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Editorial

Health management and patient care

Sathiadas MG

Productivity in general means an average output per period by the costs incurred or the resources, such as personnel, consumed in that period. When health is considered, this measure may not correctly reflect on productivity. The traditional approach to measuring health care productivity typically defines output as spending on health goods and services—e.g., drugs, hospital services, physicians' services. It can be argued that most of the productivity growth in health care has come in the form of improved quality rather than lower cost. There has been a large push toward redefining the health sector's output as disease treatments, rather than as medical goods and services. This approach was advocated by the National Academics committee on national statistics in 2002.

Hospital productivity is measured as the ratio of outputs to inputs. Outputs capture quantity and quality of care for hospital patients; inputs include staff, equipment, and capital resources applied to patient care. Output measures are based on number of patients treated, average cost for patients treated, the quality of treatment, quality-adjusted life years (QALYs) associated with treatment, waiting time for treatment, 30-day post discharge survival rates, the ratio for elective patients to non-elective patients, age and gender profiles of patients treated. Utilising a variety of different inputs including labour, capital such as land and buildings, intermediate inputs comprise drugs, dressings, disposable supplies and equipment are Considered. Teaching hospitals might incur higher costs and appear less productive than non-teaching hospitals because they tend to treat more complex or more severe patients. Moreover, teaching might introduce delays to the treatment process, as consultants tend to spend more time when assessing a patient in order to train medical students

Many innovations have reduced the cost and thereby the productivity is increased by several factors. Moving from inpatient care to outpatient care was a key step forward (1). Converting human double checking of medications to electronic checking and minimizing human documentation is one innovation.

Contrast to this the healthcare productivity has remained low due to complex new equipment which are used with limitations, increased capabilities of healthcare workforce with subspecialities, and reduced provision with a lack of a system integration plan. The health leadership insist on the productivity more when compared to the values of healthcare.

There is broad agreement that health care value needs to be improved. Preventable harm continues to cause significant morbidity and mortality. While medical practice is continuously improving, it has not kept up with patients' rising expectations. In the mid-20th century, when medicine could do a great deal less than it can now, much more attention was given to kindness, caring, good communication, honesty, reliability and trust are the interpersonal parts of a doctor patient relationship. The rise of scientific medicine has led to a preoccupation in our minds to erode the personal values. The systems that are in place for better productivity have hindered the professional touch and care towards patients (2).

The whole care of a patient is affected not because of the actions of individuals and despite the impressive care and professionalism of so many of the staff who care for patients, but because of the lack of values reflected in uncaring systems and processes that leave patients so powerless, frustrated and frightened (3).

Time spent with a patient, a handheld, a small kindness, a caring act, honesty – any of these seemingly inconsequential actions have a critical impact well beyond their stand-alone worth. These critical but unmeasurable behaviours cannot be bought or commanded, they arrive with a set of values and thrive or wither as a function of organizational culture (4).

An organization must thrive to serve patients than delivering targets. Doctors believe that targets have compromised patient care and undermining clinical decision making. The concept of setting targets has exerted a profoundly corrosive effect on the healthcare of our country introducing a form of corruption much worse than the monetary kind. The unintended consequences are deep intellectual, moral and spiritual decline that renders all official statements doubtful. We as a profession fail to voice and challenge the leadership to make things right for the patient and rediscover the lost values (5).

Our lives begin to end the day we become silent about things that matter'

Martin Luther King

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Review Article

Sperm processing techniques for Intra-Uterine Insemination

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Abstract

Intrauterine insemination (IUI) remains safe, simple relatively cost effective and a valuable initial treatment option, especially in low resource settings for selected group of patients before embarking to assisted reproduction technology treatment. Assisted reproductive technology (ART) does not include assisted insemination by sperm from either a woman's partner or a donor. Numerous factors are influencing the success rate of IUI. However, sperm processing method is a modifiable factor in an induvial basis to achieve good success rate. Aim of sperm processing methods are to target analogously and effectively filter progressively motile and morphologically normal sperm from the overall sample population resulted an enriched sperm population with higher fertilizing potential. WHO recommended sperm processing methods are usually adopted in Sri Lanka and major categories are Sperm Migration Method, Density Gradient Centrifugation Method and Column Adherence Method. Each methods have advantages and limitations in clinical practice. Therefore, andrologist and fertility specialist need to decide the best possible sperm processing method for a particular couple for optimal success rate of IUI treatment according to the clinical assessment and sperm quality and quantity.

Introduction

Intra-Uterine Insemination (IUI) is an assisted conception technique involving the deposition of processed semen into the uterine cavity around ovulation time (1,2). It is a simple technique performed with minimal infrastructure facilities and fewer risks for subfertile couples (3,4). Women with patent fallopian tubes and infertility due to male-factor, unexplained factors, cervical factors, immunological factors and ejaculatory disorders are usually indicated for this treatment. It has a 10-20% clinical pregnancy rate. However, the technique of IUI, ovulation stimulation protocols, sperm preparation techniques and ultrasound monitoring of follicular development have led to promising success rates (5).

Physiological changes of the sperm prior to natural fertilization

During coitus, the ejaculated coagulum becomes deposited around the external orifice of the cervix and the posterior fornix of the vagina. Freshly ejaculated, this coagulated semen protects sperm from the acidic vaginal environment and facilitates sperm transport through the cervix and fallopian tubes. As the coagulum begins to liquefy, otherwise trapped sperm are released into the surrounding environment. Most motile sperm with normal forms will then rapidly penetrate and migrate into the cervical mucus. A tiny fraction of these sperm might eventually reach the oocyte within the fertilization area. Those sperm remaining behind within the vagina are inactivated and summarily destroyed, likely due to the relatively high acidity of the vaginal confines.

Interestingly healthy sperm, although fully formed at the moment of ejaculation, are not yet able to fertilize an egg. Prior to making contact with the oocyte, sperm must undergo further physiological maturation possible only within the female reproductive tract, called "capacitation" (6,8). Such capacitation is inhibited outside the female in order to conserve sperm fertilization capacity. Specifically, decapacitating factors present within the seminal plasma itself prevent sperm from undergoing spontaneous and independent capacitation reactions. Once semen has been ejaculated into the vagina, several factors, including cervical mucus, will facilitate the capacitation process occurring within the reproductive tract. Also, the periovulatory mucus acts as a barrier against leucocytes, prostaglandins, and various infectious agents present in the seminal fluid. It allows only progressively motile sperm to penetrate and migrate through the cervix with normal shape and size.

Sperm processing techniques

Sperm processing techniques have been designed to duplicate these natural physiological functions of the female reproductive system. Logically, such techniques should produce the most optimal results. It mimics the

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sperm separation abilities of periovulatory mucus that can favorably influence the reproductive outcome. These methods analogously and effectively filter progressively motile and morphologically normal sperm from the overall sample population. The resultant sample contains an enriched sperm population with higher fertilizing potential.

Central to this process is separating decapacitation factors and contaminants from the seminal plasma, such as cellular debris, gelatinous pieces, epithelial cells, bacteria, leukocytes, and erythrocytes. The goal should be thorough filtering of motile sperm and the recovery of most, if not all, viable spermatozoa. Such separation procedures should be reliable, repeatable and relatively simple to perform. In Sri Lanka, WHO recommendations for sperm processing for IUI are widely adopted in clinical practice.

These separation procedures can be broadly categorized into three major groups:

- Sperm Migration Method
- Density Gradient Centrifugation Method
- Column Adherence Method

Sperm Migration Method

Motile sperm are selected based on their natural ability to migrate into a defined medium. In the sperm swim-up procedure, a low-viscosity medium is layered over the semen. The motile sperm are allowed to migrate up against gravity, leaving all other no dynamic factors within the sample behind (9).

It is also possible to recover motile sperm by allowing them to migrate down with the help of gravity into a higher viscosity composed of bovine serum albumin. This procedure has been claimed to yield a higher concentration of Y chromosome–bearing sperm (Ericsson, Langevin, and Nishino 1973). However, it is not recommended for routine use. All the procedures mentioned above allow motile sperm to swim up or down into a gradient, separating them from the nonmotile fraction and ejaculatory cellular debris left behind. They will generally yield a population of motile sperm. However, it should be noted that although sperm motility is a prerequisite for conventional IVF, not all motile sperm are fertile.

Density Gradient Centrifugation Method

Sperm are selected based on their motility, size and density differential as they are centrifuged through a continuous or discontinuous density gradient of either colloidal or salinized colloidal silica (11). Compared with sperm swim-up or swim-down procedures, density-gradient centrifugation (DGC) procedures yield a higher concentration of motile sperm(12) and are therefore considered to be industry-standard procedures for processing semen for IUI. However, the DGC method is not recommended for extremely low sperm content semen samples, highly viscous semen samples, or samples containing a large percentage of cellular debris.

Discontinuous DGC techniques were used extensively before IUI and IVF to separate motile spermatozoa from immotile spermatozoa and other cells and eliminate decapacitation factors, prostaglandins and reactive oxygen species (ROS) (13). Generally, a motile mature spermatozoon has a higher density than an immotile or immature spermatozoon (14). After centrifugation, leukocytes and cell debris are concentrated in the seminal plasma and upper layer interface. Morphologically abnormal spermatozoa collect in the interface between the upper and lower layer, and motile and mature spermatozoa form a pellet at the bottom of the tube (15).

DGC effectively separates motile from immotile spermatozoa and yields a low concentration of ROS. The reduced ROS in the lower layer, relative to the unwashed samples, strongly suggests that the treatment of semen by DGC does not expose motile sperm to oxidative stress (11).

Column Adherence Method

Sperm are selected based on the fundamental concept that nonviable sperm are ''sticky,'' and, therefore, more likely to adhere to the silica (glass) wool column than otherwise motile and functionally intact spermatozoa (16,17). Compared with the swim-up sperm and density-gradient procedures, filtration procedures yield higher concentrations of sperm, especially in cases of viscous and/or asthenozoospermic and oligozoospermic ejaculates (18). The filtered sperm also has a higher percentage of intact acrosomes (19). and chromatin integrity (20). In addition, filtered sperm yielded significantly higher results in the zona-free hamster oocyte sperm penetration assay (SPA) (21). They bound more in the zona-binding assay (22). Finally, filtered sperm resulted in a higher percentage of oocytes fertilized during in vitro fertilization than sperm recovered from the swim-up procedure (23). Sperm recovered after filtration could be successfully used for IUI.

Processing Retrograde Flow of Semen

Semen is directed into the urinary bladder during ejaculation, usually with aspermia. It is confirmed by examining a sample of post-ejaculatory urine for the presence of spermatozoa. Due to its acidity and other factors, urine is naturally detrimental to sperm quality. The first step toward successfully procuring viable sperm from urine involves chemically altering the osmolality and acidity of the bladder urine.

Since urine above 40% volume-to-volume concentration is reported deleterious to sperm function (regardless of whether urine pH and osmolality are first modified), the clinician should collect urine aliquots in a buffered physiologic solution or medium (24, 25). Collect the first aliquot of 5 to 10 ml of voided urine in 10ml of sperm processing media and immediately centrifuge at 500 x g for 5 minutes and discard the supernatant. Resuspend the resultant sperm pellet in a 5 ml medium and centrifuge at 500 x g for 5 minutes, and discard the supernatant. If sperm processing is deemed necessary, resuspend the resultant sperm pellet in the medium and proceed accordingly as described above.

Some studies have suggested that alkalinization of the urine by ingestion of sodium bicarbonate 24 h before and one hour prior to ejaculation, would increase the sperm quality in the urine. However, this method may disturb the patient's acid-base balance in the body (26, 28).

Converting the retrograde flow of semen to antegrade ejaculation may be attempted through various medical treatments. Sudafed 60 mg or Imipramine 25mg 4 times per day for 7-10 days prior to scheduled semen analysis (including tablet morning of collection). Collect and evaluate both antegrade and retrograde flow of semen. Compare results from both treatments. Choose most efficient pharmacological agent (3).

Conclusion

IUI is a safe, simple and relatively inexpensive fertility treatment for subfertility couples in low- and middle-income countries like Sri Lanka. The sperm processing technique plays a pivotal role in IUI treatment and its success. Although sperm processing procedures attempt to mimic the innate capabilities of the female reproductive system, in reality, these laboratory techniques are able, at best, to select a more suitable sperm population based solely on particular sperm characteristics.

Sperm Migration Methods all rely on progressive sperm motility, whereas Density Gradient Centrifugation Methods rely on shape, size and sperm density. The Sperm Adherence Method, on the other hand, mainly selects and removes sperm with broken or non-functional sperm membranes. Essentially, no laboratory technique developed thus far indeed and comprehensively mimics the periovulatory mucus. The latter two methods can concentrate most viable sperm into volumes sufficient for IUI but in proportions greater than those attainable by the periovulatory mucus itself.

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Review Article

Cyanide poisoning- an update

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Abstract

Acute cyanide (CN) poisoning leads to deterioration of body functions and often results in death. It can be accidental, suicidal, and at times homicidal. Since the historical period, CN has been the cause for several deaths, including fire accidents, industrial waste leakage, suicides of famous persons, and planned massacres. Several sources can lead to CN poisonings, such as smoke from the fire, mining and other industries, nitriles, and plants. The primary function of CN is to inhibit the cytochrome oxidase a3 enzyme due to the high binding affinity of CN to the ferric iron found in the haem moiety of the cytochrome oxidase a3 leads to uncoupling the mitochondrial oxidative phosphorylation and inhibiting the cellular respiration. Clinical signs and symptoms are primarily dose-related and range from gastrointestinal involvement to coma and death. In addition to decontaminating the poison and essential supportive treatment, effective antidotes are available. Last six years, fifteen Fatalities following CN poisoning were reported at Teaching Hospital, Jaffna. Social support and an adequate legal framework for controlling CN-containing substances could reduce the burden of cyanide toxicity.

Key Words

Cyanide poisoning, Oxidative phosphorylation, cytochrome oxidase, antidote

Introduction

Acute CN poisoning leads to rapid hemodynamic and neurological dysfunction. Most of the time resulted in a fatal outcome (1).CN is an easily accessible, highly lethal, and easily administrable substance. Since ancient times it has remained a threat to the general public and the arm forces worldwide. Ingestion of CN is the standard mode of poisoning rather than the other modes of administration (2). Among the several substances which contain CN, salt KCN and NaCN are the predominant agents that caused deaths (2). Circumstances of CN poisoning are mostly suicidal and accidental, but homicidal poisoning is also not uncommon.

History of cyanide poisoning

In 1704 a German painter Heinrich Diesbach, while he was trying to improve the color on his palette, invented Berlin Blue, which English chemists later called Prussian Blue (3). Eighty years after (1782), the Swedish chemist Carl Wilhelm Scheele mixed the Prussian blue with the acid and discovered HCN. HCN easily condensed and even reacted with water to form strong prussic acid (Hydrocyanic acid) (4).

After the invention of CN, it has been recorded several times in history as a potent killer.

Accidents

Fire accident at Republica Cromanon nightclub in Argentina on 30th December 2004 killed 194 people (5), fire in the Nightclub Lame Horse in Russia destroyed 156 people (6) and fire in Kiss nightclub in January 2013 in the city of Santa Maria in south Brazil where 236 youngsters were killed (7). All these incidents happened CN gas released from burning plastic and related materials (5,6,7). Using CN-containing substances in gold mines and the industrial sector can result in accidental spillage. The cyanide leakage in Argentina (1993) and Romania (2000) resulted in severe environmental disasters (8,9).

Suicides

During world war ll in 1943, Norwegian commandos have launched a successful operation called "Operation Gunner side," in which they have blasted the Nazi's heavy water storage with the view of preventing the German atomic bomb production. For this operation, troops were given CN to commit suicide in Nazi capture (10). End of World war ll several Nazi leaders including Odilo Globocknik, Richard Glucks, Hans-Georg Von Friedeburg, Robert Ritter Von Greim, Heinrich Himmler, Martin Borman, and Hermann Goring choose prussic acid (HCN) to end their life (11). German leader Adolf Hitler was biting a CN capsule while shooting himself (12). Hitler's wife Eva Braun also commit suicide by using CN (11,12). In Sri Lanka, The Liberation Tigers of Tamil Eelam (LTTE) wore a CN capsule around

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their neck to end their life if cornered by the arm forces (13). Several other famous individuals have committed suicide following ingestion of CN.

Homicide

Nazis used Zyclon B pellets (HCN) to kill the Jews on a Mass scale in extermination camps during the Holocaust. Prisoners have been kept inside the chambers, and Zyclon B has been released via the ceiling hole. People died within minutes. Millions of people were killed this way (14). Jonestown Massacre occurred on November 18th, 1978, when 900 members of an American Cult were killed by forcing them to ingest KCN laced flavored drink (15).

Available cyanide containing components

CN is mainly used in mining and other industries such as chemical synthesis, electroplating (Called Potash in Sri Lanka), tanning, metallurgy, printing, agriculture, photography, manufacture of paper and plastics, use of fumigants and insecticides (16). These salts are generated HCN and mixed with strong acids leading to significant risk in industrial workers (17). Waste products from the mining industry produced a vast amount of CN complexes. These chemicals are less toxic than other salts but create a considerable environmental risk (18).

Another group of CN called nitriles is frequently encountered as acetonitrile and propionitriles (19, 20). These chemicals are commonly used in industry as solvents and in households as artificial nail and glue removers (21).

Fire is also a significant source of CN. Many synthetic polymers such as plastics and nylon may release HCN during burning; victims in the fire have the risk of HCN and carbon monoxide poisoning (16). Both HCN and CO are causing hypoxic events. Their effects are addictive and possibly synergistic (22). Some studies suggested that CN is more contributory than CO in household fire (23).

Iatrogenic sources for CN poisoning are nitroprusside in high dose and long duration (24); Laetrile is used as a chemotherapeutic agent, a purified form of natural CN compound amygdalin (25).

CN as cyanogenic glycosides found in plant materials such as Manihot utilissima, Adenia palmata, and Rosacea group plants (26).

