The bleeding may be internal or external. This is a heredity disease. The symptoms are limited to males, but the disease is transmitted only by females to their children. There are several types of haemophilia. Each one is the result of deficiency or dysfunction of a coagulation factor. Haemophilia type A (this is the classic haemophilia, comprising 83% of all haemophilias) results from a

deficiency of plasma coagulation factor VIII. Heamophilia type B is caused by a deficiency in plasma factor IX. Haemophilia type C results from a deficiency in the factor XI. Types A and B occur almost exclusively in males. Type C occurs in both males and females. Treatment: Injection of the missing clotting factor taken from donated blood may be used to solve the problem.

Blood pressure

This is a measure of the force with which the blood exerts against the blood vessel walls during its flow. This is measured in millimetres of mercury using a Sphygmomanometer. The arterial blood pressure fluctuates with each heart beat. The heart beat has a maximum value (the systolic pressure) which is related to the ejection of blood from the heart into the arteries and a minimum value (diastolic pressure) when the aortic and pulmonary valves are closed and the heart is relaxed. Usually values for both systolic and diastolic pressures are recorded. The force exerted by blood against the walls of the blood vessels, caused by heart contractions forces a constant volume of blood round a closed system. These oscillations of the blood pressure are largest in aorta, gradually diminishing as the blood flows along the arteries, becoming non existent in the capillaries. The level of the blood pressure also decreases from heart to tissue and back to the heart. These differences in pressure enable the flow of blood around the system. An average reading for persons of 20 years old is about 120 over 80.

However there is much normal variation between individuals. Blood pressure tends to increase with age, as the arteries become thicker and harder. A temporary rise in blood pressure may take place by exposure to cold, kidney disease and other disorders. A lower blood pressure can be induced by a hot bath or exhaustion by hard work. Blood in the veins is under much less pressure than the arteries. Veins have valves that prevent blood from flowing backward, away from the heart. The circulation of the venous blood is partly controlled by movement in the surrounding muscles. Several factors control the level of blood pressure. They are: (a) heart action (rate of heart beat, force per beat, volume per minute), (b) peripheral resistance to blood flow in the capillary beds, caused by friction, (c) elasticity of the arteries, (d) total blood volume, (e) viscosity of blood. By measurement of the pulse and blood pressure, one can decide whether the heart is pumping well enough to maintain adequate pressure and flow. Hypertension causes abnormally high pressure, caused by narrowing of the small arteries. Due to hypertension over a long period, the heart enlarges due to extra strain and may eventually weakens and fail. Extremely low blood pressure may cause weakness and dizziness. Hypotension often results from disease or injury and will disappear when the disease is cured or injury is healed. The wide range of drugs available include diuretics, beta-blockers, calcium antagonists, and angiotensin converting enzyme (ACE) inhibitors, amongst others. Coronary disease prevention:

Medicines may be used to correct the risk factors responsible for Coronary disease, particularly if adjustments to lifestyle are not successful. These include drugs to lower a high level of cholesterol in the blood (lipid lowering agent) to lower raised blood pressure, and to prevent blood clotting (Aspirin). Heart Failure; The term heart failure is used to describe the situation when an inadequate pumping action of the heart leads to symptoms; such as breathlessness and fatigue. It may be the end-product of virtually all forms of heart diseases. Drugs commonly used include the diuretics, ACE inhibitors, and digoxin. Disorders of heart rhythm (arrhythmias): A variety of anti-arrhythmic drugs are used to treat disturbances of the heart rhythm.

FACTORS CAUSING ABNORMAL BLOOD PRESSURES

Type of Blood Pressure	**Causes**
Chronic hypotension	Weakened heart muscles; damaged heart valves; malnutrition; slow leakage of blood
Sudden drop in blood pressure (cardiovascular shock)	Sudden blood loss; severe allergic reaction,
Sudden rise in blood pressure	Physical exercise; emotions

Chronic hypertension	Unknown
Arteriosclerosis	Rigid or clogged arteries from
Hypertension,	stress, drugs, diet, obesity, or lack of exercise.

Block in the blood flow

The blood will not pass smoothly due to cholesterol 'block' in the arteries. This may happen in any part of the body, specially in the heart. If such a block takes place, alternate way of blood flow will have to be done for a free flow of the blood. The only possible way is to make use of 'by pass' surgery (Fig: 24) to make another alternative way for the free flow of the blood.

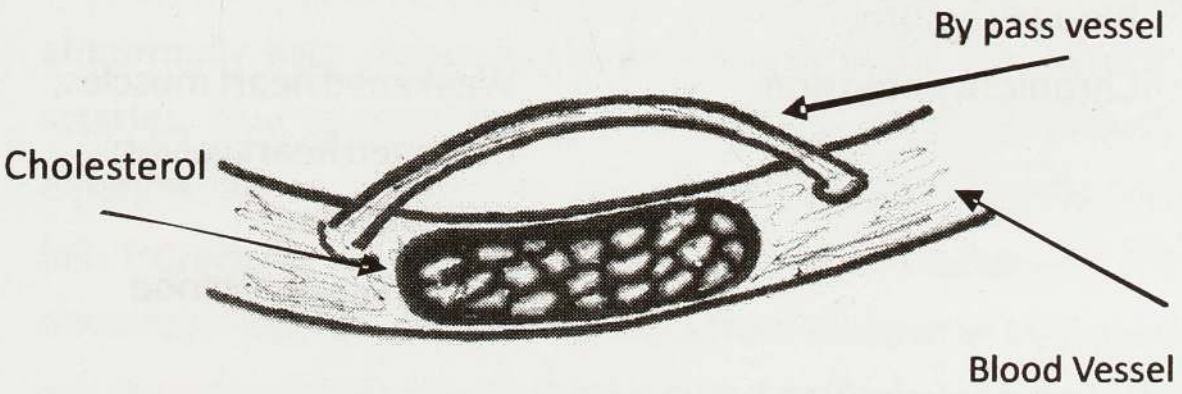

Fig: 24 "By pass" operation for a block in a supply of blood

Blue baby

This is a condition in which an infant's lips and fingers become deeply turned blue because of a defective heart or main blood vessels. The arterial blood is rich in oxygen. Venous blood contains less oxygen. The former is bright red, and the latter is much dark. The defect in blue baby is that there is a mixing of venous and arterial blood, so that the arterial blood appears much darker than normal, resulting in inadequate oxygen supply to the body tissue. The bluish appearance problem arises because of incomplete closure of two routes which cause by passing to the lungs during foetal life. It is due to the following reasons: (a) Ductus arteriosus, a blood vessel connecting the pulmonary artery and aorta, (b) Foramen ovale, a hole in the septum which divides the left and right atria. This condition is serious. Many forms of these diseases can be corrected by surgery.

