

AN UNUSUAL PERINEO-SCROTAL IMPALING INJURY

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Abstract: The ends of metal railings forming the top part of fences and gates may terminate in various types of decorative finishes, often in sharp, tapered tips. These tapered ends serve as a security measure to deter any trespassing. Accidental deaths linked to sharp tips of fences or gates can be a result of suspension or impalement injuries and are of great rarity in medico-legal literature. Herein, we provide a case of a rare double impalement injury sustained on an iron-spiked fence gate. A 51-year-old man was found alive, impaled on iron-spiked fence gate. Despite the rapid response of neighbor and paramedics, the man died shortly after hospital admission. The autopsy disclosed two channel-like penetration wounds projecting from right scrotum and perineum, consistent with the fence gate spikes, which communicated with the abdominal cavity. It seemed that the decedent, under the influence of ethanol, attempted to climb over the iron-spiked fence gate on which he accidentally impaled himself. The established cause of death was hemorrhagic shock due to numerous tears of pelvic vasculature caused by impalement injury on an iron-spiked fence gate. Despite the high-energy trauma commonly seen in impalement injuries, low-energy trauma, such as in our case, can result in death. Such injuries should not be disregarded or misrepresented for their topographical or morphological attributes. In addition, retention of foreign objects embedded in the wounds is a widely approved medical approach that minimizes the bleeding and could prevent death. In case of impalement injuries, the same should be followed.

Keywords: impalement injury, iron-spiked fence gate, exsanguination, pelvic blood vessels, scrotal penetrating injury, perineal penetrating injury.

INTRODUCTION

Impalement injuries in forensic practice are a rarely encountered phenomenon [1-4], accounting for 3% of injuries to external genitalia [5]. They represent a specific type of trauma, caused mostly by a stationary rod-like object which enters the body in its longitudinal axis, creates a channel-like wound in its path and remains lodged inside [4,6,7-9]. We present a noteworthy case of man who sustained a double impalement injury on iron-spiked fence gate. To our best knowledge, such cases are scarcely reported in medico-legal literature. The aim of this report is to emphasise the necessity of careful external examination during autopsy, elucidate the biomechanics of the event and raise awareness of such rare injuries in forensic practice.

CASE REPORT

A 51-year old man with a history of alcoholism was found alive impaled on an iron-spiked fence gate (Fig. 1). A local resident alerted the police who arrived on the scene and lowered the man to the ground before calling the ambulance. By the time paramedics arrived, the man's condition had deteriorated, but a successful cardiopulmonary resuscitation was performed. In response to the progression of shock, a CT (computed tomography) scan of the abdomen and thorax was taken which revealed an extensive blood collection in retroperitoneum, near the junction of common iliac veins (Fig. 2). A small collection of air was also detected in pulmonary trunk. Blood analysis displayed ethanol concentration of 1.84 g/l. The man's condition further declined, resulting in death 30 minutes after hospital admission. Given the traumatic nature of

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death, the body was referred for a medico-legal autopsy evaluation.

External examination showed a body of an overweight man (183 cm, 125 kg) with inapparent similar-sized skin defects on the upper part of right scrotum measuring 1.2 x 0.8 cm (Fig. 3a) and upper left medial femoral region measuring 1.4 x 0.8 cm (Fig. 3b). The defects were retracted with irregular margins, resembling entry wounds of a dull object. Closer examination confirmed channel-like wounds which communicated with the pelvic cavity. The scrotal channel extended upwards through the scrotal wall, damaged the right testicle and ascended through the inguinal canal into the abdomen. The perineal wound

track penetrated the perineal muscles and entered the pelvic cavity. Besides, three uneven cutaneous abrasions were present on the right portion of forehead.