Pathophysiology

The primary routes of CN toxicity are inhalation and ingestion. The skin and eyes can absorb the liquid form of CN. After getting absorbed, it will enter the bloodstream and distribute to the tissues and organs very quickly (27). Essentially oxidative phosphorylation is the event that gets impaired due to CN poisoning. ATP (Adenosine triphosphate) provides the major part of the energy needed for cellular function, and oxygen is utilized for ATP formation (28). Transferring electrons from NADH (Nicotinamide adenine dinucleotide) to oxygen is the vital process for ATP production, which happens through a series of electron carriers. The cytochrome oxidase enzyme system catalyzes this in the mitochondria, and impairment of this function occurs due to the inhibition of cytochrome oxidase a3 enzyme by CN. This, in turn, is because of the high binding affinity of CN to the ferric ion found in the haem moiety of the oxidized form of cytochrome oxidase a3. Therefore, uncoupling mitochondrial oxidative phosphorylation and inhibiting cellular respiration, even with enough oxygen in the blood—cellular metabolism shifts from aerobic to anaerobic, leading to subsequent lactic acid production. As a result, the tissues with the highest oxygen requirements (Brain and heart) are the most severely affected organs by acute CN poisoning (29).

CN is not only affecting the cytochrome oxidase a3 enzyme system but also other essential mechanisms, especially in severe toxicity (30). Another school of thought says that decreased cardiac output and cardiogenic shock can happen due to severe vasoconstriction of the coronary artery and pulmonary arterioles (31). The release of biogenic amines may also play an adverse outcome following CN toxicity. Pulmonary edema has also been noted. It is primarily due to left ventricular failure rather than capillary endothelial damage and leak or neurogenic causes (32). However, the exact mechanism related to cardiovascular events is still debatable.

Clinical symptoms and signs

Clinical presentation is dose-related. In small doses, there could be a saltish taste in the mouth, the smell of bitter almonds in the breath, Gastrointestinal symptoms such as salivation, nausea, and vomiting. They can develop shortness of breath, bradycardia, hypotension, arrhythmias, cyanosis, anxiety, vertigo, headache, confusion, drowsiness, paralysis, and eventually coma (26, 28).

In larger doses, patients will get rapid loss of consciousness, twitching of muscles, convulsions, cardiovascular collapse with shock and pulmonary edema, coma, and death. They are often found dead at the scene, pronounced dead on admission to the hospital, or die soon after the access of the hospital (26, 28).

Medical treatment for cyanide poisoning

CN toxicity is rapid, and often there is limited time to treat the patient. Decontamination should be done among all the patients depending on exposure. In inhalational exposure, remove the clothing and other ornaments. In addition to the above dermal decontamination should be done in liquid and solid exposure. Always wear double gloves and mask as several case reports revealed secondary contamination from the victims (33). CN may be exhaled from the affected individual's lungs or contaminated via heavily soaked clothing, skin, or vomitus (33,34).

Gastrointestinal decontamination is very limited due to the rapid onset of toxicity, but some forms of CN have to take a prolonged time for absorption. The patient presented within one hour; it is reasonable to perform orogastric lavage and treat with activated charcoal (35).

Oxygen therapy is very crucial in CN poisoning. 100% oxygen ventilation will increase the tissue oxygen delivery, but in CN poisoning, the main issue is the usage of oxygen rather than the delivery. It might seem useless that give oxygen as a treatment modality (36). However, theoretically, increased oxygen may have a synergistic effect with antidotes. In addition, oxygen may increase the respiratory excretion of CN, stimulate the activation of the other oxidative systems such as enzymes that are not jet poisoned by CN, and activate the rhodanese enzyme indirectly (37, 38). Hyperbaric oxygen treatment for cyanide toxicity is still debatable. Most studies found no positive correlation between hyperbaric oxygen therapy and cyanide toxicity (39,40,41,42). Still, treatment with hyperbaric oxygen is beneficial in carbon monoxide poisoning complicated with CN toxicity (43). Further supportive treatment is needed for other conditions such as acidosis, hemodynamic instability, and convulsions. Usually, seizures are very severe and need aggressive management. In some cases, hemodialysis may be primarily for worsening acidosis and renal involvement (44).

Antidotes

The antidote is defined as "A drug whose mechanism of action has been determined, which can modify either toxicokinetics and/or toxicodynamics of the poison and whose administration to the poisoned patient reliably induces a significant benefit" (45). An ideal antidote should have all the above qualities, and in addition to that, it should not harm when administered to a nonpoisoned patient (allow for errors in diagnosis.). Choosing the antidote is depends on the regional interest. The US is using Lilly Kit ("Taylor Kit" or "Pasadena Kit"), comprised of amyl nitrite, sodium nitrite, and sodium thiosulfate. Some other countries use dicobalt edetate, hydroxycobalamin, and 4-dimethylaminophenol(4-DMAP). Sodium nitrite, sodium thiosulfate, and hydroxycobalamin are administered by intravenous or intraosseous route, amyl nitrite can be used as an inhalational agent, and 4-DMAP is given intramuscularly.

Sodium nitrite and Amyl nitrite: The mechanism of action of this substance is the formation of methemoglobin by mass action and removing the CN from the cytochrome oxidase enzyme. It will lead to the restoration of oxidative phosphorylation. Rhodanase will convert the CN to less toxic thiocyanide and eliminate it via urine (46). Severe hypotension could be a significant adverse effect of nitrites (47).

Sodium Thiosulfate: Donate sulfane sulfur molecule to rhodanase to form the thiocyanide and regenerate the original enzyme (48).

Hydroxycobalamine (Vit B12a): Binds CN quickly and irreversibly form the cyanocobalamin (Vit B12) and is excreted through urine (49). It also binds with nitric oxide (NO), restoring blood pressure in poisoned patients (50).

Dicobalt edetate: It acts as a chelator forming a stable component. It should use only severely poisoned by CN as its potential toxicity by free cobalt (51).

4-Dimethylaminophenol: It is induced the methemoglobin but efficient and faster than sodium nitrite (52).

There are substances under active research and future that can be developed as efficient antidotes such as Alpha-Ketoglutarate, Cobinamide, Dihydroxyacetone, Hydroxylamine, Salfanegen, and S.methyl Mthylthiosulfonate (MTSO) (53,54,55,56,57).

Autopsy findings

The odor of bitter almonds could be noted on entering the autopsy suite while doing the external examination and opening into the body cavities especially opening the stomach. The ability to smell the CN is inherited as a sex-linked recessive trait. Thus, limited people have the ability to smell the poison (26). Bright red or brick red color of the skin, hypostatic areas, blood, muscles, and vascular organs can be observed. Diffusely red mucosa can be seen in the stomach; it can sometimes be observed in the esophagus, duodenum, and jejunum. In addition to the above findings, remnants of CN capsule in the mouth and injury to the gum, tongue, and buccal mucosa in CN capsule biting during suicides and presents of plant materials in the stomach in cyanogenic glycoside toxicity can be noted (26).

Deaths due to cyanide poisoning in Jaffna (2015-2021)

Except a few, all were goldsmiths who succumbed following CN poisoning. A mother (Table 1. Case No 5) has killed her children (Table 1, Case No 6, 7, and 8) by poisoning them with CN and committed suicide with the same method following the 55th day of her husband's (Table 1, case No 4) dismissal by the same poison. A housewife (Table1, Case NO 14) has committed suicide with CN following the husband's (Table1, Case No 13) death due to self-ingestion of CN.

Table 1: Summary of fatal cyanide poisoning cases at Teaching Hospital Jaffna from 2015 to 2021

Case number	Date	Age	Gender	Marital status	occupation	Alcoholism	circumstances
1	12-06-2015	35	Male	Married	Goldsmith	alcoholic	suicide
2	01-08-2016	59	Male	Married	Laborer	alcoholic	suicide
3	23-08-2017	38	Male	Married	Goldsmith	alcoholic	suicide
4	03-09-2017	37	Male	Married	Goldsmith	Occasional alcoholic	Suicide
5	27-10-2017	28	Female	Married	Housewife	Nonalcoholic	suicide
6	27-10-2017	04	Female	-	-	Nonalcoholic	Homicide
7	27-10-2017	02	Male	-	-	Nonalcoholic	Homicide
8	27-10-2017	01	Male	-	-	Nonalcoholic	Homicide
9	19-01-2018	34	Male	Unmarried	Goldsmith	alcoholic	suicide
10	14-11-2018	22	Male	Unmarried	Goldsmith	Nonalcoholic	suicide
11	22-04-2019	46	Male	Married	Goldsmith	alcoholic	suicide
12	01-04-2021	39	male	Unmarried	Goldsmith	Nonalcoholic	suicide
13	07-05-2021	34	Male	Married	Ex goldsmith	alcoholic	suicide
14	07-05-2021	33	Female	Married	Housewife	Nonalcoholic	suicide
15	23-10-2021	49	Male	Married	Ex Goldsmith		suicide
16	28-11-2021	31	Male	Married	An employee of a private firm	alcoholic	suicide

Conclusion

From a toxicological point of view, the death from CN poisoning is rare; however, it is essential to suspect such occurrence in such occupational clusters necessitates the scientific autopsies to be the primary source to detect the cause. Reducing the incidence of self-inflicted deaths warrants more robust sociological support and a need for legalized control of such toxic substances. Failing it, such readily available industrial substances tend to become the household modality of death and a preferred tool for planned homicides due to their inconspicuous nature.

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Review Article

Anatomical variations in the origin of the superior thyroid artery

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Abstract

Superior thyroid artery (STA) is first and lowest branch of external carotid artery (ECA) and it supplies thyroid, parathyroid, upper larynx and neck region. The STA origins either from ECA, common carotid artery (CCA) or its bifurcation level. Various researchers have reported differences in its origin. The STA commencing from the ECA is comparatively more in Indian and Ethiopian but its derivation from CCA bifurcation point is more in Turkey and Korean. Origin of STA in relative to upper border of thyroid cartilage is used as a landmark. The CCA bifurcates into external and internal carotid arteries at same level and occasionally bifurcates at a higher or lower level than its usual site. Origin of STA from CCA is associated with high bifurcation and its origin from the ECA is related with the low CCA division. Comparatively STA origin from CCA or its bifurcation level is more on right side. The CCA developed from third aortic arch and any alteration in development of aortic arches might also contribute to these variations. The STA is an artery of abundant clinical significance and it is recommended to do detailed study of its origin, course, branches, size, and positional relation with the external laryngeal nerve, hyoid bone and thyroid cartilage. Understanding of these variations is immense importance in academic and clinical arena for planning and performing surgical procedures in neck region.

Keywords

Superior thyroid artery variation, carotid bifurcation, upper border of thyroid cartilage

Introduction

The Superior thyroid artery (STA) is the first branch of the external carotid artery (ECA) in the neck. The STA provides branches to sternocleidomastoid, infrahyoid, cricothyroid, superior laryngeal and glandular/terminal branches to both thyroid and parathyroid glands (1,2). Thus it supplies the anterior part of neck region. Most of the Medical standard textbooks state that the STA origins as an anterior or front branch from the ECA (2,3,4).

The variability in the place of origin and level of origin of STA were reported by different authors. The STA may origin either from the common carotid artery (CCA), or ECA or at the level of CCA bifurcation site (4,5).

The variant STA is Detected by accidental injury during surgical procedures like total bilateral lobectomy, total unilateral with partial contralateral lobectomy of thyroid pathological conditions. The incidental damage or accidental injury of the STA or its branches or any malignant attack of its vessel wall may results in death by bleeding (2).

Anatomical study of superior thyroid artery:

Anatomically the STA was exposed by a skin incision made from the jaw to sternum in the midline and the fold of skin reflected inferolaterally and platysma muscle was taken upward. The fat and fascia were detached from the borders of the sternocleidomastoid. Then the sternocleidomastoid muscle withdrawn and the deep fascia removed from the anterior belly of digastric muscle to expose the infrahyoid muscles. The fat and fascia between the posterior belly of digastric and superior belly of omohyoid were removed to expose the carotid triangle. Thus exposed the major vessels of carotid triangle including CCA, ECA, the part of internal carotid artery (ICA) and branches of the ECA. The STA was the first and lowest branch of ECA in the carotid triangle (5).

Origin of superior thyroid artery from different source of vessels:

The previous reported studies pointed out the three major types of variants in the origin of STA (table 1) and other variations were in lesser percentage.

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Table-1 Differences in the origin of STA by different authors:

Author	Year/ Country	Origin of superior thyroid artery			
		Major three types of variations			Others
		ECA (in %)	CCA bifurcation level (in %)	CCA (in %)	
Joshi A et al.,	2014, India	66.6%	31.81%	1.51%	Nil
Dessie MA	2018, Ethiopia	44.2%,	27.9%	26.7%	1.2 % (lingual artery)
Ozgur Z et al.,	2009, Turkey	25% (above CCA)	40%	35%	Nil
SY Won	2016, Korea	20%	40%	40%	Nil

It was noted that the origin of STA from the ECA was comparatively more in the Indian and Ethiopian population (Fig 1) but its derivation from the CCA bifurcation point (Fig 2) was comparatively more in Turkey and Korean population. It was suggested by Natis K et al *in* 2011, development of a novel classification scheme on the origin of the STA and they commented that its origin in majority of the cases is considered at the level of the CCA bifurcation and not from the ECA (6). The origin of STA from CCA was found 45 % in the Americans but only 5% in the Swiss population (7). Ozgur Z et al. noted that greater incidence of origin of STA from the CCA was present in the East Asians (2).

Fig 1. STA originates at the level of bifurcation of right CCA at its anterior surface

1. CCA 2.IJV 3. Vagus nerve 4.Thyroid gland 5.Sternothyroid 6. Thyrohyoid 7. Cricothyroid 8. Superior thyroid artery 9. Facial artery 10. Hypoglossal nerve 11. Inferior alveolar nerve 12. Phrenic nerve 13.Scalene anterior muscle 14. Trunk of brachial plexus 15. Submandibular gland 16. External carotid artery 17. Internal carotid artery.

Fig 2. STA originates from the posteromedial surface of the right ECA.

STA 2. Mylohyoid muscle and Y denotes level of the hyoid bone

The CCA commonly provides no branch prior to its split into external and internal carotid arteries in the neck but a reported studies stated CCA may give rise to the superior thyroid, vertebral, laryngeal or ascending pharyngeal arteries (7).

Munjamkar P. et al. in 2017 compared the origin of STA on both sides of the neck and they commented STA most frequently arose from the ECA on the left side compared to right but majority of STA origin either from the CCA or at its bifurcation level on the right side (8). Thus comparatively right side of the neck has more chance for its origin from the CCA or its bifurcation level.

Burlakoti and Massy-Westropp, reported a case of common arterial trunk (thyrolinguofacial trunk) for three arteries namely lingual, superior thyroid and facial arteries in their studies (9). The study by Joshi A et al. observed that the STA might arise from the subclavian artery or shared trunk with the lingual artery in lesser percentage (5).

Various scholars have conveyed the cases of thyrolingual trunk originating from the CCA (2). Ghosh et al. reported an extremely rare variation where STA originated from the internal carotid artery near the CCA bifurcation level (10). Thwin S et al. noticed a common linguofacial stem in their studies (11). The linguofacial stem was the commonest detected deviation with the thyrolinguofacial trunk happening only in less number (12). The STA originated from lingual artery in 1.2 % of Ethiopian population (4).

Origin of superior thyroid artery in relation with the midline cartilages in the neck region:

It was observed that STA commonly arose as an anterior branch from the ECA immediately above the CCA bifurcation

level (5), which was usually just above the upper margin of thyroid cartilage. Another study stated that the STA origin just at the lower margin of greater cornu of hyoid bone (8).

Apart from these studies of dissimilarities in the origin of the STA from different sources of vessels, the study of the origin of STA in comparative to the midline structures in the neck were desirable for successful surgeries (13). Thus the level of the beginning of STA in relation to the upper border of thyroid cartilage was selected and used as an important landmark (Fig 1).

Table-2 Differences in the origin of the STA in level with the upper border of thyroid cartilage by different authors

Author	Year/ Country	Origin of superior thyroid artery from		
		Above the upper border of thyroid cartilage	At the level of upper border of thyroid cartilage	Below the level of upper border of thyroid cartilage
Sreedharan R et al.,	2018, India	96.66%	1.66%	1.66%
Dessie MA	2018, Ethiopia	51.2%	44.7%	44.7%
Joshi A et al	2014, India	86.36%	13.64% is at the same level and below it	

It was noted from the above studies that the STA originated above the level of upper margin of thyroid cartilage was more in number than the other types. (Table 2)

The CCA normally divided into ECA and ICA at the level of upper margin of thyroid cartilage and the STA which was the first branch from the ECA must be located slightly above the level of the thyroid cartilage. Al-Rafiah A et al. identified the CCA may bifurcate either at a superior or inferior than its usual site and they commented higher bifurcation of CCA was more common (12, 14). Thus bifurcation level of CCA may also influence the source of origin of the STA (12). (Figur 2)

The derivation of STA from CCA was connected with high CCA bifurcation and its derivation from the ECA was connected with the low carotid bifurcation (4). SY Won, (2016) reported the suggestion that these variations might be due to the ethnic differences (13).

The CCA and the part of the internal carotid artery were developed from the third aortic arch. The ECA buds cranially as a novel vessel from the third aortic arch (15). Any little changes or alteration in the development of the aortic arches might also be contributed to these variations. The origin of the ECA from the uppermost part of the 3rd aortic arch or straight from the dorsal aorta and the derivation of the ICA from the 2nd aortic arch associated with the ECA establishment from small canals are the anticipated embryological explanation for the high bifurcation of CCA (16).

Preoperative ultrasound examination is necessary to predict these types of variation of STA (9). Former angiographic valuation to determine the level of carotid division and the branch off pattern of the carotid arterial system may provide esteemed information to escape the damage of vital neck structures (12).

Clinical significance of superior thyroid artery:

Studies indicated that in 20-45% of superior parathyroid glands received the major vascular supply from the STA (17). The anterior glandular branches (AGB) of STA typically course along the medial border of the upper pole of thyroid lobe to supply largely the frontal surface as anteromedial and anterolateral glandular branches (2, 18). The AGB traversed above the isthmus to communicate with its corresponding branch of the opposite side while its posterior glandular branch (PGB) inclines on the posterior border to supply the corresponding medial and lateral surfaces (2).

