Haemodynamic instability secondary to minimally displaced pubic rami fractures: a report of two cases

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ABSTRACT

We report 2 patients with haemodynamic instability secondary to minimally displaced pubic rami fractures following a fall. Both complained of pain and swelling in the abdomen and groin, and had abdominal distension and bruising in the abdomen, groin, and perineum. All these may be early signs of severe vascular injury and should be treated promptly. Both patients were treated with embolisation of the injured vessels using emergency angiography.

Key words: fractures, bone; iliac artery; pelvis; pubic bone

INTRODUCTION

Closed, low-energy pubic rami fractures following falls are common in the geriatric population. Vascular injuries associated with these fractures may be life threatening. Close monitoring ensures prompt diagnosis and treatment. We report 2 patients with apparently stable, minimally displaced, closed pubic rami fractures complicated by vascular injuries and subsequent haemodynamic instability. Both were treated with embolisation of the injured vessels using emergency angiography.

CASE REPORTS

Case 1
In May 2006, a 70-year-old diabetic and hypertensive woman presented with a head injury caused by a fall. She had a history of a cerebrovascular accident with right hemiplegia and paroxysmal atrial fibrillation treated with warfarin. The Glasgow Coma Scale was 15/15. There was a 1.5 cm scalp laceration over her occipitus. Her abdomen was soft and non-tender. Her blood pressure and pulse rate were 166/106 mm Hg and 102 bpm, respectively, but subsequently deteriorated to 72/35 mm Hg and 122 bpm in rapid
atrial fibrillation. After resuscitation these improved to 110/70 mm Hg and 80 bpm 4 hours after admission. Her haemoglobin level was 124 g/l and international normalised ratio (INR) was 3.1. She complained of suprapubic pain with distension and tenderness. 37 hours after presentation, urgent ultrasonography of the abdomen showed a large heterogenous mass in the right pelvic wall, suggestive of a haematoma. Her blood pressure and pulse rate remained stable, but the haemoglobin level was decreasing (from 101 to 80 g/l in 3 hours). Blood transfusion was initiated and her haemoglobin level returned to 111 g/l, with an INR of 1.1. 42 hours after presentation, an urgent contrast computed tomography (CT) showed fractures of the right superior pubic ramus and sacral ala with a large pelvic haematoma and active contrast extravasation (Fig. 1a). There were no signs of intraperitoneal haemorrhage. 46 hours after presentation, her vital signs were stable and bruising was found around the right groin tracking down to both labia majora. Radiographs showed a minimally displaced fracture of the right superior pubic ramus (Fig. 1b). An urgent angiogram showed active bleeding around the right obturator artery and anterior internal iliac artery (Fig. 1c). All leakages were successfully embolised with gelfoam. Once the haemoglobin level had stabilised, warfarin was resumed. Seven days later, CT with contrast showed a static pelvic haematoma. She was discharged after rehabilitation.

Figure 1 (a) Contrast computed tomographic scans showing a large pelvic haematoma with active extravasation and an isolated fracture of the right superior pubic ramus (arrows). (b) An anteroposterior radiograph showing a minimally displaced fracture of the right superior pubic ramus (arrow). (c) An angiogram showing hypervascularity and abnormal contrast staining in the right obturator artery (arrow).

Case 2

In October 2006, a 59-year-old woman presented with bruising around her left foot and ankle after a lorry rolled over her left foot. Her abdomen was essentially normal. Radiographs of the left foot showed metatarsal fractures. Her haemoglobin level was 97 g/l and her blood pressure was 90/60 mm Hg. She complained of bilateral groin pain with tenderness on passive movement and there was bruising tracking down to her perineum. Radiographs of the pelvis showed bilateral fractures of the superior and inferior pubic rami (Fig. 2a). Her blood pressure became progressively lower and her haemoglobin level dropped to 69 g/l within 3 hours, requiring resuscitation with blood and intravenous fluids. An urgent CT with contrast of the abdomen and the pelvis showed multiple pelvic fractures with a haemoretroperitoneum, subcutaneous haematoma, and intramuscular haematoma, with no extravasation.

Figure 2 (a) An anteroposterior radiograph showing minimally displaced fractures of both pubic rami (arrows). (b) Contrast computed tomographic scans showing retroperitoneal haemorrhage and subcutaneous haematoma in the left hemi-abdomen, fractures of the bilateral inferior pubic rami, left superior pubic ramus, S1 vertebra, and pelvic haemorrhage (arrows). (c) An angiograph showing a suspicious leakage from the right internal iliac artery (arrow).
of contrast (Fig. 2b). Her persistently low blood pressure and haemoglobin level prompted an urgent angiogram, which showed leakage from both anterior internal iliac arteries (Fig. 2c). The leakages were embolised with gelfoam and her vital signs stabilised. After rehabilitation, she could walk with full weight bearing upon discharge.

DISCUSSION

High-energy trauma to the pelvis may cause life-threatening vascular injuries.\(^2,3\) Stable, minimally displaced pelvic fractures after a trivial injury may also result in the avulsion of pubic vessels and haemodynamic instability. A 71-year-old warfarinised woman sustained a superior pubic ramus fracture after a fall and had a massive haemorrhage, which was treated with embolisation.\(^4\) An 86-year-old woman and a 43-year-old man with minimally displaced pubic rami fractures became haemodynamically unstable and were also treated with embolisation.\(^5\)

In people aged >60 years, 26 per 100 000 people per year sustain osteoporotic pubic rami fractures.\(^6\) These patients are usually managed with bed rest and analgesics, with radiographic follow-up and full-weight-bearing walking training. Close monitoring is not routinely implemented as the injury is usually due to low-energy trauma. Nevertheless, vascular injury to the pubic rami can be life threatening in older patients as they are more fragile and likely to have multiple co-morbidities, hence less cardiovascular reserve. When a lateral impact causes a pubic ramus fracture, the local vasculature is shortened rather than subjected to tensile or shearing forces, so the bleeding is usually caused by a fracture fragment.\(^7\) Despite the good outcomes in our patients, angiographic embolisation is not without risk; complications such as gluteal infarctions and false aneurysms have been reported.\(^8\)

Physical examination is crucial for detecting early signs of massive bleeding,\(^4,5\) in particular, abdominal examination of any skin bruising and swelling in the perineal region. A high index of suspicion and close monitoring are necessary in high-risk patients (e.g., those who are warfarinised), even in those with stable and minimally displaced pubic rami fractures. Both our patients complained of abdominal and groin swelling and pain and showed abdominal distension, bruising of the abdomen, groin, and perineum. These may be early signs of severe vascular injury and should be addressed promptly. The patient’s vital signs and mental state should be monitored to detect hypovolaemic shock early.

REFERENCES