Internal examination revealed hemorrhage in retroperitoneal space in volume of 300 ml of both liquid and coagulated blood. After evisceration of internal organs, the pelvic vessels were inspected. Right common iliac artery was transversally ruptured (Fig. 4), the left common iliac artery and the left internal and external iliac arteries were incompletely multifocally ruptured (Fig. 5). The left common iliac vein was punctured 1.5 centimeters below confluence with the right iliac vein (Fig. 6). In addition, sacral promontory was broken and left oblique abdominal muscle was lacerated. No other internal organs were harmed. Air embolism as a potential cause of death was proved negative. Blood alcohol concentration showed 1.29 g/l.



Figure 1. The iron-spiked fence gate. The left spike (L) and the right spike (R) with blood traces.

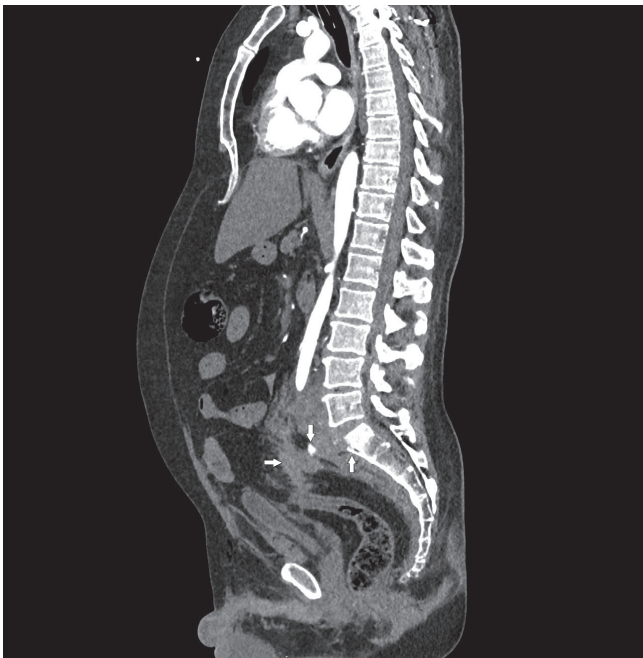


Figure 2. Sagittal CT scan revealed blood clots in the retroperitoneal space (left arrow); active bleeding to the site (middle arrow); and fracture of sacral promontory (right arrow).

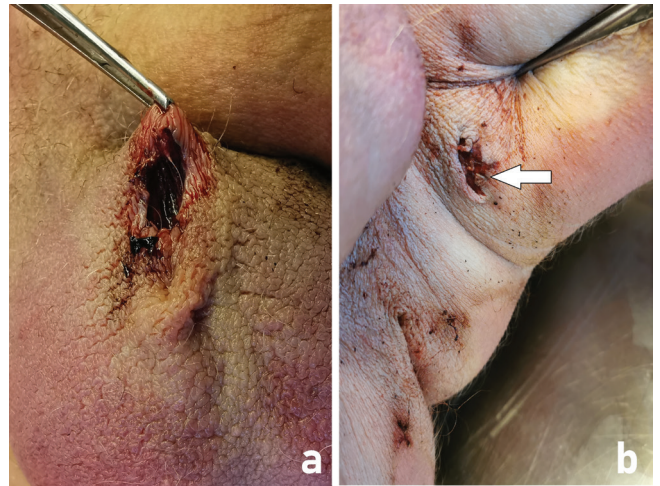


Figure 3. a - Entry wound on the right scrotum; b - Entry wound on the perineum (arrow).