The STA crossed the external laryngeal nerve before it reached the upper pole of thyroid lobe (5). The nerve is likely at risk when ligating the STA stem. The rate of injury to this nerve is variable but it can be as high as 58% and its dysfunction results in inability to achieve high frequency sound (18). External laryngeal nerve is the sole motor nerve to the cricothyroid muscle, which maintains the tension of the vocal cord.

The study of the course of the STA and its distance from the thyroid gland should be clearly defined to minimize the bleeding during the removal of tumors from thyroid and parathyroid glands (13).

The STA is clinically essential for embolization of thyroid and parathyroid masses. The STA can be used as a source of repairing material succeeding carotid endarterectomy. It is the nourishing channel for almost 80% of thyroid growths (19,13). There is a correlation between the STA blood flow and the thyroid gland mass, micro vessels density and histopathological pattern in Grave's disease (19). During radical neck surgery, the chief dreaded problem is the break of the superior thyroid artery and its branches (5).

Conclusion:

The superior thyroid artery is a blood vessel of abundant clinical significance and it is recommended to do the detailed study of its origin, course, branches, size, relationship with the

external laryngeal nerve, hyoid bone and thyroid cartilage are needed. These important values are necessary for a harmless effort in appropriate location for catheterization, preparation and implementation of any surgical procedures in neck region. Understanding of these arterial variations is immense importance in academic and clinical arena.

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Original Article

A comparison of outcomes of management of Dengue Haemorrhagic Fever using minimal intervention and the standard management protocol in paediatric units of a Sri Lankan tertiary care facility; A retrospective comparative cross-sectional study

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Abstract

Dengue is a mosquito-borne viral infection found in tropical and sub-tropical climates worldwide. Dengue Fever is a significant health concern in Sri Lanka. Dengue Hemorrhagic Fever is managed following a standard protocol laid down by the Ministry of Health Sri Lanka. During the recent epidemic of dengue a deviation from standard protocol was observed with minimal intervention (i.e. without intravenous fluids and urinary catheterisation).

This study aimed to compare minimal intervention vs. standard protocol with regard to the development of complications and outcomes of children with Dengue Haemorrhagic Fever.

A comparative cross-sectional study was conducted retrospectively using secondary data

The clinical records of paediatric patients with Dengue Haemorrhagic Fever (n=151) admitted to Teaching Hospital, Karapitiya, Galle, Sri Lanka during 2019. The study subjects were categorised into two groups as standard protocol and minimal intervention based on the type of management received.

Of 151 patients , 98 (65%) were managed following standard protocol and 53 (35%) following minimal intervention. No significant differences were observed in the two groups in age ($p=0.57$), sex ($p=0.72$), day of fever on admission ($p=0.65$), and haematological parameters on admission ($p>0.05$). There was no difference in the recovery and duration of hospital stay in the two groups. However, infections ($p=0.04$) and fluid overload ($p=0.004$) were significantly more common in the standard protocol group compared to the minimal intervention group.

Minimal intervention reduces complications of the management of DHF and reduces the burden to the health care system and patients.

Keywords

complications, critical phase, Dengue Hemorrhagic Fever, Fluid overload, Sri Lanka

Introduction

Dengue is a mosquito-borne viral infection found in tropical and sub-tropical climates worldwide, mostly in urban and semi-urban areas (1). The number of dengue cases reported to World Health Organization increased over eightfold over the last two decades, from 505,430 cases in 2000 to over 2.4 million in 2010 and 5.2 million in 2019 (1). Dengue infection has become a significant public health concern in Sri Lanka too (2).

Dengue has a broad spectrum of clinical presentations (3). Dengue haemorrhagic fever is characterised by transient increased vascular permeability leading to plasma leakage. The period during which the fluid is leaked is called the critical phase, which is very dynamic, and the progression of leaking is highly variable from patient to patient (4).Therefore, all suspected patients with DF should be closely followed up to identify whether they develop DHF to carry out meticulous fluid management during the critical phase.

Management of dengue is based on National Guidelines (4). According to the guidelines intravenous (IV) fluids should be started in all the patients who are entering into critical phase. Those who can drink , IV fluids as 0.5ml/kg/hour are given to 'keep vein open' during the critical phase while the balance is given orally. Hourly urine output is the best guide to decide the rate of IV fluid infusion to maintain circulation. Therefore, all high-risk patients such as infants, obese patients, patients with underlying diseases, patients with complications such as shock and platelets below 50,000/mm^3 should be catheterised according to the guidelines. Hematocrit (HCT) measurements of 4-6 hours are indicated in non-shock patients, and it is done more frequently in patients who develop shock.

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During the recent dengue epidemic in 2019, some deviations from guidelines of the management of DHF were observed due to various reasons such as less human resources in the ward, needle phobia and not giving consent for interventions due to cultural issues. These deviations include administrating total oral fluids instead of IV fluids, measurement of urine output without catheterisation, and HCT measurement 12 hourly with full blood counts instead of 4 hourly HCT in patients who showed leaking. This management is named as Minimal Interventions (MI). These deviations from the guidelines have not made much difference in the outcomes according to the experience of clinicians.

This study aimed to compare the outcome of patients managed with different protocol (minimal intervention) with the standard protocol (according to national guidelines) in managing DHF in terms of complications and the patient's overall outcome.

Management of DHF with minimal interventions has already been practiced in some countries. A study conducted in Taiwan with 49 patients with DHF without shock has revealed advantages of oral hydration over intravenous fluid, and patients treated with IV fluids were more prone to develop pleural effusion and pulmonary oedema (9,5). Moreover, Dengue management needs more human resources and laboratory facilities compared to any other vector born disease (11,6). Therefore, it is worth compare outcomes of minimal intervention with standard management protocol in managing DHF. The findings of this research will be helpful to plan a prospective case-control study to compare the outcome of minimal intervention Vs. Standard protocol. Hereby the complications associated with management of DHF can be reduced, and the data will help to revise the guideline of management of DHF.

Methods

A comparative cross-sectional study was carried out retrospectively using secondary data available in the clinical records of paediatric patients with DHF admitted to Teaching Hospital, Karapitiya, during the year 2019. Teaching Hospital, Karapitiya is the only tertiary care facility in the Southern province that caters to paediatric patients and has three general paediatric wards. Paediatric DHF patients from all three wards, who had been diagnosed by hematological parameters and evidence of fluid leakage into the body cavity confirmed by two ultrasound scans, were included in the study. DHF patients who had incomplete DHF monitoring charts were excluded from this study.

The study subjects were categorised into two groups based on the type of management received. Those children who were managed according to the National guidelines for management of DF, i.e. intravenous fluids, urinary catheterisation, and four hourly capillary hematocrit measurements, were categorised as Standard Protocol (SP) group. Patients who received only oral fluids, who were not catheterised and had not, had regular micro hematocrit measurements categorised as Minimal Intervention (MI) group.

The study variables included basic demographic characteristics of the patients, day of fever, hematological/ biochemical parameters, details of fluid management, complications developed during management and the outcomes of management. Relevant data were extracted from the Bed Head Tickets (BHT) and dengue monitoring charts on the BHT using a data extraction sheet. Data analysis was done using SPSS statistical software (Version 20.0). The study subjects who were managed with minimal intervention initially and later changed to SP were excluded from the subsequent analysis.

Statistical significance was analysed by using the Mann-Whitney U test for quantitative data and the Fisher's exact test / Chi-square test for qualitative data. The level of significance was set at 0.05.

The ethical clearance for the study was obtained.(Reference No:- 2020 P 107). Permission for data collection was obtained from the Director, Teaching Hospital, Karapitiya and the Consultant Paediatricians in charge of the paediatric units.

Results

The study sample consisted of 151 DHF patients. Of these patients, 98 (64.9%) had been managed according to the standard protocol (SP), while 53 patients (35.1%) were managed with minimal intervention (MI) at the commencement of treatment. Subsequently, 28 out of these 53 patients (18.5% of the original sample) were excluded from the study due to interventions introduced later during the management such as starting intravenous fluids (n=22) and urinary catheterisation (n=6). Therefore, at the end of the critical phase, the standard protocol group consisted of 98 patients (79.7%), while 25 patients (20.3%) were in the minimal intervention group.

The patients in MI group and SP group were compared with respect to their socio-demographic characteristics, duration of fever on admission and hematological parameters at baseline to ensure that the two groups were comparable. The MI group consisted of 11 males (44%) and 14 females (56%) and the corresponding numbers in SP group were 47 (48%) and 51 (52%). Fisher's exact test indicated that there were no significant gender differences between the two groups (p=0.723). Similarly, no statistically significant differences were noted in age, day of fever and the haematological/

biochemical parameters at baseline between the two groups as shown in Table 1.

Table 1. Comparison of the age, duration of fever and haematological parameters on admission between two study groups

Variable	Standard protocol (N=98)		Minimal intervention (N=25)		p value*
	Median	Interquartile range	Median	Interquartile range	
Age in months	111	84	120	80.5	p = 0.579
Day of fever on admission	4	1	4	2	p= 0.657
Total while cell count (mm^3/L)	4.38	2.62	4.53	3	p= 0.499
Hematocrit	39	6.42	38	4.7	p= 0.905
=Platelet count (mm^3/L)	88	77.25	108	54	p= 0.453

**Mann–Whitney U test*

The lowest platelet count, highest recorded haematocrit and the highest recorded levels of liver enzymes were compared between the SP group and MI group during the critical phase. There was no significant difference in the lowest platelet count during the critical phase in two groups (p=0.772), however, a statistically significant difference was observed in the highest AST (p=0.004) / ALT (p=0.044) and the highest recorded haematocrit (p=0.009) in two groups, all three parameters being higher in the SP group (Table 2).

Table 2. Comparison of selected hematological and biochemical parameters during the critical phase between the two study groups

Variable	Standard protocol (N=98)		Minimal intervention (N=25)		p value*
	Median	Interquartile range	Median	Interquartile range	
Lowest Platelet Count (mm^3/L)	31	22.5	33	24	p= 0.772
Highest AST (IU/L)	127	107	73	91	p= 0.004
Highest ALT (IU/L)	52	55	34	79.25	p= 0.044
Highest recorded Hematocrit	43	5	41	4.6	p= 0.009

**Mann–Whitney U test*

Approximately 50% (n=62) of the patients in the sample developed complications of management of whom 61 belonged to the SP group. The proportions with complications were compared between the two study groups and the results are presented in the Table 3.

Table 3. Comparison of the complications between two study groups

Complications	Standard protocol (N=98)		Minimal intervention (N=25)		p value
	Number	%	Number	%	
Secondary Infections					
Yes	16	16.3	0	0.0	p=0.040*
No	82	83.6	25	100.0	
Bilateral Pleural effusion					
Yes	32	32.7	1	4.0	p=0.004**
No	66	67.3	24	96.0	
Fluid overload with dyspnea					
Yes	25	25.5	0	0.0	p=0.005**
No	73	74.5	25	100.0	

Fisher's exact test *** Chi-square test*

When considering fluid overload, bilateral pleural effusion was present in one patient (4%) in the MI group compared to 32 patients (32.7%) in the SP group and this difference was statistically significant (p=0.004). Dyspnoea due to fluid overload was detected in 25 patients (25.5%) in the SP group, and none had developed dyspnoea due to fluid overload in the MI group (p=0.005). Ascites was detected in three patients (3.1%), and generalised oedema was seen in five patients (5.1%) in the SP group and none had developed ascites or generalised oedema in the MI group, however, this difference was not statistically significant (p>0.05). In managing fluid overload, nearly 14% of the patients in the SP group required intravenous furosemide compared to none in the MI group.

Secondary infections were another complication observed in the SP group (n=16, 16.3%) but the patients of the MI group have not had any secondary infections during the illness, the difference being statistically significant (p=0.04). Cannula site infection (6%), septicemia (6%) and UTI (4%) were the types of infections observed.

Fluid quota is a guide for fluid therapy during the critical phase of DHF. It is calculated by adding 5% extra fluid to the maintenance therapy for 24 hrs. In our study sample, the minimal intervention group only needed 80% of the fluid quota, whereas the standard protocol group needed 91% of the fluid quota. This difference of the percentage of fluid quota used in the two groups was statistically significant (p<0.0001; Fisher's exact test).

All the patients in our study sample recovered with or without complications (Table 4). Five out of 123 patients (5.3%) have been admitted to the Intensive Care Unit (ICU) due to shock on admission (n=1), bleeding (n=2) fluid overload (n=2), and septicemia (n=1), whereas none (0%) needed ICU care in the minimal intervention group ($p<0.001$). The median duration of hospital stay in patients managed according to standard protocol or with minimum intervention was 5 days (interquartile range: 2 days and 2 days, respectively).

Table 4. Comparison of the final outcome of the patients in two study groups

Outcome	Standard protocol (N=98)		Minimal intervention (N=25)		p value*
	Number	%	Number	%	
Fatalities					
Yes	0	0.0	0	0.0	-
No	98	100.0	25	100.0	
Needed ICU care					
Yes	5	5.3	0	0.0	p<0.001
No	93	94.7	25	100.0	
Recovered					
With complications	61	62.2	1	4.0	p<0.001
Without complications	37	37.8	24	96.0	

*Chi-square test

When comparing the development of complications, 61 (62%) patients in the SP group had developed at least one complication compared to only one patient (4%) in the MI group and this difference was statistically highly significant ($p<0.0001$).

Discussion

This study attempted to compare the development of complications and the final outcome of pediatric dengue patients managed according to standard management protocol or with minimal intervention in a tertiary care facility in 2019. The analysis was based on secondary data extracted from the clinical records of these patients. The findings revealed that the minimal intervention approach is equally effective in managing patients while minimising the risk of complications due to management.

There is no specific therapy for Dengue Fever. Meticulous fluid management is the mainstay of treatment in DF that is currently governed by consensus guidelines rather than by strong research evidence (7). Therefore, scientific evidence in favour of adopting a minimal intervention approach in uncomplicated dengue patients may lessen the burden of the health care system in the face of an increasing number of cases.

Sri Lanka has reached the lowest-ever dengue case fatality rate of <0.2% in 2018 (8). In keeping with this trend, there were no fatalities in our sample. However, complications such as fluid overload and infections were high among the standard protocol group ($p<0.0001$). Fluid overload seems directly related to intravenous fluid therapy. The percentage of fluid quota given during the critical phase is significantly high in the SP group who received intravenous fluids compared to the MI group who had only oral fluids. Two children needed ICU care due to fluid overload. The WHO and national guidelines emphasise the crucial importance of restrictive fluid resuscitation to minimise fluid overload (3,4). Therefore, we suggest that oral rehydration therapy would be a better option in children with uncomplicated DHF, minimising the risk of fluid overload.

All the patients in our study group have survived, and it was found that patients who received intravenous fluid were prone to develop pleural effusion and/or pulmonary oedema. There are not many studies found to compare the results of our study. A study conducted in Taiwan in 2007 has revealed the advantages of oral hydration over intravenous fluid in adult patients and concluded that oral hydration might be as effective as intravenous fluid replacement for adults with non-shock DHF (9,5). However, the fluid requirement of children is different from adults, and the conclusion for this study has to be interpreted cautiously. Another limitation of this study is that it has not mentioned the type of oral fluid used, whereas in the present study, Oral rehydration fluid was used as the main therapy.

The other main complication found in our study population is sepsis, which was also seen only in the SP group ($p<0.004$). Urinary tract, cannula site infections, and septicaemia were the causes.

Dengue management needs more human resources and laboratory facilities compared to any other vector-borne disease (10,6). Frequent HCT measurements need a lot of workforces and are time-consuming, especially during epidemics. None of the patients in the MI group had regular HCT measurements in our study population, which indicates four-hourly HCT measurements are not mandatory in the management of every DHF patient. However, further prospective studies are needed to determine the frequency of HCT measurements in DHF.

To our knowledge, this study is the first attempt at analysing the outcomes of two different management options for DHF in paediatric patients. The findings of this study will be important for clinical decision-making and the formulation of national guidelines in the future.

This study was conducted using data extracted from the clinical records of patients with dengue fever managed at a tertiary care facility over one year. Although a clinical trial would have been the ideal design for a study of this nature, one advantage of using secondary data is that the likelihood of information bias due to differential reporting or differential care given to the patients was minimal as the data has already been recorded. Further, the ethical issues in assigning the intervention do not arise in using secondary data.

The present study is limited by its small sample size, which could explain the failure to detect statistically significant differences in some parameters compared. Further, as this is a retrospective study, patients' clinical parameters, which give a clearer picture of the patients, were not analysed in-depth, and the study was a single-centre experience. Nevertheless, in the absence of scientific evidence on the effectiveness of the current management protocol, we believe that this study will serve as a first step towards planning well-designed clinical trials to compare minimal intervention approach and standard protocol in the management of DHF in the future.

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Original Article

Demographic factors, patterns, and trends of deaths following road traffic accidents in the northern Sri Lanka.

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Abstract

This study aimed to understand the prevalence of road traffic accident (RTA)-related death in the northern province of Sri Lanka, exploring the demography, vehicle involved, and hospital admission.

A Hospital-based cross-sectional descriptive study done and data were collected retrospectively from 210 autopsies and case notes at Teaching hospital Jaffna.

Motorbike riders were more vulnerable, with an incidence of 55.2%. Age above 61 years contributed significantly to death after hospitalization with a P-value of < 0.005. The influence of alcohol at the time of the incident markedly contributed to the loss of life before hospital admission.

In conclusion the motorcycles were deemed to contribute to the mortality and alcohol influence and age contributing to the pre-and post-hospitalization deaths, respectively.