Cardiac Arrest

This is the failure and stopping of pumping action of heart. If the heart stops beating for only a few seconds, permanent damage may occur to the brain. Death usually occurs if the heart stops beating for several minutes. Fortunately heart functions involuntarily. Therefore it continues to beat even if the individual is unconscious. The reason for heart failure is due to heart disease and disorders. They are: congenital defects of the heart, coronary artery diseases, infections of heart muscle,

valves and membranes, congestive heart failure (chronic inability of heart), improper impulse and the heart murmurs (abnormal sound). Death follows very rapidly, unless the heart beat can be restored. The immediate methods of action to restore heart beat are "first aid" by external cardiac massage, artificial respiration, defibrillation and direct cardiac massage and call for a physician immediately for medication.

Cardiomyopathy

This is the disease or disorder of the heart muscle. The cardiac muscles makes up the walls of the heart and their contraction is responsible for pumping blood out of the heart. Heart muscle is under the control of autonomic nervous system and works automatically. The disease may arise from a number of different causes including viral infection, congenital abnormalities and chronic alcoholism. Peripartum (perinatal) cardiomyopathy is a disease of cardiac muscle that is characterized by congestion and dilation of the left ventricle which occurs in late pregnancy or in the first six months of pregnancy.

Coagulation Defects

There should be no comment made before a good history has been taken and a thorough examination has been performed on the patient. His previous history such as dental extractions, surgery, childbirth and trauma should be known

about the patient. A family and drug history is very important. Physical examination may suggest the underlying cause. Vascular abnormalities and platelet disorders tend to result in minor skin bleeding, especially in the lower limb. Coagulation defects tend to result in prolonged post-traumatic bleeding (including that due to surgery) and bleeding into joints and muscle. Thus, a patient with a bleeding history but a normal coagulation screen will require more detailed investigation including assay of the individual factors.

CHEST PAIN MAY INDICATES THE FOLLOWING DISORDERS

Angina
Myocardial infarction
Acute aortic dissection
Pericarditis
Reflux oesophagitis
Oesophageal Spasm
Peptic ulcer disease
Pneumonia
Pulmonary embolism
Pneumothorax
Chest wall injuries
Musculoskeletal
Costosondritis
Rib Secondaries
Herpes zoster
Depression
Da Costa syndrome

Coronary Artery Disease

This refers to any abnormal condition that affects the arteries of the heart. Coronary heart disease reduces the amount of blood that the coronary arteries are able to deliver to the myocardium. The reduction in blood flow damages the

myocardium. The degree of damage depends on the size of the arteries. This may also happen with age. Inadequate blood flow to the heart muscle can results in Angina pectoris. Degenerative changes in the artery wall can cause the inside surface of the artery to become roughened. The chance of platelets aggregation increases at rough surface, which increases the chance of Coronary thrombosis. Inadequate blood flow can cause infarct. A heart attack is often referred to as a Coronary thrombosis or a Myocardial infarct (section of heart tissue where the blood supply has been cut off). People who survive infarctions often lead fairly normal lives if they take extra precautions. The commonest disease is Coronary atherosclerosis which is more prevalent in those people with high fat, saturated fat, refined carbohydrate etc. The blood flow may be made smooth by angioplasty (Fig:25). The main causes for such defects are also known well now. Most cases call for moderate exercise, adequate rest, disciplined diet, and reduced stress.

CAUSES OF CHRONIC HEART DISEASE

Genetic
Diet
Cholesterol
High Blood pressure
Stress
Lack of exercise
Smoking
Diabetes
Pollution

