



Primary total hip arthroplasty after acetabular fracture using intra-acetabular bended plates

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INTRODUCTION

Acetabular fractures in the elderly represent the most rapidly growing segment of acetabular trauma (1,2,3,4,5,6,7). The most common cause of traumatic acetabular fractures in the elderly are falls (low-energy) (1,4,6,8) and the majority of these fractures are the result of minimal trauma regarding osteoporotic bones (1,6,8). The peak incidence of moderate trauma, resulting from a fall to the ground from an erect position, was in the seventh decade (1,3,6). The factors that influence outcomes are: age, comorbidities, decreased physiological reserve, reduced healing capacity, osteopenic bone and fracture patterns (2,4).

Elementary fracture patterns (in elderly 27 – 37 % of all fractures) consist of anterior and posterior wall fractures, anterior and posterior column fractures and transverse fractures. Posterior wall fractures are the most common type of acetabulum fracture in the elderly (8,10). According to epidemiological studies performed by the German pelvic study group 2 fractures of the anterior column combined with posterior hemitransverse fractures resulting in a protrusion of the femoral head (classification of Letournel; type 62B3 according to the classification of the AO/ASIF) are prevalent in elderly patients (9).

Treatment methods used for acetabulum fractures are: skeletal traction (non-operative), minimal invasive fixation techniques, open reduction and internal fixation with or without total hip arthroplasty (THA), and cable fixation of acetabular

fractures with or without THA. According to literature there is no optimal method of acetabulum fracture management (2,4,5). The non-operative management of displaced fractures often results in poor outcomes (2,5,6). The High (Audrius – is the h capitalized in High because it is a name?) rates of acetabular loosening are higher for delayed THA compared with a control group of primary THA. Primary THA combined with ORIF can provide optimal outcomes (2,10).

Advantages of acute THA in the elderly are earlier mobilization, faster recovery, avoidance of technical problems that can occur with delayed arthroplasty, and less revisions as compared with delayed arthroplasty (2,6,10). The disadvantages are major technical challenges of simultaneously obtaining both implant and fracture stability, in addition to the prolonged duration of the operations (2).

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In addition to higher age, indications for primary THA combined with ORIF included displacement in the fracture line exceeding 1 cm, a fracture line extending to the weight-bearing part of the acetabulum, presence of hip arthritis, cartilage injury, defects of the weight-bearing area of either the femoral head or acetabulum, and Pipkin type IV injury.

An increase of acetabular fractures in the elderly needs new surgical techniques to achieve better results. The aim of our report is to present a surgical technique that we are using for treating acetabular fractures in the elderly.

Surgical technique

Preoperative planning for these procedures demands a complete radiographic analysis of the fracture including a computed tomographic (CT) scan. The CT scan improves the perception of the comminution of the articular surface and helps in the assessment of the degree of structural compromise of the acetabular walls. The CT scan will also accurately reveal the presence of a fracture of the femoral head.

The posterior Kocher-Langenbeck approach is usually adequate for exposure of the fracture. Excision of the femoral head exposes both the anterior and posterior walls as well as the posterior column and superior acetabular area. Column stability is achieved by using the standard techniques of direct and indirect reduction with fixation using plates and screws. The posterior column is stabilized with typical posterior reconstructive plates that also secure the posterior wall (Fig.1).

In the next stage we perform stabilization of both (anterior and posterior) columns. Usually we stabilize the anterior and posterior columns using one or two intraacetabular reconstructive bended plates with screws (Fig.2).

This ensures excellent primary stability of both columns, allowing stable cemented cup fixation. The columns do not need to be anatomically reduced because of the rigid and stable acetabulum fixation. Once the columns are stabilized, the excised femoral head can be fashioned as a structural graft to bridge the contained defects. Bone grafting of the acetabulum was used in all patients.

After osteosynthesis of the acetabulum and bone grafting we used cemented THA with a polyethylene cup cemented into the acetabulum (Fig.3).