Keywords

Road traffic accidents; Vulnerable Road users; Alcohol influence: hospital admissions, Northern Sri Lanka

Introduction

Road traffic accidents (RTA) are unintended collisions of one motor vehicle with another, a stationary object, or a person, resulting in injuries, death, and property loss. RTA is a major worldwide public health problem that kills nearly 1.25 million people and leaves 20-50 million people injured annually (1,3). WHO indicates that road traffic injuries are currently estimated to be the 9th leading cause of death across all age groups globally and predict it to become the 7th leading cause of death by 2030 (4). Most of the time, those who survive are left with disabilities that seriously hamper their quality of life and productivity. Low and middle-income countries are the most affected, as the road traffic crashes and injuries are linked to the number of vehicles, road conditions, drivers' behavior, and the country's level of economic and social development (5,7). Poor road infrastructure, inappropriate mixing of vehicle types, inadequate traffic law enforcement, and delayed implementation of road safety policies contribute to the increased incidence of road traffic crashes (7,8).

Sri Lanka is dealing with an injury-related crisis, with a recent 85% increase in road traffic fatality rates, leading to crashes accounting for 25000 injuries yearly and ten deaths every day (9,12). Trauma is the leading cause of hospitalization in Sri Lanka, with a rate of 3100 admissions per 100000 population (12). Current expenditures for trauma management are estimated to be in the range of 14.2 billion rupees ($80 million), with 37% of that cost dedicated to inpatient care (13).

The Sri Lankan government recently implemented new legislation to prohibit the importation of motor vehicles without seatbelts, airbags, and anti-lock brake systems from improving vehicle safety (14). Despite this development being a forward move towards reaching the global best practice vehicle safety measures, such regulations would have minimal impact on the protection of pedestrians, pedal/motorcyclists, and three-wheeler passengers, which comprise a large proportion of Sri Lankan and Indian sub-continental road traffic trauma casualty mass.

In Sri Lanka, a lack of road safety research and the limited availability of statistics on road traffic crashes and injuries make it difficult for policymakers to propose interventions to prevent them. This study highlights the demographic factors, patterns, and trends of deaths following RTA in the northern part of Sri Lanka.

Methodology

Our study was a retrospective hospital-based cross-sectional study. We obtained data from 210 autopsies performed at Teaching hospital Jaffna of RTA victims from January to

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December 2019. The data contained pre autopsy interviews, a perusal of facts from bed head tickets, and autopsy reports. The data was recorded and organized based on the variables by the researchers. Collected information was analyzed using SPSS (version 25), Chi-Square test was used for statistical analysis. A p-value of less than 0.05 was considered statistically significant.

Results

Socio-demographic factors

We had analyzed 210 autopsies. There were 83.3% males and 16.2% females. It was noted that the victims were mainly from the age between 20-40 (33%) and age above 60 years (37.1%). A total of 152 (72.4%) were married and 47.6% (n-100) were on daily wage (Table 1).

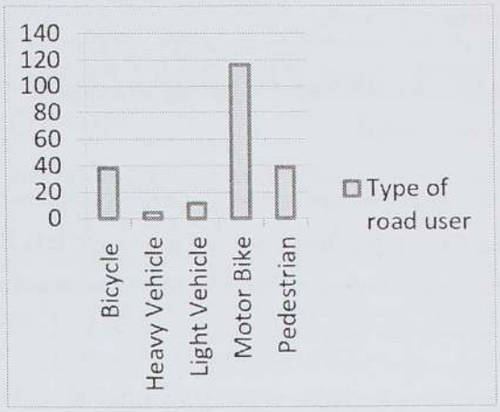
Table 1: Socio-demographic factors of the deceased who have died following RTA

Socio-demographic factors	Number	Percentage
Age		
0-10 Years	5	2.4%
11-20 Years	14	6.7%
21-30Years	35	16.7%
31-40years	35	16.7%
41-50 Years	19	9.0%
51-60 Years	24	11.4%
61-70 Years	42	20%
Above 70	36	17.1%
Sex		
Male	176	83.3%
Female	34	16.2%
Marital status		
Married	152	74.4%
Unmarried	58	27.6%
Incomes		
Permanent income	45	21.4%
Daily wage	100	47.6%
No income	65	31.0%

Alcoholism

A total of 78 (37.1%) were habitual alcohol consumers, and all of them were males. Forty seven (22.4%) were under the influence of alcohol at the time of the accident. Nearly 69.5% (n-146) died after hospital admission. Motorbike riders were more vulnerable. 55.2% (n-116) of motorbike users succumbed following RTA (Figure 1).

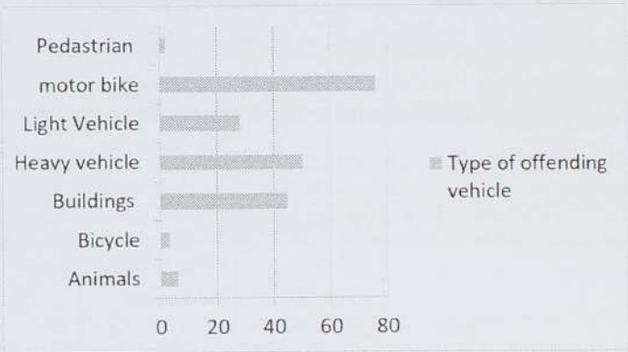
Figure 1: Type of road users



Type of offending vehicle

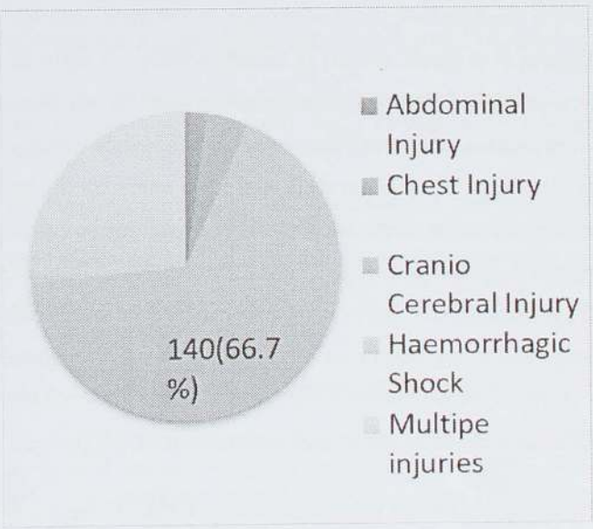
Nearly 31.4% (n-66) died after colliding with a motorbike. Heavy vehicles also contributed significantly. Nearly 23.8% (n-50) have died following being struck by a heavy vehicle. Third offenders (21.9%, n-46)) colidied with a stationary object alongside the roadside such as parapet walls, lamp posts, etc. (Figure 2)

Figure 2: Type of offending vehicle



Analysing the cause of death, 67.7% (n-140) fatality was due to craniocerebral injuries (Figure 3)

Figure 3: Cause of death



Relationship between the age and deaths following hospital admission

Based on the age of the victims, the researchers classified the samples into two groups.

The first group, above 61 years, and 63 (80.7%) succumbed to death. The Chi-square test revealed a p-value less than 0.005, indicating that the age above 61 years contributed significantly to death after hospitalization ($P < 0.005$) (Table 2).

Table 2: Association between age and hospital admission.

Age of the victim	Occurrence of Death		
	After hospital	Before Hospital	Total
Less than61	83	49	132
More than 61	63	15	78
Total	146	64	210

Out of 163 people who were not under the influence of alcohol, 24.5% (n-40) died before the hospital admission. Out of 47 people under the influence of alcohol at the time of the accident, 51.1% (n-24) died before hospital admission. The influence of alcohol at the time of incidence significantly contributed to the pre-hospitalization deaths ($P < 0.001$) (Table 3).

Table 3: Association between alcohol influence and hospital admission.

	Occurrence of death		Total
	Before Hospital admission	After Hospital Admission	
Not under alcohol influence	40 (24.5%)	123(77.5%)	163
Under alcohol influence	24 (51.1%)	23(48.9%)	47
Total	64	146	210

($P < 0.001$)

Discussion

Sri Lanka is a small island in south Asia with around 21 million people. The public transport system in our country is in a primitive state therefore usage of personal vehicles is relatively high. The vulnerability of road users on the roads increased due to an increased number of personal vehicles. Vulnerable road users (VRU) are at more risk on the roads (10,11). Pedestrians, bicyclists, and motorbike users can be named VRU as they don't have any protective device to minimize injury. Three-wheeler occupants also must be considered as VRU as they have very minimal protection (15).

In our study, males are more affected (83.3%). Geepara et al. (72%) from Batticoloa and Vijitha De Silva (91%) from Galle also have male predominance in their studies (16,17). Those aged between 20-40 years (33.3%) and aged above 61 years (37.1%) had a higher mortality rate in our study. Geepara et al. stated that age between 19-40 years is more vulnerable, and Vijitha de Silva et al. show that in their research, 70% of the victims were between 21-50 years (16,17). Age of 21-45 years is a very active and productive age group. The death of a person in this age group will affect the whole family, their friends, and the nation as a whole. Our study reveals that those whose age is above 61 years also succumbed in alarming numbers following RTA. Morbidities, especially non-communicable diseases, are high in this age group (17). Comorbidities play a significant role in the outcome of the injured victims. Amongst the vulnerable road users, the elderly population contributes remarkably, be it actively or passively (15). For all these reasons, the elderly population is affected more. Around half of the people (47.6%) were on a daily wage basis. A study from India and Italy also reinforces that low socio-economic group people are subjected to road traffic injuries frequently (18,19).

Drunken drive is a well-known factor in road traffic crashes. Geepara et al. and A.U. Jayathilake et al. mentioned that being under the influence of alcohol is one of the key factors contributing to road traffic accidents (17,20). Our study shows that 22.4% (n-47) of the people were under alcohol at the incident. Edirisinghe et al. stated that around two-thirds of the pedestrians and nearly half of the active vulnerable road users had more than 80 mg/dl of alcohol in their blood (21). Compared to this study, our figures are low.

This study shows 92.4% (n- 194) of VRU have died following RTA. Amongst them, 55.2% were motorbike users, 19% were pedestrians, and 18% were bicycle riders. Edirisinhe et al. had the same results, as VRU were the most affected group (98%) (15). Forjuoh S stated that pedestrians are frequently the victims in RTA in African countries. The percentages of pedestrians being the victims are 75%, 65%, and 89% in Abidjan, Nairobi, and Addis Ababa, respectively (22). According to Edirisinghe et al., it was noted that 48% of the pedestrian and 45% of motorbike users lost their lives. This can be justified as the study has been done at Colombo North Teaching hospital, where pedestrians are high in number on the roads (15). In our study, 55.2% of the victims were motorbike users because motorbikes are the primary transport vehicle in the region where we conducted our study. Motorbikes were on the top of the list of offenders, with 35.7% (n-75), followed by heavy vehicles with 23.8% (n-50) and stationary objects alongside the roads being the third on the list with 21.9% (n-

46). A study from Sri Lanka and India revealed that heavy vehicles were the primary culprits for road crash deaths (17,23). Once again, motorbikes were the primary offending vehicles because they are used by the majority of the people in the area our study was conducted in.

In our study, those above 61 made up a higher percentage of those who died after getting admitted to the hospital. The northern part of Sri Lanka's elderly population's general mode of transportation is by foot, bicycles, small motorbikes, and public transport. They travel relatively slow. As the relative velocity of the accident decreases, the severity of the injuries also will reduce. This could have been the reason for the delayed deaths after the hospital admission. There is no literature available to support this correlation.

It is noted that a statistically significant amount of the people who were under the influence of alcohol at the time of the incident died before they could be admitted to the hospital. Euphoria, poor judgment, tunnel vision, delayed reaction time, and reduced alertness are the effects of alcoholism, leading to the driver's irresponsibility. High speed and poor control can lead to severe injuries, resulting in people losing their lives before even gaining admission to a hospital.

Conclusion

The study concluded that motorbike users predominantly succumbed following RTA. People under the influence of alcohol had a high chance of dying before hospital admission. A significant number of older people died after access to the hospital following RTA. The findings clearly show the need to develop specific RTA prevention strategies based on strict surveillance, legal actions, and community awareness to all wakes of people.

Conflict of interest: Nil

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Original Article

Risk Factors Leading to Preterm Deliveries Among the mothers in Jaffna District, Sri Lanka

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Abstract

Health status of pregnant woman is associated with the risk of preterm delivery. An institutional-based descriptive study was conducted among 173 mothers who delivered preterm babies at the Teaching Hospital, Jaffna, Sri Lanka.

Median gestational age of the preterm babies was 35.0 (±1.9) weeks. The mean birth weight of the preterm babies was 2.2 (±0.6) kg, and 54.3% of preterm babies were males. Nearly half of the mothers (54.9%) did not have complications during pregnancy, while pre-rupture of membrane (25.4%) and hypertension (13.3%) were in higher prevalence among those who had the complications. The risk factors of very preterm deliveries observed were the mothers who were primies (OR: 3.021), the mothers who maintained interpregnancy interval of <1 year (OR:1.117), had sexual intercourse before two weeks of delivery (OR:1.607) and were diagnosed with pregnancy complications (OR:1.695).

The prevalence of very preterm birth is low. However, based on the risk factors linked to very preterm identified by this study, implementation of interventions focusing on improving the profile of the pregnant mothers may serve as a protective factor for reducing very preterm birth.

Keywords

Pregnancy health, very preterm, moderate to late preterm, Jaffna District

Introduction

Births occurring before the completion of 37 weeks of gestation are known as preterm birth (1). Preterm births are categorized as very preterm (28 to <32 weeks) and moderate to late preterm (32 to <37 weeks) (1). Despite the advances of neonatal and obstetric care practices in Sri Lanka, the preterm birth rate in Sri Lanka ranges between 10 and 15 per 1000 live births (2).

Pregnancy illnesses such as pregnancy-induced hypertension, gestational diabetes mellitus anemia (2), pre-pregnancy overweight, family history of diabetes, women with chronic hypertension, number of pregnancies, placental abruption, family history of preterm birth, pre-rupture of the membrane and multiple pregnancies (3) have been associated with adverse birth outcomes. Hence, this study was carried out to investigate the pregnancy risk factors which could be associated with preterm deliveries.

Method

An institutional-based descriptive study was conducted at Teaching Hospital, Jaffna (THJ) Sri Lanka between October 2015 and February 2017 among 173 mothers who delivered preterm babies at the gestation between 28^{+1} and 36^{+6} weeks. The mothers who were residing in Jaffna Regional Directorate of Health Service (RDHS), and delivered very and moderate to late preterm babies in THJ were recruited for this study. The mothers who could be selected under inclusion criteria, and gave their consent were considered as sample of this study.

The sample size calculated was 170 based on Daniel formula (4) and a national study of Kiridana et al. (5)

A pre-tested interviewer-administered questionnaire included pregnancy conditions such as antenatal care clinic visits, body mass index at first registration of clinic, parity, inter-pregnancy interval, contraceptives use prior to conception, subfertility treatment, previous history of preterm birth/ abortion/ ceasarean section, pregnancy complications, multiple pregnancies and sexual intercourse prior to two weeks delivery. The gestational age was calculated as it was on the delivery date based on the Last Regular Menstrual Period (LRMP). Data were analysed using Statistical Package of Social Sciences (SPSS), version 23.0. Pregnancy risk factors for very preterm and moderate to late preterm delivery were identified using bivariate analysis. $P<0.005$ was considered statistically significant.

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Ethical approval was obtained from the Ethics Review Committee, Faculty of Medicine, University of Jaffna, Sri Lanka (J/ ERC/ 14/ 58/ NDR/ 0113). Informed written consent was obtained from the mothers. Confidentiality and anonymity of all records were ensured.

Results

Teaching Hospital, Jaffna provides Perinatal Care Services including Special Neonatal Care. The mothers (n=173) were selected from three maternity wards of this hospital.

Birth profile

Mean gestational age of the preterm babies was 35.0 (±1.9) weeks which ranged between 28^{+1} and 36^{+6}. Mean birth weight of the preterm babies was 2.2(±0.6) kg which ranged between 0.8 and 4.2 kg, and 54.3% of preterm babies were males. The frequency of moderate to late preterm delivery was 91.9% (n=159). The ratio between the very preterm to moderate to late preterm was 1: 11.4 (14 nos.:159 nos.).

Maternal profile

The age of the mothers ranged between 17 to 45 years with the mean age of 28.8 (±6.4) years. Majority (84.4%) of the mothers were aged between 20 and 34 years, while 4.6 and 11.0% of them were teenagers and over-aged respectively. Among the mothers who delivered preterm babies, all were Tamils and, majority were Hindus (72.3%), married (98.8%), studied up to General Certificate of Education- Ordinary Level [GCE (O/L), 79.8%], housewives (86.1%), receiving monthly income per person > 4,340 LKR (62.4%), and living in extended families (75.7%).

Majority of the mothers (96.0%) had registered at the Public Health Midwives offices. The mean BMI of the mothers was 23.7 (±4.6) kgm^{-2}, and ranged between 13.8 and 36.0 kgm^{-2}. Primi mothers were 47.4%. Majority (60.4%) of the mothers who had the parity above one, maintained 1 to 3 years of interval between two subsequent pregnancies. Sixty percent of the mothers reported that they did not use contraceptives within 4 to 12 months before conception. The mothers who underwent In Vitro Fertilization subfertility treatment was 1.2%. Previous history of preterm deliveries, abortion, and cesarean section were recorded among 15.0, 17.3, and 9.8% of the mothers respectively.

Pregnancy complications such as pre-rupture of the membrane (25.4%), hypertension (13.3%), anemia (9.2%), and gestational diabetes (5.8%) were observed in higher numbers, while more than half of the mothers (54.9%) were not diagnosed with pregnancy complications. More than half of the mothers (52.8%) reported that they had sexual intercourse during the last two weeks before the delivery.

Discussion

The frequency of moderate to late preterm (91.9%) (Table 1), and ratio between the very preterm to moderate to late preterm (1: 11.4) was in agreement with the statistics of Teaching Hospital, Jaffna, where it was during 2016 and 2017 were 89.4, and 87.4% respectively and 1:8.4 and 1:6.9 respectively (6). (Table 1)

Table 1: Birth of preterm babies at different gestational periods.