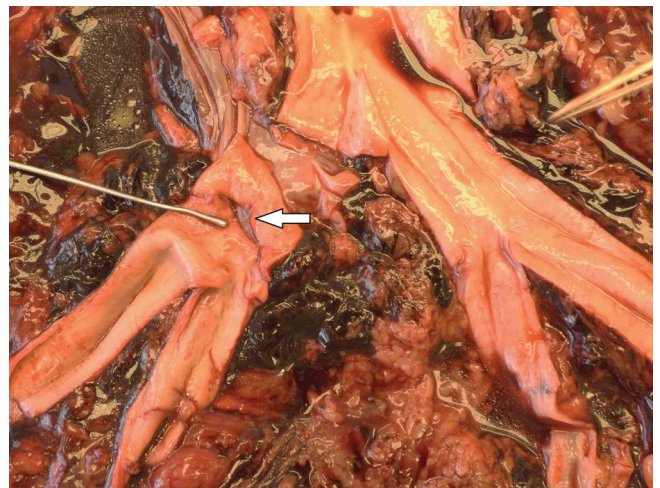


Figure 4. Transversal rupture of the right common iliac artery caused by the right fence gate spike (arrow).

Further toxicological analysis was negative. Histological examination of the injured arteries revealed traumatic rupture of the media with vital hemorrhage into the adventitia (Fig. 7).

The cause of death was exsanguination caused by traumatic ruptures of multiple pelvic vessels as a result of a double impaling injury. The death was classified as accidental.

It seemed that the decedent, under the influence of ethanol, attempted to climb over the iron-spiked fence gate on which he accidentally impaled himself. The spike on the left (Fig. 1) breached the left common iliac vein and lacerated the oblique abdominal muscle. The spike on the right (Fig. 1) fully transected the right external iliac artery and stopped on sacral promontory. In his attempt to break free, the man exerted force on the fence spike embedded in his sacral

promontory, bending it and causing the left spike to shift inward. This movement led to multiple tension ruptures of left iliac arteries and increase in blood loss. After he was removed from the fence, the bleeding intensified, implied by the several blood puddles in the area. Furthermore, the effect of alcohol on vasodilation could have hastened the exsanguination and impaired the movement coordination suggested by forehead abrasions that likely resulted from a previous fall.

DISCUSSION

Impalement is defined as a penetrating injury where a variably sharp or narrow object pierces through and becomes embedded within the body [10]. Additional criteria of an impalement injury include transfixion and immobilization, sometimes even suspension of the victim [11]. Structurally, they combine aspects of blunt force and penetrating trauma [3,4,12] with the entry wounds typically surrounded



Figure 5. Incomplete tension ruptures of the left iliac internal artery (left arrow) and left iliac external artery likely caused by the movement of the victim (right arrow).



Figure 6. Puncture wound of the left common iliac vein caused by the left fence gate spike (arrow).

