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Bike stunt gone wrong – Fatal Impalement by Liquor Bottle, landing into the death

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ABSTRACT

Sharp force injuries are the leading cause of death worldwide. Accidental deaths due to sharp force wounds are extremely rare compared to homicide and suicide cases. Therefore, their exact incidence or prevalence is not accurately known. This paper presents an accidental death due to massive blood loss resulting from the sharp cutting of the left femoral artery by glass fragments that impaled the left groin region of a young male. He was allegedly performing a bike stunt under the influence of alcohol. The body was found in a pool of blood, surrounded by multiple glass fragments from a broken alcohol bottle that was lying shattered next to the body. The autopsy revealed a near-total transection of the left femoral artery and significant glass injuries to the skin. Evidence of self-mutilation and scarification in multiple body regions highlighted risky behavior. To determine the circumstances of death in cases of accidental glass injuries, a thorough medico-legal investigation, including details of the death scene, post-mortem examination, and chemical analysis of viscera for any intoxicants or stupefying agents, is always necessary.

Introduction

Alcohol consumption is woven into the social, cultural, and political fabric of modern times. This is particularly true for young individuals, where alcohol consumption appears to be inextricably linked to patterns of violence and risk-taking, while cultural norms additionally exert a powerful influence on individuals' behavior.1

Deaths by sharp force injury, most of which are homicides, constitute a small percentage of the deaths investigated by legal autopsies. The injuries can be caused by a broad spectrum of specific sharp-pointed weapons and implements. Regular margins of the wound and the absence of tissue bridging help differentiate an incised wound from a laceration.2

Wounds produced by glass constitute a special category that may cause difficulty in interpretation in the absence of information concerning the circumstances of the injury. Glass wounds can mimic, at least superficially, scratch abrasions, lacerations, incised, and stab wounds.3

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The circumstances involving glass injuries also constitute a separate category. Homicidal glass wounds are commonly encountered in bar brawls, where a broken bottle or drinking glass may be used, often primarily as a blunt instrument that may shatter on impact, causing both blunt and incised injuries (Lath 2014 HFM). Accidental deaths due to glass wounds are uncommon and usually caused by a fall into a glass door or window, an aquarium, or another type of architectural glass surface (Karger et al. 2001). The forensic case reports of accidental deaths from glass wounds are very few.

Polson et al3 described a case in which a sailor was discovered injured on the deck cargo in a pool of blood. During the postmortem examination, they found that the main wound was surrounded by multiple abrasions, and a glass fragment was also recovered from the wound. The femoral vein was punctured. The clothing disclosed several fragments of glass belonging to an alcohol bottle. The sailor put one bottle in his left trouser pocket. The ship rolled up, and he had fallen. The bottle shattered, and a fragment punctured his thigh.

In another case described by Gitto et al2, the man tried to enter the unit by kicking the glass door and breaking the glass. The broken glass penetrated the inguinal region of the person, and he sustained two stab injuries in the groin region. Both the femoral artery and vein were injured, and he died due to massive blood loss.

We hereby present a unique case of an accidental death caused by the acute transaction of femoral vessels from impaling glass fragments into the left inguinal area, leading to exsanguination and shock. While performing a bike stunt under the influence of alcohol, the deceased suddenly lost his balance, ultimately taking his life.

Case Report

Case history and scene investigation

Under the influence of alcohol, a 26-year-old male tried to perform bike stunts, in front of several individuals, on a concrete street around his home. He put an alcohol glass bottle under the elastic waist band of his knickers, around the left inguinal region. Suddenly, he lost balance of his bike and fell down in a prone position on the glass bottle. Upon turning the body aside, a broken alcohol bottle and multiple glass fragments were discovered in his left inguinal and adjacent abdominal region, along with three major injuries on the left groin and numerous minor abrasions in the vicinity. The patient was taken to the hospital, where he was pronounced 'dead on arrival' after about one hour of incident.

Post mortem Examination

The dead body was brought for a postmortem examination after about 20 hours of the incident. After a thorough perusal of the police papers and detailed accounts of the crime scene and witnesses, the autopsy was commenced.

On external examination, the body was of average build and 174 cm in length. The lower left part of his t-shirt showed multiple irregularly shaped tears over an area of 5 cm x 4 cm (Fig. 1). The rest of the body was naked. The lower half of the body was heavily smeared with dried blood stains. Over the front of the chest, numerous old hypo- to hyperpigmented scar marks with raised surfaces were running oblique and parallel over a large area. Similar scars were appreciated over the bilateral upper and lower extremities. Scant pinkish-purple lividity was present over the back, suggesting only a little blood in the vessels. The rigor mortis was fully developed and strong.

Two obliquely placed lacerated wounds of sizes 12 cm × 5 cm × 4 cm and 6 cm × 1 cm × 0.5 cm, respectively, were present on the anterior aspect of the left thigh (Fig. 2). Underlying soft tissue, tendons, muscles, and femoral vessels were exposed. The margins of the wounds showed fine serrations, slightly wavy and wrinkled, and showed blood infiltration. Occasional tissue beveling and bridging were present. The vessels were surrounded by a hematoma (Fig. 3). Seepage of blood and significant ecchymoses were appreciated in the pelvic tissues. No pelvic fracture was, however, seen. The proximal aspect of the left femoral vein showed a total transaction and retraction. Multiple linear, triangular, reddish scratch abrasions of varying sizes were present all around the wound region.

