

## Case reports

### Fracture of the acetabulum complicated by a tear of the femoral vein—a case report after 5 years

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A 19-year-old boy sustained a pelvic fracture in a sleigh accident. He hit a wall at high speed with his right leg, the hip in extension and external rotation. During the first 18 hours, he was transfused with 10 units of red cells, in addition to 7 liters of intravenous fluids. On admission to our hospital 22 hours after the injury, he was circulatorily stable. He was treated with traction and the pelvic fracture was further evaluated with Judet oblique views and a CT scan. There was a comminuted anterior column fracture, with a wall fragment close to the external iliac and common femoral vessels and a disruption of the symphysis (Figure 1). The CT scan showed a major dislocation of the anterior column and wall fragment (Figure 2). In addition, there was a stable compression fracture of the 3rd lumbar vertebral body.

After 4 days, the right limb was edematous and pulses could not be palpated distally or in the groin. Doppler signals were weak. The patient still required transfusions (a total of 4 units after admission and 3 of these during the last 24 hours). Angiography showed a normal, but partly compressed external iliac artery in the groin due to a hematoma. A bleeding obturator artery was successfully embolized. Ultrasound-Doppler demonstrated a venous filling defect just below the inguinal ligament, interpreted as a thrombus in the common femoral vein.

The patient was treated with low molecular weight heparin. He was operated on via an ilioinguinal approach after 5 days. The anterior abdom-



Figure 1. AP, obturator and iliac oblique. The anterior column fracture crosses the anterior border of the iliac bone above the anterior superior spine. An associated anterior wall fragment is dislocated anteriorly and upwards, whereas the posterior column is normal.

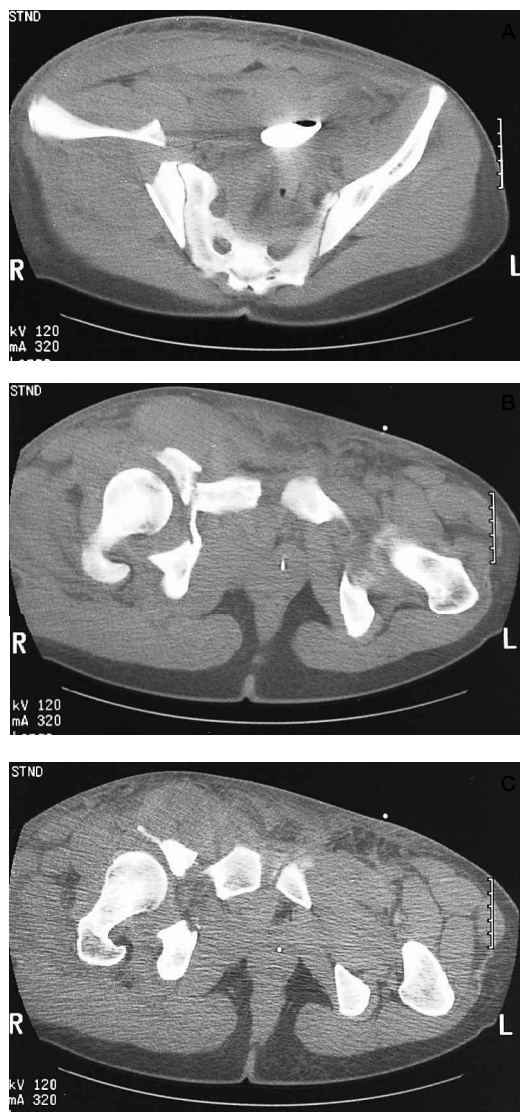


Figure 2. CT scans demonstrate external rotation of the anterior column (A) and anterior dislocation of the femoral head and an anterior wall fragment (B-C)

inal wall was disrupted. After subcutaneous dissection, direct access was obtained to the retropubic space and the dislocated anterior part of the acetabulum. The external iliac and common femoral veins had been torn and were lacerated a distance of 8 cm. A clot was present in the proximal end of the femoral vein. No attempt was made to identify the external iliac vein in the hematoma. A reconstruction of the anterior column and acetabulum was done, followed by a veno-venous crossover bypass from the disrupted femoral vein to the con-

tralateral common femoral vein with a polytetrafluoroethylene (PTFE) graft. 9 blood transfusions were given during the 8-hour operation. Postoperatively, the patient developed a high pulmonary arterial pressure, a sudden drop in systolic and diastolic pressures and oxygen saturation, interpreted as a pulmonary embolism. He was treated with unfractionated heparin. He was weaned from the ventilator after 2 days and recovered without any other complications.

Passive motion of the hip was started immediately after the operation and walking without weight-bearing after 5 days. The preoperative swelling of the leg disappeared a few hours after the operation. An Ultrasound-Doppler 16 days after the operation showed obliteration of the graft, but there was no edema of the limb. 6 months after the injury, he had returned to his previous manual job. After 5 years, he had an excellent clinical and good radiographic result (Figure 3) evaluated by clinical and radiological grades, according to Matta (1994).

On visual analogue score (VAS), with a scale from 0–10, he scored 0 points (no pain) for pain at rest, 1 point for pain when walking, 3 points for pain during the night and 0 points for daily activities (0 = normal and 10 totally disabled). He scored 100 points on Harris hip score (Harris 1969). He had no postthrombotic complaints and, objectively, there was no swelling.

## Discussion

Injuries of major vessels have been reported in 1–3% of unstable pelvic fractures (Rothenberger et al. 1978b, Moreno et al. 1986, Pohlemann et al. 1994) and the mortality rate is up to 83% (Rothenberger et al. 1978a).

