Traumatic abdominal wall hernia – four cases and a review of the literature

T. C. HARDCASTLE, M.B. CH.B., M.MED. (CHIR), F.C.S. (S.A.)
D. F. DU TOIT, M.B. CH.B., M.MED. (CHIR), F.C.S. (S.A.)
C. MALHERBE, M.B. CH.B.
G. N. COETZEE, M.B. CH.B.
M. HOOGERBOORD, M.B. CH.B.
B. L. WARREN, M.B. CH.B., M.MED. (CHIR), F.C.S. (S.A.), F.R.C.S. (EDIN.)

Department of Surgery and Section of Trauma, Stellenbosch University, Tygerberg, W Cape

C. C. MODIN, M.D. (STOCKHOLM)

Department of General Surgery, Danderyds Hospital, Stockholm, and Karolinska Institute, Sweden

Summary

Objective. To review blunt traumatic abdominal wall hernias (TAWHs) in our institution.

Method. Retrospective review of blunt abdominal trauma cases over a 6-month period.

Results. Four patients with TAWH were identified. The mean age was 36 years. Three had been involved in vehicular collisions, and 1 had been assaulted with a large stone. All were diagnosed on presentation, 3 by computed tomography scan and 1 clinically. Two were repaired as emergencies, and 1 was repaired after 4 months. The 4th patient refused surgery.

Conclusion. This uncommon injury requires a high index of suspicion and a low threshold for intervention. CT scan offers the best imaging potential.

The incidence of blunt trauma is increasing in South Africa, although the majority of trauma remains of a penetrating nature. Traumatic abdominal wall hernia (TAWH) (excluding diaphragm injury) remains an uncommon diagnosis, despite good clinical review and imaging.

Four cases presented recently to the trauma centre at Tygerberg Academic Hospital.

Case 1

A 36-year-old male passenger in a motor vehicle collision presented with fracture of the left humerus and right ankle. On screening ultrasound, free fluid was noted in the abdomen. Contrasted abdominal computed tomography (CT) (Fig. 1) revealed a traumatic abdominal wall hernia superior to the left iliac crest. At laparotomy the defect was repaired in two layers, without the need for mesh.

Case 2

A 35-year-old female pedestrian was hit by a vehicle from the left. She had a left 11th rib fracture, macroscopic haematuria and a left acetabular fracture. Ultrasound revealed free intra-abdominal fluid. Contrasted CT scan of the abdomen showed splenic and renal lacerations, with no evidence of ongoing haemorrhage, but also a TAWH above the left iliac crest, containing colon (Fig. 2). At laparotomy serosal tears of the colon were repaired, and the ruptured left ovary was resected. The hernia was repaired from the inside in 2 layers using non-absorbable sutures.

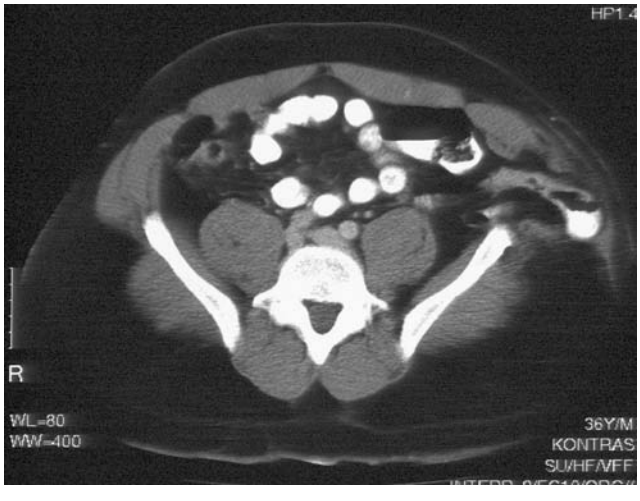

Fig. 1. CT scan of the abdomen (case 1) demonstrating TAWH of the left flank.

Case 3

A 38-year-old woman was involved in a motor vehicle collision. Her injuries included severe lung contusion with respiratory failure, fracture of the left humerus and right femur neck, an injury to the eye and a fractured mandible. On CT scan of the abdomen a left para-rectus muscle hernia was noted. Because she was not fit for abdominal surgery at that time owing to the other injuries, the patient was initially

Fig. 2. CT scan of the abdomen (case 2) demonstrating left-sided TAWH with colonic content.

managed in the ICU and subsequently underwent extensive orthopaedic surgery, with a corset to control the hernia. The hernia was electively repaired using an extra-peritoneal mesh-inlay technique 4 months after injury.

Case 4

A 34-year-old man was admitted after a blunt assault; a brick or stone had been thrown onto his abdomen. The only clinical finding was a traumatic hernia in the lateral border of the rectus muscle, which was easily reduced. Elective repair was planned for the next day, but he refused surgery and left the hospital against medical advice.

Discussion

TAWH is defined as herniation of the viscera through the abdominal wall within the context of disrupted muscle and fascia layers but with intact skin, where there is distinct history of trauma preceding the occurrence of the hernia.[1] Pre-existing hernias are excluded.

