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WHY IS IT ESSENTIAL TO AMEND THE ABORTION LAW IN SRI LANKA? : A MEDICO-LEGAL PERSPECTIVE ON CRIMINAL ABORTIONS AND VICTIMIZATION.

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Abstract

'Pregnancy' is considered a gift to a woman, and simultaneously becomes a risk which influences life. Complications of pregnancy may affect a woman a great deal. 'Abortion' is a process where there is premature expulsion of a fetus from the uterus. This may occur naturally or as a result of wilful termination. Wilful termination of a pregnancy or 'Criminal abortion' is illegal in Sri Lanka but is performed by abortionists against the law of the country. In Sri Lanka, abortion is legal if it is to save the life of the mother, but it becomes criminal when it is performed for other purposes. The Penal code (Amendment) bill 1995, proposed the legalization of abortions in instances where the victim is a prey of a sex crime such as rape, incest or where the fetus is impaired. However, the proposal was not sanctioned. High rate of criminal abortions occurs, especially in developing countries. It is clear that, with the enforcement of strict abortion laws in a country, the rate of criminal abortions rise and less restrictive abortion laws impede the 'back door abortionists'. This paper discusses the nature of criminal abortions, the legal conditions pertaining to the jurisdictions in the world, and the concept of victimization.

Key Words: Abortions, Law, Criminal, Victimization, Jurisdictions

Introduction

Criminal abortion is, if given a definition which is simple in nature, "termination of pregnancy in violation of law". Abortion can generally be known as the expulsion of the fetus from the uterus before the term of gestation is completed. Criminal abortion is unsafe and sometimes even fatal. It is commonly performed by persons lacking necessary skills and competencies or in an environment without sufficient medical standards. The decision on the part of victims of unwanted pregnancies to, terminate the pregnancy leads them to clandestine providers of the services. These services are unsafe in nature due to the unskilled human resources and unhygienic environment. In Sri Lanka, these service providers of abortions have affected the maternal morbidity and mortality. Victimization is high among young women in Sri Lanka who are sexually active within the relationships. Women within lawful wedlock are compelled to resort to criminal abortions in instances where the youngest child of the family is at the infant stage and the impression existing within them that their families are completed.

As per section 303 of Penal Code in Sri Lanka, Abortions are criminalized except to save the life of the mother. Do restrictions imposed by the law on abortions 100% conducive to women and society? Do legal restrictions violate the right of a woman?

Methodology

The study is normative in approach. It basically studies primary data and secondary data. Primary data was collected and supported by secondary data. As primary data, the study analyses cases in which the principles of law and the medico legal aspects related to criminal abortions are discussed. As secondary data, the paper analyses research papers, internet, publications, and legislations which are applicable internationally and locally. The study analyses the Penal Code of Sri Lanka and the Medical termination of pregnancy Act 1971 of India.

Results and Discussion

Where the criminal abortions are concerned, 150,000-175,000 abortions take place in Sri Lanka. This condition has created a controversy, whether abortion can be identified as a Women Right. As per the records of the World Health Organization, 6.5% of abortions are either certainly induced or probably induced and 16 % are possibly induced and 7-16% of admissions are due to complications of induced abortions.[1] Abortion trends reveal that unsafe abortions are basically sought by illiterate and poverty stricken women in rural areas. As per the opinions of experts, it has been recognized that it is mainly due to ignorance of reproductive health and contraceptive methods.

It has been urged by the reformations that, the abortion law of the country must undergo a mitigation so as to liberalize the existing strict laws. Thus, attention was predominantly directed on decriminalization of abortions where fetal infirmities are detected and where unwanted pregnancies occur due to rape and incest. It is a general perception that the present law on abortion is anachronistic. Such a perception is basically due to the fact, that it does not address the social needs of the society. An amendment to the law is necessitated by the alarming increase of unlawful abortions.

The reason for women resorting to criminal abortions is partly sociological in nature. There, the question arises as to whether women are entitle to make decisions on her pregnancy. It simply means that a woman

has a sole right to decide whether she wants to continue the pregnancy or not. At that point, rights of the woman and fetus are considered. Priority has been given to the right of the woman as the fetus is considered as a life without a mind. The right of women in deciding her private rights is of prominent consideration. The equal rights of women concerning her private rights include her right to have control over the body and child birth.[2]

Reformations to the law on abortion are conciliatory in nature. It deals with autonomy of women and a choice between compulsion into motherhood or life threatening illegal procedures. There are opponents to abortions.[3] They insist on the 'sanctity of life'. Life is seen as a sacred entity which deserves protection at all cost. Legalization of abortions would lead to violating inalienable rights to the life of the fetus. It is connected with the assumption that the "life begins at conception".[4] The argument which surfaces at the point is whether a fetus can be identified as having the same moral standing as a human female in society. Can we prioritize the wellbeing of a bundle of cells at the cost of physical wellbeing and aspirations of an individual member of society? The matter is, whether a fetus has capability to outweigh the choice of a woman. A choice at this instance totally influences the quality of life of the individual. As per the general perception, Right to life is inalienable in nature. This is with exceptions, as the sanctity of life is not accepted at every instance. Self-interest supersedes the sanctity. It is evident in cases where the next kin are capable of consenting to terminating the life patients subjected in comas and life support.

Annually, 42 million women with unwanted pregnancies resort to abortions and 20 million of such abortions are unsafe. The maternal mortality rate worldwide has significantly increased due to unsafe abortions. One way of preventing deaths due to unsafe abortions are less restrictive abortion laws and greater contraceptive use. The former issue on less restrictive abortion laws is specifically a task for the legislatures of countries. The contraceptive use is extended to an area of community basis. There must be education on the use of contraceptives, availability of legal and safe abortions with access to such services and post abortion services. As per the records of the World Health Organization, every 8 minutes, a woman in a developing country is confronted by death, due to severe complications of unsafe abortions. As far as the history of the world is concerned, the time period from 1995 -2003 is reported as a period where the overall numbers of abortions reduced. However, the number of unsafe abortions remained steady. In western countries, it has been recorded that 3% are unsafe abortions in contrast to developing countries where it is 55%. Highest percentage of unsafe abortions is taken place in South America, Africa and Latin America. In America, Sharon Diana Hoag death case (1963) is of prominent concern. The girl aged 20, died after an illegal abortion service named "Lee Blue" despite efforts to save her. The abortionist who performed the illegal abortion was convicted. In America, another death was reported in 1960, Claudette Sayles death case, which caused the death of her due to a criminal abortion performed at her residence.

Abortion related complications have been identified worldwide as hemorrhage, sepsis and maternal mortality including 220,000 maternal deaths. The deaths are caused due to hemorrhage, infections, sepsis, genital trauma and necrotic bowel. The complications include poor wound healing, infertility, injury to the internal organs, bowel resections, loss of productivity and psychological issues.[5, 6] Women who have been subjected to complications of abortions require blood products, antibiotics, oxytocic, anesthesia, and the services of surgical specialists.[6]

The impact of restrictive and less restrictive abortion laws on victimization.