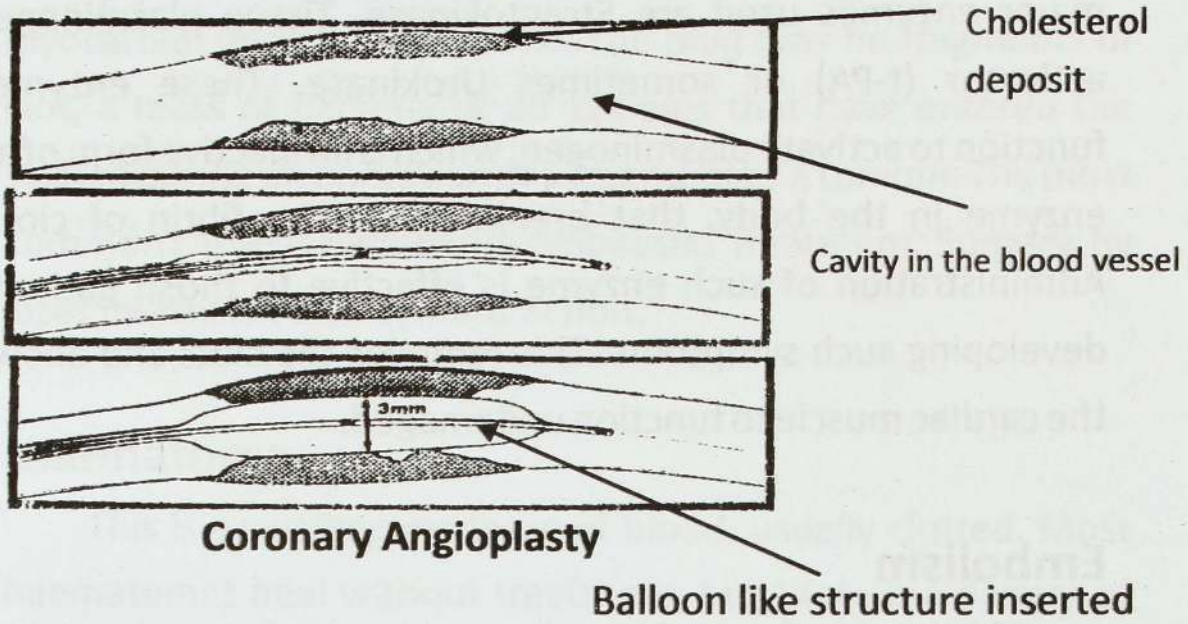

Fig:25 Angioplasty in persons with blood flow block

Coronary Thrombosis

This is the formation of blood clot in a coronary vessel. Such a sudden blockage of one of the coronary arteries by a blood clot or thrombosis interrupts the blood supply to the heart. Coronary thrombosis generally results from Artheroma. The part of heart muscle that has its blood supply disrupted dies. This condition is referred to as Myocardial infarction. Heart failure and cardiac arrest are potentially fatal, resulting in Coronary thrombosis. Coronary by-pass surgery is a surgical procedure that relieves the effects of obstructions in the coronary arteries. Small rotating blades and lasers are also being developed to remove lesions from coronary vessels. There are special enzymes to break down such blood clots. The

major enzymes used are Streptokinase, Tissue plasminogen activator (t-PA) or sometimes Urokinase. These enzymes function to activate plasminogen, which is an inactive form of an enzyme in the body, that breaks down the fibrin of clots. Administration of such enzyme is effective to those patients developing such symptoms. This removes the clots and allows the cardiac muscle to function undamaged.

Embolism

This is a blockage of blood vessel by an obstruction called an embolus formed by a clogged artery or heart valve. An air embolus may develop if an excessive amount of air is admitted during intravenous injection, during surgery or moving from high pressure area to low pressure. An embolism in brain artery may cause stroke, which is a sudden neurological disorder often caused by decreased blood supply to a part of brain. It can occur as a result of thrombosis (a stationary clot), an embolism (a floating clot that becomes lodged in small vessels), or a haemorrrhage (rupture or leaking of blood from vessels). As a result, the tissues normally supplied by the arteries become necrotic (dead). The affected area is called an infarct (an area of cell death). The main cause for this is arteriosclerosis, which interfere with normal blood flow, and can result in a thrombosis (clot or plague formed inside the vessel) and a piece of the plague called an embolus that can break loose. These may float through the circulation and get lodged in small arteries to cause

myocardial infarction or stroke. The plug may be fragments of clot, a mass of bacteria or air bubbles that have entered the system during an operation or a fragment of a tumour. The most common cause is pulmonary embolism. Treatment: Surgery, by laser treatment or enzymatic action.

Haematoma

This is a swelling made up of blood, usually clotted. Most haematomas heal without treatment, but there is a danger of infection. Particularly, the haematoma forming between the placenta and uterus produces irritation to the uterus muscle. It may produce a considerable pain. The serious pain, vaginal bleeding and foetal compromise suggest the diagnosis of a subplacental haematoma; also known as Abruptio placenta. Subdural hematoma refers to the blood clot in the skull, beneath the outer covering of the brain.

Haematopoiesis

This is the process of production of blood cells. This occurs in the embryo and foetus in tissues such as the yolk sac, liver, thymus, spleen, lymph nodes and red bone marrow. After birth, haematopoiesis is confined primarily to red bone marrow, with some lymphoid tissue helping in the production of lymphocytes. In young children, nearly all the marrow is red bone marrow. However, in adults, red marrow is confined to the skull, ribs, sternum, vertebrae, pelvis, proximal femur and proximal humerus. The red marrow in other locations is

replaced by yellow marrow. All the formed elements of the blood are derived from a single population of stem cells called haematoblasts. These stem cells give rise to immediate progenitors of the various types of blood cells, such as, proerythroblasts, myeloblasts, lymphoblasts, monoblasts, megalo-blast (gives rise to erythrocytes), granulocytes, lymphocytes, monocytes and platelets. The development of each cell line is regulated by a specific growth factor.

Haemolysis

This is the destruction (lysis) of red blood cells which may result from infection, poisoning or as antibody response. Haemolysis takes place when red blood cells are placed in hypotonic solution, gain water and burst. Antibody interaction with an antigen bound to a red blood cell may result in agglutination or haemolysis or rupture of the attacked red blood cells in such manner that haemoglobin is released. Haemoglobin is broken down in macrophages and the breakdown products are used or excreted. Globin (protein) chains are broken down to individual amino acids in the macrophages and are metabolized or used to build up new proteins. Haem is broken down to bilirubin and iron. Bilirubin is bound to serum albumin and transported to the liver, where it is secreted into the intestine as part of the bile. Iron is distributed to various tissues for storage or transported to red bone marrow and used in the production of new haemoglobin. This is the lysis of Red cells.

Haemolytic Disease of newborn

This is a serious disease which is characterized by haemolysis, leading to anaemia and severe jaundice. Rh incompatibility can pose a major problem in some pregnancies when mother is Rh negative and the foetus is Rh positive. If the foetal blood leaks through the placenta and mixes with the mother's blood, the mother becomes sensitized to Rh antigen. The mother produces Rh antibodies that cross the placenta and cause agglutination, and haemolysis of foetal erythrocytes. This disorder is called haemolytic disease of the newborn (HDN) or erythroblastosis foetalis and it may be fatal to the foetus. In the first pregnancy, however, there is often no problem. In later pregnancies, there can be a problem because the mother has been sensitized to the Rh antigen. Consequently, if the foetus is Rh positive and if there is any leakage of foetal blood into the mother's blood, she rapidly produces large amounts of Rh antibodies and HDN develops. HDN can be prevented if Rh-negative woman is given an injection of a specific type of antibody preparation, called anti-Rho (D) immune globulin (RhoGAM). The injection can be administered during the pregnancy or before or immediately after each delivery or abortion. The injected antibodies bind to the Rh antigens of any foetal erythrocytes that may have entered the mother's blood. This treatment inactivates the foetal Rh antigens and prevents sensitization of the mother.