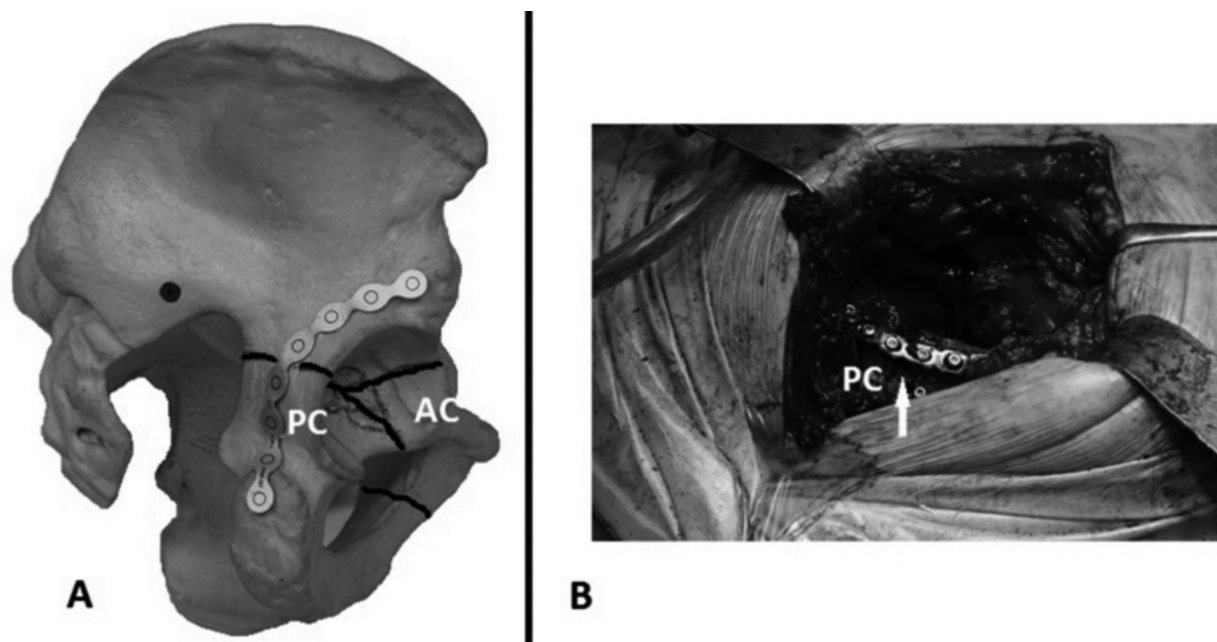


Fig. 1. — Schematic view (A), intra-operation view (B) of the posterior column stabilisation with typical posterior reconstructive plate.