Babies		
Gestational Period (Weeks)	**No.**	**Percentage**
28^{+1}-31^{+6}	14	8.1
32^{+0}-36^{+6}	159	91.9
Total	**173**	**100.0**

Pregnancy details

Attending the Antenatal Clinics

Registering with the Public Health Midwives offices as soon as of pregnancy is mandatory in Sri Lanka and mothers can gain adequate knowledge regarding the birth outcomes via sharing the experiences under close supervision (7). Under such situation, about 4% of the mothers recruited for this study have not registered with the Public Health Midwives offices, while the statistics of Sri Lanka also reported that it was 2.2% (8). Among those who had not attended the antenatal clinic (n=7), 42.8% (n=3) had the pregnancy complications such as gestational diabetes (n=2) and hypertension (n=1). However, there are insufficient evidence to conclude that attending the antenatal clinic would reduce the preterm birth among socially disadvantaged or vulnerable populations when compared with standard models of antenatal care (9).

BMI of the Mothers

The mean BMI of the mothers was of overweight category. In this study, 17.3% of the mothers had the BMI of less than 18.5 kgm^{-2}, while 39.9% of mothers had the BMI above 25.0 kgm^{-2}.Thus the number of mothers who were obese was two times higher than those were underweight.Sri Lankan statistics stated that there is a decline in underweight maternal population of as 20.2, 18.8 and 17.5% during 2015, 2016,

and 2017 respectively (13). In the present study, the mothers with overweight/obesity and underweight have delivered very preterm in the frequency of 5.8 and 1.2% respectively.

Parity of mothers

The frequency of primi mothers was 47.4%, and second, third, fourth, fifth, and seventh parity mothers were 28.9, 15.0, 3.5, 4.6, and 0.6% respectively. This frequency distribution indicated that, primi mothers had higher percentage of preterm deliveries. In addition to that, 12.2% of the primi mothers have delivered very preterm babies. Previous studies had also endorsed our observation (14-15).

Inter-Pregnancy Interval

Very preterm deliveries was 6.2% among the mothers who maintained less than one year of interpregnancy interval. Inter-pregnancy interval is considered as short if itis less than one year (16). In the present study, 60.4% maintained above one year interpregnancy interval, and it matched with a previous study where it was 90.1% (17).

Contraceptive Usage

Family planning determines the spacing of pregnancies, and it is achieved through information, education, and the use of contraceptive methods (1). In the present study, 39.8% used contraceptive method, and the very preterm deliveries was 5.8% among them. Oral contraceptive pills (42.0%) and Depo- Provera Injection (33.3%) were the major types of contraceptives. It matched with a study indicated that 59.4% of the Sri Lankan mothers used oral contraceptives (18).

Subfertility treatment

Subfertility itself is a known risk factor for preterm birth as In Vitro Fertilization (IVF) treatment transfer more than one embryo, and multiple gestations increase the risk of early birth (1). In this study, IVF percentage is very poor, i.e. two mothers (1.2%) aged 33 and 28 years underwent such treatment as they had not conceived for more than 3 years after the marriage, and delivered very preterm babies.

Multiple Pregnancies

Eleven multiple pregnancies [ten twins (11.6%) and one triplet (1.7%)) were recorded in this study. The mean and are range of mothers who delivered twins were 27.5 (±6.1) and 20- 37 years respectively, and 30% of them were above 30 years. The age of the mother who delivered triplets was 32 years. It might be due to multiple birth rates increase with increasing maternal age, i.e. more than 30 years (19). However all the multiple pregnancies (n=11) were terminated in moderate to late preterm, and none of them had IVF treatment.

Abortion and prior preterm delivery

The previous history of abortion also positively influences current preterm birth (10, 12), because of infectious conditions and vascular complications during pregnancy. (20). In this study, 17.3% of the mothers had previous history of abortion, and in a previous study it was 26.1% (21). Further association of preterm deliveries with the subsequent pregnancies had also been reported (12),

Previous caesarean section

All the mothers (n=17) who had past history of caesarean section delivered the current preterm baby by caesarean section. Among those, 5.9% delivered very preterm babies. Even though 13 (76.5%) mothers maintained inter-pregnancy interval of 1-3 years, mode of delivery was caesarean section, because of there is a risk of uterus rupture in case of trial of labour (22), and most of the mothers and their obstetricians in Sri Lanka would not be happy to take the risk (23). Further, few studies also reported that the history of the previous cesarean section positively had significant relationship with the incidence of preterm delivery (12, 22).

Intercourse during Pregnancy

More than half of the mothers (52.8%) reported that they had sexual intercourse during the last two weeks before the delivery, and 9.7% of them delivered very preterm babies. The reason for the risk of sexual intercourse on preterm delivery might be that the pregnant mothers may have more chances of getting infected with pathogenic microorganisms if they engage in frequent intercourse and have increased risk of preterm delivery (24). Hence, restriction of sexual intercourse is routinely recommended to prevent preterm labour (25). However, there is an evidence that sexual intercourse does not increase the risk of delivering preterm babies (26). So, it is contradictory to conclude that having sexual intercourse during the last two weeks before the delivery may lead to preterm delivery.

Pregnancy Complications

More than half of the mothers (54.9%) did not report pregnancy complications. It might be due to paying home visits and health education regarding pre-conception preparation and the prevention of pregnancy complications by Public Health Midwives (7). Among the pregnancy complications, pre rupture of membrane (46.3%) and

hypertension (24.2%) were in high incidence and they matched with a Sri Lankan study (27, 28). Among the mothers diagnosed with pregnancy complications, 10.3% of them only have delivered very preterm babies.

Frequency of mothers diagnosed with anemia was 9.2%, while the prevalence of anemia in pregnancy in Sri Lanka is 29.1% (29). However, in an Asian country, Pakistan, 93.0% of the mothers who delivered preterm babies were diagnosed with anemia (10). Further, underweight might be co-existed with anemia (7), and it is evidenced in this study that 37.5% of the anemic mothers were underweight

Influence of pregnancy conditions on preterm deliveries

Table 2 describes the influence of pregnancy conditions on very and moderate to late preterm deliveries. Eclampsia, pre-pregnancy diabetes mellitus, previous history of preterm birth, short inter pregnancy interval, and multiple gestations are associated with an increased risk of preterm birth (30).

Table 2: Relationship between pregnancy conditions of the mothers and the gestational age of the preterm babies.

Pregnancy Factors	Gestational Age				p- value	OR	95 % CI
	VP		MLP				
	No	%	No	%			
BMI category					0.351 (FET)	0.585	0.185-1.850
UW/ OW/ OB	9	7.0	120	93.0			
NW	5	11.4	39	88.6			
Parity					0.092 (FET)	3.021	0.909-1.038
Primi	10	12.2	72	87.8			
Not primi	4	4.4	87	95.6			
Pregnancy interval					1.000 (FET)	1.117	0.116-1.719
<1 year	1	6.2	15	93.8			
>1 year	4	5.6	67	94.4			
Contraceptive used					0.411 (FET)	0.578	0.174-1.924
Yes	4	5.8	65	94.2			
No	100	9.6	94	90.4			
Previous PTB					1.000 (FET)	0.986	0.207-4.694
Yes	2	8.0	23	92.0			
No	12	8.1	136	91.9			
Previous LSCS					1.000 (FET)	0.688	0.084-5.606
Yes	1	5.9	16	94.1			
No	13	8.3	143	97.1			
Pregnancy complications					0.407 (FET)	1.695	0.562-5.112
Yes	8	10.3	70	89.7			
No	6	6.3	89	93.7			
Sexual intercourse two weeks before delivery					0.578 (FET)	1.607	0.516-5.009
Yes	9	9.7	84	90.3			
No	6	30.0	14	70.0			

*FET- Fisher Exact Test value, *p<0.050 = statistically significant, VP- Very Preterm, MLP- Moderate to late preterm, UW- underweight, OW- overweight, OB- obesity, LSCS- lower segmental caesarean section, PTB- preterm birth*

Majority of the very preterm babies (9 babies out of 14 nos.) were delivered either by underweight or overweight or obese mothers. However, no statistically significant association was found between the gestation age of babies and the category of body mass index of the mothers (p= 0.351).

Among the primi mothers, majority (87.8%) of them delivered moderate to late preterm babies, and primi mothers were 3.021 times more likely to deliver very preterm babies. However, no statistically significant association was found between parity and gestation (p=0.092). Only one baby was born to the mother who maintained a short inter-pregnancy interval of <1 year, and it was 1.117 times risk to deliver very preterm. However, no statistically significant association was found between pregnancy interval and gestation age of preterm babies(p>0.050). Majority of the very preterm babies (n=10) were delivered by mothers who did not use contraceptives before the current pregnancy. However, the use of contraceptive methods did not influence the gestation (p= 0.411). The babies born to the mothers who underwent subfertility treatment were very preterm (n=1) and moderate to late preterm babies (n=1). None of the very preterm babies were twins or triplets, i.e. all the multiple pregnancies (n=11) were terminatedin moderate to late preterm.

Among the very preterm babies (n=14), two babies were born to the mothers who had previous history of preterm delivery, and one baby was born to the mother who has attended previous cesarean section. However, such previous histories of pregnancy records had no statistically significant association with the gestational age of the babies (p>0.050).

The majority of the very preterm babies (9 out of 14 nos.) were delivered by the mothers who had sexual intercourse during the last two weeks before delivery, and it had 1.607 times the risk to deliver very preterm babies. However, no significant association was found between sexual intercourse during the last two weeks before delivery and gestational age (p= 0.578). Among the very preterm babies (n=14), 8 babies were born to mothers who were diagnosed with pregnancy complications. It was 1.695 times the risk to deliver very preterm babies, however, no statistically significant association was observed between pregnancy complications and gestational age (p=0.407).

Conclusion

Risk factors causing very preterm delivery were by the mothers who were primies, maintained inter pregnancy interval of <1 year, had sexual intercourse before two weeks of delivery, and diagnosed with pregnancy complications. To arrive at a definite decision, preterm babies should be compared with term babies as well.

Acknowledgment

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Conflict of interests

Authors declare that they have no conflict of interests.

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Case Report

A cadaveric study on variation in branching pattern of common carotid artery

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Abstract:

Carotid arterial system are vessels of head and neck region. Comprehensive understanding on its branching configuration is of considerable importance to avoid accidental injury during surgical interventions. Common carotid artery (CCA) usually bifurcates into external carotid artery (ECA) and internal carotid artery (ICA) at level of upper border of thyroid cartilage. Normally ECA lies anteromedial to ICA at its commencement and provides branches, but ICA does not provide any branches in neck. In this case, right CCA bifurcated above cricoid cartilage and divided into two branches of equal diameter in a middle-aged female cadaver. Medial one does not provide any branch and it appeared pale. It continued upward, entered carotid canal and it was confirmed as ICA. The ECA was found lateral to right ICA both in its origin and course. ECA provided lingual, facial and occipital branches. Superior thyroid artery was not identified, and it might be accidently damaged during dissection. It was noticed ECA was a content of carotid sheath. Vagus nerve first found between IJV and CCA and subsequently located between IJV and ECA. Third aortic arch contributed to development of CCA, leading part of ICA and entire part of ECA. Remaining part of ICA was developed from cranial portion of dorsal aorta. Therefore, any embryological deficiency in third aortic arch, dorsal aorta or changes inside of origin of ECA may lead to alteration in position of these vessels. Understanding vascular anatomy of neck is vital in precise interpretation of radiological images and neck surgeries.

Key words

Branching pattern of common carotid, Reversed position, Internal carotid, External carotid,

Introduction

Being the main nourishing arteries of the head and neck region, carotid arteries have distinct clinical significance. Carotid arteries require safety from accidental iatrogenic damage during surgical interventions, radiological assessments and other invasive actions. Therefore, a comprehensive understanding on branching configuration of carotid arteries is of considerable importance in surgeries and other invasive techniques involved in the head and neck region.

The common carotid artery (CCA) usually bifurcates into external carotid artery (ECA) and internal carotid artery (ICA) at the level of upper border of thyroid cartilage (1). Normally the ECA lies anteromedial to the ICA at its commencement in the cervical region (2). The ECA passes under the submandibular and parotid gland and terminates as the maxillary and superficial temporal artery inside the substance of the parotid gland. The ECA provides the superior thyroid, ascending pharyngeal, lingual, facial and occipital arteries in the carotid triangle of the cervical region. Posterior auricular artery origins just above the carotid triangle. The ECA is the artery for the neck and the face region (3). The ICA is the artery for brain tissues and usually it does not provide any branches in the neck. The ICA is the frequent place for stenosis, atherosclerosis and aneurysm in the older population (4). Proper identification of the internal, external carotid arteries and knowing their course and distribution is of utmost vital importance for any surgeon operating in the neck region.

In the previous documented literatures, dissimilarities in the vascular composition of the neck especially carotid triangle have been reported. We report a variation in the branching pattern of CCA, which was identified in a cadaveric dissection.

Case report:

In this case report, it was noticed that CCA bifurcated above the cricoid cartilage. It divided into two branches of equal diameter in which the medial one does not provide any branch in the neck and it appeared pale and continue upward and entered into the carotid canal and it is confirmed as the ICA (Fig 1). The lateral branch was identified as the ECA and it provides the branches: the lingual, facial and occipital arteries. (Fig 2). The superior thyroid artery was not identified and it might be accidently damaged or injured during routine undergraduate dissection.

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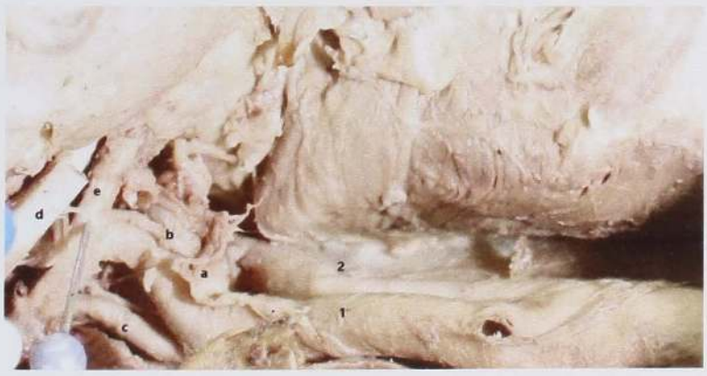
It was noticed the ECA was a content of the carotid sheath. The vagus nerve first found between the IJV and CCA and subsequently it located between the IJV and ECA (Fig 1). Thus it was concluded the positional changes in the two terminal branches of CCA (reversed position of ICA and ECA).

Fig 1 Right side anterior view of the neck

1 & 2 - Tracheal rings, 3 - Anterior arch of cricoid cartilage, 4- CCA, 5- ECA, 6 - ICA ,7- Vagus nerve, 8 - IJV, 9 - Thyroid tissue

Fig -2 showing the branches of the right external carotid artery



1- ECA, 2-ICA, a- Lingual artery, b-Facial artery, c-Occipital artery, d-Tendon of the posterior belly of digastric muscle, e-Hypoglossal nerve

Discussion:

In this case, we observed the lateral origin and lateral position of ECA in relation to ICA. The ECA normally developed as a sprout from third aortic arch, mostly medial to ICA (5). The ICA developed from two different sources. The third aortic arch formed the leading part of ICA but the residual part of the ICA was developed from the cranial portion of dorsal aorta (5).

Thus third aortic arch gives to the formation of the CCA, main part of ICA and the entire part of ECA. Therefore, any embryological modification in the third aortic arch, dorsal aorta or changes in the side of origin of ECA bud might lead to the alteration in the position of the ECA and ICA. In normal organization, the ECA initially located medial to the ICA at its origin level and later high up in the cervical region, the ECA appears to pass backward to ICA (6, 7).

If the ECA located lateral to ICA at its origin level generally at the bifurcation point of CCA can be infrequently transacted during carotid endarterectomy (7). It was not unusual in the differences in the branching design of the aortic arches (8). Most of them were not related with any symptom and generally found as a secondary discovery during the usual investigative procedures (8).

A previous study out of 52 cadaver specimen, noted that 63.5% aortic arches presented traditional branching pattern and the residual showed dissimilarity in the pattern of its branches (9). Another study reported a similar case and they stated that the occurrence of the reversed position of ICA and ECA in adults were more normally seen on the right side than the left one (10). Ito H et al., (2006) also mentioned about the reversed position of these vessel in the literature. It was noticed 6.3% of cases with reversed position of ICA and ECA and it was also observed in all reversed cases, the superior thyroid, lingual and facial arteries arose from the posterior aspect of ECA and later those branches ran forward superficial to ICA (11).

In this study, we noticed the bifurcation of CCA above the cricoid cartilage. Normally CCA bifurcates into ECA and ICA at the superior border of thyroid cartilage. The thyroid cartilage is situated at the C4 and C5 level, aids as a noticeable anatomical landmark for surgical procedures (12). The bifurcation of CCA can occur as high at the level of hyoid bone or even at the level of styloid process, or low at the cricoid cartilage (13).

Bifurcation point of CCA represents the embryological budding point of the ECA from the CCA. Usually there is a pair of third aortic arches and dorsal aorta on both left and right of early embryo. Later in the embryonic life dorsal aorta fuses below the level of aortic arches. Since arterial system more predominant on the left and venous system dominant on the right side of the developing embryo the remaining part of the right dorsal aorta which was below the fourth aortic arch later

degenerates. The left dorsal aorta simply continues with the left side arch of aorta as the descending aorta. Right dorsal aorta also contributes to certain parts of the right subclavian artery. Thus, the Anatomical variation in the right subclavian artery must be looked for to check any variation of the right dorsal aorta. Behzad Saberi (2020) described specific differences in the morphology of ICA, and it might undergo variations during the embryological development (14). The ICA normally passes straight in the neck and some of its variations are kinking, coiling and tortuosity (15).

Conclusion:

The variant anatomy of the arterial vessels is of profound surgical relevance. Uncommon course of these vessels in unanticipated condition could lead to the unintentional injury to these structures and added complications. Understanding the vascular anatomy of the neck is also vital in precise interpretation of radiological images.

