Case Report
Hip Knee J. Vol. 5, No. 1, 2024, pp. 32-38
p-ISSN: 2723-7818
e-ISSN: 2723-7826
http://dx.doi.org/10.46355/hipknee.v5i1.124

THE COMBINED HIP PROCEDURE: OPEN REDUCTION INTERNAL FIXATION COMBINED WITH TOTAL HIP ARTHROPLASTY FOR THE MANAGEMENT OF SEVERE ACETABULAR FRACTURES IN THE ELDERLY: A CASE REPORT

Rolandi Indra Pramukti[1], Mohammad Zaim Chilmi[2], Jifaldi A.M.D. Sedar[3]

[1] Fellow of Indonesia Hip and Knee Society, Orthopaedic and Traumatology Surgery Department, dr. Soetomo General Hospital, Surabaya, Indonesia

[2] Senior Consultant Orthopaedic and Traumatology Surgery Department, dr. Soetomo General Hospital, Surabaya, Indonesia

[3] Consultant Orthopaedic and Traumatology Surgery Department, dr. Soetomo General Hospital, Surabaya, Indonesia

ABSTRACT

There are many varieties of acetabular fractures affecting the elderly are due to various patient characteristics and fracture characteristics. Applying highly individualized (tailor made) management principles is essential in order to achieve successful outcomes. Previous literatures have described indications and outcomes of different option of management, including closed treatment, open reduction internal fixation, and direct or staged total hip arthroplasty. Appropriate opted initial management is critical, as early failures and subsequent salvage surgery can be resulted in morbidity. Clinical results after ORIF closely largely depend on the quality of articular reduction and the ability of maintaining a congruent reduction of the hip joint. Fracture characteristics and ability to achieve anatomic-articular reduction, should be treated with ORIF. However, fracture characteristics predictive, prior to early post-traumatic arthritis should be treated with simultaneous ORIF and THA (Combine Hip Procedure, CHP). The case presented is one referral institutions treatment algorithm and management approach in dr. Soetomo general hospital.

Keywords: Acetabulum Fracture, Elderly, Combine Hip Procedure, ORIF, Total Hip Arthroplasty

Article History:
Submission : April 15th, 2022
Revision : December 19th, 2023
Accepted : January 29th, 2024

Corresponding Author:
Rolandi Indra Pramukti
Fellow of Indonesia Hip and Knee Society, Orthopaedic and Traumatology Surgery Department, dr. Soetomo General Hospital, Surabaya, Indonesia
rolandman@gmail.com

INTRODUCTION

High-energy trauma may cause the acetabulum to suffer from fractures. These cases most commonly occurred in younger patients of less than 40 years and, open reduction and internal fixation required in displaced cases (1). Restoring the joint and achieving anatomical reduction have been shown to halt post traumatic arthritis development, yet, there might be a possibility of degeneration and femoral head avascular necrosis (1). Regardless of these and other potential complications, restoring the displaced acetabular fractures anatomically has still been regarded as the treatment of choice for most displaced fracture. In elderly patients, acetabulum fractures may be resulted from a high-energy injury.

Nevertheless, in the presence of osteoporosis or osteopenia, fractures may also follow a moderate- or even low-energy injuries such as a fall to the ground from a standing position. These falls may cause similar patterns of displacement and comminution along with impaction of the acetabulum and the femoral head. Previous literatures have described treatment of choice ranging from nonoperative care, acute total hip arthroplasty, a delayed total hip replacement and the use of ORIF technique (2). Whilst, poor outcomes may develop due to poor quality of the bone or unstable pelvic column injuries. In order to better outcomes, a complex (tailor made) approach may be essential in treating these injured elderly patients. As simultaneous internal fixation and early total hip arthroplasty were done, we may achieve stabilization of fracture, reduction of pain reduction, and early mobilization. This approach may reduce complications related to soft tissue, via wider surgical opening and avoid reoperation through same tissue.

PRESENTATION OF CASE

A 69-year-old male suffered from an injury in his left hip joint after falling from a high place and was rushed to a hospital. At the hospital, he was diagnosed with a T- shaped acetabular fracture.

