

# Acute total hip arthroplasty for acetabular fractures in the elderly

## 11 patients followed for 2 years

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**ABSTRACT** – We describe the use of cable fixation and acute total hip replacement for acetabular fracture in the elderly. 12 patients with acetabular fractures, having a mean age of 79 (65–93) years, were treated with cable fixation and acute total hip arthroplasty. 8 were T-shaped fractures and 4 associated fractures of the posterior column and posterior wall. 1 patient died 5 months after surgery and the remaining 11 were followed for 2 years. All patients had a good clinical outcome. Radiographic assessment showed healing of the fracture and a satisfactory alignment of the cup without loosening.

This surgical technique provides good primary fixation, stabilizes complex acetabular fractures in elderly patients with osteoporotic bone and permits early post-operative mobilization.

Many acetabular fractures in the elderly are complicated by an extensive comminution, impaction and osteopenia. The prognosis is therefore poor both after open reduction and internal fixation and closed treatment (Mears and Shirahama 1998).

A good therapeutic alternative may be an early total hip arthroplasty (THA). Although various authors have reported the use of THA as initial management of acetabular fractures, it is very difficult to stabilize the fracture and prevent early acetabular loosening in patients with osteopenic bone (Kelly and Lipscomb 1958, Mears and Shirahama 1998).

We describe the surgical technique and outcome after cable fixation and acute THA in the treatment of acetabular fractures in the elderly.

### Patients and methods

From February 1998 to October 1999, 12 patients with an acetabular fracture were treated between 4 and 15 days of injury with cable fixation and primary THA. The average age at the time of injury was 79 (65–93) years. None of the patients had additional fractures.

Before surgery, skin traction was applied. The radiographic evaluation included conventional anteroposterior and oblique pelvic images. The fractures were classified using Letournel and Judet's method (1993). 8 were T-shaped and 3 associated posterior column and posterior wall fractures. The indication for surgery was a displaced intra-articular fracture (> 2 mm) or a large segment of acetabular surface with a roof angle exceeding 45° (Matta and Merritt 1988).

In all patients, the clinical and radiographic follow-ups were done at 6 weeks, 3 months, 6 months, 1 and 2 years. 1 patient died 5 months after the operation and the remaining 11 were followed for 2 years after surgery.

The clinical outcome was assessed with Matta and Merritt's method (1988). Fracture healing, signs of cup loosening and heterotopic ossification were evaluated.

### Surgical procedure

The Kocher-Langenbeck approach to the hip was used. Following a T-shaped capsulotomy, a femoral neck osteotomy was performed and the head was removed. The acetabulum was cerclaged with a 2 mm Dall-Miles cable. The transverse ligament

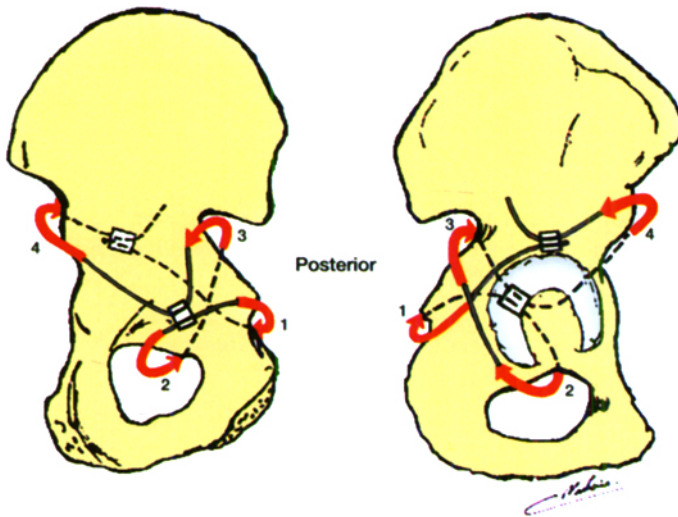


Figure 1. Consecutive cable passage steps. Medial view (left) and lateral view (right).

was divided and the obturator foramen prepared at teardrop level with a periosteal elevator. A curved cable passer was introduced through the obturator foramen and directed towards the greater sciatic notch while maintaining permanent bone contact with the quadrilateral surface, and preventing iatrogenic damage to branches of the obturator artery, the obturator nerve or the internal pudendal artery. The cable was grasped with a cable passer at the greater sciatic notch and passed towards the obturator foramen, then posteriorly reclined so that it surrounded the posterior column. The anterior column was then approached by a 2 cm longitu-

dinal incision placed just below the anterior superior iliac spine (ASS). (One can also extend the Kocher-Langenbeck and perform a triradiate exposure.) The fascia lata was incised towards the tensor muscle, but averting the lateral cutaneous nerve of the thigh. The gap between the sartorius muscle and tensor fasciae lata muscle was bluntly dissected with a finger, and the two muscles retracted from each other. The fibers of the rectus femoris muscle were longitudinally split to reach the inner wall of the iliac wing, above the ASS. A Satinski clamp was passed towards the greater sciatic notch, so that the cable could be grasped at this notch and pulled towards the iliac fossa and to the ASS. The clamp must be moved carefully in order not to damage the external iliac artery and vein. Sometimes we had to dissect sharply the iliopectineal fascia from the greater sciatic notch to pass the cable. The gluteus minimus muscle was then bluntly dissected from the outer table of the iliac wing so that the cable could be passed on the lateral surface of the iliac wing close to the bone towards the notch. The free end of the cable was then passed through the second hole of the cable sleeve. At one extremity of the Dall-Miles cable,