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Case Report

Successful pregnancy outcome following treatment for extensive maxillary mucoepidermoid carcinoma with metastasis –A case report

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Abstract:

Mucoepidermoid carcinoma (MEC) is a locally invasive tumour of the salivary glands and accounts for nearly one third of all malignancies of the major and minor salivary glands. It has a female preponderance and (3:2) common after the third decade of life. Here we report a case of a 32-year-old woman who had successful pregnancy outcome following treatment for extensive maxillary mucoepidermoid carcinoma with metastasis.

Keywords

Mucoepidermoid carcinoma, salivary glands, ulcer, antenatal care, Multidisciplinary team care (MDT)

Introduction

Salivary gland tumours are rare (3%) head and neck tumours. (1) One third of salivary gland malignant tumours are mucoepidermoid carcinoma (MEC) arising from the pluripotent cells of excretory ducts of salivary gland epithelium. (2)

It has a female preponderance and (3:2) common after the third decade of life. [3] Radiation exposure, tobacco use, viral infections, environmental chemicals, and gene mutations are associated with MEC. (2)

Mucoepidermoid carcinoma affects mainly the parotid glands. Glandular enlargement is soft, painless when involves minor salivary glands. Advanced tumour is associated with pain, pus discharge, ulceration, resorption of palatal bones and tumour spreading into adjacent cavities. (4) High grade MEC metastases to regional lymph nodes. (5)

Case history

A 22-year-old patient was diagnosed with suppurative MEC of maxillary antrum extending to parapharyngeal space and defaulted follow-up and treatment. She was symptomatic since the age of 16 years with an ulcer on the palate. At the age of 21 years, she became pregnant resulting in a term uncomplicated vaginal delivery.

At the age of 26 years, she was seen by ENT team in another hospital for hearing problems and referred to Oro Maxilla Facial unit for further management. She defaulted treatment again.

One year later she attended antenatal clinic for her second pregnancy with a facial asymmetry along with large malignant looking palatal ulcer with a TNM stage of $pT_2pN_{1b}pM_x$ (Stage $III_)$ (7).

After having a multidisciplinary team approach, a treatment plan was devised along with detailed patient counselling. The treatment was initiated after medical termination of her ongoing pregnancy.

After a surgical excision and correction of the defect with a palatal prosthesis, she was treated with radiotherapy and was on regular follow-up with contraception for 2 years.

At her age of 32, after complete remission of disease, she conceived spontaneously and had specialist led antenatal care. Her labour was induced at 38 weeks for fetal growth restriction but delivered by caesarean section due to intrapartum fetal distress. Mother and baby were discharged in good condition. Text Box 1 summarizes the timeline of events.

Text box 1: Timeline of events

2004 - (Age 16): Ulcer on hard palate noted by patient. medical advice not sought.

2009 (Age 21): Delivered her first baby

2010 (Age 22): Investigated for ulcer on hard palate for the first time and mucoepidermoid carcinoma diagnosed. Treatment planned but defaulted.

2014 (Age 26): Investigated by ENT team for hearing problem and transfered to oro maxillary facial (OMF) unit for further management and defaulted again.

2015 (Age 27): - Facial asymmetry and palatal ulcer detected during antenatal booking in her second pregnancy. Multidisciplinary team mangement initiated consisting of surgery and radiotherapy.

2020 (Age 32): Spontaneous conception and delivery after complete remmision of disease.

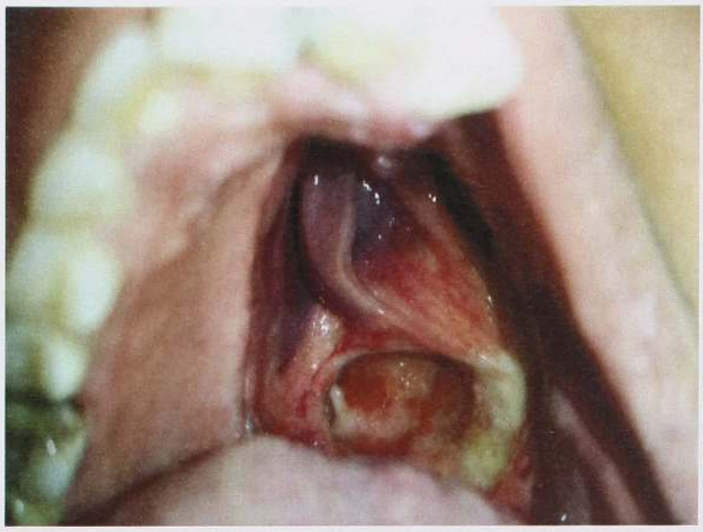

Figure 1: Extensive ulcer involving left palate

Discussion

Though this patient had a palatal ulcer for 5 years before her first pregnancy, she went through a pregnancy and an uncomplicated delivery without being noticed as the mucoepidermoid carcinoma is usually asymptomatic and slow growing in nature.

When the diagnoses of MEC was made for the first time the patient was having symptoms of advanced tumor and the treatment was further delayed due to poor patient compliance. Eventually when the patient accepted the treatment it was almost 6 years from onset of symptoms and 2 years from the diagnosis.

Though the patient's TMN staging of the disease was $pT_2pN_{1b}pM_x$ (Stage $III_)$,with intensive multi-disciplinary treatment approach, she recovered completely and had a successful pregnancy.

Conclusions

Though mucoepidermoid carcinoma has no causal relationship with pregnancy, a wholistic antenatal care would detect unrelated conditions in otherwise a healthy and young population.

Despite the treatment was unacceptably delayed in our patient due to poor compliance and resilience of the patient, she was successfully followed up during her pregnancy. This shows our well established primary antenatal health care system in Sri Lanka.

Conflicts of interests

There are no conflicts of interest.

Acknowledgements

We acknowledge the patient for providing her written consent for publishing this case for educational purpose.

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Case Report

Takayasu arteritis: In a middle-aged Sri Lankan male - A case report

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Abstract

Takayasu arteritis is a vasculitic condition which affects large and medium sized vessels primarily aorta and its main branches. It is a rare condition affecting females more than males between 10 and 40 years of age with spectrum of clinical presentation. Here we present a case of 58 year old man who presented to us with non-specific gastrointestinal symptoms who was eventually diagnosed with Takayasu arteritis.

Keywords

Takayasu arteritis, vasculitis

Introduction

Takayasu arteritis (TAK) is classified into large and medium vessels vasculitis with the predilection for aorta and its major branches (1). Its aetiology is still unknown but proposed as autoimmune process associated with antibody following infections (2). It is a granulomatous inflammation of the vessel wall leading to stenotic, occlusive or aneurysmal changes in the vessels (3,4). Worldwide incidence of TAK estimated 2.6 cases per million per year with more case detection from Asia, Africa, central and south America (4). About 80 percentage of the patients with TAK are females and the mean age of onset is approximately 30 years (3,4). Because of the rarity of this condition diagnosis of TAK is often delayed.

Case report

A 58-year-old male who did not have any significant co-morbidities in the past, presented with one week history of watery stools mixed with blood and mucus. He did not have fever or vomiting. There was no contact history of diarrhoeal illness. He had consumed food from outside home before the onset of illness. He also had reduced appetite and significant unintentional weight loss of 2 stones over the past two years. He also had epigastric abdominal pain for the last two years which was colicky in nature, radiating to back, aggravated by food intake and relieved by leaning forward. He had belching and heartburn. He needed to open his bowel following each meal and he used to pass loose stools without blood or mucus. He did not have headache, joint pain, skin rashes, skin ulcers, oral or genital ulcers, chronic cough with sputum or history of tuberculosis in the past. He did not have chest pain, dyspnoea or limb claudication. He had history of alcoholism and smoking which he gave up four and two years before respectively. There was no history of high-risk sexual behavior. His past medical history is not significant otherwise. He underwent right side inguinal hernial repair 30 years back. He was a fisherman, married and has two children.

On examination, he looked well. His body mass index was 19.27 Kg/ m^2. He was neither pale nor icteric. There was no clubbing, lymphadenopathy, skin ulceration, mucosal ulceration or ankle edema. Capillary refilling time was less than two seconds. On cardiovascular system examination, pulse rate was 56 beats per minute which was regular with good volume. Distal pulses in right side limb namely brachial, radial and dorsalis pedis were not palpable. Blood pressure discrepancy was noted in bilateral upper limb with the blood pressure of 77/ 59 mmHg in right arm and 100/60 mmHg in left arm with the arterial oxygen saturation of 90 % on right arm and 99% on left arm. On auscultation bruit was heard over both subclavian arteries. Precordial auscultation findings were normal. His abdomen was soft without organomegaly, he had mild tenderness over umbilical region. Respiratory system and neurological examination were unremarkable.

On investigation his complete blood count revealed WBC count of 14.86 x 10^9/L, haemoglobin of 13.3 g/dL and normal platelet count. ESR was 72 mm/first hour and CRP was 11.5 mg/L. Renal function, serum electrolytes and serum calcium were normal. Liver function was otherwise normal except mild elevation of ALT which was compatible with grade 1 fatty liver on ultrasound abdomen. Urine full report, stool full report, urine and stool culture were normal. VDRL and Mantoux test were negative. Ultrasound scan of the abdomen revealed normal size kidney in both side with normal architecture. 2D echo was normal. Upper GI endoscopy revealed severe gastritis with mild duodenitis. Chest X-ray was normal. Plain X-ray abdomen did not reveal pancreatic calcification. CT angiogram of thoracic and abdominal aorta

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and its branches revealed subtle irregular thickening of ascending aorta, narrowing of right brachiocephalic trunk and left common carotid artery without complete obstruction, and stenosis at the origin of celiac axis, superior and inferior mesenteric arteries. (Figure 1)

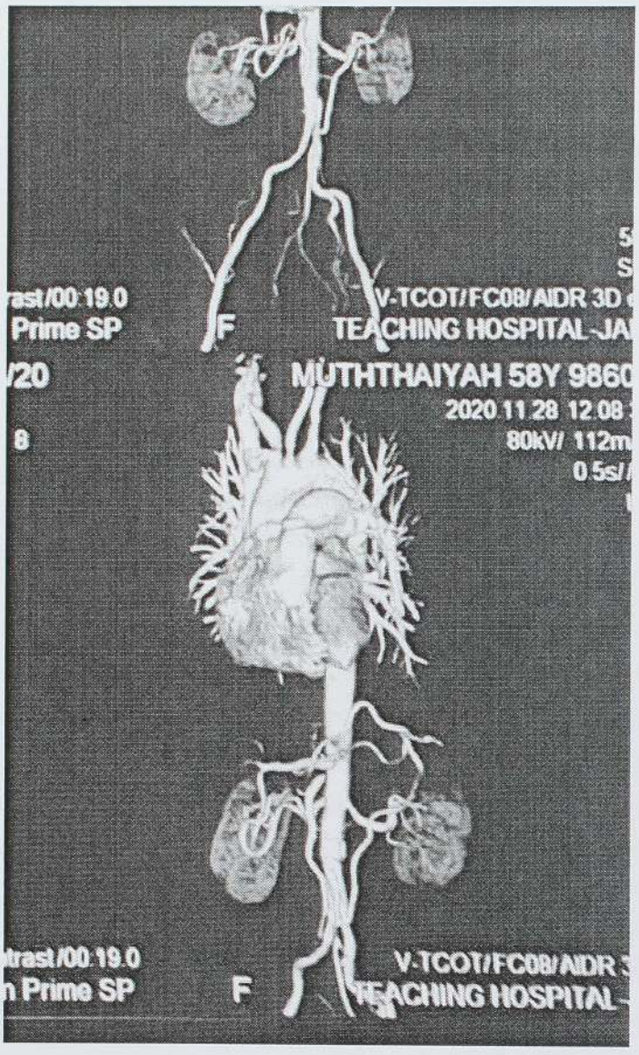

Figure 1: CT angiogram

Based on the clinical findings from the history, examination and investigation diagnosis of Takayasu arteritis type V is made. He was started on oral prednisone 1mg/Kg/day with bone mineral prophylaxis. He was also started on treatment for gastritis and duodenitis with proton pump inhibitors coupled with *Helicobacter pylori* eradication regime. A month later, on review he was asymptomatic.

Discussion

TAK is a rare condition often present with absence of peripheral pulses so called 'pulse less disease' (4). It is diagnosed by using American College of Rheumatology 1990 criteria (2). Following are the six components of the criteria 1) age of 40 years or younger at disease onset 2) claudication of the extremities 3) decreased pulsation of one or both brachial arteries 4) difference of at least 10 mmHg in systolic Blood pressure between arms 5) bruit over one or both subclavian arteries or the abdominal aorta 6) arteriographic narrowing or occlusion of the entire aorta, its primary branches, or large arteries in the upper or lower extremities that is not due to arteriosclerosis, fibromuscular dysplasia, or other courses. Presence of three or more of six criteria supports the diagnosis of TAK with the sensitivity of 90.5% and the specificity of 97.8% (5). According to Takayasu conference held in Tokyo in 1994 (5,6), TAK is sub-grouped into six types according to angiographic findings of arterial involvement as follows, type I- branches from the aortic arch; type IIa- ascending aorta, aortic arch and it's branches; type IIb- ascending aorta, aortic arch and its branches, thoracic descending aorta; type III-thoracic descending aorta, abdominal aorta, and/or renal arteries; type IV- abdominal aorta and/or renal arteries; type V- combined features of types IIb and IV. Our patient fulfilled four criteria to make the diagnosis of Takayasu arteritis, type V.

Presentation of TAK can vary from asymptomatic to non-specific symptoms such as fever, weight loss, malaise and myalgia with chronic cause to life threatening condition like CVA, myocardial infarction or mesenteric ischemia according to the area of vessel involvement. There are studies done on distribution of TAK related to sex and ethnicity respectively, which revealed females have higher tendency for the involvement of supra diaphragmatic portion of the aorta and its branches such as aortic arch and its branches whereas males have higher tendency for the involvement of infra diaphragmatic portion of the aorta and its branches such as abdominal aorta, renal arteries, mesenteric arteries and iliac arteries which is present in our patient. Patients with TAK from Japanese descent, among whom most are females (90%) have involvement of the aortic arch and its major branches but in patients from Indian descent where significant number of patients are males (37%) have involvement of the abdominal aorta and its branches (1).

Conclusion

Because of the rarity of the condition, TAK is often overlooked especially when patient present with nonspecific symptoms. Therefore, clinical suspicion of TAK should be entertained irrespective of the age, sex and ethnicity of the patient whenever clinical findings denote the possibility of Takayasu arteritis. It is pivotal for preventing major and life- threatening complications of TAK and for providing symptomatic improvement with the commencement of appropriate medical treatment.

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Case Report

Kikuchi–Fujimoto disease: The great imitator

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Abstract

Kikuchi–Fujimoto disease (KFD) is an unusual clinical entity among tropical countries like Srilanka. It follows the self-limiting course with the background of uncertain pathogenesis Here we report a case of a 15-year-old boy who presented with fever with generalized lymphadinitis. The clinical and histological features overlap with infective, autoimmune, and malignant diseases. It slowly resolves the nature and limited exposure to KFD, posing a considerable challenge.

Keywords

Lymphadenitis, Kikuchi disease, necrotizing lymphadenitis

Introduction

KFD or idiopathic histiocytic necrotizing lymphadenitis is an unfamiliar disease. It was first described in 1972 from Japan (3). It is the higher prevalence among Japanese and other Asian people. It is a rare cause of fever with lymphadenitis in children and young females, which mimics lymphoma, SLE, syphilis, infectious mononucleosis, and Tuberculous lymphadenitis (4). A female predilection is reported (female to male ratio of 4:1) (5). Adults younger than 40yrs are often affected, but KFD is seldom reported in children with a low recurrence rate(5).

Case report

A 15-years-old boy presented with a 3-week history of fever with severe constitutional symptoms. He had symmetrically small and large joint pain simultaneously without early morning stiffness for one week. He denies respiratory symptoms, and there was no contact history or past history of TB. Cardiovascular and genitourinary system reviews were not significant. He had not developed any rashes, oral ulcers, or pruritus.

He was mildly pale, with no icterus and no redness of the eye. He had generalized lymphadenopathy (cervical, axillary, and inguinal) with the largest LN in the R/posterior cervical triangle. His Lymph nodes were non-tender and rubbery consistency. His abdomen was soft and had no clinically palpable organomegaly. Table 1shows the investigations performed.

