

A Case Report

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

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Abstract:

Sharp weapon injuries are one of the leading causes of death worldwide. Accidental deaths due to sharp force wounds are extremely rare when compared to the homicide and suicide cases. The exact incidence or prevalence of such injuries is not well documented. This paper presents a case of accidental death due to massive blood loss caused by the sharp severing of the left femoral artery by glass fragments that penetrated the left groin of a young male. The incident reportedly occurred while he was performing a bike stunt under the influence of alcohol. The body was discovered in a pool of blood, surrounded by several glass fragments from a broken alcohol bottle, which lay shattered next to it. The autopsy uncovered a nearly complete transection of the left femoral artery and sin-qua-non glass injuries of the skin. Evidence of self-mutilation and scarification over multiple body regions highlighted a borderline and risk-taking behavior. In cases of accidental glass injuries, determining the circumstances of death requires a comprehensive medico-legal investigation. This includes a detailed analysis of the death scene, a post-mortem examination, and chemical testing of the viscera for the presence of intoxicants or stupefying agents.

Keywords: Alcohol, Femoral artery,

Introduction:

Alcohol consumption is deeply embedded in the social, cultural, and political fabric of modern society. This is especially true for young people, for whom alcohol use is often closely associated with patterns of violence and risk-taking. Additionally, cultural norms exert a significant influence on individual behavior.¹

Deaths from sharp force injuries, predominantly homicides, make up a relatively small percentage of cases investigated through legal autopsies. These injuries can result from a wide range of sharp-pointed weapons and tools. Distinguishing an incised wound from a laceration is aided by the clean edges of the wound and the absence of tissue bridging.²

Wounds produced by the 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, lacerated, incised, and stab wounds.³

The circumstances entailing glass injuries also constitute a separate category. Homicidal glass wounds are frequently seen in bar fights, where broken bottles or drinking glasses are often used as blunt instruments. These items can shatter on impact, leading to both blunt and incised injuries⁴. Accidental deaths from glass wounds are rare and typically result from falls into glass doors, windows, aquariums, or other architectural glass surfaces⁵. Forensic case reports of accidental deaths caused by glass wounds are quite limited.

Polson described a case in which a sailor was discovered injured on the deck cargo in a pool of blood. During 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 got rolled up, and he had fallen. The bottle got shattered, and a fragment punctured his thigh³.

In another case, a man attempted to enter the house on second floor of the building by kicking its glass door, causing it to shatter. The broken glass penetrated the left upper front thigh of the person, and he sustained two stab injuries in the region. Both the femoral artery and vein got injured, and he died due to massive blood loss.

We hereby present a unique case of an accidental death caused by acute transaction of femoral vessels from impaling glass fragments into left inguinal area, leading into exsanguinations and shock. While performing a bike stunt under influence of alcohol, the deceased suddenly lost its balance that ultimately took up 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 body was brought for a postmortem examination approximately 20 hours after the incident. Following a thorough review of police reports and detailed accounts of the crime scene and witness statements, the autopsy was conducted.

Upon external examination, the body was of average build and measured 174 cm in length. The lower left part of his t-shirt showed multiple irregular-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 smudged with dried blood stains. Over front of the chest, numerous old hypo- to hyper pigmented scar marks with raised surfaces were running oblique and parallel, over a large area. Similar scars were appreciated over bilateral upper and lower extremities. Scant pinkish-purple lividity was present over the back suggesting only little blood in the vessels. The rigor mortis was fully developed and strong.



Fig. 1:

Two obliquely placed lacerated wounds were observed on the anterior aspect of the left thigh: one measuring 12 cm x 5 cm x 4 cm and the other 6 cm x 1 cm x 0.5 cm. (**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 hematoma. Seepage of blood and significant ecchymosis, was appreciated in the pelvic tissues. No pelvic fracture was however seen. The proximal aspect of left femoral artery showed a total transaction and retraction (**Fig 3**). Multiple linear, triangular, reddish scratch abrasions of varying sizes were present all around the wound region.

