Case report

Degloving injury to groin, scrotum and penis due to low-velocity handlebar injury

Hannah Thompson,[1] Oliver Burdall,[2] Kokila Lakhoo[2]

[1]Paediatric Surgery, University of Oxford Medical Sciences Division, Oxford, UK
[2]Paediatric Surgery, John Radcliffe Hospital, Oxford, UK

Correspondence to
Ms Hannah Thompson;
hannah.thompson15@nhs.net

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SUMMARY

Bicycles are a common cause of blunt abdominal trauma causing 5%–14% of injuries. However, impalement or shear injuries from low-velocity mechanism of injury are rare. We report a case of a 14-year-old boy presenting with an extensive left groin injury sustained while cycling one-handed along the pavement at walking pace. The laceration ran for 12–14 cm from the left groin across the pubis to the right and 10 cm inferiorly into the perineum. This inverted the left scrotum and partially degloved the penis. The corpus cavernosa and tunica vaginalis were exposed up to the level of the superficial inguinal ring. Literature on handlebar-impalement injuries is sparse and the majority of penile degloving injuries described in the literature result from alternative mechanisms. This unusual case demonstrates the potential forces involved, and potential damage resulting from handlebar injuries even at low velocity.

BACKGROUND

Handlebar injuries make up ~10% of bicycle-associated injuries and mostly cause blunt trauma.[1] Bicycles account for 5%–14% of blunt abdominal trauma with a reported incidence of 1.15 per 100 000 population under 20 years of age.[2–4] Impalement or shear handlebar injuries are an uncommon subset of handlebar-related bicycle injuries. With rare mechanisms such as this, it is difficult to know the range of outcomes or the extent of damage that occurs due to limited documented evidence. Here, we describe a degloving groin laceration from a low-velocity handlebar injury.

CASE PRESENTATION

A 14-year-old boy presented to the emergency department with an extensive left groin injury sustained from cycling into a stationary car on the pavement while holding a drink in his left hand. He was not wearing a helmet. He was transferred to hospital in pelvic binder with liberal packing over the wound. He was assessed and stabilised in the emergency department prior to thorough wash out, debridement and exploration under general anaesthetic (figure 1). The laceration ran for 12–14 cm from the left groin across the pubis to the right and 10 cm inferiorly into the perineum. This inverted the left scrotum and partially degloved the penis. The corpus cavernosa and tunica vaginalis were exposed up to the level of the superficial inguinal ring. The wound was closed in layers after inspecting for foreign bodies and neurovascular damage. The tunica and deep fascia were intact throughout the wound.

Outcome and follow-up

There was no significant vascular damage and normal sensation was noted postoperatively, including follow-up at 4 weeks. There were no post-operative issues with voiding. The effect on sexual function was not assessed and remains unknown. Intramuscular tetanus toxoid booster was administered preoperatively. The patient was discharged the next day with 5 days of co-amoxiclav and a support dressing.

DISCUSSION

This case is unusual in both mechanism and resulting injury. Handlebar injuries causing blunt abdominal trauma are well described in the literature; however, reports of impalement or degloving injuries are sparse.[1 2 5] Most bicycle-associated injuries are skin abrasions; however, extensive morbidity has been described in association with bicycle injuries, especially handlebar injuries, due to the low surface area of the bare metal end of the handlebar.[3 6–8]

A review of 219 children with abdominal handlebar injuries documented no impalement trauma, which is in keeping with a number of other smaller studies.[9 10]

In a prospective trauma, database of almost 4000 over a 5-year period found that 2.6% of cases admitted to the trauma service involved bicycles (n=101). Fifteen were handlebar injuries but only three of these were *impalement* injuries. These three patients were all boys and all required surgical intervention. One of the cases described involved major tissue disruption caused by the handlebar. Similar to our case, there was no vascular injury, though in their case there was no penile degloving injury.[11]

With the exception of one described case of traumatic circumcision and penile degloving in a 49-year-old caused by impact with snowmobile handlebar, the majority of penile degloving injuries described in the literature result from alterative mechanisms of injury, notable inclusions are dog attacks, industrial machine accidents and sexual misadventure.[12–14] In the case of the snowmobile, the injury was managed in almost identical way with surgical debridement and repair. In the reported cases involving other mechanisms, staged repairs were required with skin grafting. Understandably, the latter two mechanisms are rare in childhood.

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Figure 1 Left groin impalement bicycle handlebar injury.

Learning points

- Handlebar injuries can be a source of both significant intra-abdominal and degloving injuries.
- Injury prevention efforts should continue to focus on avoidance of high-risk behaviours, use of helmets and road safety.
- It is important not to underestimate the potential damage of even low-velocity incidents.

It is important to note that impalement, as well as severe blunt intra-abdominal injuries may occur due to the small surface area at the edges of handlebars acting in a spear-like fashion.[4 15 16] A prospective study of 813 bicycle-related injuries in children found 21 handlebar injuries, 10 of whom had life-threatening intra-abdominal trauma. In all 10, the bicycle handlebars had no plastic covering on the end of the handle.[17]

Introducing the addition of protective ends to the edges of the handlebars may increase the surface area and soften the material. Additionally, a limit on the rotational swing of handlebars, such as on stunt or trick bikes like bicycle motocross (BMX) where they can often rotate 360°, would avoid falling into a dangerous perpendicular plane. Greater provision of cycling proficiency courses and road safety education may also prevent injury by reducing the overall bicycle-related trauma.

The case presented here demonstrates the effect of a low-velocity handlebar injury resulting in impalement and subsequent degloving injury. It is relatively unique in the series of handlebar-related injuries in existing literature and serves to broaden our experience of impalement injuries caused by bicycle handlebars.

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