The rate of unsafe abortions in countries where restrictive abortion laws exist is 23 of 1000 women. It has reduced to 2 of 1000 women in countries where abortion laws are less restrictive. The mortality rate in countries with restrictive abortion laws is higher when compared to countries which have less restrictive abortion laws. It has been recorded as 34 deaths per 1000 childbirths in instances of restrictive abortion laws and 1 death per 1000 childbirths in the instances of less restrictive abortion laws.[7] Victimization due to unsafe, criminal abortions are less in countries within the European region. This differs from the developing regions where victimization rate is high. The social, and economic conditions which compel women to resort to "back door abortionists" are the basis for the higher rate of deaths and complications. The best example for this phenomenon is India, where women have been compelled to resort to unskilled, local providers of abortion services, despite strict rules imposed by the Medical Termination of Pregnancy Act 1971. The act has removed legal impediments to terminate pregnancies. In Cambodia, abortions are legally allowed on request.

As far as the context of developing countries is concerned, unwanted pregnancies occur due to the lack of knowledge among women about issue on contraception. Free access to contraceptives has the possibility to reduce unintended and unwanted pregnancies. The invention of contraceptive technologies has facilitated the decline of the abortion rates. Religious objections existing in the societies, unavailability of contraceptive methods, concerns on the possible health and side effects have become impediments for the successful use of contraceptives.[5, 6, 7]

Back door abortionists / unskilled abortionists

Involvement of a medical practitioner in an abortion which is criminal and illegal is considered as outlawing the ethics of medical profession. There are instances of woman procuring her own abortions, the outsiders assisting and supporting the performance of abortions, and providing drugs and instruments. Unwanted pregnancies may occur due to rape, incest, adultery, promiscuity and illicit sexual intercourse. The sexual acts without protection ultimately ended with illegal abortions. In Patricia Parrish case, the death of a 26 year old mother of two children died due to a criminal abortion. At autopsy, it was revealed that Patricia spent 2 hours in a bathtub filled with steaming hot water with ingestion of "medicinal capsules" at thirty minute intervals. In the case of the 24 year old Razia Trytiak (1967), whose body was found in a garbage dump was a girl of Russian origin, bought up in America working as a punch operator. Autopsy revealed that death was due to air embolism as a consequence of attempted abortion. She was six months pregnant, when she died.

It is generally known that a criminal abortion can be performed by the individual herself. Beatrice Fern death case (1945) is of predominant consideration. Beatrice was a 35 year old woman and a mother of three children. As the family underwent a financial crisis, she decided to terminate her pregnancy. After performing the said abortion, the woman died due to complications. The medical practitioner who was arrested argued that the woman performed an abortion on herself and that as an expert, he assisted her in her own act.[8]

This contention was the same in Indian context. In the Indian Medical termination of pregnancy bill 1971, it was proposed to mitigate the existing abortion law in India. The feminists movements in United States

of America, battled for the decriminalization of abortion restrictions, where it asserted the right to privacy freedom and choice of women. Thus, in the American sense, the woman is seen as an entity who is strengthened to make her own medical decisions. Roe v. Wade (1973), accepted that there is a constitutional right for women to be free and make personal decisions on biological and reproductive matters. Reproductive justice is of predominant consideration.

Women become the victims of criminal abortions basically due to their economic, social and financial status. In developed countries, the rate of criminal abortions is less in comparison with the developing countries. The "back alley" abortionists or back door abortionists are the last resort of the poverty stricken women, when they are burdened with an unwanted pregnancy.

In the medico-legal sphere, criminal abortions have been identified as the premature expulsion of the fetus from the uterus. Women die due to the complications of the criminal abortions such as vagal inhibition, air embolism, hemorrhage, pneumonia, and meningitis. The abortionists use different methods such as Higginson's injection, the use of chemicals (such as Potassium permanganate) and other instruments.[9]

Conclusion

It is believed that, criminal abortions exist due to criminalization of abortions in society by introduction of restrictive laws. Sri Lankan abortion law is mitigated only to the extent where the specific pregnancy is a threat to the life of the mother. The penal code (Amendment) Act 1995, proposed liberalization of the strict abortion law in Sri Lanka. Thus, it proposed that the abortions in Sri Lanka to be permitted in the instances where the woman is a victim of rape, incest or where the fetus is detected with an impairment.

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SUICIDE, HOMICIDE OR BEAR ATTACK?

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Introduction

Discriminating injuries by animal attacks from other types of trauma and assessing their contribution to the cause of death is often difficult. Careful evaluation of the injury pattern, thorough scene examination and performing adequate ancillary investigations is essential in such situations.

Case report

A young male was found dead in a hut in a chena, lying in a pool of blood with a shotgun beside him. There was a suicide note on the floor written with charcoal which indicated that he had encountered three bears in the jungle, fought and escaped with injuries. Autopsy revealed minimal damage to the clothes and to the body. There was a near contact entry wound under the chin. Shaving of the head hair revealed a star shaped entrance wound with burning and blackening on the vertex. An exit wound with extensive disruption of the left side of face was seen. CT scan confirmed the above findings. The manner of death was concluded as a homicide.

Conclusion

Minimal damages to the clothes and other areas of the body exclude bear attack with a high probability. Even though entry under the chin is more suggestive of suicidal firing, the entry at the vertex favors the involvement of another person.

Keywords: *Bear attack, Homicide, Shotgun*

Introduction

Animals may be responsible for an array of potentially lethal injuries. On occasion, blunt or sharp trauma from animal activity may be confused with postmortem artifacts or with inflicted injury from an assault.[1] Hence, discriminating injuries by animal attacks that mimic other types of trauma and assessing their contribution to the cause of death is often difficult. Careful evaluation of the injury pattern, thorough scene examination and performing adequate ancillary investigations is essential in such situations.

Case Report

A 36 year old male attached to the Civil Security Defense Force was found dead in a hut in a chena at a remote area of Ampara, Sri Lanka. He was in a supine position in a pool of blood and a locally made muzzle loading shotgun lay on his left side. There was an extensive ripped injury on the left side of the face. There were multiple footprints stained with the dried blood of an adult human on either side of the body but no blood was seen on the soles of the deceased [Fig. 1]. History revealed that he was a right handed.

There was a scrawl on the cement floor written with wood charcoal, stating that he was attacked by three bears in the jungle, fought and escaped with injuries and decided to commit suicide [Fig.2]

One of the metal sheets of the roof had a circular hole with a small piece of cloth [Fig. 3]. This cloth was smeared with gun powder but had no blood. There were multiple fragments of human tissue in the surrounding area. A bag belonging to the victim was found in an area deep in the jungle about 6 km away from the chena, with blood and disturbed vegetation.

Fig: 1. Position of the dead body and the shotgun. *[There were multiple human footprints either side of the body. (Arrows)]*

Fig: 2. Suicide note on the floor scribble by wood charcoal

Fig: 3. Hole on the roof with a piece of cloth hanging (arrow).