Haemorrhage

This is referred to bleeding - a flow of blood from ruptured blood vessel which may occur externally or internally. It may be arterial haemorrhage, venous haemorrhage or capillary haemorrhage. Haemorrhage from a major artery is the most serious kind, as large quantities of blood are quickly lost and death can occur within minutes. Haemorrhage at specific sites within the body are designated by special names: Haematuria from kidney, urinary tract; Haemoptysis from lungs; and Haematemesis from stomach. Severe haemorrhage may cause rapid pulse, dizziness, a drop in the blood pressure, a rise in pulse rate and clammy or sweaty skin. Blood in the stool, urine or vomitus may indicate internal bleeding. Haemorrage can be controlled by applying pressure, tourniquets, or surgical clamps to the blood vessels until clotting begins. In some cases of haemorrage, Vitamin K is administered to bring about the clotting.

Haemorrhagic anaemia

This is the loss or destruction of erythrocytes. This is caused as a result of trauma, ulcers or excessive menstrual bleeding. Chronic blood loss, in which small amounts of blood are lost over a period of time, can result in iron deficiency anaemia. Haemolytic anaemia is a disorder in which erythrocytes rupture or are destroyed at an excessive rate. This is caused by inherit defects within the erythrocytes. Many kind

of haemolytic anaemia result from unusual damage to the erythrocytes by drugs, snake venom, artificial heart valves, autoimmune disease or haemolytic diseases of the new born.

Heart attack

This is the diminishing stage of heart's ability to function. A heart attack occurs when the blood supply to the heart is cut off by damage or blockage to the coronary arteries that deliver blood to heart muscles. This is due to the death of the portion of the heart muscle because of a lack of oxygen. A coronary artery or one of its branches may be partially blocked by a blood clot or fat deposits. Under the conditions the myocardial cells die. The death of an area of the myocardium is called an infarct. This is the true heart attack, or myocardial infarction. Whether a person survives a myocardial infarction depends on the extent of the cells' death and on location of the damage. Angina pectoris, the chest pain caused by momentary deficient blood delivery to the heart, is usually a serious symptom of impeding cardiac problems. Blood flow to the myocardium may be inadequate, resulting in ischemia (the rate of flow of blood to an organ is inadequate for aerobic respiration), which can be overcome by coronary by-pass surgery. The initial treatment includes drugs to relieve the severe pain, and to deal with the clot-thrombolytics ('clot-busters') and Aspirin. Other drugs are often needed to deal with complications.

Heart block

This is a condition of failure in the conduction of electrical impulses from the natural pace maker (the sino auricular node), which passes the message to all the parts of the heart for pumping action. Heart block is more common in elderly and in those who have degenerative changes. However, it may also be congenital or resulting from other forms of heart diseases.

Heart failure

This is due to the progressive weakening of the heart muscles. This makes ineffective to pump blood normally. Hypertension can produce significant enlargement of the heart and can result in heart failure. Cardiac failure may be due to heart disease such as myocardial infarction, congenital defects, aortic valve stenosis, and incompetence of the aortic and bicuspid (mitral) valves or failure of right or left ventricle. Heart failure can also result from excessive plasma, K concentration, decreases the resting membrane potential of myocardial cells, low blood Ca++ reduces excitation contraction coupling. High blood K+ and low blood Ca++ can thus cause the heart to stop in diastole. Conversely, low blood K+ and high blood Ca++ can arrest the heart in systole. The term congestive heart failure is often used in describing heart failure because of the increased venous volume and pressure that results. Elevated blood volume places a work overload on the heart, and the enlarged ventricles have a higher metabolic requirement for oxygen.

These problems are often treated with drugs that increase myocardial contractility (such as digitalis), drugs that are vasodilators (such as nitroglycerin), and diuretic drugs that lower blood volume by increasing the volume of urine excreted. Advanced age, malnutrition, chronic infections, toxins, severe anaemias, hyperthyroidism or heredity factors can be responsible for increased susceptibility to heart failure.

Hodgkin's disease

This is the cancer disease of the lymph nodes. As a malignant disease of lymphatic system, the cancer tends to attack lymph glands throughout the body after spreading to the neighbouring organs. Its cause is unknown. Symptoms: Persistent swelling of one or more lymph glands of the neck. This is followed by fever; swelling of other lymph nodes, the spleen and liver takes place and finally anaemia. It usually strikes persons between the age 20 and 40. Treatment consists of intensive radiation therapy. The disease is rather rare and most victims can be cured if the treatment begins early. The disease was first described in 1832 by Dr. Thomas Hodgkin of England. The following viruses are responsible for Lymphomas: T cell lymphocytotropic virus (HTLV), a group of viruses including the AIDS (HIV) virus which is HTLV III. One or more of the viruses are responsible for this disease. Surgery, radiotherapy and chemotherapy are used for treatment.

Hyperlipidaemia (Hyperlipaemia)

This is the presence of excess of concentration of fat in the blood. An excess of cholesterol in the blood may lead to coronary artery disease and atheroma. An excess of triglycerides may lead to Pancreatitis.