Table 1: Summary of investigations performed

WBC	5,890 (N-66%, L-30%)
Hb	10.6 g/dl (MCV-83.2, MCHC-32)
PLT	321,000
CRP	31IU/l
ESR	112
Blood culture	No growth
LDH	882
Blood picture	Normocytic normochromic anaemia with marked rouleaux formation Compatible with anaemia of chronic disease
ANA	Negative
C Xray	No significant abnormality detected
Mantoux Test	Negative
Fibrinogen level	2.3g/l (1.8-3.6)
USS Abdomen	Multiple cervical LN-(R&L-L1b, LII, LIII) with increased vascularity and no necrotic area seen. Multiple lymph nodes were seen in the axillary, Inguinal, mesenteric, and para-aortic area Thyroid –normal Spleen -9.4cm
R/Cervical LN biopsy	The fragments of LN show multiple circumscribed foci of necrosis and karyorrhectic debris. Neutrophils and atypical cells are seen. Preserved areas show reactive lymphoid follicles with prominent germinal centers. The immunohistochemical assessment was done with CD3, and CD20 showed a reactive pattern of staining. Features are in keeping with Kikuchi's necrotizing lymphadenitis *(Figure 1)*

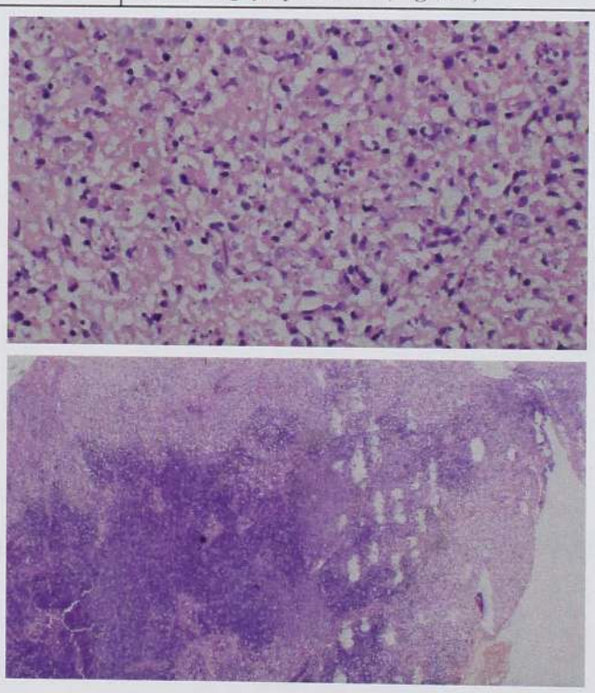

Figure 1: Lymphnode biopsy shows necrotizing lymphadenitis

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Alanine Transaminase (ALT)	7 U/L
Aspartate Transaminase (AST)	19 U/L
Random blood sugar	180 mg/dL
Total protein	6.7 g/dL
Albumin	2.4 g/dL
Globulin	4.3 g/dL
Bilirubin	0.7 mg/dL
Urine Full Report	Sugar +++ Albumin – nil Pus cells – 1-2/high power field Red cells – 20-25/ high power field
Serum Calcium	8.4 mg/dL (8.6 – 10.2 mg/dL)
Serum phosphate	1.3 mg/dL (2.3 -4.7 mg/dL)
Serum magnesium	1.5 mg/dL (1.6-2.6mg/dL)
Blood cultures	No bacterial growth
C-reactive protein	245 mg/dL
Venous blood gas	pH -7.42 PCO2 - 28 mmHg PO2 – 86 mmHg HCO3 – 20.9 mmol/L Lactate – 0.6 mmol/L
Urine ketone bodies	positive
SARS-CoV-2 real time RT-PCR	On 1st day of admission -RNA detected ct value 15
	On 12th day of admission- RNA detected ct value 26
SARS-CoV-2 total Antibody level	>10.00 Index reactive
Melioidosis antibodies	negative
Cerebrospinal fluid analysis	Proteins – 104 mg/dL Glucose 92 mg/dL (Plasma Random blood sugar – 299 mg/dL) Polymorphs – 10/mm^3 Lymphocytes – 03/mm^3 Red cells – 03/mm^3
Chest Xray	Normal

With high clinical suspicion of mucormycosis he was started on liposomal amphotericin B 5mg/kg daily (150 mg/day). Immunosuppression was maintained at the minimum required level by adjusting the tacrolimus dose by observing the serum levels. Urine ketone bodies were positive, but there were no overt features of diabetic ketoacidosis.

MRI scan of the paranasal sinuses, orbits and brain revealed pan sinusitis with preorbital and orbital cellulitis, with spreading infection into the orbital apex, cavernous sinus, Meckel's cave, trigeminal nerve complicated with abscess formation in the left middle cerebellar peduncle, and cerebellum [figure 01 and 02]. There was no evidence of other organ involvement such as lungs, kidneys, and gastrointestinal tract.

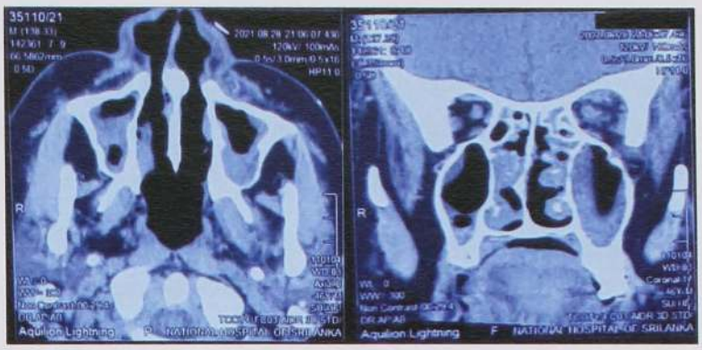

Figure 1: Transverse (left) and coronal (right) MRI images showing maxillary sinusitis and inflammation of nasal turbinates

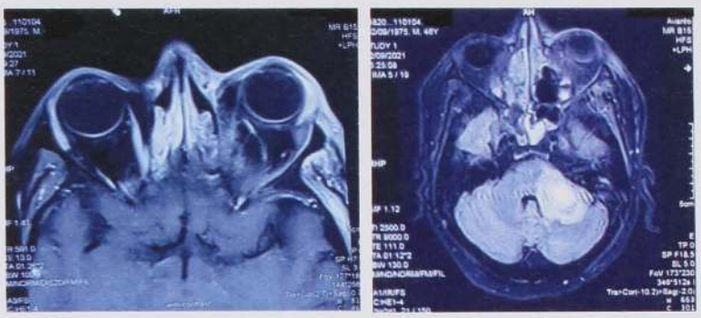

Figure 2: A transverse MRI image showing left orbital cellulitis and loss of enhancement of left nasal mucosa- "black turbinate sign" (left) and follow-up MRI image showing abscess formation in the left cerebellum (right)

He underwent left orbital decompression and repeated functional endoscopic sinus surgeries (FESS) for debridement of necrotic tissues. Rhizopus species was isolated by the culture of the necrotic tissue from the debridement surgery. Liposomal amphotericin was continued for a total of 12 weeks. Follow-up MRI scans showed regression of the lesions and swelling. The patient was ultimately neurologically stable but left with the blind left eye, left-sided total external ophthalmoplegia, trigeminal and facial palsy with cerebellar symptoms and signs.

Discussion

Our patient had rapidly progressive extensive rhino-orbital-cerebral mucormycosis extending into the base of the skull and cerebellum which started to manifest 7 days after the onset of COVID-19 symptoms. The infection had spread rapidly within hours to days into the surrounding structures of the brain and skull. On admission to the hospital 13 days after the onset of runny nose, fever and cough his PCR for COVID -19 was positive with a reactive antibody level of > 10.00 index to COVID-19. Therefore, he probably had COVID-19 infection and rhino-orbital-cerebral mucormycosis simultaneously. Diabetes and kidney transplantation with immunosuppression have predisposed the infection in our patient.

Conclusion

Rhino-orbital-cerebral mucormycosis is a rare fungal infection that can cause devastating clinical manifestations involving multiple organ systems, in immunocompromised hosts.

Early diagnosis and vigorous treatment with liposomal amphotericin B and appropriate surgical debridement carry a better outcome.

It is an emerging clinical entity observed in the context of COVID-19 infection. When patients present with symptoms of sinusitis and multiple cranial nerve lesions and other focal neurological signs the clinician should suspect rhino-orbital-cerebral mucormycosis. In addition, multicentered studies should be carried out to identify the exact causal relationship between these two infections.

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Discussion

The clinical manifestations of KFD are fever, general or local lymphadenopathy, skin rash, loss of appetite, weight loss, arthritis, and hepatosplenomegaly. Blood investigation is usually unremarkable and carries less diagnostic value to diagnose KFD (4). The immunohistology findings help to make a definite diagnosis. Histology finding describes three distinct phases as the disease progresses (2). The early stage is a proliferative phase which shows follicular hyperplasia. The next stage is a necrotizing phase in which necrosis with histiocytes as the significant cell type and the absence of neutrophils help differentiate KFD from SLE and drug induce lymphadenopathy. Immunohistochemical stains show CD68-positive plasmacytoid monocytes and histiocytes with an expression of myeloperoxidase help to differentiate from SLE(1). The later stage of the disease shows Xanthomatous appearance in histology.

Histology of Lymph nodes in Hodgkin lymphoma shows necrosis associated with neutrophils infiltrating and reed Sternberg variant atypical cells with CD 15, CD30, and CD 45 positive is easily differentiated from Kikuchi (4). In herpes simplex, lymph nodes surrounding mononuclear cells and neutrophils are usually present.

KFD has a low recurrence rate of around 3 to 4% (5). Treatment approach usually symptomatic, but persistent or severe symptoms and signs have been treated with glucocorticoids and IV immunoglobulin. Hydroxychloroquine has a place in the management of recurrence of the disease. Few patients may develop SLE in later years, which requires regular follow-up for several years (6). Our patient responded well to symptom management within one month without unnecessary intervention.

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Case Report

Extensive Rhino-Orbital-Cerebral mucormycosis in kidney transplant recipient associated with COVID-19 infection: A Case Report

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Abstract

Rhino-orbital-cerebral mucormycosis is an invasive disease caused by fungi. Diabetes mellitus and solid organ transplantation are known risk factors, while it is increasingly recognized in patients with COVID-19 although the exact causal relationship is unknown. Early diagnosis and treatment with liposomal amphotericin B with surgical debridement carries a better outcome in these patients.

We present a case of extensive rhino-orbital-cerebral mucormycosis involving the paranasal sinuses, left orbit, cavernous sinus, middle cranial fossa with abscess formation in the left middle cerebellar peduncle in a 46-year-old kidney transplant recipient with concomitant COVID-19 infection.

Introduction

Mucormycosis is an invasive fungal infection caused by the genera from the order Mucorales, who live everywhere in the environment (1), that causes infections particularly in the immunocompromised host (2).

Genera including Rhizopus, mucor, Rhizomucor, Cunninghamella, Absidia, Sakenaea, and Apophysomyces are the commonly observed organisms causing human infections (1). Risk factors are diabetes mellitus, diabetic ketoacidosis, deferoxamine and iron overload, glucocorticoid treatment, hematological malignancies, solid organ and hematopoietic transplantation, trauma, broad-spectrum antifungal treatment, and malnutrition (2,5).

COVID-19 infection appears to be associated with mucormycosis (3,4). In some case reports mucormycosis developed sometime after the diagnosis of covid-19 or simultaneously (3,4). It may manifest involving many organ systems including, paranasal sinuses, orbits, brain, respiratory tract, gastrointestinal system, skin, kidneys or may cause disseminated infection with hematogenous spread. Rhino-orbital-cerebral infection is the commonest (2,5). It usually begins as acute sinusitis and then spreads to adjacent structures such as orbits, palate, the base of the skull, brain, and brainstem rapidly over several days to a couple of weeks (3).

We report a case of extensive rhino-orbital-cerebral mucormycosis in a kidney transplant recipient with concomitant COVID-19 infection.

Case presentation

Our patient was a 46-year-old male teetotaler and a non-smoker with type 2 diabetes mellitus and hypertension for the last 13 years. He underwent live donor kidney transplantation 4 months before the presentation due to diabetic nephropathy. He was on routine immunosuppressant medications (prednisolone, mycophenolate mofetil, and tacrolimus) with successful graft functioning.

Two days after the 1st dose of the Sinopharm COVID vaccine he experienced fever, cough, runny nose, loss of appetite, and diarrhea. He started to have pain and numbness in the left side of the face 7 days later and rapidly progressive left-sided visual loss and diplopia. He got admitted to the tertiary care hospital due to worsening headache and complete blindness of left eye.

On admission, he had a blind left eye and left-sided marked proptosis, complete ophthalmoplegia, hemifacial sensory loss, jaw drop, lower motor type facial nerve palsy, and cerebellar signs without pyramidal signs. After taking blood for cultures, he was started on IV meropenem and IV vancomycin. A nasopharyngeal swab for SARS COVID -19 was positive. He did not have evidence of severe COVID infection/pneumonia. His investigation results on admission were as follows [Table 01].

Table: Investigation Results

Investigation	Results
White Cell Count (WBC)	12.6×10^9 /L
Hemoglobin	10.5 g/dL
Platelet Count	83×10^9 /L
Serum Creatinine	0.7 mg/dL
Serum sodium	136mmol/L
Serum potassium	4.2 mmol/L

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Case Report

Guillain- Barré Syndrome (GBS) after Sinopharm vaccination

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Abstract

Neurological complication following Sinopharm vaccination is extremely rare and Guillain-Barre syndrome (GBS) is among the least common complication. Here we report a case of a 62-year-old male with GBS secondary to Sinopharm vaccination. A diagnosed patient with schizophrenia presented with three-day history of lower limb weakness with preceding sensation of numbness. Nerve conduction study was suggestive of GBS, and lumbar puncture shows cytoprotein dissociation. He was managed with IV immunoglobulin and supportive management and drastic improvement was noted. The patient made an uneventful recovery with full muscle power.

Keywords

GBS, sinopharm vaccination

Introduction

GBS is an immune mediated polyneuropathy which presents as acute flaccid paralysis. Preceding infections are the predominant trigger of Guillain- Barré Syndrome (GBS). Epstein-Barr virus, Mycoplasma pneumonia, varicella-zoster virus (VZV), and covid 19 virus have also been related to GBS, though the associated clinical and electrophysiological variants are less well-defined. (1,2)

GBS is also known to be a sequalae following vaccination. Here, we report a case of 62-year-old immunocompetent male with GBS preceded by Sinopharm vaccination.

Case report

A 37-year-old male previously diagnosed patient with schizophrenia presented with difficulty in walking for 3 days duration. It was preceded by numbness of lower limbs. There was no objective sensory impairment. The upper limbs, bulbar and respiratory muscles were not involved. There were no prior history of diarrhoea or respiratory tract infection in the recent past. He had his 1st dose of Sinopharm vaccine 2 weeks before the onset of symptoms.

On examination, upper limb power was 5/5 MRC (medical research council) grading with lower limb power of 4-/5 and no respiratory muscle involvement. Deep tendon reflexes were absent globally and sensory examination was normal. A provisional diagnosis of GBS was made. Nerve conduction study (NCS) study was done which was suggestive GBS, and the cerebrospinal fluid examination showed cytoprotein dissociation, which confirmed our diagnosis of GBS.

His basic blood investigations were normal with a potassium of 4.0. His fasting blood sugar was normal and retroviral studies were negative. His serum CMV IgM antibodies were not detected but had CMV IgG antibodies. His mycoplasma antibodies were not positive. EBV IgM antibodies were negative. His CRP was normal. Patient was started on intravenous immunoglobulin (IVIg) and supportive treatment and the patient's condition improved in due course of time.

Discussion

Guillain-Barre Syndrome (GBS) is an autoimmune acute inflammatory polyneuropathy usually elicited by infection. Several studies reported GBS associated with Coronavirus Disease 2019 (COVID-19) infection. (2,3) The link between the COVID-19 vaccine and GBS is still not clearly established. As prevalence of GBS high among population there is a chance that it might be coincidental. (4) GBS following post COVID-19 vaccination has been reported notably following AstraZeneca vaccine and Pfizer-BioNTech vaccine. (5)

Patient clinical features were compatible with diagnosis of GBS i.e., weakness, paresthesias, and diminished or absent deep tendon reflexes. He had no preceding history of diarrhoeal or respiratory infecting and the viral screening was negative. We could not proceed with *Campylobacter jejuni* serology however the CRP was normal with negative blood cultures makes it least likely. In the absence of prior events and the fact he had his Sinopharm jab within 4 weeks of the

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symptom onset its arguable that vaccination as a trigger for GBS in this patient.

Conclusion

GBS following COVID vaccines are increasingly being reported especially following Astra Zeneca and pFizer vaccines. Though surveillance and further studies using robust study designs will be of benefit to see significance of the association we should keep in mind of the possible flaccid paralysis following vaccination.

Informed Consent

Informed consent was taken from the patient to disclose information in the case report.

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Case Report

Severe leptospirosis complicated with atrial fibrillation

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Abstract

Cardiac rhythm abnormality is a common finding in patients with leptospirosis. Relative bradycardia, atrial fibrillation, atrial flutter and ventricular premature beats are the common arrhythmias seen in leptospirosis. In the present case, the patient presented with septic shock and had atrial fibrillation. Further evaluation revealed hypokalemic acute kidney injury and severe metabolic acidosis. The atrial fibrillation reverted to sinus rhythm after correction of hypokalemia, acidosis, septic shock and with medical cardioversion. This case revealed that early detection of rhythm abnormalities and other forms of cardiac involvement and correction of precipitating factors is important in preventing fatal outcomes in leptospirosis

Key words

Leptospirosis, Relative bradycardia, atrial fibrillation, atrial flutter

Introduction

Most infections of leptospirosis are asymptomatic or mildly symptomatic. However, a small number of cases can develop the severe form of illness with multi organ failure. The presence of cardiac involvement by performing a 2DEcho or clinically tends to predict a poor outcome in leptospirosis. (1,2)

Case report

A previously healthy 45yrs old male farmer admitted with fever of one week. The fever was high grade and remittent, which responded to paracetamol. It was associated with chills, rigors, arthralgia and myalgia. He also had dry cough from the onset of fever. Two days prior to the admission he observed reduction in urine output despite adequate intake. He also experienced mild shortness of breath. There was no history of dysuria, hematuria or frothy urine. His latest muddy water exposure was one week prior to the onset of symptoms. Before one hour of admission he developed palpitations and increased severity of shortness of breath which brought him to the hospital.

On admission, the patient was febrile, dyspneic and unwell. He had conjunctival suffusion and was icteric. He was conscious and rational. His room air oxygen saturation was 93% and pulse rate was 140bpm which was irregularly irregular. The blood pressure was 80/50 mmhg. His abdominal and neurology examinations were normal and there was bilateral bibasal fine occasional crepitations in the lung fields.

A clinical diagnosis of leptospirosis with septic shock was made. The blood pressure picked up to 110/70 mmhg after 1500ml of crystalloid boluses. Patient was given intravenous ceftriaxone after taking blood and urine cultures. An urgent ECG showed an atrial fibrillation with the rate of 146 bpm. The ABG revealed severe metabolic acidosis with high lactate levels. The ABG potassium level was 2.74 mmol/l. The potassium level was rapidly corrected with 30mmol IV potassium chloride over 30 minutes. After the potassium replacement the ABG potassium level was 3.2mmol/l. The heart rate dropped to 120bpm after the correction of potassium and shock but the rhythm remained as atrial fibrillation. The patient was given loading dose of intravenous amiodarone and started on maintenance dose with careful monitoring of vitals.

His initial investigations are given below (table1.1).