CT scan was done prior to the autopsy. The pattern of metal pieces and pathway of pneumocephalus [Fig. 4] indicated that the direction of firing was from top of the head to the left side.

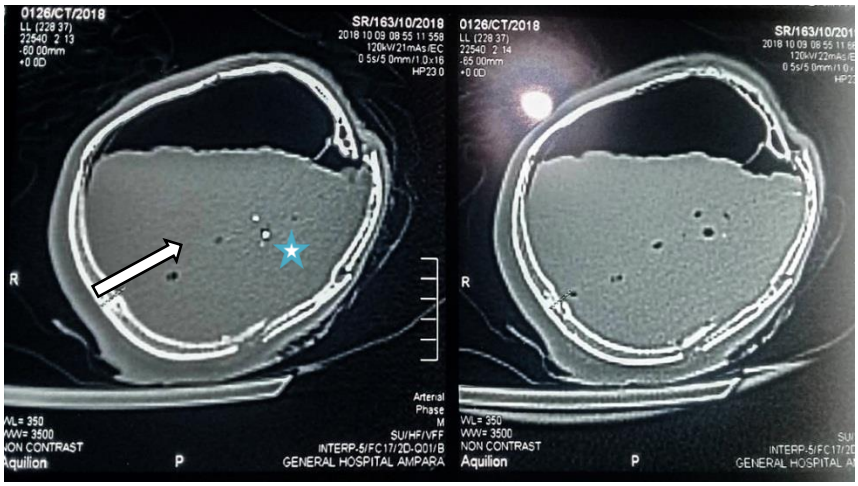

Fig: 4. CT of the head [*The section is at the level of vertex in this figure. The position of the head is turned on to the left. There is a pathway of pneumocephalus (arrow) along with two metal pieces (*)]*.

Autopsy revealed a 70 kg Asian Caucasoid 178cm in height. There was no evidence of physical or congenital deformities. The deceased was clad in a black color T-shirt and a short trouser.

Hypostasis was fixed in dependent areas such as on face, sides and front of the neck, trunk and limbs sparing pressure areas which was compatible with the position in which he was found at the scene [Fig. 1]. There was no disturbance to his clothing or injuries to the body below the neck.

The wound under the chin showed burning, blackening and tattooing with perforated laceration which was recognized as an entry wound. The perforated laceration placed on left side of the face showed extensive tissue disruption and resembled an exit wound [Fig.5].

Shaving of the head hair revealed a stellate shaped perforated laceration with burning and blackening placed just posterior to the vertex and associated with deficiency of skull which was circular, 1.5cm in diameter and inner beveling. This injury was identified as an entry wound. The exit wound of this injury was placed on same exit wound described above [Fig. 6]. The trajectory of this injury was through the brain, injuring the occipital area, mid-brain and left temporal areas.

There were four lacerations measuring 1-3cm on the dorsal aspects of both hands similar to defense injuries. The laceration on the middle phalanx of right ring finger exposed an underlying fractured and strands of hair.

Fig: 5. Shot gun injury to the face. [Arrow-entry site and direction upwards and to the left]

Fig: 6. stellate entry at the vertex [Exit in the same area as shown in fig. 5, Arrow-direction of the shot downwards and to the left]

A blood sample, strand of hair in the finger and the air dried cloth were sent to the Government Analyst (GA) for DNA analysis. Swabs from finger tips and webs, clipped nails from both hands and tissue swabs from two entry wounds were sent to explosive and fire investigation section of the GA department to detect gun powder residues. Hand writing of the deceased was taken from a log book and sent with a photograph of the scrawl on the floor to the Examination of Question Document section of the GA department. The cause of death was given as firearm injuries to the head and manner was concluded as homicide following the death investigation.

Discussion

Exit wounds after discharge of smooth bore weapons are quite variable in appearance. At its most extreme, gross catastrophic disruption may be seen. This is especially so in shots in close proximity to the head.[2] In this case the major injury to the left side of the face was due to the exit wound of a shot gun. The entry was under the chin with features suggestive of near contact range. The injury was compatible with an upwards and to the left direction. Since the deceased was right handed, the direction and the range was compatible with suicide. However, the position of the shot gun placed on the left side aroused the possibility that this was a case of homicide.

A firm contact discharge against tissue overlying bone (such as the skull) causes gas to rebound from the rigid base raising a dome under the skin that can split to give a ragged entrance wound. This effect is by no means invariable.[3]A similar entry was found on the top of the head in this case. The range can be determined as firm contact according to the described nature of the entry as above. CT scan of the head confirmed the pathway of shrapnel or missile / a bullet from vertex to the left side of the face, hence a common exit to both entries. Since the site of the entry on the

head was inaccessible, it indicated firing by another person.

It was impossible to determine whether a shrapnel from the gunshot under the chin caused injuries to the brain as there was another gunshot to the head. Therefore, possibility of volitional activities after the shot under the chin cannot be determined. However, there was a high possibility of ruling out volitional activity after the shot to the head as it causes gross destruction to the brain.

Bear attacks with paws, claws and teeth cause tearing, crushing, cutting and penetrating injuries to the body.[4]They stand on hind limbs and attack with fore limbs, usually to the upper part of human body. Human beings show a natural reflex action of covering the face using upper limbs while being attacked. This reflex action makes injuries of upper limbs a common presentation.[5] In this case, the scribble on the floor stated that the deceased encountered three bears and fought them.

Defense wounds are caused when a victim attempts to protect himself from an attacker and indicates that this victim is conscious at that moment.[6]
Defense injuries found on the body were mainly superficial lacerations over the dorsum of both hands and a compound fracture of the right middle phalanx of the ring finger and this pattern is compatible with previous studies as well. [7,8,9]

At the same time there were minimal injuries to the rest of the body and minimally damaged clothes.

Scene examination is very important, especially in abnormal presentation of deaths due to asphyxia and firearms [10, 11, 12, 13, 14] and assists in reconstructing event.

If the deceased fought with three bears, as per the suicidal note, there would have been more injuries to the body than what was found. Therefore, it aroused suspicion of an actual bears attack. Also the pattern of injuries were such that the possibility of defense injuries due to human attack could not be excluded. With the compound fracture of a finger in the dominant hand one must expect a fair amount of blood where the suicidal note was written. However, this was not so. Therefore, there was a high chance that the scrawl was by another person to mislead the circumstance of death.

The human foot print at a scene of crime is valuable physical evidence.[15]However, absence of blood on the soles of the deceased implied that one or more people walked around the body after the incident. Analysis of foot prints would help trace the assailants.[16, 17, 18]

A hole on the roof with a piece of cloth smeared with gun powder but no blood is more in favor of a shot which was had not gone through the body. As the shot gun at the scene was a muzzle loading gun, the probability of a second shot from the decedent after sustain the injury to the head is very remote.

Conclusion

Thorough scene examination, careful evaluation of the injury pattern and adequate ancillary investigations in this case indicated that the circumstance of death is more favor of homicide than suicide.