Hypertension

This is a condition of high blood pressure in the arteries. Extra stress on the artery walls can damage them and interfere with blood supply to the heart, kidneys and brain. Hypertension causes heart attack, stroke and kidney failure. Although some people with essential hypertension have low renin (an enzyme secreted into the blood by the glomerular apparatus of kidneys), renin catalyzes the conversion of angiotensinogen into angiotension (II) secretion. Most have either normal or elevated levels of renin secretion. Renin secretion in the normal range is inappropriate for people with hypertension, since high blood pressure should inhibit renin secretion and through a lowering of aldosterone (a corticosteroid hormone involved in regulation of electrolyte balance-mineralocorticoid), results in greater excretion of salt and water. Inappropriately high levels of renin secretion could thus contribute to hypertension by promoting (via stimulation of aldosterone secretion) salt and water retention and high blood volume. The interaction between salt intake, sympathetic nerve activity, cardiovascular responses to sympathetic nerve activity, kidney function, and genetics, make

it difficult to sort out the cause and effect sequence that leads to essential hypertension. Many researchers have suggested that there is no single cause and effect sequence but rather a web of cause and effect. This view is debatable. The other complications include cerebral haemorrage, heart failure and kidney failure. There are several drugs available to reduce blood pressure. To reduce blood pressure excessive weight should be lost, excess salt intake be avoided and strain of all types of works be lessened. Hypertension may be due to an unknown cause, kidney disease or endocrine disease. Malignant hypertension is a condition itself or an end stage of essential hypertension. Antihypertension drugs have revolutionized treatment and given sufferers a near-normal life.

Hypotension

This indicates the condition of low blood pressure. In most cases low blood pressure is not threatening nor does it require treatment. Infrequently, certain types of disease cause low blood pressure and form a medical problem. Treatment: Drugs are administered to correct the hypotension.

HYPOTENSION

Renal	Endocrine
Renal parencymel diseases	Adrenal
e.g. Glomerulonephritis	-Conn's syndrome
Renal artery atnosis	-Phaeocromocytoma
Chornic pyellonephritis	Cushing's syndrome
Polycystic kidney disease	Acromegaly

Connective tissue disease
(especially systemic sclerosis)
Diabetic nephropathy

systemic

Drugs

Oestrogen containing oral contraceptives
Glucocorticoids-corticosteroids
Minerelocorticoids liquorice
Monoamine oxidase inhibitors and tyramine
Sympathomimetics
Nebulised salbutamol

Cardiovvascular

Coarctation of the aorta

Incompatibility

This is usually refers to "not agreeable" between the bloods of donor and recipient in the blood transfusion. Before the blood transfusions are performed, a major cross match is made by mixing serum from the recipient with blood cells from the donor. If the types do not match, the recipient's antibodies attach to the donor's red blood cell form bridges that causes to clump together or agglutinate. This is referred to as incompatibility. Such transfusion errors that result in such agglutination (incompatibility) in the blood can produce a blockage of small blood vessels and cause haemolysis, which may damage the kidneys and other organs.

Ischaemia

This is a condition of deficiency of blood in an organ or part of the body, caused by obstruction of the blood vessels by blood clot or atherosclerosis. This causes lack of oxygen that leads to tissue death in the affected area. Recent evidence suggests that mental stress can cause constriction of atherosclerotic coronary arteries, leading to ischaemia of the heart muscle. Myocardial cells are adapted to respire aerobically and cannot respire anaerobically for more than a few minutes. If ischaemia and anaerobic respiration continue for more than a few minutes, necrosis (cellular death) may occur in the area most deprived of oxygen. A sudden, irreversible injury of this is called Myocardial infarction (MI). The term "heart attack" is usually refers to myocardial infarction. Myocardial ischaemia may be detected by the changes in the S-T segment of the electrocardiogram, and proper medication can be used to save the life.

Leukaemia

This is the cancer of the blood forming tissue; primarily affected are the bone marrow, lymph, nodes and spleen. The white blood cells vastly increase in number as a result of the malignancy in blood making tissues. Usually the white blood cells are immature and unable to fight off infections; hence the victims of leukaemia readily contract other diseases. If immature cells proliferate it is acute leukaemia which is either myeloblastic or lymphoblastic. Acute myeloblastic leukaemia is

repidly fatal if not treated properly. Acute lymphoblastic leukaemia has a more favourable out look and many children can expect to be cured after two year course of treatment. If mature cells proliferate then it is referred as chronic leukaemia which is either myelocytic (granulocytic) or lymphocytic. Chronic myelocytic leukaemia may run a static course over several years but eventually an acute phase supervenes. Chronic lymphocytic leukaemia occurs mainly in the elders. Leukaemia in some animals is caused by virus, and there is evidence that viruses may be a cause of leukaemia in humen. Inspite of extensive research, however, the cause of leukaemia in humans is unknown. Symptoms: A large number of immature leukocytes in a blood sample is diagnostic of the disease leukaemia. A low white blood cell count may occur probably as a result of poor nutrition. Excess production of leukocytes in the red marrow can also interfere with erythrocytes and platelet formation and thus lead to anaemia and bleeding. Enlargement of the lymph nodes and spleen are among the symptoms of leukaemia. Other symptoms, apart from anaemia, general weakness, loss of weight and nervousness. Internal bleeding is common. It may be indicated by large, bruise like patches on the skin. Victims may bleed from gums and may bleed extensively from small cuts. Although there is no definite cure by blood transfusion, drugs and radiation can be relieved for a few months to many years. But leukaemia is fatal if unattended.

Lukocytosis

This is an abnormal and temporary increase in numbers of white blood cells in the blood. An elevated leukocyte count, the Leukocytosis is often associated with infection. It usually accompanies bacterial infection but not viral infection. This is because the body's defence mechanism is to fight against bacteria by producing more leukocytes. A blood sample may form a useful as a diagnostic tool for identifying the infective form.

Macrocytosis

This is a condition in which abnormally large red blood cells (erythrocytes) are present in the blood. It is characteristic of macrocyte anaemia such as those caused by the deficiency of vitamin B12 and folic acid.

Macrophage

This indicates the function of large scavenger cells (phogocytes), which are found in various tissues and organs including the liver, spleen, bone marrow, lymph nodes, connective tissue and microglia of the central nervous system. They remove foreign bodies such as bacteria from blood and tissues. Fixed macrophages remain in one place in the connective tissue. Free microphages are able to migrate between cells and gather at the site of infection to remove bacteria and other foreign materials. Old and damaged

erythrocytes are removed from blood by macrophages. Within the macrophage, lysosomal enzymes break open erythrocytes and begin to digest haemoglobin.