A layer-wise dissection of the left thigh was then performed to search for glass fragments or other potential sharp items within the tissues. No glass or other sharp item fragments were detected within the tissues. X-ray examination could not be performed due to time constraints. On internal examination, the body's organs were pale and uninjured. The stomach contains 200 ml of semi-digested yellowish-brown food, and a typical alcoholic odor was coming out from it. Punctiform to confluent left ventricular and septal subendocardial hemorrhages were present. Renal cortical pallor, typical of shock kidney, was present. The death was due to severe blood loss due to a total transection of the left femoral vein by the glass fragment(s). Viscera were sent for chemical analysis and reported positive for ethyl alcohol.

Discussion

Glass is well known as a brittle and potentially dangerous material. However, most of the injuries involve children

and adolescents who are less aware of the dangers than adults and whose behavior in the presence of architectural glass is often hazardous. The severity of the injury depends on the type of glass used. The severity of the injury would be very low if the glass came complete with all safety measures; however, if no safety measures were used in the manufacturing of the glass, it would easily break down and cause much more severe injuries, as seen in our case.

In India, beverage (alcohol) bottles do not have any safety measures. Different types of glass are commonly used. Annealed glass: This is the "ordinary" glass that is commonly used for glazing windows and other applications. It is not an approved safety glass. Laminated glass: "an approved safety glass" that consists of two or more sheets of glass permanently bonded together by an intervening layer of tough plastic. Toughened or tempered glass: This consists of a single sheet of annealed glass that is strengthened by heat or chemical treatment. Toughened glass is an approved safety glass. Wired glass consists of a sheet of ordinary glass with wire completely embedded, usually as squares or parallel wires. The wired glass was developed as a fire retardant for which it is still rated as the best glass.4

Due to their heterogeneous shapes and sharpness, glass fragments can produce different mechanical injuries without excessive force. For this reason, accidental sharp-force injuries and fatalities vary greatly in their presentation.2 The usual wound caused by the glass is an obvious laceration, often accompanied by multiple scratches or abrasions. The appearances of the lesser injuries are somewhat reminiscent of the imprint of a bird foot. Multiple angular abrasions accompany lacerations of varied severity. When the wound looks like an incised wound, examination with a hand lens at an early stage will probably detect slight bruising of the margins. Side cuts are also likely to be seen, and these are characteristics of wounds produced by the glass. A search should be made for flakes or particles of glass in the wound.3

Broken glass injuries, which can range in severity from mild to life-threatening, unfortunately, leave victims defenseless. The most common types of broken glass injuries include:

Surface-level cuts, which involve only penetration of the skin, usually require minimal treatment, including stitches.

Deep-level lacerations, which occur when pieces of glass penetrate deeper than the top layers of skin and lacerate the underlying tissue and muscle fibers.

Severed limbs, which are the most serious type of broken glass injury, occur when a large piece of glass penetrates all the way through a person's bone, resulting in significant blood loss and potential amputation.5One of the effects of alcohol consumption that has been extensively researched is risk-taking behavior. Previous studies looked at numerous forms of risk-taking, such as drunk driving, violence, and aggression, sexual behavior, and gambling. According to Steele and Josephs's (1990) "alcohol myopia" model, alcohol makes social behavior more extreme because it blocks response conflicts by reducing cognitive constraints on affective preferences.

Different countries define the "safe" limit of alcohol intake for driving differently. In India, the current limit is generally 30 mg/dl. Given that the limit may represent a socially acceptable threshold for drinking, as seen in our case, the multiple scars on the body of the deceased denote his risk-taking behavior after alcohol consumption.

In clinical surgery, injuries caused by falls on glass surfaces that result in multiple sharp fragments are common.

Impalements and other rare wounds are frequently discovered during the autopsy. Impaling injuries usually result from bodily impact against relatively stationary, rod-like objects. Impaling injuries combine the morphological characteristics of penetrating trauma and blunt force tissue damage. Most often, impaling injuries are merely the consequence of accidents, although some studies have focused on suicide impalements as a result of mental health issues. While most fatal impaling wounds involve the head and thoracic regions, on rare occasions, fatal impalement of an extremity may occur.

Certification of the manner of death in cases of atypical wounds, especially without appropriate death scene photographic documentation, may be easily misinterpreted. For example, atypical impaling wounds together with numerous cutaneous injuries distributed in specific topographical collections, as reported in this case, may masquerade as an animal-related attack, a gunshot wound, an explosion-related injury, an injury due to attempts at self-defense, homicidal violence, or even a torture-related injury.

Furthermore, the injuries and circumstances in our case are strikingly similar to those seen in illegal break-ins, also known as the "break, enter, and die" syndrome.

Sharp shards of glass may cause stab and incised wounds that can breach the integrity of major blood vessels, resulting in fatal hemorrhage. A variety of factors contribute to a lethal outcome in these circumstances, including intoxication with a failure to appreciate the severity of the

injury, inability to adequately apply rudimentary first aid measures (such as direct pressure over the bleeding point), and failure to seek medical attention. In addition, adrenergic responses and vasodilatation from alcohol, drugs, and the underlying situation may also hasten exsanguination. Subendocardial hemorrhages, such as those seen in our case, are a significant finding in cases of massive blood loss. They are formed due to a sudden pressure change between the ventricle and the coronary system, the release of catecholamines, or a direct impact on the heart. The highest incidence (80%) of subendocardial haemorrhage (SEH) was observed in cases where significant blood loss and brain injuries were combined. 10

Conclusion

Alcohol consumption is a predisposing factor for injuries that result during episodes of sudden anger, imbalance, and reckless riding. Injuries to arteries, nerves, and veins are more frequently seen in patients under the influence of alcohol. The participation of the forensic pathologist at a suspicious death scene in such cases may be useful in determining the mode and manner of death, as autopsy findings alone may be misleading in the absence of satisfactory information from the death scene.

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