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Points to Ponder: Protective gear for Sri Lankan Motorcyclist

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Injuries on motorcycle riders admitted after collisions range from minor abrasions to fractures and other major injuries to different regions of the body.[1]

The motorcyclists who are involved are employed at different institutions. It is imperative that they report back to duty following hospital treatment.

Cushioning of major impacts to the body following a collision will minimize the injuries and reduce hospital stay. Further the expenses spent on treating major injuries by the government could be minimized. [2]

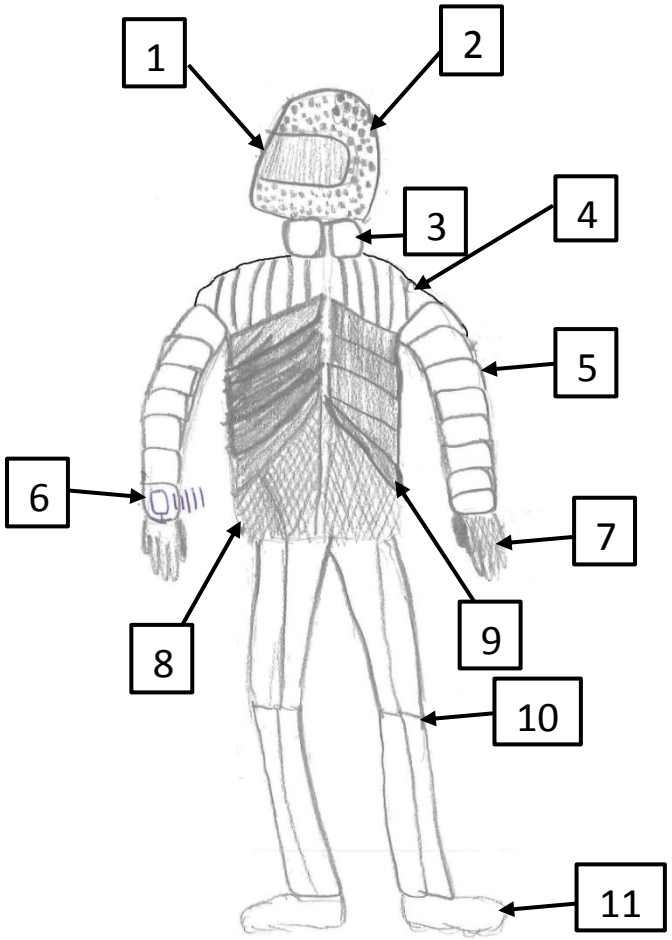
Currently it is illegal to ride a motorcycle without a helmet. The suggested protective gear which is used in other countries can be encouraged in Sri Lanka too.

The sport of cricket was played with minimal protection in the past. However, after experiencing several injuries the sport is played with maximum protection to the body.

A suggestion is proposed to encourage Sri Lankan motorcyclists to use additional protective gear to minimize injuries to different parts of the body. (Figure 1)

Keywords; injuries, motorcyclist, protective gear

Protective gear for a Sri Lankan motorcyclist



1. Shockproof visor
2. Rubber padded helmet
3. Thickly padded high neck collar
4. Strong rubber lines to guard areas of collar bone
5. Cuff like padded long sleeves
6. Speed sensors that vibrate when the speed limit is exceeded
7. Cross fiber glove
8. Cross fiber jacket to prevent exposed areas being injured
9. Thickly padded lower portion to prevent ribcage fractures
10. Thickly padded trousers (Exoskeleton)
11. Rubber studded shoes with padding inside

Figure 1

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BASAL SKULL FRACTURE OF NON- TRAUMATIC ORIGIN - A CASE REPORT

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Introduction

The Interpretation of postmortem findings is based on internal and external examination of the dead body. Postmortem artifacts (PA) are changes/ features introduced after death that may be confused with features introduced ante mortem.

We report a base of skull fracture in an extensively burnt body which was identified as a PA. This has not been reported in the literature.

Case report

A 58 -year old female was admitted to the emergency unit with extensive burns in a semiconscious state and died on the fourth day after admission.

Burns involving approximately 60% of body surface were identified at autopsy. There was a linear, almost hinged fracture in the middle cranial fossa which was identified during the removal of vault of skull. Absence of bleeding around the fracture site, absence of soft tissue injuries of the head, face and rest of the body, normal brain and pattern of skull fracture confirmed that the fracture is of postmortem origin, which may have been caused during sawing and removal of vault of skull. Further, it was identified that the thickness of the skull was less than normal which may have contributed to this.

Conclusion

This case highlights the fact that basal skull fractures may occur as an autopsy artifact. Therefore accurate interpretation of such fractures is essential to ascertain the cause and manner of death.

Keywords: Postmortem artifact, autopsy artifact, basal skull fracture, hinged fracture, burns Manuscript

Introduction

The forensic pathologist plays a key role in the investigation of deaths. Their autopsy finding in conjunction with circumstantial evidence leads to formulating an opinion on the cause and manner of death. [1]

Therefore identification and interpretation of findings autopsy is vital. Postmortem artifacts (PA) are changes/ features introduced after death that may be confused with features introduced antemortem.[2] PA can be introduced between death and autopsy or during the autopsy. [3]

We report a base of skull fracture in an extensively burnt body which was identified as a PA. This has not been reported in the literature.

Case report

A 58 -year old female admitted to the emergency unit with extensive burns in a semiconscious state died on the fourth day while being treated in the intensive care unit.

The victim was married and had no children. The husband was a farmer. She had no history of any other disease conditions and was not on any medications. However it was revealed that the deceased was distressed about her subfertility and alcohol abuse of her husband. Even though there had been suicidal ideation frequently in the recent past, there was no past history of attempted suicide. She did not take any medication or follow-up for her suicidal ideation.

History revealed that on this particular day, neighbors detected smoke and heard screams of a female from the backyard of the house. On arrival they saw that the house was on fire and that she was locked in a room. Once rescued she had stated that she wanted to die and set herself on fire with kerosene. The empty kerosene bottle was found in the room.

The body was preserved in a refrigerator till autopsy. The autopsy commenced approximately 14 hours after death. The autopsy was of a 72 kg Asian Caucasoid 172cm in height. She was covered with white hospital cloth. There was no evidence of physical or congenital deformities. Surgical dressing was draped over the burns and was stained with yellowish green slough which emanated an offensive smell. These burns were seen on head and face, front of neck, trunk and limbs involving 60% of body surface area. The burns were both superficial and deep partial thickness in nature.

A linear, almost hinged, fracture was seen in the middle cranial fossa (Fig-1) while removing the vault of skull. There was no macroscopic or microscopic evidence of periosteal bleeding or collected blood adjacent to the fracture. This fracture extended to the temporoparietal area bilaterally up to the incision which was made to remove the vault during autopsy. There was no blood collected between meninges and the brain was normal. No injuries were identified on soft tissue of head, face or rest of the body. It was identified that the thickness of the skull was less than normal.