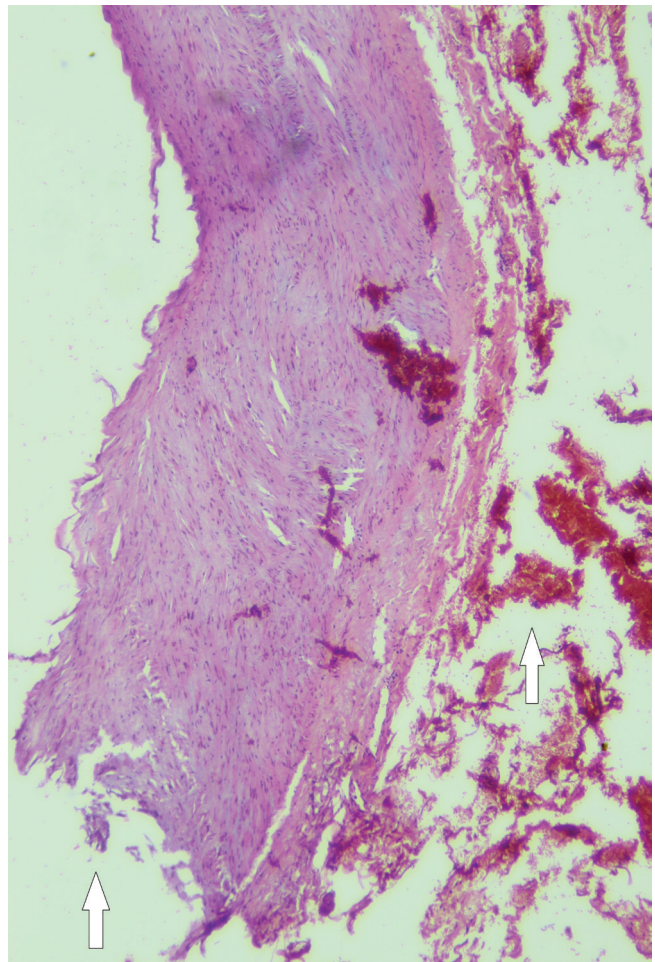


Figure 7. Histological examination of the injured arteries revealed traumatic rupture of the media (left arrow) with vital hemorrhage into the adventitia (right arrow).

by well-defined concentric abrasion collars. Parts of clothing may be forced into the wound tracks [13]. Typical sites of fatal impalement injuries are thoracic region [3,6,12-16] and cranio-facial region [1,7,17-21]. The manner of death is often accidental, but homicides [11,17], suicides [21-23] and sexually motivated acts [22] are also described. The accidental manners of death include impalements in traffic [1,6,12,14,15,18], falls from height [7,13,19,20,24] and animal-related attacks [16,25].

Blunt force represents the major mechanism of scrotal injuries [26,27]. Nevertheless, the number of penetrating scrotal injuries has scaled with a rise in the rates of crime and violence in the recent past [28]. A comprehensive study by Bjurlin *et al.* reported the incidence of scrotal penetrating trauma at 1.6% of all penetrating trauma to external genitalia and 0.44% of all types of trauma. Gunshot wounds were found to be the most frequent mechanism of external genital injuries, accounting for 93%, followed by impalements (3%), self-emasculatio/knife wounds and bites [5]. Perineal penetrating trauma is primarily associated with concomitant anorectal, genital and urologic injuries, with additional reports of pelvic and vascular injuries. The mechanisms involved are similar to those in external genital trauma. Notably, there is a remarkable disparity in the proportion of impalement injuries of perineum between pediatric and adult population, with a 13-fold higher incidence observed in the former group [29].

Impalement injuries of perineal and genital region are usually presented in literature as non-lethal trauma in pediatric patients [30,31] while lethal fence impalements are commonly linked to high-energy trauma as vehicular crashes [1,15] and falls from height [32]. Herein, we present a remarkable case of a lethal double impaling injury of perineal and genital region suffered while climbing over an iron-spiked fence gate. The ends of metal railings forming the top part of fences and gates may terminate in various types of decorative finishes, often in sharp, tapered tips. These tapered ends serve as a security measure to deter any trespassing into restricted areas. Accidental deaths linked to sharp tips of fences or gates can be a result of suspension or impalement injuries. Heath and al. documented a similar case of a 18-year old man accidentally impaled on a spear tip finial [33]. The cases share the following: accidental impalement while climbing over the fence gate, impalement in the scrotal region, traumatic ruptures of pelvic vasculature, death due to exsanguination after getting free and high blood

alcohol concentration. Motor impairment resulting from prior alcohol intake could have plausibly been the principal factor that led to the injury. It is also worth noting that bleeding seemed to have intensified after the decedent's extrication. Thus, retaining the decedents in place for as long as possible may conceivably heighten probability of their survival.

Our case underlines the importance of a well-performed external examination of the body during the autopsy where the inconspicuous skin wounds at the site of penetration could be misinterpreted or even overlooked. Diagnostical hurdles could arise in scenarios with sparse anamnestic data where morphological and topographical features of the wounds may resemble animal-related attacks, explosion-related injuries, gunshot wounds, homicidal violence and torture [4]. To conclude, impalement wounds of such character as presented in this report highlight the significance and indispensability of meticulous scene documentation, as without it, the formation of cause of death could arise from ambiguous and open-to-interpretation injuries, leading to erroneous conclusions.

Conflict of interest

The authors declare that they have no conflict of interest.

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