Fig 2



Fig 3



A layer-by-layer dissection of the left thigh was conducted to identify any glass fragments or other sharp objects within the tissues. No glass or sharp item fragments were found. 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 typical alcoholic odor was coming out from it. Punctiform to confluent left ventricular and septal subendocardial haemorrhages were present (**Fig 4**). 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 artery by the glass fragment(s). Viscera were sent for chemical analysis and reported positive for ethyl alcohol.

Fig 4



Fig 5



Discussion:

Glass is recognized as a brittle and potentially dangerous material. However, injuries commonly involve children and adolescents, who are less aware of the risks, compared to adults and often exhibit more hazardous behavior around architectural glass. The severity of the injury depends on the type of glass used. The severity of 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.⁶

In India, beverage (alcohol) bottles do not have any safety measures. Here are the different types of glass commonly used: **Annealed Glass:** This is the standard glass used for windows and other applications. It is not classified as a safety glass. **Laminated Glass:** This is a safety glass made from two or more layers of glass bonded together with a tough plastic interlayer. It is designed to remain intact when broken. **Toughened or Tempered Glass:** This is a single sheet of annealed glass that has been strengthened through heat or chemical treatment. It is classified as a safety glass due to its increased strength and resistance to breakage. **Wired Glass:** This type of glass has a sheet of ordinary glass with wire mesh embedded within it, often arranged in squares or parallel lines. Originally developed as a fire retardant, wired glass is still considered one of the best options for fire resistance.⁶

Due to their varied shapes and sharp edges, glass fragments can cause a wide range of mechanical injuries with minimal force. Consequently, accidental sharp-force injuries and fatalities resulting from glass fragments can present in diverse ways². 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 are:

a. Surface-Level Cuts: These involve only the penetration of the skin and typically require minimal treatment, such as stitches.

b. Deep-Level Lacerations: These occur when glass pieces penetrate deeper than the skin, causing damage to underlying tissue and muscle fibers.

c. Severed Limbs: The most severe type of injury, this occurs when a large piece of glass penetrates completely through a bone, leading to significant blood loss and the potential for amputation.⁷

Alcohol consumption has been widely studied for its impact on risk-taking behavior, including drunken driving, aggression, risky sexual behavior, and gambling. According to a study, "Alcohol Myopia" model, alcohol heightens social behavior by diminishing cognitive constraints and response conflicts, which leads to more extreme affective preferences⁸. Different countries set varying limits for "safe" alcohol intake when driving. In India, the current limit is generally 30 mg/dl. This threshold often reflects a socially acceptable level of drinking, as illustrated in our case; the multiple scars on the body of the deceased denote his risk-taking behavior after alcohol consumption.⁹

In clinical surgery, injuries caused by falls on glass surfaces that result in multiple sharp fragments are common.¹⁰

Impalements and other unusual wounds are often encountered during autopsies. Impaling injuries typically occur when the body strikes stationary, rod-like objects. These injuries exhibit features of both penetrating trauma and blunt force tissue damage. While most impalements result from

accidents, some research has explored suicides involving impalement due to mental health issues. Although fatal impalements most frequently affect the head and thoracic regions, fatal impalements of extremities, though rare, can also occur. Certifying the manner of death in cases with atypical wounds, particularly without adequate photographic documentation of the death scene, can be prone to misinterpretation. For instance, atypical impaling wounds combined with numerous cutaneous injuries arranged in specific patterns might be mistaken for injuries resulting from animal attacks, gunshot wounds, explosions, self-defense attempts, homicidal violence, or even torture.¹¹

Additionally, the injuries and circumstances in our case closely resemble those associated with illegal break-ins, often referred to as the "break, enter, and die" syndrome. Sharp shards of glass can cause stab and incised wounds that may compromise major blood vessels, leading to fatal hemorrhage. Several factors can contribute to a lethal outcome, including intoxication, which may impair the ability to recognize the severity of the injury and apply basic first aid measures (such as direct pressure on the wound), as well as a failure to seek medical attention. Additionally, adrenergic responses and vasodilation induced by alcohol, drugs, and the overall situation can accelerate blood loss.¹²