The cause of death was determined as septicaemia following extensive suicidal burns.

Discussion

Correct identification of postmortem artifacts are vital. The chance of misinterpretation of such PA is approximately 8% in medicolegal autopsies and higher in decomposed bodies.[4]

PA encompass minor to gross change including fractures. [1]Skeletal injury is explained as damage to a bone following an impact.[5, 6] Injuries to bone are categorized as those are caused by blunt or sharp forces or, low/ high velocity projectiles.[7]

Skull fractures are classified based on location, type of force or type of fracture or even according to the manner of causation. [1, 8]

The time of infliction of a fracture is medicolegally relevant. It may cause at antemortem, postmortem or perimortem. [8, 9, 10]

Skull fractures are important as the skull is the protective covering of the brain. [11] It is further important to determine the cause and the manner of death during the medicolegal investigation.

The mechanism of skull fractures is influenced by four variables: (a) impact velocity, (b) impact surface, (c) cortical thickness, and (d) cortical density.[12] About 70% of skull fractures are linear.[13] The base of skull is a weak structure due to it being composed of relatively thin bone, union of multiple bones, presence of orifices (for blood vessels and nerves), sinuses and buttresses. [2, 14, 15]

A hinge fracture is a type of basilar fracture which is rarely seen.[2, 16] It is a fracture placed transversely across the dorsum sellae of the skull which may appear as two halves and is due to compressive force. [1, 14, 17] It can be caused by heavy blunt force or ballistic trauma to lateral aspect of the head or substantial force to forehead or chin. [18, 19, 20] However this case revealed no injuries to head or face.

Furthermore thinning of skull bone was identified in this case for which no reason could be identified even though many causes have been identified in the literature. [21, 22, 23]

The site of initiation of skull fracture with impact is still a questionable area in forensic practice [24] for which many different hypotheses have been proposed. [24, 25, 26, 27, 28] A fracture may be initiated towards the impact or away from the impact or at the site of the impact [24, 25, 26, 27, 28, 29] However no such impact was identified on head or face at autopsy in our case. The hinge fracture identified terminated on either side at temporoparietal area of the skull on the incision made for removal skull vault. This is again complies with the 'Puppe'rule".[30] It is strongly indicated that it occurred after the incision for removal of the vault was made as an autopsy artifact.

Hinge fractures are rarely observed postmortem due to lack of collagen tissues in the bones due to putrefaction.[7] However, this autopsy was done soon after death on a refrigerated body and therefore it is unlikely that the collagen content of bones were affected.

Microscopic examination of hinge fracture did not reveal any hemorrhage or tissue reaction which further confirms that the fracture was inflicted postmortem. [31, 32]

Approximately 180,000 burn fatalities are seen annually which predominantly occur in low and middle income countries.[33] Burn is a common type of injury in forensic practice and its incidence follows traffic injuries, falls and interpersonal violence.[34] Sepsis following burns is a known and common fatal complication which is evident in this case[35, 36]

The commonest agent used in suicides or attempted suicides by burning is flame. This victim also used a flame to terminate her life.[37] Female gender predominance is seen in previous studies of deaths due to burns and this finding is consistent with our case.[38, 39, 40, 41]

Conclusion

This case highlights the fact that basal skull fractures may occur during dissection of the skull as an autopsy artifact. Therefore correct interpretation is vital to ascertain cause and manner of death. It is recommended that direct supervision by a forensic pathologist during autopsy would minimize its occurrence and help interpret artifacts accurately.

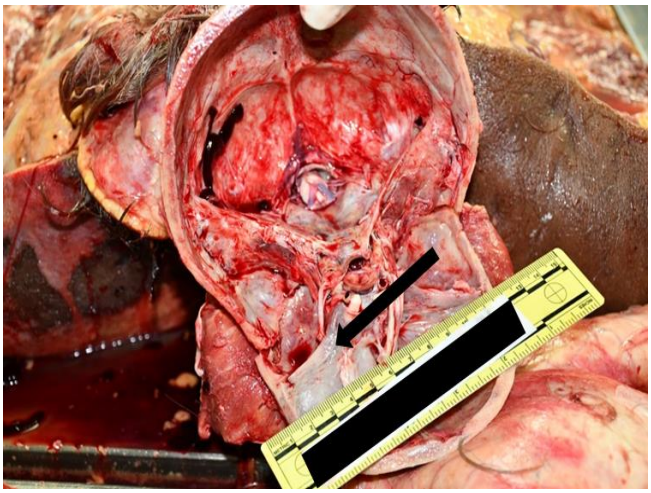

Figure 2: Hinge fracture (Indicated by arrow)

Figure 1: Extensive burns with yellow-greenish slough (severely infected)

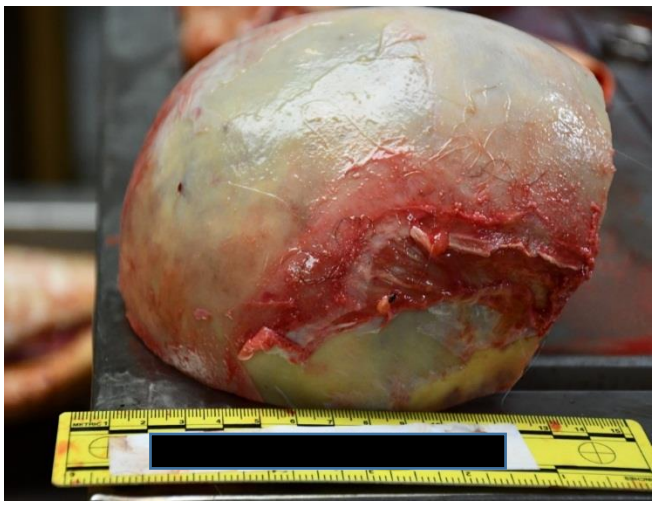

Figure 3: Skull cap. Absence of continuation hinge fracture.

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MEDICO LEGAL ASPECTS OF INJURIES SUSTAINED BY OCCUPANTS OF THREE WHEELERS IN ROAD TRAFFIC CRASHES:

A study conducted in a tertiary care hospital in the central province of Sri Lanka

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Abstract

Introduction: Injuries and death due to road traffic accidents (RTA) are a major public health problem in third world countries like Sri Lanka. Sixteen percent of all vehicles used in Sri Lanka are three-wheelers. Statistics reveal a high incidence of impacts involving three-wheelers in Sri Lanka.

Objectives: To determine the nature of the incident, nature of injuries and mechanism of causation of injury due to road traffic crashes among patients admitted to a tertiary care unit in Kandy, Sri Lanka.

Methodology: Data on socio-demographic profile, type of occupant, nature of the incident, mechanism of causation of injury, type of injury, region of the body affected and severity of injury were retrieved from Medico-Legal Examination Forms (MLEF)of patients admitted after three-wheeler crashes to the Teaching Hospital Peradeniya from 2016 to 2018. Data were analyzed using SPSS VERSION22.

