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CASE REPORT

Crotch rocket[2] pelvic fractures

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Summary The change in trends in motorcycle design means that users of these machines are more prone to pelvic trauma if involved in a direct collision. The high riding fuel tank is in direct contact with the lower abdomen and pelvis when in the normal, prone, riding position. In a direct collision, the fuel tank is driven back into the pelvis. This causes fractures of the pubic rami with extensive soft tissue damage. In general, the accidents that cause these types of injuries are caused by sudden head-on collisions which occur without time to apply the breaks.

Introduction

Recent trends in motorcycle sales have seen the move towards more racy designs. The heavier older models, with low riding fuel tanks, high handle bars and modest top speeds, are being replaced by lighter, faster more aerodynamic motorcycles with high riding fuel tanks and lowered handle bars, similar to racing machines (Fig. 1).[5]

With the increasing number of powerful racing type motorcycles on the roads we have observed an increase in the number of pelvic fractures.[6] The pelvic fractures observed involve the anterior pelvis, with associated soft tissue, and urological injuries.

Case presentation

A 31-year-old male motorcyclist was involved in a high speed motor vehicular accident. He was in a head-on collision with a car. He was wearing a helmet. He had no loss of consciousness. He recalls the car appearing in front of him, but having had no time to apply the brakes.

Following initial resuscitation in the Accident and Emergency department his pelvic X-rays confirmed a fracture of both pubic rami with significant displacement of the fracture fragments (Fig. 2). Local examination revealed a laceration in the anterior scrotum, communicating directly with the fracture fragments. A CT scan demonstrated a Denis type I fracture of his right sacrum.[3]

There was no evidence of bladder or urethral injury on his retrograde urethrogram. An ultrasound of his scrotum confirmed absence of both testes.

The patient was taken to the operating theatre for exploration of his scrotum, and for debridement of his compound pelvic fracture.

His right testis was located in his groin, and was intact. His left testis was located in at the scrotal neck but was only 50% intact. Both testes were relocated in the scrotum and fixed in the scrotal wall.

The fracture fragments were debrided and irrigated from both the scrotal wound and from a freshly fashioned midline incision. The fracture

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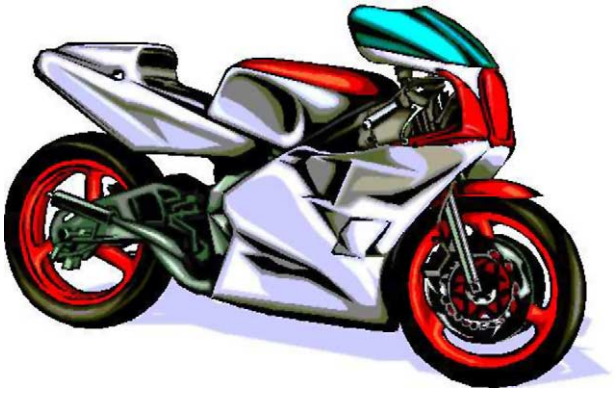

Figure 1 Modern ''Crotch Rocket'' motorcycle with high riding fuel tank.

fragments were stabilised with a combination of anterior plate fixation and external fixation (Fig. 3).

The patient's wounds healed uneventfully and he was discharged after 20 days hospitalisation.

Discussion

The change in trends in motorcycle design means that users of these machines are more prone to pelvic trauma if involved in a direct collision. The high riding fuel tank is in direct contact with the lower abdomen and pelvis when in the normal prone riding position. In a direct collision, the fuel tank is driven back into the pelvis. In general, the accidents that cause these types of injuries are caused by sudden head-on collisions which occur without time to apply the breaks.

Mechanism of injury

The breaking systems in high performance motorcycles are capable of stopping the vehicle over a very short distance. When the breaks are applied, the front hydraulic shock absorbers compress, positioning the driver on top of, rather than behind the fuel tank. If the driver sustains a head-on collision in this position he will be thrown forward, avoiding contact with the fuel tank. If there is not adequate time to apply the breaks, the front of the motorcycle will not be compressed and the driver will be thrown directly forward against the high riding fuel tank, sustaining a direct blow to the anterior pelvis and soft tissues.

The associated injuries can be devastating. Pelvic fractures, testicular rupture, urethral and bladder injuries, as well as other injuries may result from high velocity trauma.[1] In addition to the pelvic