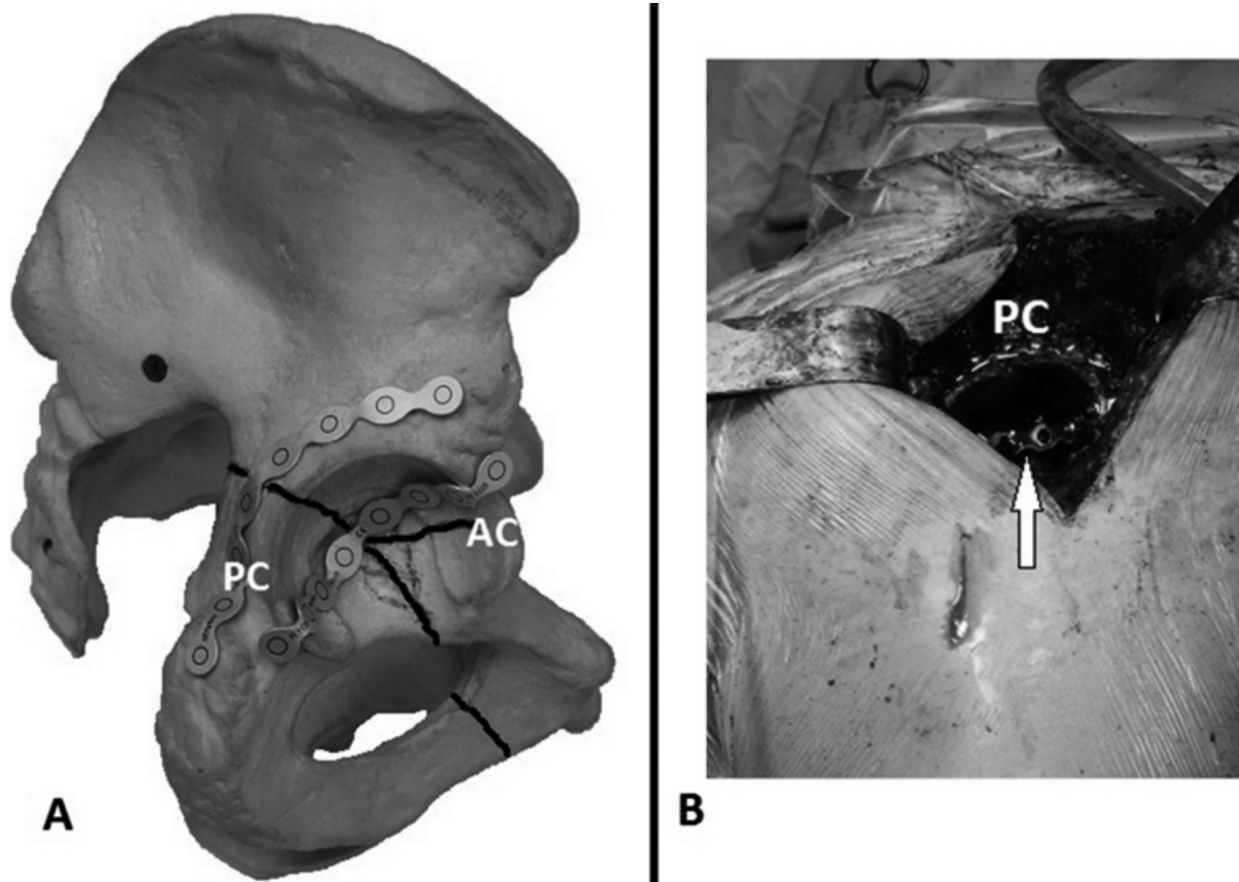


Fig. 2. — Schematic view (A), intra-operation view (B) of the anterior and posterior column stabilisation by one or two intraacetabular reconstructive bended plates with screws.



Fig. 3. — THA with a polyethylene cup cemented into the acetabulum after osteosynthesis of the acetabulum and bone grafting.

Fig. 4 illustrates this strategy in a case study involving a 75-year-old man who sustained this typical both-column fracture, as evidenced by a spur sign, after falling from a tree. The fracture was exposed through a posterior approach. After removal of the femoral head, the anterior and posterior columns were reduced into a stable position and fixed with a posterior column plate and two intraacetabular bended reconstructive plates and screws were directed from the posterior to anterior columns. The femoral head was used as a structural graft to fill a contained superior and quadrilateral surface defect. After 8 years, a follow-up was conducted with this patient. He achieved excellent hip function recovery and stability.

In our hospital 14 patients were treated using this technique with a follow-up of 4 - to 14 years post-



Fig. 4. — Preoperative radiographic view (A). Computed tomography scan (B). Postoperative radiographic view (C, D).

surgery. There were no instances of loosening and all bone grafts were incorporated. All of the patients walked independently and seventy-five percent of these elderly patients had good to excellent Harris hip ratings and none required revision for loosening or mechanical failure.

CONCLUSIONS

In general, acute total hip replacement will provide the best functional outcome for elderly patients with severe acetabular fractures. Our proposed technique

of internal fixation using standard posterior column fixation and additional intraacetabular reconstructive banded plates with screws for immediate use of total hip arthroplasty for these injuries should be considered as an efficient approach in the care of elderly patients. This ensures the excellent primary stability of both columns, allowing stable cemented cup fixation. The early clinical experience in this approach to treatment suggests that immediate total hip replacement yields results that are similar to the total hip replacement performed for degenerative hip arthritis.

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