Results: The commonest incident was the toppling of the vehicle (55%). Most injuries were sustained by the impact on an object inside the three-wheeler (44%). The commonest injury seen was abrasion (63%) and the majority of injuries were non-grievous (68%). Lower limb was the most affected (45%). More rear passengers were injured than drivers (62%). There was no significant difference in injury pattern between driver and rear passenger group.

Conclusion: Toppling was the commonest type of incident with most injuries being abrasions and sustained by rear-seat passengers by the impact on objects within the three-wheeler.

Keywords: Three-wheeler accidents, pattern of injuries, Safety measures

Introduction

History of road traffic accidents dates back to the 18th century. Statistics indicate that road traffic accidents are rising steadily resulting in approximately 1.24 million deaths annually worldwide.[1]

World Health Organization (WHO) statistics indicate that deaths due to road traffic accidents ranked 9th among the leading causes of death in 2012 with a prediction of being 8th in 2030.[2] RTAs affect countries with lower per capita income more than higher-income countries with expenditure amounting to approximately 1% -1.5 % of gross national income.[2] This is in contrast to developed countries where death from road traffic accidents rank lower among the leading causes of death.[3]

A study done study in India concluded that, approximately 3247 people die daily worldwide due to RTA and that it is a major cause of death in the 5−29 year age group. It estimates that approximately 20 million die and 50 million are injured from RTA annually. This study indicates that 90% of RTA deaths occur in developing countries, it is 11th among leading causes of death and amounts to 2.1% of all deaths worldwide. Most victims were young adults between 15- 44 years with 73% of deaths occurring in males. The most affected groups were pedestrians, cyclists, two-wheeler riders, and passengers on public transport. Furthermore, they predict that RTA injuries would be in the third position in the list of diseases worldwide by 2020. Interestingly RTA deaths are expected to rise by 83% in low-income countries and reduce by 27% in higher-income countries. Therefore, RTA injuries would be a major burden on health care budgets.[4]

Southeast Asian countries have a higher number of deaths from RTA from the year 2000 to 2011.[5] Among them, around 33% of deaths were seen in the occupants of the motorized two or three-wheelers.[6] A study done among the occupants of vehicles in RTAs revealed that 37% were on motorcycles, 28% in three-wheelers, 13% in dual-purpose vehicles and 11% in buses.[7]
In Sri Lanka, 22,000 persons had been injured as a result of RTA in2015 with 2801 deaths.[2] The World Bank predicts that there would be a 150% increase of RTAs from 2000 to 2020 in Sri Lanka.[8]

Sri Lanka is a country where all injured persons of vehicle accidents are mandatorily reported to the police if they seek medical treatment. This differs from countries like New Zealand and the UK, where they can refrain from reporting.[9, 10]

Statistics indicate that registered three-wheelers in Sri Lanka are 766,784 in the year 2012and was 15.7% of total vehicles registered in the country.[6] From 2004 to 2012, the number of registered three-wheelers in Sri Lanka has risen by 260%.

A study done in the western province of Sri Lanka indicates that 54 % of three-wheeler accidents took place during the daytime (between 07.00h to 19.00h) and that passengers were the commonest victims (40%).[5] Soft tissue injury was the commonest injury observed (75%) with 21% sustaining long bone fractures. Toppling of the three-wheelers due to a sudden turn of the vehicle has accounted for 30% of accidents. Out of 28 drivers in the study group, 25 had admitted tampering with handle lock to increase the vehicle's turning angle. Toppling due to a sudden turn was identified as the cause of the accident in all those who had tampered with the handle-lock. At the time of the accident, 89% of the drivers and 28% of pedestrians who were injured have been under the influence of alcohol. Being under the influence of Alcohol was identified in 67% of three-wheeler accidents in the night.[7]

A study done in the central province, Sri Lanka revealed that 28% of the victims of road traffic accidents were occupants of three-wheelers while a study conducted in

the western province of Sri Lanka, revealed that the occupants of the three-wheelers were the commonest victims (40%).[5]

Road traffic accidents occur due to carless and high-speed driving, not abiding by traffic rules, attitudes of the drivers ("right of the mighty"), overcrowding of vehicles, and lack of attention to the condition of vehicles, driving under the influence of alcohol and drug, driver fatigue, congested roads, illegal constructions.[11]

Despite the high frequency of three-wheeler accidents, studies regarding the topic are sparse. Studies on the injury patterns of occupants of three-wheeler crashes, in the central province of Sri Lanka, is important due to its unique geographic and climatic feature.

Objectives

To determine the nature of the incident, nature of injuries and mechanism of causation of injury due to three-wheeler crashes among patients admitted to a tertiary care unit in Kandy, Sri Lanka from 2016-2018.

Materials and methods

A descriptive study was conducted on patients admitted to the teaching hospital Peradeniya, with a history of three-wheeler crashes, from 2016 to 2018.

Data on socio-demographic profile, type of occupant, nature of the incident, mechanism of causation of injury, type of injury, region of the body affected and severity of injury were retrieved from clinical forensic examination and Medico-Legal Examination Forms (MLEF).

Patients less than 3 years of age, the elderly or debilitated and road fatalities were excluded.

Data were analyzed using SPSS VERSION22.

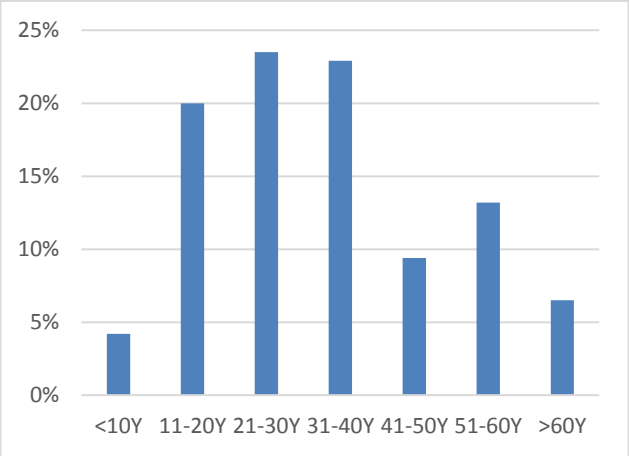
Ethical approval was obtained from the Ethical Review Committee of the University of Peradeniya.

Results

Socio-demographic profile

There were 310 patients with 91% (281) males.

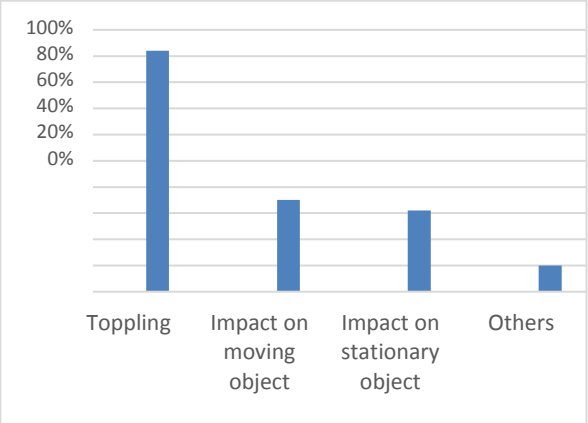
Figure 1: Age distribution of victims



The majority of 24% (73) were between 21 to 30 years of age.