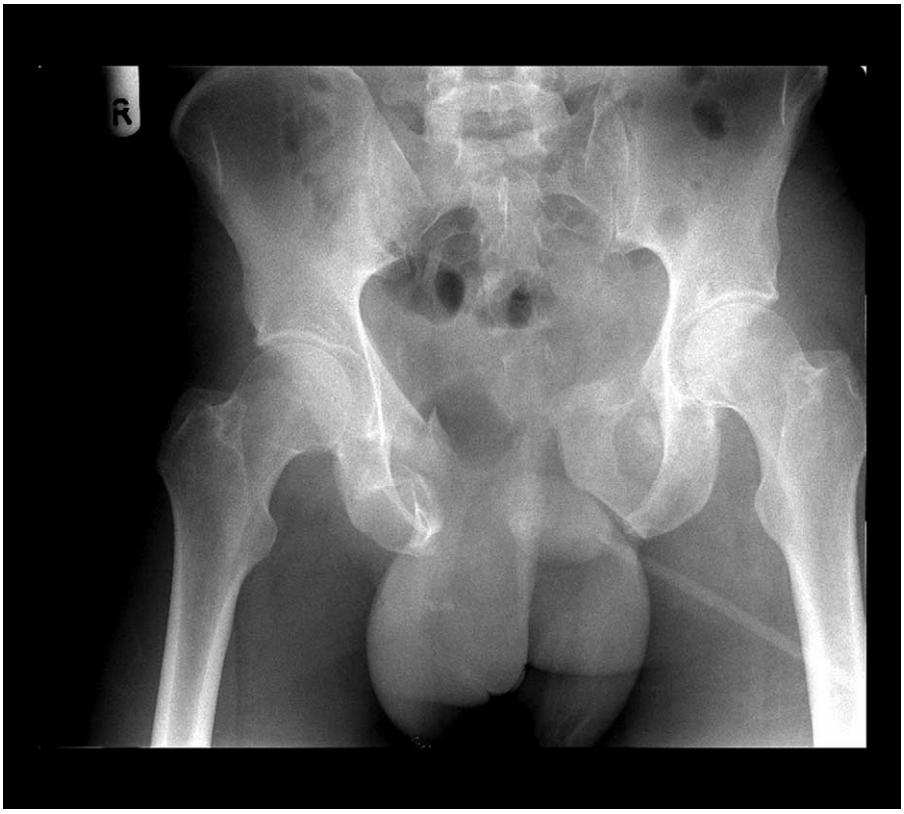

Figure 2 Fracture of both pubic rami with significant displacement of the fracture fragments.

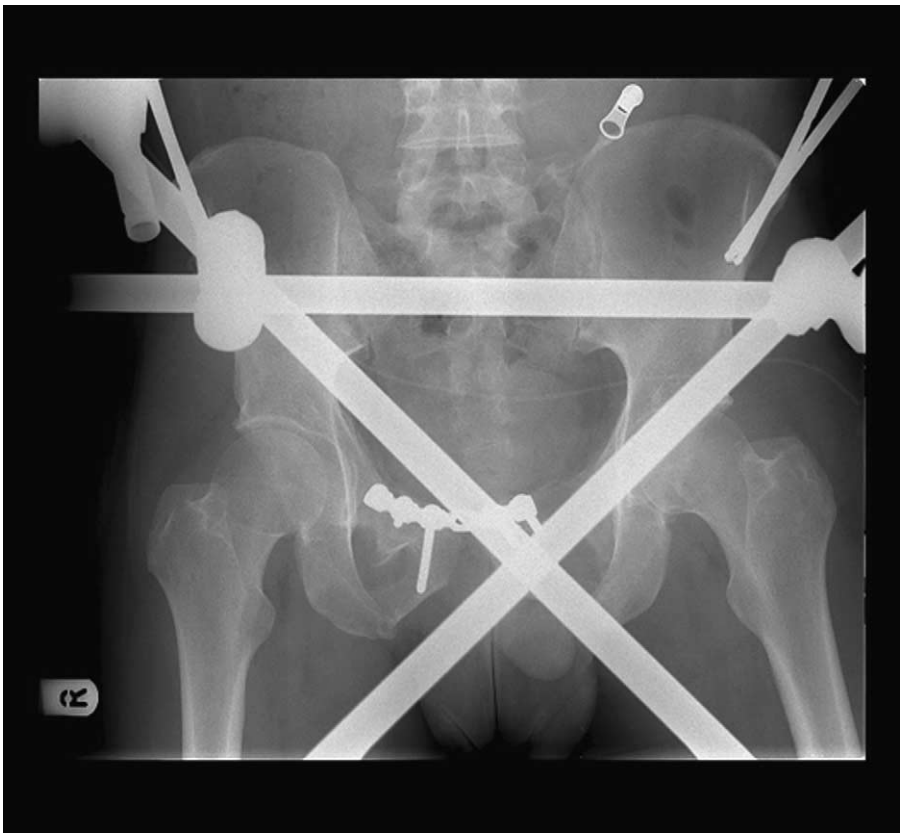

Figure 3 Fracture fragments stabilised with a combination of anterior plate fixation and external fixator.

injury, our patient had extensive scrotal damage with both testes severely traumatised and displaced out of the scrotum.

Another factor which contributes to the increased risk of injury associated with this type motorcycle is the racing position adopted by the driver. The driver is crouched in an aerodynamic position, gripping the dipped handlebars. In this position the driver does not have a good view of the road ahead. This is suitable for racing but is not ideal in road driving where dangers can come from all angles.

Conclusion

This report highlights the impact that changing motorcycle design is having on the patterns of pelvic trauma. Faster, more powerful, aerodynamic machines may be suitable for racing purposes but they present a significant danger for road use. Unfortunately, these designs represent the single biggest unit of sales in the motorcycle industry.[4]

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