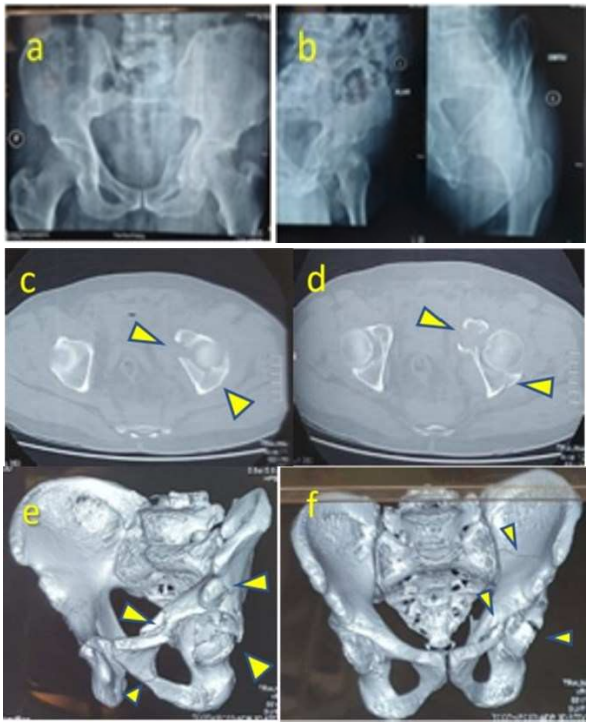

Figure 1. Initial anteroposterior radiograph (A) Alar and obturator (B) CT scan showing iliac wing, anterior and posterior wall acetabular fracture (C,D,E,F)

The patient was given skeletal traction on his left femur and given treatment for other comorbidity, which has Hypertension and Diabetes mellitus, and prepared for optimal surgical procedure.

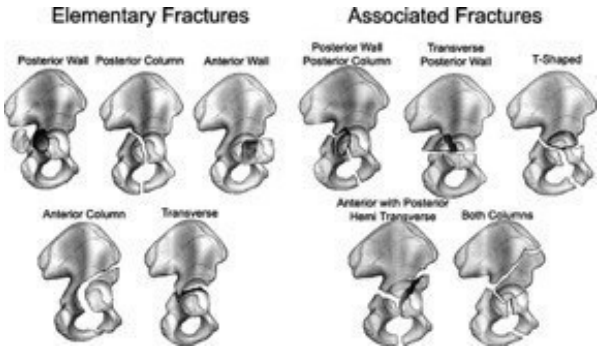

Figure 2. The Judet and Letournel acetabular fracture classification system

The operative management consisted of fracture stabilization using standard ORIF techniques followed immediately by THA during the same anaesthesia. In this case, both column fracture fixation is using modified Stoppa approach, combined with lateral window of the ilioinguinal approach (so called Olerud approach) exposing all fractures lines extending superiorly to the iliac crest.

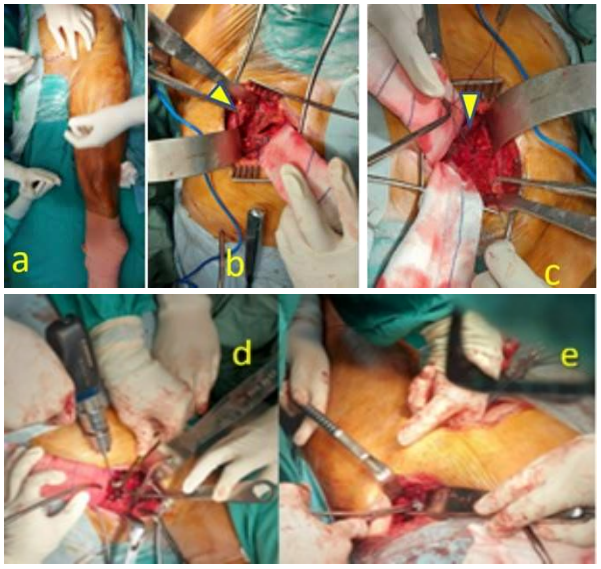

Figure 3. Modified Stoppa Approach (A) Identify corona mortis vessel (B) Ligation of corona mortis (C) Reduce and plate placement (D) Lateral window are used to insert the screw (E).

We identified corona mortis vessel and made a ligation into it, then reduced the fracture site and put two recon-plates in the anterior and posterior acetabular column. After placement of the fixation device, one is 10 holes recon-plate and put 3 screws on proximal and 2 screw in distal on anterior column and the other 10-hole recon- plate, 2 screw both proximal and distal hole, we checked under c-arm.