Nature of the incident

Figure 2: Type of incident

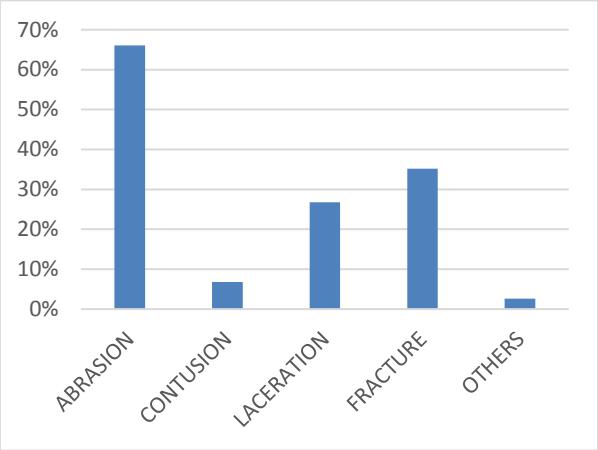


Toppling was the commonest type of incident seen in 56% (172)

Comparison of injury pattern between drivers and rear passengers

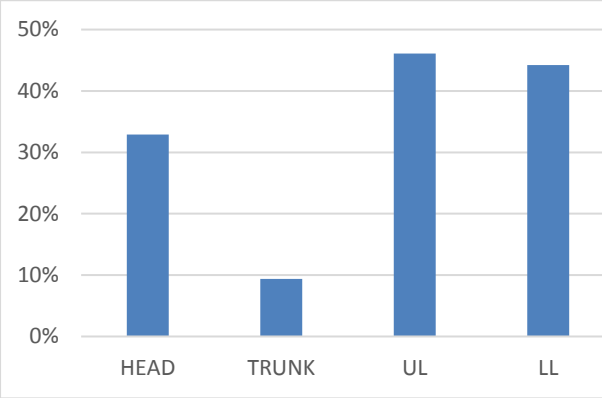
Nature of the injuries

Figure 4: Type of injury



The majority had more than one type of injury. Abrasions were the commonest seen in 66% (220) victims.

Figure 5: Region of body injured

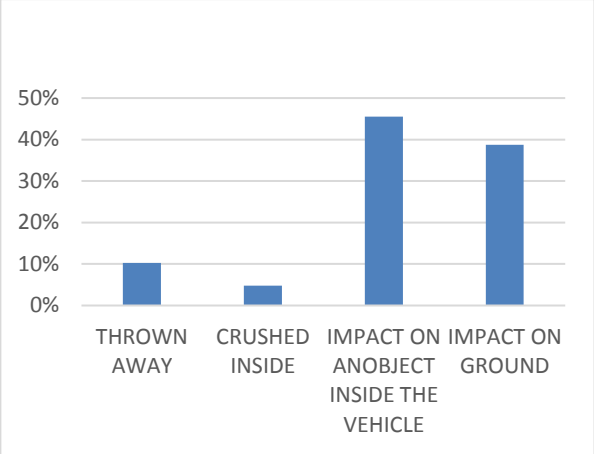


46% (143) victims had injuries in the upper limbs.

Sixty-nine percent (214) victims had non-grievous injuries with 31% (95) having grievous injuries.

Mechanism of causation of injuries

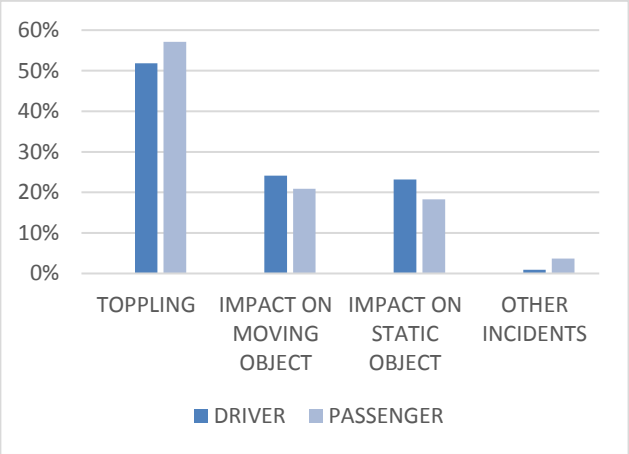
Figure 3: Mechanism of causation of injuries



Majority 48% (141) of victims were injured due to the impact on an object inside the three-wheeler.

Nature of incident

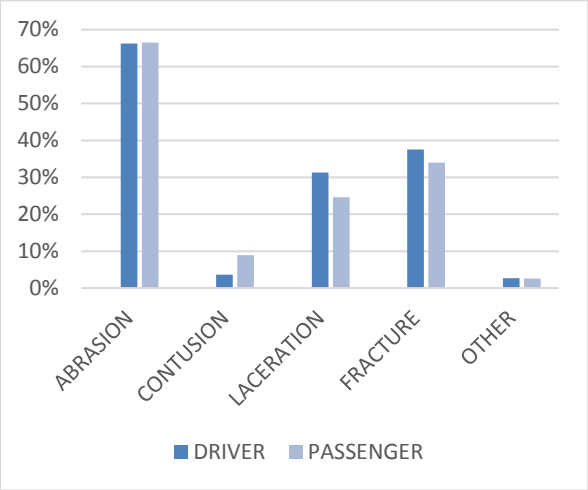
Figure 6: Type of incident



More passengers (57%) were affected than drivers (52%) where there was toppling of the vehicle but more drivers than passengers sustained injuries due to impact on objects There was no significant difference between the type of incident of the driver and passenger group.

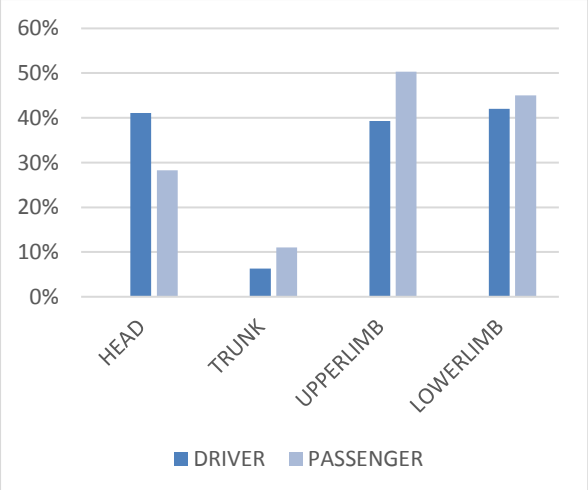
Nature of injuries

Figure 8: Type of injury



Abrasions were seen almost equally among drivers and rear passengers while contusions were seen more among passengers. However, lacerations and fractures were more commonly seen in drivers than in passengers. There was no significant difference between the type of injury of the driver and rear passengers. (Fisher's exact test values = 0.5)