Subendocardial hemorrhages, such as those seen in our case, are a significant finding in 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 hemorrhage (SEH) was observed in cases involving both significant blood loss and brain injuries.¹³

Conclusion

Alcohol consumption can predispose individuals to injuries resulting from sudden anger, imbalance, and reckless behavior. Injuries to arteries, nerves, and veins are more commonly observed in individuals under the influence of alcohol. The involvement of a forensic pathologist at the scene of a suspicious death can be crucial in determining the mode and manner of death, as autopsy findings alone may be inconclusive without adequate information from the death scene.

References

1. Laing AJ, Sendall MC, Barker R. Alcohol-related violence presenting to the emergency department: is 'glassing' the big issue? *Emerg Med Australas*. 2013 Dec;25(6):550-7. doi: 10.1111/1742-6723.12136. Epub 2013 Oct 9. PMID: 24118859.
2. Gitto L, Bonaccorso L, Serinelli S. Death due to severe blood loss following an accidental lesion to the femoral vessels. *Med Leg J*. 2019 Dec;87(4):196-201. doi: 10.1177/0025817219875425. Epub 2019 Nov 5. PMID: 31686595.
3. Polson CJ. *The essentials of Forensic Medicine*. 4th ed. New York (USA): Pergamon Press; 1984.
4. Lath V. Homicidal glass injuries: Patterns and forensic implications. *HFM*. 2014.
5. Karger B, Rothschild MA, Pfeiffer H. Accidental sharp force fatalities--beware of architectural glass, not knives. *Forensic Sci Int*. 2001 Dec 1;123(2-3):135-9. doi: 10.1016/s0379-0738(01)00526-6. PMID: 11728738.
6. Oliver TI, Lawson JS. Glass laceration injuries and prevention. *Med J Aust*. 1979 Mar 10;1(5):190-1. doi: 10.5694/j.1326-5377.1979.tb128987.x. PMID: 449776.
7. Firm WZCL. The 3 most common types of broken glass injuries [Internet]. Wagner Zemming Christensen, LLP. 2020 [cited 2023 Jan 9]. Available from: <https://www.wzclawfirm.com/the-3-most-common-types-of-broken-glass-injuries>.
8. Steele CM, Josephs RA. Alcohol myopia. Its prized and dangerous effects. *Am Psychol*. 1990 Aug;45(8):921-33. doi: 10.1037//0003-066x.45.8.921. PMID: 2221564.
9. Abrams D, Hopthrow T, Hulbert L, Frings D. "Groupdrink"? The effect of alcohol on risk attraction among groups versus individuals. *Journal of Studies on Alcohol*. 2006;67(4):628–36.
10. Clark AJ and Webber GMB. Accidents involving glass in domestic doors and windows in England and Wales. *Accid Anal Prev* 1982;14(4): 293–303.
11. Janik M, Ublova M, Kucerova S, Straka L, Hejna P. An atypical impaling injury of the iliofemoral region. *Forensic Sci Med Pathol*. 2013 Dec;9(4):607-10. doi: 10.1007/s12024-013-9446-2. Epub 2013 Apr 23. PMID: 23609039.
12. Byard RW. The 'break enter and die' syndrome may involve significant injury to major neck vessels. *J Forensic Sci*. 2011 Jan;56 Suppl 1:S252-4. doi: 10.1111/j.1556-4029.2010.01601.x. Epub 2010 Oct 15. PMID: 20950320.

13. Nikolic S, Zivkovic V. Subendocardial hemorrhages in a case of extrapericardial cardiac tamponade – A possible mechanism of appearance. *Srp Arh Celok Lek.* 2016 Jul-Aug;144(7-8):440-2. PMID: 29652455.