Table 1.1: Initial investigations of the patient

Complete blood count	
White blood cells (*103/µL)	13.8
Neutrophils %	74.5
Lymphocytes %	18.4
Haemoglobin (g/dl)	13
Platelets (*103/µL)	11
ABG	
pH	7.2
HCO 3- (mmol/l)	16.7
Potassium (mmol/l)	2.6

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lactate (mmol/l)	6
Serum potassium (mmol/l)	2.6
Serum sodium (mmol/l)	142
Serum calcium (mmol/l)	2.2
Serum magnesium (mmol/l)	0.9
Serum phosphate (mmol/l)	1.5
Serum creatinine (µmol/l)	677
Blood urea (mg/ dl)	261
Liver function test	
AST (U/L)	26
ALT (U/L)	19
Total bilirubin (µmol/ L)	227
Direct bilirubin (µmol/ L)	221
CRP (mg/l)	342
CPK (U/L)	96
LDH (U/L)	490
Troponin I	negative
UFR	pus cells – 8, red cells – 10, protein +
Blood and urine cultures	no growth
Coagulation profile	normal

The chest x-ray on admission revealed no evidence of pulmonary haemorrhages. The bedside echocardiogram did not reveal any pericardial effusion or left ventricular dysfunction. The bedside ultrasound scan abdomen revealed mild hepatomegaly with acute renal parenchymal changes. Urgent nephrology opinion was taken for oliguric acute kidney injury with metabolic acidosis. The patient was offered an urgent haemodialysis and transferred to ICU.

The maintenance dose of amiodarone was continued for 24 hrs and then changed to oral amiodarone. The oral amiodarone slowly tailed off and omitted over the next four days. The potassium levels were closely monitored and corrected during the ICU stay. He returned to sinus rhythm after 36 hours of admission and did not develop any further episodes of atrial fibrillation.

A proper 2D echocardiography revealed ejection fraction of 60% without any evidence of myocarditis. The Lepto MAT which was sent on admission was positive with the titre of >1:320.

His urine output, creatinine levels and bilirubin levels slowly improved. He was transferred to medical ward after 1 week of ICU stay and discharged after 10 days of admission. A review was planned after 5 days of discharge with complete blood count, creatinine, bilirubin levels and ECG.

Discussion

Cardiac injury in leptospirosis results from toxic damage associated with endotoxins, immunoallergic phenomena or direct damage by Leptospira. Disseminated intravascular coagulation and electrolyte imbalances also play an important role in leptospirosis-associated cardiac involvement. (3)

In our case the patient developed atrial fibrillation without any evidence of myocarditis. Hypokalemia, acidosis and septic shock were thought to be the contributary factors for the development of atrial fibrillation.

Electrical cardioversion is the ideal management option for atrial fibrillation in a haemodynamically unstable patient. As our patient was in septic shock, we immediately restored the blood pressure with crystalloid boluses. We rapidly corrected the hypokalemia which was a major contributing factor to the arrhythmia. With the correction of the septic shock and hypokalemia the heart rate improved but the rhythm was not restored to sinus rhythm. Then we decided for medical cardioversion with amiodarone. The acidosis also corrected with haemodialysis. The atrial fibrillation in our patient reverted to sinus rhythm with careful monitoring of electrolytes, fluid management, correction of metabolic acidosis and with medical cardioversion.(4,5)

Conclusion

Cardiac involvement in leptospirosis is associated with poor outcome. Close monitoring and early detection of rhythm abnormalities and other forms of cardiac involvement and correction of precipitating factors is important in preventing fatal outcomes.

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5. National guidelines for the management of leptospirosis

Case Report

Post Infectious Glomerular Nephritis (PIGN) leading to Posterior Reversible Encephalopathy Syndrome (PRES); an uncommon presentation.

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Abstract

Posterior Reversible Encephalopathy Syndrome (PRES) is an acute encephalopathy characterized by headache, altered consciousness, visual symptoms and convulsions. Diagnosis is supported by Magnetic resonance imaging (MRI) of the Brain. Here we report a case of PRES in a 24-year-old-male who showed complete recovery with the control of blood pressure. Finally Post Infectious Glomerular Nephritis (PIGN) was found to be the underlying etiology of hypertension to develop PRES.

Introduction

PRES is characterized by headache, altered consciousness, visual symptoms, convulsions and symmetrical subcortical white matter vasogenic edema predominantly in posterior cerebral hemispheres (1). Hypertensive crisis is the common cause for PRES (2). Developing hypertensive encephalopathy and PRES following PIGN is known but uncommon presentation.

Key words

PIGN, PRES, MRI-Brain

Case presentation

A 24-year-old male was transferred from peripheral hospital to emergency unit with the history of two episodes of generalized tonic clonic seizures with loss of consciousness. He was drowsy. His Glascow Coma Scale was 13/15 (Eye-4, Verbal-4, Motor-5). He did not have signs of meningeal irritation. His limited neurological examination was normal including ophthalmic fundoscope. Bilateral ankle oedema with infected lower limb eczema and periorbital oedema were noted. His blood pressure was 180/120 mmHg. Rest of the examination was unremarkable.

When further questioning from the sibling, we found that he had chronic lower limb eczema for more than 2 years. He was fever free, but he complained headache with intermittent vomiting for one week and treatment was taken at peripheral hospital. There were no visual symptoms neither urinary symptoms, but urine output was low. There were no other systemic symptoms. He occasionally takes alcohol. There was no history of smoking, drug abuse and high-risk sexual behavior. He was having allergy to tomatoes and prawns.

His urinalysis revealed moderately field full red cells with dysmorphic red cells of 75% suggestive of glomerular origin, and mild proteinuria. His serum creatinine was 118micromol/L with blood urea of 8.9mmol/L and normal electrolytes. He had mild leukocytosis with neutrophil predominance. His CRP was 57mg/L and ESR was 32mm/1st hour. ANA was negative. His blood and urine cultures revealed no growth. Non contrast computed tomography (NCCT) of brain revealed bilateral occipital white matter hypodensity. He was further subjected to MRI, which showed high signal intensities on T2 weighted and Fluid-attenuated inversion recovery(FLAIR) images in the subcortical white matter of bilateral parietal, occipital, cerebellar hemispheres and dorsal aspect of pons and normal intensities in Diffusion-weighted imaging(DWI) consistent with the radiological diagnosis of PRES (Figure 1). Cerebral Magnetic Resonance Angiography revealed no abnormalities to suggest vasculitis. His CSF analysis was within normal limits. His anti streptolysin O titre (ASOT) was 400 U/ml(<200 U/mL).

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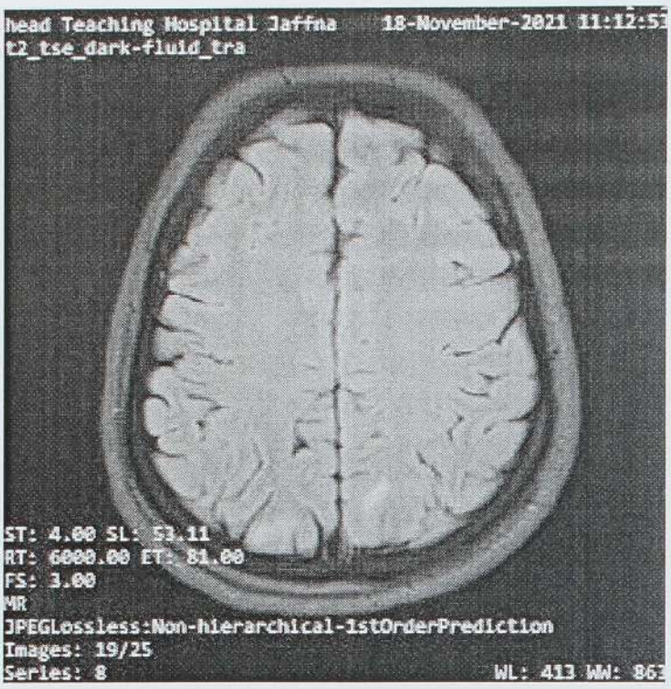

Figure 1: MRI Brain showed high signal intensities on T2, FLAIR images in parieto-occipital regions bilaterally

He was diagnosed to have PRES due to PIGN following lower limb skin sepsis. His blood pressure was well controlled with oral amlodipine. Antiepileptics were not started as he was fits free. Oral phenoxy methyl penicillin was commenced to eradicate the remaining infection.

He made a complete neurological recovery. His serum creatinine came down to 74micromol/L during ward stay. He was discharged with the antihypertensive and followed up at clinic. Dermatology follow-up also arranged for the management of eczema. After 3 weeks, his repeat urinalysis was completely normal and antihypertensive was gradually tailed off.

Discussion

PRES is a neurological condition, primarily characterized by headache, altered consciousness, visual symptoms and convulsions clinically and vasogenic oedema primarily in subcortical white matter areas, predominantly in posterior cerebral hemispheres (parieto-occipital regions), also in cerebellum and brainstem radiologically (1). Hypertensive crisis is the commonest cause but also occurs with cytotoxic immuno suppressive therapy, renal disease and auto immune disorders (2). Children are more vulnerable even in the low blood pressure.

Pathogenesis is unclear, but appears to be related to disordered cerebral auto regulation and endothelial dysfunction leading to brain hyper perfusion and break down of the blood brain barrier allowing extravasation of fluid and blood products in to brain parenchyma (3, 4). Prevalence of PRES following PIGN is known but rare and only few cases reported. (4).

Neuro imaging is mandatory in the diagnosis of PRES. It usually reveals white matter oedema typically in both posterior cerebral hemisphere. But relative sparing of calcarine and paramedian parts of occiptal lobes and cortical gray matter help to distinguish from infarction. MRI typically shows high signal intensities on T2 weighted images and FLAIR. Hypo or iso intense signal on DWI helps to differentiate from basilar stroke which causes hyper intensity (5, 6).

It is typically reversible condition but can lead to true ischemia and infarction or intracranial hemorrhage if left untreated. Treatment depends on aetiology, but commonly due to hypertension. Successful treatment causes resolution on neuro imaging within days to weeks (6).

Conclusion

PRES should be considered in hypertensive patients who have headache, altered consciousness, visual symptoms and convulsions.

MRI-Brain helps in prompt diagnosis and treatment.

Consent

Consent was taken from patient for publication.

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Memoriam Prof. Kandiah Balasubramaniam (1932-2021)

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Among Tamil academics, there were two K. Balasubramaniams. One was internationally renowned pharmacologist Dr. Kumariah Balasubramaniam (1926-2011). Though I have heard about him, I never met him personally, because when I joined the Department of Biochemistry, Faculty of Medicine, University of Peradeniya in 1978, he had left the island to join UNCTAD, Geneva, as a senior pharmaceutical advisor. His obituary appeared in the Lancet medical journal of Aug 20, 2011.

My mentor was biochemist Prof. Kandiah Balasubramaniam (1932-2021). While Kumariah Balasubramaniam was a medical doctor, Kandiah Balasubramaniam's first calling was that of an apothecary (Pharmaceutical chemist). The chronologically elder one was known as 'Bala' or 'Dr, Bala'. As such, the younger one earned a moniker 'Coconut Bala' in academic circles, mainly because his earlier postdoctoral research was on coconut. Nevertheless, his Ph. D research, conducted at the Indiana University was on thyroid gland tissues of dogs. His 1965 thesis carried the title, 'Proteolysis in the thyroid gland and its stimulation by thyrotropin'. Sections of the thesis results appeared in the journals Endocrinology and Biochemica et Biophysica Acta in 1965 and 1966.

By Sri Lankan standards, and for his generation of scientists who stayed in Sri Lanka after the 1983 ethnic riots, Professor Bala was prolific. He was also an institution builder, having moved to the University of Jaffna by 1984, and served as the Department head of Biochemistry and subsequently as the Dean of the Faculty of Medicine. He was elected to the National Academy of Sciences of Sri Lanka in 1985.

I was his student in biochemistry for two years, 1973 and 1974, at the University of Colombo. Then, I didn't impress him at all. But, in 1975, while I served as the President of the Colombo Campus Tamil Society, Prof. Bala was the Treasurer of that society. At routine intervals, I had to visit with him, to get his approval signature for spending money for particular functions arranged by the society (such as arranging the benefit movie show, annual Tamil cultural festival for two days, printing the Ilam Kathir magazine of the society), and to submit the receipts. He was so meticulous in accounting for a single cent, and I learned from him the virtues of frugality. I gather, he then spent a sabbatical leave year at the University of London, and researched on coconut kernel enzymes.

Subsequently, I moved to the University of Peradeniya and researched for my Master's degree in biochemistry, while simultaneously working as a temporary assistant lecturer. Prof. Bala was chosen as one of the two my external examiners, While the other external examiner, Prof. Mervyn Thenabadu, was somewhat lenient in his questions at the viva voce exam, now I remember Prof. Bala gave me a tough time during the thesis defense, for nearly 90 minutes. His friendship with my father notwithstanding, I realized that he was discharging his duties as an examiner impartially and didn't wish to graduate a 'half-baked biochemistry master's degree' holder from Peradeniya. I was grateful for his tough grilling then, and he made me realize the difference between undergraduate studies and graduate studies.

In my condolence email sent to Prof. Bala's daughter (Prof. Shamini Pratapan), I wrote as follows: ".... Before I left for USA, in August 1981, I did visit your house (then in Nugegoda) to say my farewell to Prof. Bala...

Then, after I completed my Ph.D at the University of Illinois, I moved to University of Toyo in 1986. When I visited Jaffna in November 1986, I visited the house where your father was living, with my father once. He requested me to apply for the Lecturer position at the University of Jaffna then, so that I could join him. For obligations at the University of Tokyo and for personal reasons, I had to reject his kind offer. This was the last meeting I had with your father. 35 years had passed by..."

What I remember now about that visit with Prof. Bala 35 years ago, was the banter he and my father shared. He telling my father. "Why not find a good girl here and get him married

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quickly, before he leaves?" My father couldn't answer that question easily, but replied, "He is the one who have to decide." I remained silent, pouting a smile. Then, Prof. Bala invited me to visit his lab the following day. I did visit, and he was earnest in hiring me as a lecturer, showing the modest lab, which had a refrigerator, where he stored his chemicals.

Then, Prof. Bala complained about the imposed electricity cuts by the municipality, which played havoc with the storage life of enzymes stored in the refrigerator. We refrained from talking Tamil politics at that time. He inquired me about my then research at the University of Tokyo. At that time, I was studying the muscle proteins in the edible marine foods, such as sea cucumber and lobster. He said, 'You can study them, even here in Jaffna'. But, what about the research instrument facilities? I was learning transmission electron microscopic techniques and then trendy SDS gel electrophoretic techniques, which I missed during my Ph. D. research at the University of Illinois.

As my first degree was in zoology, I wished to study many animals, because my research for Masters and doctoral degrees was in winged bean (Psophocarpus tetragonolubus) due to research funding and interests of my academic advisors. Thus, with much regret, I had to politely decline Prof. Bala's offer. But, I did respect his conviction of serving the University of Jaffna, and training younger generation of biochemists, as evinced in the papers they had published with Prof. Bala as a senior author. Prof. Vasanthi Arasaratnam (later to be the Vice Chancellor of the University of Jaffna) was one of them.

Occasionally, I wonder, if I accepted the offer Prof. Bala made to me in November 1986, what could have happened to my life. This is a big 'If', God only knows the answer. I can guess, that I could have been a co-author in few of Prof. Bala's publications. This merit, I miss now. I do envy his longevity in scientific productivity, for almost half a century, from 1965 to 2014, especially under the turbulent conditions in civil war days of Jaffna. Lastly, I admire his 'guts' to move to Jaffna in the post-1983 period, stay there and continue his career as a published scientist.

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Abstract

The abstract should provide the context or background for the study and should state the study's purpose, basic procedures (selection of study participants, settings, measurements, analytical methods), main findings (giving specific effect sizes and their statistical and clinical significance, if possible), and principal conclusions. Clinical trial abstracts should include items that the CONSORT group has identified as essential. Clinical trials should give clinical trial registration number at the end of the abstract. Authors are recommended to consult the SAGER guidelines for the reporting of sex and gender information.

Abstract should include the sub-headings: Introduction, Objectives, Methods, Results and Conclusions. Number of words should be less than 250 words. Brief Reports should have an unstructured abstract limited to 150 words.

Main text

The text should contain the following categories;

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Methods
Results
Discussion
Acknowledgements
Conflicts of Interests
References
Tables and Figures

Under a subheading "Conflicts of Interests ", all authors must disclose any financial and personal relationships with other people or organisations that could inappropriately influence (bias) their work. If there are no conflicts of interest, authors should state that "There are no conflicts of interest".

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Number references in the order in which they are first cited in the text.

Use Arabic numerals within parentheses e.g. (2).

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Sample references below are in the style required by the *JMJ*.

Journal articles

Jayatissa R, Gunathilaka MM, Fernando DN. Iodine nutrition status among school children after salt iodisation. *Ceylon Med J* 2005; **50**: 144-6.

List all authors when 6 or fewer; when more than 6 list only the first 3 and add *et al.*

Books

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1. Author. Eisen HN. *Immunology: An Introduction to Molecular and Cellular Principles of the Immune Response*. 5th ed. New York: Harper and Row, 1974.

2. Editors. Dausset J. Colombani J, eds. *Histocompatibility Testing* 1972. Copenhagen: Munksgaard, 1973.

3. Chapter in a book. Hellstrom I, Helstrom KE. Lymphocyte-mediated cytotoxic reactions and blocking serum factors in tumor-bearing individuals. In: Brent L, Holbrow J, eds. *Progress in Immunology* II. v. 5. New York: American Elsevier, 1974: 147–57.

Websites

Preminger GM, Tiselius HG, Assimos DG, *et al.* Guideline for the management of ureteral calculi. American Urological Association, 2007. http://www.auanet.org/education/guidelines/ureteralcalculi (accessed on Feb 20, 2013)

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Figures or illustrations should be professionally drawn or prepared digitally. A high resolution (300dpi) digital copy of the figure or illustration should be submitted. Lettering should be uniform in style. Free hand or typewritten lettering is not acceptable. Number the figures in the order in which they are cited in the text.

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