Mitral Incompetence

This is due to malfunction of the mitral valve. Mitral valve was formerly known as the bicuspid valve is located between atrium and ventricle of the left side of the heart. It has two cups or flaps and normally allows blood to pass into the ventricle from the atrium, but prevent any back flow. Mitral incompetence is also known as mitral regurgitation. If the mitral valve is defective, it allows the blood to leak back from the left ventricle into the left atrium. This condition is often caused by rheumatic fever, congenital defect or as a result of heart attack. This makes the left ventricle to work harder forcibly. As a result, eventually it may unable to cope up and this can result in left sided heart failure. Symptoms: Atrial fibrillation, breathlessness and embolism. Treatment: drug treatment and /or surgery to replace the defective valve.

Mitral Stenosis

This is a condition in which the opening between the left atrium and left ventricle is narrowed due to scarring and adhesion of the mitral valve. This scarring is often caused by rheumatic fever. The symptoms are similar to those of mitral incompetence, accompanied by a diastolic murmur. Babies with

severe pulmonary arterial obstruction and an intact ventricular septum are critically ill in neonatal period. Mitral and aortic stenosis accompanied by hypoplasis of the left ventricle and aorta is referred to as hypoplastic left heart syndrome. It is treated surgically by widening the stenosis (Mitral valvotomy) or by valve replacement (Mitral prosthesis), thus surgically creating systemic-to-pulmonary shunts.

Murmur

This indicates the abnormal sounds of the heart. If the blood flow is uninterrupted it is smooth. But if blood flow is obstructed the flow becomes turbulent and generates a "water gurgling" sound, similar to water flowing through rocks. A characteristic sound can be heard using the stethoscope, caused by uneven blood flow through the heart or blood vessels. If an atrioventricular heart valve does not close completely, there will be a 'wistling' sound after the characteristic 'lub' sound. Most often, in adults, murmurs indicate valve problems, caused either by incomplete closure, called valve incompetence, or by the inability of a valve to open completely, known as valve stenosis. Heart murmurs can also be present in normal individuals, especially children without indicating disease. Murmurs are classified as diastole (when the ventricles are relaxed and filling with blood) or systolic when they are contracting. Many murmurs are caused by defective heart valves, which are congenital or due to rheumatic

endocarditis, associated with rheumatic fever. In this disease, the valves become damaged by antibiotics made in response to an infection caused by Streptococcus bacteria. This may be due to mitral stenosis - the mitral valve becomes thickened and calcified. When the valves are incompetent, they do not close properly, and the murmurs may be produced as blood regurgitates through the valve flaps. Murmurs can also be produced by the flow of blood through septal defects - holes in septum between right and left sides of the heart. These are usually congenital and may occur either in the interarterial or interventricular septum. Surgery is the only way to ameliorate.

Myocardial Infarction

This is the death of a part of myocardium from deprivation of blood to it. The coronary artery or one of its branches may be partially blocked by a blood clot or fat deposits. Under these conditions the myocardial cells die. The death of this area is called infarct. This is the myocardial infarction leading to heart attack. The cardiac muscles do not reproduce and dead tissues are repaired with no contractile scar tissue. The patient experiences a heart attack with sudden intense of chest pain which may radiate to arms and jaws. Whether a person survives by myocardial infarction depends on the extent of cell death and on the location of the damage.

Myocarditis

This is the inflammation of muscle in the heart (myocardium) and can lead to heart failure. Infection of heart muscles, includes bacterial or viral infections. Most such infections can be controlled with antibiotics and other drugs before they permanently damage the heart tissue.

Necrosis

This is the death of a part of the tissues in the midst of healthy tissues. Under abnormal conditions, cell death necrosis is characterized by swelling of the cell, and the cellular membrane. Necrosis takes place when cells are destroyed by infection or when they are cut off from their blood supply. When an area of a body compresses the tissue, it causes ischema, the complete stoppage or reduced blood circulation. The consequence is the destruction or necrosis of the tissues. This is followed by death of the tissue concerned. Once the tissues die, microorganisms gain entry to produce an infected ulcer.

Occlusions by Clots

This is the obstruction in the coronary arteries in the form of clots. Apart from by-pass surgery and rotating blades and laser treatment, special enzymes are used to break down blood clots. The major enzymes used are Streptokinase, tissue

plasminogen activator (t-PA) or sometimes Urokinase. These enzymes function to activate plasminogen, which is an inactive form of an enzyme in the body that breaks down the fibrin clots. Removal of occlusions produced by clots re-establishes blood flow to the cardiac muscles, that are permanently damaged by the occlusion.

Palpitation

This is evident when the heart beats noticeably or irregularly, which the person becomes aware of it. The heart beat is not normally noticed, but it is felt with fever and emotion. Palpitation may be due to neuroses, heart disease and heart disorders. A common cause is too much consumption of tea, coffee, alcohol and smoking. Treatment: drugs can be used for control. Persistently troublesome palpitations may require drug therapy; such drugs are known as anti-arrhythmic drugs. All of these drugs are specific for a particular type of palpitation. Therefore the patient may have to choose the suitable one with care.

Pericarditis

This is an inflammation of pericardium, the membrane that surrounding the heart. The cause is frequently unknown, but it can be due to infection, diseases of connective tissue, or damage due to radiation treatment of cancer. Pericarditis can result from bacterial or viral infections. It can be extremely

painful with sensation of pain in the back to the chest. Pericarditis can result in accumulation of fluid within the pericardial sac. The bacteria can find a way to enter body through an open wound. A condition called constrictive pericarditis occurs, when the inflammation forms thickening of pericardium that restricts heart action. Symptoms: Chest pains, coughing etc. The condition is marked by difficulty of breathing, swollen neck veins and accumulation of fluids in the legs. It may be due to uraemia and produces fever.