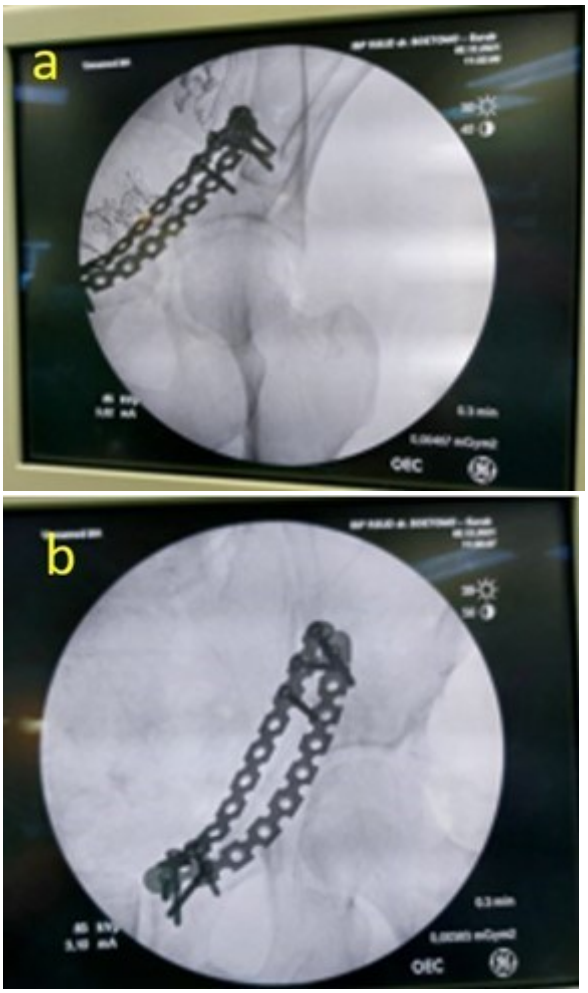

Figure 4. AP position c-Arm (A) Obturator view position c-Arm (B).

The osteosynthesis can reduce fracture site, compared with initial x-ray. Then, the patient was positioned in lateral decubitus, and a postero-lateral approach was used

for posterior wall osteosynthesis followed by the THA.

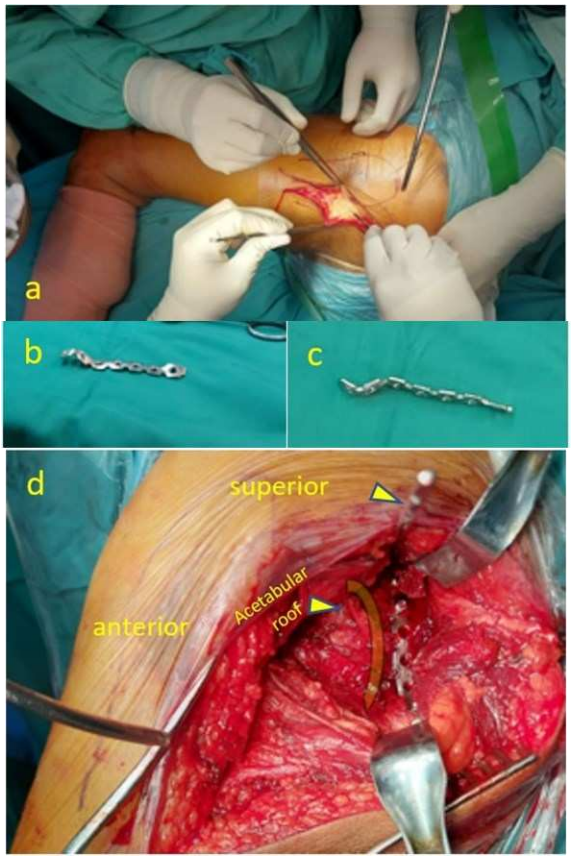

Figure 5. Postero-lateral approach (A) Bended plate following acetabulum curvature (B,C) 7-hole recon-plate placement to posterior wall acetabulum using 2 screw on proximal and distal hole, showing Schanz pin on superior aspect.

After osteosynthesis of the posterior wall, we proceed to THA, first we dislocated the head femur and decapitated, later on we use the head of femur as morselized bone graft, to fill the defect of acetabular joint surface. After the reverse reamer, we could achieve round shaped acetabulum and bone defect had all filled with bone graft. We proceed to put cementless acetabular cup and fixate with 2 screws superiorly. Then we proceed to placing the femoral stem.