Since the first report by Selby[2] in 1906, only about 50 cases have been reported in the literature.[3,4] These have been divided into two groups based on the mechanism of injury, in an attempt to predict the possibility of associated intra-abdominal injury.[3] There is a high-energy impact group, with mainly tangential energy transfer, with hernias involving the flank and supra-umbilical abdominal wall. Three of our cases fulfil the criteria for inclusion in this group.

The other group includes the so-called 'handle-bar' hernia, initially described by Dimyan *et al.*,[5] with low impact and usually minimal intra-abdominal injuries. The fourth case described in this report is of this type, although the mechanism of injury was somewhat different in that the patient had a large stone thrown onto his abdomen.

All the patients presented immediately after the trauma and were diagnosed either clinically or on CT scan of the abdomen. This is in keeping with previous reports[6] where some 72% of patients presented immediately. The differential diagnosis includes rectus and abdominal wall haematomas, which must be carefully excluded. CT scan of the abdomen with oral and intravenous contrast is the most reliable diagnostic test, although the limitation of assessment of bowel viability is accepted.[6] The increased use of CT scan after blunt trauma as part of patient evaluation will probably lead to more frequent diagnosis of these hernias in the future.

In keeping with our approach, most cases in the literature were also offered early surgical repair,[6] and repair was delayed only where other injuries took higher priority. However, delaying the repair in the high-energy type of injury is not without complication. This is illustrated in the report by Mahajna *et al.*[4] where colonic strangulation occurred during a 12-hour delay.

In terms of operative management it was only necessary to use a mesh graft in the 1 patient who, because of extensive other injuries with a higher priority of care, had a delayed repair of the hernia. The other 2 patients had a double-layer suture repair of the defect, using non-absorbable suture material. This is in keeping with the international experience,[6] where 84% of cases were repaired using suture alone. There are sporadic reports of laparoscopic repair, but mostly these were in cases with delay in presentation, often in the setting of the 'handle-bar' type hernia.[7,8]

Regarding the commonly associated injury patterns, in our cases only 1 had significant intraperitoneal injuries, including colonic and solid-organ injuries, compared with all 6 patients in the series by Lane *et al.*[3] and rectal or colon injuries in the series by Brenneman *et al.*[9] from Toronto.

Brenneman and co-workers[9] also highlight extra-abdominal injury patterns associated with the traumatic hernia to include pelvic and lumbar fractures, as do Walcher *et al.*[10] Two of our patients had fractures of the pelvis (acetabulum) or near the pelvic area (proximal femur and femur neck respectively). These injuries imply a significant transmission of kinetic energy to the body. Humerus fractures and rib fractures also occurred in our series.

The 'handle-bar'-type hernia/low-energy type, which is most frequently reported,[6] is not associated with a high incidence of intra-abdominal bowel injuries[5] and often presents later, making it amenable to delayed and even laparoscopic repair. Our single case of the low-energy type bears out these characteristics in that there was no intraperitoneal pathology beyond the obvious hernia.

Conclusion

This group of injuries remains uncommon, comprising 0.002% of cases in our institution and 1% in other series,[9] which implies the need for a high index of suspicion and a low threshold for diagnostic imaging to exclude the diagnosis. There should be early intervention to repair the hernia and this should be performed by suture repair if possible in the acute phase, given the risk of recurrence. There may be a place for laparoscopic repair in selected patients presenting later. Given the risk of associated bowel injuries in the high-energy type, synthetic mesh repairs are best avoided.

REFERENCES

1. Donald D, Jeffery L, Randel T. Acute traumatic abdominal hernia. *J Trauma* 1994; **36:** 273.
2. Selby CD. Direct abdominal hernia of traumatic origin. *JAMA* 1906; **47:** 1485.
3. Lane CT, Cohen AJ, Cinat ME. Management of traumatic abdominal wall hernia: *Am Surg* 2003; **69**(1):73 - 75.
4. Mahajna A, Ofer A, Krausz MM. Traumatic abdominal hernia associated with large bowel strangulation: case report and review of the literature. *Hernia* 2004; **8:** 80 - 82.
5. Dimyan W, Rose J, MacKay L. Handlebar Hernia. *J Trauma* 1980; **20:** 812 - 813.
6. Kumar A, Hazrah P, Bal S, Seth A, Parsad R. Traumatic abdominal wall hernia: a reappraisal. *Hernia* 2004; **8:** 277-280.
7. Vargo D, Schurr M, Harms B. Laparoscopic repair of a traumatic ventral hernia. *J Trauma* 1996; **41:** 353-355.
8. Munshi IA, Ravi SP, Earle DR. Laparoscopic repair of blunt traumatic abdominal wall hernia. *JSLS* 2002; **6:** 385-388.
9. Brenneman FD, Boulanger BR, Antonyshyn O. Surgical management of abdominal wall disruption after blunt trauma. *J Trauma* 1995; **39:** 539-544.
10. Walcher F, Rose S, Roth R, Lindeman W, Mutschler W, Marzi I. Double traumatic abdominal wall hernia and colon laceration due to a pelvic fracture. *Injury* 2000; **31:** 253-256.