Phlebitis

This is the painful inflammation of a vein, evidenced by swelling and sensitivity in the area of inflammation. This commonly occurs as complication of varicose veins, producing pains and hot feeling around the vain with possible thrombosis development. Varicose veins result from incompetent valves that are caused by stretching of the veins in the legs. The veins become so dilated that the flaps of the venous valves no longer overlap or prevent the backflow of blood. As a result the venous pressure is greater than normal in the veins of the legs, resulting in oedema. Blood flow in the veins can become sufficiently stagnant than the blood clots. The condition can results in Phlebitis, which is inflammation of the veins. If the inflammation is severe and blood flow becomes stagnant in a large area it can lead to gangrene, which is the tissue death, caused by a reduction or loss of blood supply. Treatment: Drugs and elastic support.

Phlebothrombosis

This is the obstruction of a vein by a blood clot. This is common in the deep veins of the leg, particularly in the calf. This results in heart failure. Pregnancy, injury and surgery may change the clotting factors in the blood. The danger is that the clot may move up, creating a pulmonary embolism. Large clot may be removed surgically, otherwise, the treatment involves anticoagulant drugs and body exercise.

Rheumatic Heart disease

This disease can result from a Streptococcal infection in young people. Toxin produced by the bacteria can cause an immune reaction called rheumatic fever in about 2 to 4 weeks after the infection. The immune reaction can cause inflammation of the endocardium called Rheumatic endocarditis. The inflamed valves especially the bicuspid valve, can become stenosed or incompetent. The effective treatment of streptococcal infections with antibiotics has reduced the frequency of rheumatic heart disease.

Rh blood group disease (Haemolytic disease of the new born-(hdn) or erythroblastosis fatalis)

A specific antigen that is present in blood is named, Rh factor. This Rh or Rhesus factor, named for the monkey in which it was first discovered. This is found in certain blood, designated Rh-positive. Rh-negative blood is that blood lacking the Rh

factor. If Rh-positive blood is introduced into the blood stream of one who has Rh-negative blood, antibodies are produced, because the Rh-negative immune system is unfamiliar with Rh factor and views it as an invader. Mixing of different bloods can come about in two ways: By the transfusion of Rh-positive blood to an Rh-negative person, or through the mixing of the blood of an Rh-negative mother with that of a child, who has inherited Rh-positive blood from the father. In either case Rh factor in Rh-positive blood will cause the Rh-negative system to form antibodies to trap and destroy the offending Rh factor. Such action causes the formation of clumps in the blood that can create its stoppage that will result in death. This disorder is called haemolytic disease of the new born (HDN) or erythroblastosis foetalis. As with all allergies, the first exposure may not cause serious reaction because of the time required for the body to form anti-bodies. The second transfusion during second pregnancy, however, when the anti-bodies are already present in the blood and immune system to ready to produce more, will almost always cause severe complication. A development of a substance that disables the Rh antibodies have made complications from Rh incompatibility relatively rare. HDN can be prevented if the Rh-negative women is given an injection of a specific type of antibody preparation called anti-Rho(D) immune gloibulin (RhoGAM). The injection can be administered during the pregnancy or before or immediately

after each delivery or abortion. The injection contains antibodies against Rh antigens. The injected antibodies bind to the Rh antigens of any fetal erythrocytes that may have entered the mother's blood. This treatment inactivates the foetal Rh antigens and prevents sensitization of the mother. If HDN develops, treatment consists of slowly removing the blood of the foetus or newborn and replacing it with Rh-negative blood. The newborn can also exposed to fluorescent light, because the light helps to break the large amounts of bilirubin formed as a result of erythrocyte destruction. High levels of bilirubin are toxic to the nervous system and can destroy brain tissue.

Shock

This is a failure of the cardiovascular system to provide adequate blood to every part of the body. The collapse of the cardiovascular system may be caused by any three conditions: Blood is lost due to haemorrhage; vessel blockage; and there is insufficient blood flow to provide adequate nourishment and oxygen to all parts of the body. The body process may slow down, reducing circulation and without nourishment, the organs begin to die, especially the brain. Depending on its severity, shock can be divided into three separate stages: (a) the non-progressive or compensated stage, (b) the progressive stage and (c) the irreversible stage. All types of circulatory shock exhibit one or more of three stages, regardless of their causes.

Several types of shock are classified by the cause of the conditions: Circulatory shock occurs when there is inadequate blood flow and/or oxygen utilization by the tissues. Hypovolumic shock refers to circulatory shock due to low blood volume, as might be caused by haemorrage (bleeding), dehydration or burns. This is accompanied by decrease in blood pressure and decreases cardiac out put. Septic shock refers to dangerously low blood pressure (hypotension) that may result from sepsis or infection. This can occur through the action of a bacterial lipopolysacharide called endotoxin. Anaphylactgic shock occurs as a result of allergic reaction (usually to bee sting or pencillin). This results from widespread release of histamine, which causes vasodilation and thus decreases total peripheral resistance. Neurgenic shock in which there is a rapid fall in the blood pressure due to the upper spinal cord damage or spinal cord anesthesia. Cardiogenic shock results from cardiac failure, as defined by a cardiac output that is inadequate to maintain tissue perfusion. This commonly results from infarction that causes the loss of a significant proportion of the myocardium.

CAUSE OF SHOCK

Hypovolaemic	**Distributive**
Haemorarrhage	Sepsis
Burns	Anaphylaxis
Gastrointestinal losses	Neurogenic shock (spinal injury)

Cardiogenic	Obstructive
Myocardial infarction	Cardiac tamponade
Acute valvular damage	Massive pulmonary embolism
Arrhythmia	Tension pnueumohorax

Thalassaemia

Thalassaemia is a disease which affects the red blood cells in the body. It is genetically inherited from parents and spread from generation. In these patients the red blood cells are abnormal and short lived and they break down easily. Thus reduces the amount of haemoglobin in the body and causes anaemia. A person having the disease usually manifests symptoms by the age of 5-6 months. The disease is usually severe in these patients and need regular blood transfusion throughout their lives in order to live. This is Thalassaemia Major. They do not grow as well as they should. Due to the break down of red cells, they appear to be pale and the eyes tend to look yellowish. These patients have excess iron in the body and it gets stored in the vital organs like the spleen, liver, heart and pancreas causing damage to these organs. Patients' abdomen gets enlarged due to the enlargement of liver and spleen. In Thalassaemia Minor the patients have no symptoms. The person is carrying an abnormal gene in red cell. It is also called Thalassaemia trait. The person appears to be normal both physically and mentally. It could be only be detected by the blood tests.