Figure 9: Region of body injured

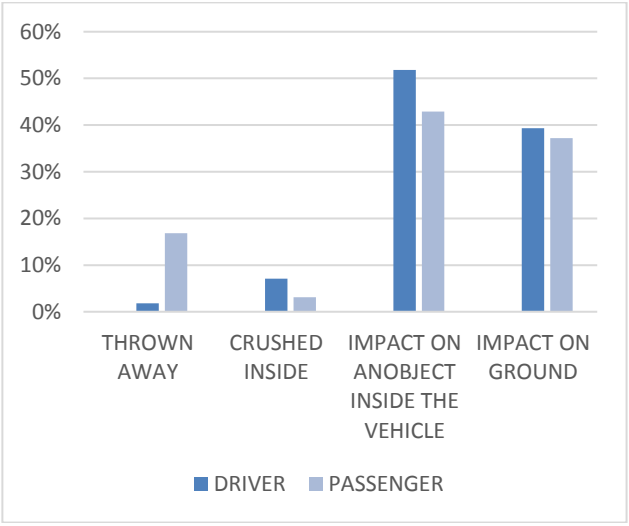


More drivers sustained head injury than passengers while injuries to trunk, upper limb and lower limb were seen more among passengers than in drivers.

However, there is no significant difference in the region of the body injured between drivers and passengers.

Mechanism of causation of injuries

Figure 7: Mechanism of causation of injuries



The majority of rear passengers (17%) were injured by being thrown out from the vehicle than drivers (2%). However, all other injuries were seen more frequently in the driver than in passengers.

Discussion

Three-wheelers are light weighted motorized vehicles with a relatively open structure. The recommended carrying capacity of this vehicle is three rear passengers and a driver.[12] This paper focuses on the nature of the incident, nature of injuries and mechanism of causation of injury due to road traffic crashes among patients admitted to a tertiary care unit in Kandy, Sri Lanka.

This study recognized males as the most vulnerable. Even though the trend appears to be changing overall due to an increase in female drivers it is not reflected in this study.[1] This is highlighted by the male

predominance in our sample as well among occupants of other types of vehicle accidents, in other studies conducted in the Kandy and Anuradhapura districts of Sri Lanka and in countries like India.[13,14,15]In our study population the 21 -30 year age group was the most vulnerable which is compatible with previous Sri Lankan studies in the central province where the most vulnerable group was identified as 20- 29 years among victims of all road traffic accidents and 21 -30 years in a study conducted on three-wheeler crashes.[5, 13,14,15]

The commonest type of incident seen was toppling of the vehicle.[5] However, a study done in the western province revealed that a majority of three-wheeler crashes were due to impact with another vehicle.[6] Studies revealed that interfering with the handle lock of the vehicle to increase the turning cycle was an important contributory factor especially of three-wheelers operating in the city. However, poor road surface and foggy climatic conditions may contribute to the toppling of three-wheelers in the central province. Conversely, studies reveal that crashes are more common in dry road surfaces probably because of the greater number of vehicles traveling under such conditions.[6]

The impact on objects inside the vehicle was the commonest mechanism of causation of injuries in this study. Surprisingly, the injury pattern was similar in drivers as well as rear-seat passengers. However, the drivers sustained injuries from impacts on the handlebar and structures such as windscreen and other modifications introduced to the vehicle, while rear-seat passengers impacted the front metal bar which was not padded. Some impacts were due to goods inside the vehicle while some were due to modifications made to the vehicle. Injuries in rear passengers in three-wheelers differ from injuries sustained by passengers of other vehicles as they impact on the front metal bars instead of the front seat. The next frequently mechanism of causation of injuries was impact on the ground due to being thrown away or crushed between vehicle and ground.

The study revealed that passengers are more at risk of being thrown away than drivers. This may be due to drivers bracing themselves for the impact or due to holding on to the handlebar.

Ninety percent of victims sustained surface injuries without internal damage.[1] A study conducted in Sri Lanka revealed soft tissue injury as the commonest type of injury among victims of three-wheeler crashes.[11] Abrasions were identified as commonest type of injury in occupants of three-wheelers, motorcyclists and motor car passengers in another study.[13]

Surface injuries caused by shattered glass seen in other vehicular accidents are rarely seen among victims of three-wheeler crashes. Injuries to the limbs which were the commonest in our study were similar to the injuries sustained by passengers of motorcycles.[13] However, this contrasted with the findings of Vadysinghe et al where the most affected region of the body was the head where they have described a similar mechanism of causation of injuries. [21]

Three-wheelers are included in the term "traffic" defined in section 240 of the motor traffic act of Sri Lanka. (Motor traffic act of SL, section 240) Hence they are under the common law relating to the motor vehicle in Sri Lanka.

Seat belts were mandatory for the passengers of the vehicles on the highways as the law introduced by the Amendments made at the road traffic act in 2009and described in the section 157(1) which stated "No person shall travel in a prescribed seat in a vehicle of a prescribed class or description unless he uses a seat belt of a type prescribed by the minister". Three-wheelers as type of motor vehicle, Is also under this law.

This study revealed that most injuries were non-grievous. This is because the fatalities were excluded. The pattern of injury among the fatal three-wheeler crashes needs further investigation.

Ejection of the passenger from the vehicle is known to occur in high-speed collisions and if the vehicle is toppled.[1] In three-wheeler accidents, the relatively open structure of the vehicle has contributed to throwing away from the vehicle. Furthermore, Unrestrained by seat belts of the occupants of three-wheelers is also influenced by this mechanism significantly.

The type and severity of the injuries sustained by the occupants of vehicles in road traffic accidents, depends on factors like force of impact, duration of impact, position of the passenger in the vehicle, use of seat belts, intrusion of the external objects, ejection from the vehicle at the incident, and the vehicular behavior after the impact.[1]

The force of impact depends on the speed of the vehicle. The maximum speed limit for the three-wheeler is 60 km /h, which is much less than for other vehicles. However, the positive effect of this speed limit is negated by a lack of seat belts and airbags in these vehicles.

The direction of impact is important in severity assessment. The lack of protective structures, bumpers and a bonnet makes three-wheel occupants more vulnerable to injuries with impact from any direction. There was no significant difference seen between the driver and rear passenger category in our study population.

Conclusions

The most vulnerable group were males between 21- 40 years of age. The commonest type of incident was the toppling of the vehicle. The majority were injured due to impact on objects inside the three-wheeler. Abrasions were the commonest type of injury while the limbs were the most affected body region. The majority of injuries were non-grievous with no significant difference in the injury pattern between the driver and passengers.

Recommendations

Ensure that:

(1) seat belts are in place for both the passenger and the driver compartments
(2) there is Padding of the passenger compartment with the removal of unnecessary modifications
(3) protective doors are installed
(4) drivers and the general public are educated regarding the effects of overcrowding, speed limit, transportation of goods and modifications to the vehicle
(5) those roads are maintained in good condition and traffic laws are abided

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