Only a few cases of injuries of major vessels in acetabular fractures have been reported (Frank et al. 1989, Cheng et al. 1995). Letournel and Judet reported injuries to gluteal and obturator vessels (without exact incidence), but no major vessel injuries in their series of 940 acetabular fractures (Letournel and Judet 1993). Matta (1994) had one injury to the femoral artery at surgery, but did not report any injuries to major vessels in his series of 119 patients operated on with the ilioinguinal ap-

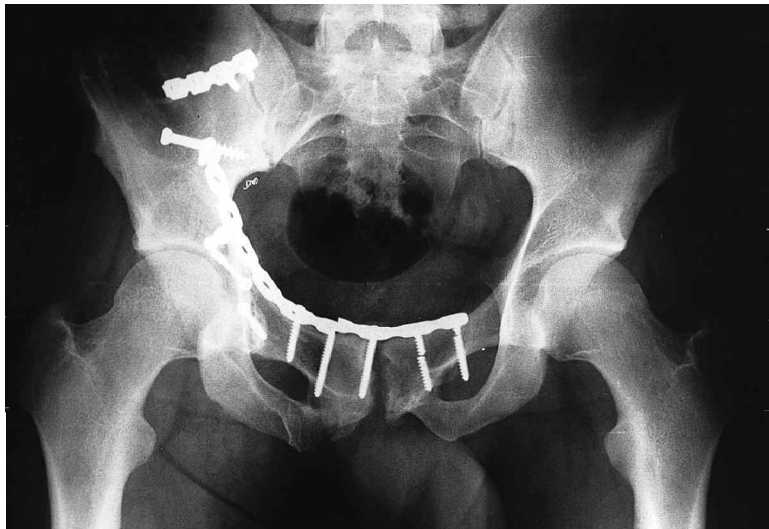


Figure 3. 5-year follow-up demonstrating a normal appearance of the right acetabulum

proach. Mayo (1994) and Ruesch et al. (1994) reported 1 injury to the external iliac and femoral veins, respectively, among 163 and 102 acetabular fractures.

Our patient had a partially unstable pelvic ring fracture (A-P compression with concomitant acetabular fracture) and major blood loss during the first hours after the injury. He became hemodynamically stable before transportation to our hospital, was therefore observed in the Intensive Care Unit and was not taken to angiography. During the next 48 hours after admission, he was transfused with only one unit of erythrocytes. Then he became circulatorily unstable, with swelling and diminishing pulses in the affected extremity, which was the reason for angiography. As he was successfully embolized without needing transfusions during the following hours, he was observed until the next day when the planned operative reduction of the acetabular fracture was done. The laceration of the femoral/iliac veins was not clinically suspected before the operation. The swelling of the lower limb was thought to be partly caused by a compressing hematoma and partly by the thrombi disclosed by the Ultrasound-Doppler examination.

Young previously healthy individuals may tolerate venous ligation in trauma (Yelon and Scalea 1992, Machado et al. 1994). However, experiments show that venous ligation decreases the ar-

terial blood flow. In an animal study, arterial blood flow to the hind limb became significantly lower after venous ligation than after venous repair, and 72 hours after the repair, it had returned to normal. Peripheral venous hypertension and edema occurred in all limbs with venous ligation and persisted for the 72-hour experimental period (Nazzari et al. 1994). Authors with long clinical experience share this view (Miranda Junior et al. 1991).

Veins should preferably be repaired with venous grafts. However, in cases of trauma, this may be difficult depending on the size of the vein. The larger size of veins requires complex and time-consuming panel and spiral-vein grafts (Woodson et al. 1990, Sharma et al. 1992). PTFE (Goretex) grafts have been used (Sharma et al. 1992) and as a Goretex graft may be easier to fit to the right size, they are time-saving. Clinical and experimental experience show that it is not important whether the graft stays open for an extended time. This was also true of our case, where the crossover bypass provided drainage only for a few days postoperatively, which was sufficient for restoration of the limb circulation and the long-term venous drainage of the extremity.

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## Urinary frequency caused by a misplaced acetabular reinforcement ring—a case report

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In 1986, a 26-year-old man, who had had Perthes' disease, underwent a Charnley arthroplasty. Multiple dislocations were reduced by closed reduction and treated by a hip brace. Finally an open reduction and revision were attempted but the dislocations continued. In 1993, the hip was revised using a Müller cup with a reinforcement ring and a Wagner femoral prosthesis (transfemoral approach). The postoperative radiograph showed malposition of the reinforcement ring's hook, which protruded medially into the pelvis. The patient began to complain of discomfort in the lower left quadrant of his abdomen and urinary frequency up to every two hours. He also continued to have dislocations. A Girdlestone procedure was considered in order to solve the problem of his recurrent dislocations. However, the patient preferred to continue using a hip brace.

During 1994, he underwent an evaluation of the gastrointestinal tract and the urinary system. Barium enema and abdominal ultrasound were nor-

mal. As part of the urinary tract evaluation, he underwent a urodynamic study that showed no evidence of stress incontinence or detrusor muscle instability of the bladder. The compliance was normal and there was no residual volume in the bladder. The urinary cultures were negative. An intravenous pyelogram examination showed external pressure on the left bladder wall, without extravasation.

Therefore it was considered that mechanical pressure on the bladder wall was causing bladder irritation, resulting in urinary frequency. Intraoperative cystoscopy revealed an inward bulging of the left bladder wall without perforation, caused by the protruding part of the hook of the reinforcement ring. This was cut short, using metal shears via a suprapubic approach. No improvement ensued.

Cystography (Figure 1) showed the same finding, i.e., indentation of the left bladder wall. In another attempt (1996) to treat the urinary frequen-