Thrombosis

The thrombosis is the formation or presence of a blood clot in a blood vessel or in one of the cavities of the heart. A thrombosis remain at a point where it was formed. A blood clot that travels through a blood vessel before lodging is called an embolus. Coronary thrombosis is the formation of a blood clot in a coronary artery. The clot obstructs the flow of the blood to the heart muscle and causes a deficiency in the blood supply to it and consequently damage the heart tissue. If the thrombosis is large enough, it may block blood circulation to the cells beyond the blockage and causes tissue death. If the blockage occurs in the coronary artery, it results in death of the person. If the thrombosis breaks away from the vessel wall and floats freely in the blood stream, it is referred to as embolus. An embolus is not a problem until it encounters a blood vessel too narrow for it to pass through.

Valvular Heart Disease

This is a disease that affects mainly the aortic valve and mitral valve which may narrow (stenosis), or weaken. Aortic valve disease is associated more with old age, while mitral valve disease is rheumatic in origin. There are two types of diseases: Acquired valvular heart disease, in which the aortic stenosis accounts for 10 % of the aquired valvular disease in pregnancy. The cardiac output is limited by the degree of stenosis. Aortic insufficiency accounts for approximately 2.5% of valvular

lesions and is generally well tolerated. Mitral stenosis is the most common acquired valvular lesion. Congenital valvular heart disease in which some portion of blood flow is shunted. These lesions include Ventricular septal defect (VSD) and Atrial septal defect (ASD). Aortic valve disease is associated with old age, while mitral valve disease is rheumatic in origin.

Valvulitis

This is the inflammation of valves of the heart. This disease is due to rheumatic fever by infection. There are two varieties of valve that can be used to replace the diseased one in the patients. Mechanical: Artificial, man-made valves, sometimes called "plastic" valves, although they have little plastic in them. Biological: Valves made from human or specially treated animal tissue.Both types of valve have advantages and disadvantages; both are good but neither is perfect.

Varicose Vein disease

This is a condition characterized by swollen, knotted blood vessels, usually in the legs. The blood returning to the heart from legs is pushed against gravity. Veins carrying blood from the legs to the heart have valves that opens to admit upward-flowing blood and close to prevent the blood from dropping back. When the valve is disabled, blood drops back down the veins. The increased weight causes the next valve to collapse and so on down the vein. When several valves break down, the vein is twisted, knotted, stretched or swollen out of shape and

becomes engorged with blood. This occurs in people of weakened, obesity, lack of exercise, long stretches of sitting and standing. Varicose veins are temporary as in case of pregnancy, when they are caused by strain of carrying additional weight. In severe cases there may be pains and cramps, especially at night. Most commonly found in lower limbs, where they can result in gravitational ulcer; in the rectum - rectal varicose haemorrhoids and in lower oesophagous - oesopageal. Elastic bandages or supportive stockings may ease discomforts of varicose veins of the legs. More serious varicose veins are removed surgically, although alternatives are sclerotherapy and phlebectomy.

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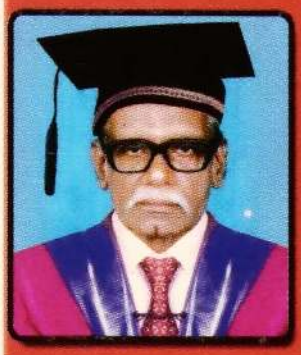
Professor V.K.Ganesalingam J.P – Chairman, Sri Lanka Red Cross Society, Jaffna Branch



He was appointed as the founder Professor of Zoology and Head, Department of Zoology in the University of Jaffna, Sri Lanka in 1975. He served as the Dean, Faculty of Science in 1988-1991, acting Vice Chancellor in 1988. Again he was elected as Dean, Faculty of Science in 1996 and completed in 1999.

In 1989 he joined the SLRCS and became the Chairman of Point Pedro SLRCS Division. Subsequently he was elected as the Committee member of SLRCS Jaffna Branch, and later elected as the Chairman SLRCS Jaffna Branch and as the Vice President in SLRCS – NHQ Colombo. He participated at the International Conference of Federation of Red Cross and Red Crescent Societies, held in Geneva in 1999 and 2001, and visited ICRC, IFRC, UN, ILO, WHO in Geneva (Switzerland) and visited London several times. He was elected as the Chairman SLRCS Jaffna Branch again in 2001, and in 2005; still he continues as the Chairman, SLRCS. He is one of those who has drafted the SLRCS's present constitution.

He has B.Sc. (Hons.) from the University of Ceylon, Colombo (1962), M.Sc. from the University of Hawii, U.S.A. (1965), Ph.D. from the University College London , University of London (1970) and awarded the Hon D.Sc. (Sri Lanka) by the University of Jaffna.

He was a recipient of the Fellowship of East-West Centre USA (1963), Commonwealth Universities Association (1978/79) University of Wales, Nuffield commonwealth (1986/87) Imperial College, London, UNESCO University of Baroda (1984), GTZ Germany (1986) Nairobi and British council (1990) British museum. He published several research papers in local and foreign journals and books of academic importance.

He was the President, Family Planning Association DAC Jaffna District, President, Consumer's Society of Jaffna District, Deputy District Governor of Lions International 306B, and President of NGO consortium of Jaffna District.

K.Balakrishnan, J.P, B.A (Hons)
Hony. Secretary,
Sri Lanka Red Cross Society – Jaffna Branch.