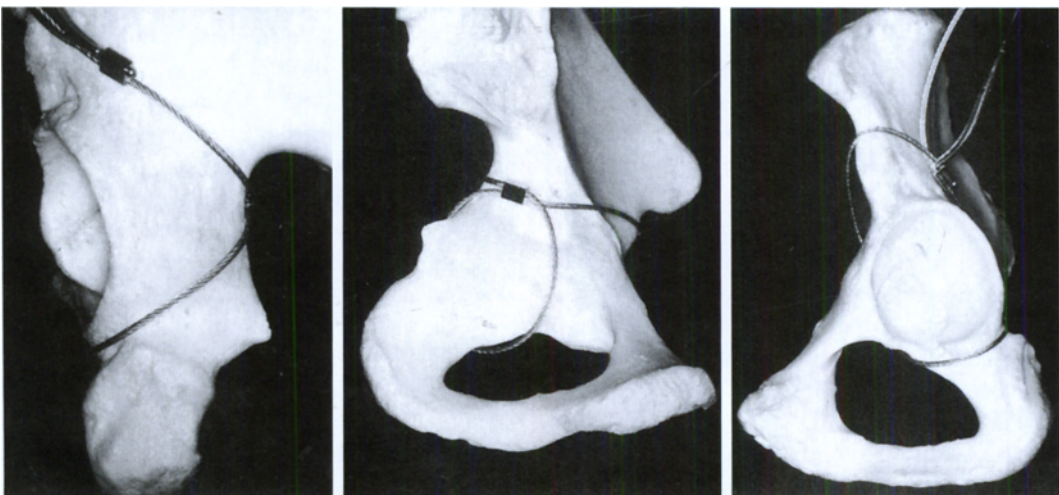


Figure 2. Location of cable in a plastic bone model. Lateral view (left), medial view (middle) and acetabular view (right).



Figure 3. Anteroposterior radiograph at 24 months after surgery.

a small ball is fixed, which permits the cable to be tightened with a dynamometric tensor. A second sleeve may be used so that the cables cross in the middle of the quadrilateral surface. This second sleeve must be placed between the two first phases of passage of the cable or before it is passed into the greater sciatic notch towards the ASS. The acetabular fracture was reduced, while keeping the cable under moderate tension with a clamp, thus allowing its preparation by the acetabular reamers until the subchondral bone could be seen. The femoral head was used for bone grafting, usually using a cancellous bone washer placed behind the quadrilateral surface. A press-fit cup was then placed in the prepared acetabulum thereby neutralizing the fracture with 3 radial screws and 2 screws placed on the lateral tab in a latero-medial direction. When the screws were in position, the cable was tightened, thus allowing adequate stabilization of the acetabular ring. Finally, the femoral component was cemented and the wound closed after reattaching the pelvic-trochanteric muscles. 24 hours after the operation, we started to move the patient from bed to armchair. At 48 hours, active range of motion and isometric exercises, particularly of hip abductors and flexor muscles, were started and weight bearing, as tolerated, was allowed after 4 (2–8) days.

Low molecular weight heparin was injected subcutaneously up to 3 weeks after surgery for thromboembolic prophylaxis. Indomethacin 50 mg

was given twice daily for 1 week to prevent heterotopic ossification.

## Results

The operation lasted between 2 and 3 hours. The average duration of hospitalization after surgery was 10 (7–13) days. There were no per- or post-operative complications.

At the final clinical evaluation, 7 patients were classified by using the Matta and Merrit (1988)

score as excellent and 4 as good. No significant limb length inequality was noted. On a visual pain scale (0 to 10 points), the patients complained about very little hip pain—i.e., score between 0 and 4 points. 1 patient needed walking aids because of peripheral neuropathy

At the 2-year follow-up, all cases showed a good anatomical reduction of the fracture and the acetabulum cup had maintained a satisfactory alignment without radiographic signs of loosening. 8 patients had grade 0 and 3 patients grade 1 ossification with Brooker et al.'s method (1973).

## Discussion

Some clinicians believe that the best treatment for an acetabular fracture in the elderly patients is non-surgical (Matta and Merrit 1988), because a stable anatomic reduction is more difficult to achieve in those with osteoporotic bone (Mears et al. 1985). Surgical options are early (Kelly and Lipscomb 1958, Mears and Shirahama 1998) or late THA (Stauffer 1982, Romness and Lewallen 1990, Weber et al. 1998).

Late THA is used in patients with secondary arthrosis, nonunion, malunion or avascular necrosis of the femoral head (Stauffer 1982, Romness and Lewallen 1990, Letournel and Judet 1993). However, its disadvantages include a technically difficult operation and a higher risk of complica-

tions (Mears et al. 1985, Weber et al. 1998).

Early THA has hardly been used because of the difficulty in stabilizing the acetabular fracture sufficiently for adequate fixation of the cup in the presence of osteoporosis and comminution (Jimenez et al. 1997, Mears and Shirahama 1998, Mears 1999).

Mears and Shirahama (1998) reported 19 cases of primary stabilization with cables followed by THA during the same operation. We have modified the technique. They passed the cable through a drill hole in the base of the anterior inferior iliac spine and used 2 cables. We used only one cable, and it was passed just below the anterior superior iliac spine. In our opinion, it is not necessary to drill a hole, because our cable forms a figure of 8 around the acetabulum which is stabilized by insertion into osteoporotic cortico-cancellous bone of the quadrilateral surface. The advantage of this technique is that tightening of the cable permits good initial reduction and stability of the fracture even in osteoporotic bone so that the prosthetic cup may be inserted and used as a hemispheric buttress which completes fracture stabilization. We think that this technique is safe and less difficult.

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