After inspecting final reduction and position of implant, the wound is then irrigated using saline solution. Two drains were inserted, one in the space of Retzius (medial window) and another in the iliac fossa (lateral window) of the ilioinguinal approach. Afterwards, closure of the inguinal canal, external abdominal fascia, and inguinal ligament are done using nonabsorbable sutures. Then the wound is closed in layers using absorbable sutures.

Figure 6. Dislocating head of femur, and morselized it.

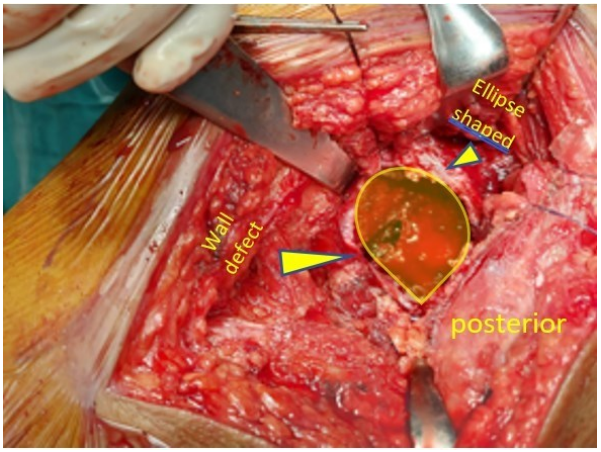

Figure 7. Ellipse shaped and acetabular wall bone defect

Figure 8. Fill the bone defect (A,B) impaction morselized bone graft using reverse reamer / impactor (C).

Post Operative In order to verify adequate fracture reduction and implant positioning, we then acquired postoperative radiographs.

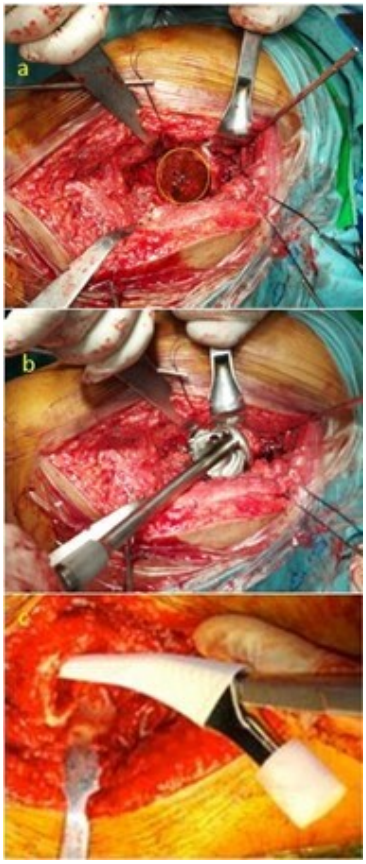

Figure 9. Round shaped acetabulum (A) Placement cement- less acetabular cup (B) Placing femoral stem (C)

Figure 10. Post-operative x-ray, showing good reduction of both column and posterior wall osteosynthesis, also good THA result.

DISCUSSION

ORIF techniques used in managing displaced acetabular fractures have been shown to provide good to excellent outcomes (3,4). Previous literatures have even detailed the usage of an ORIF technique in certain fracture management in elderly resulting in good outcome (5,6). However, not every acute acetabular fracture affecting the elderly can be appropriately deal with ORIF. Several studies have reported in the presence of pre- existing arthritis, associated fracture patterns, impacted margins, intra-articular fragments, femoral head lesions, suboptimal reduction of fracture, with or without the presence of osteoporosis, and patients older than 55 years of age have demonstrated that ORIF will result in poor clinical outcomes in comparison to other. Acute THA may be the attractive solution for managing such patients.

Nevertheless, fracture with coexisting presence of osteoporosis may cause obtainment of adequate fixation using hip replacements alone seems impossible. Only few articles have previously discussed combined techniques as management of acetabular fractures in the elderly. Weber et al (7) and Bellabarba et al8 discussed the advantage of acetabulum osseous anatomy restoration, despite the subsequent development of osteoarthritis,

and the usage of plate fixation for recognized fracture line.

In 2019, Borg et al. reported the only cohort study comparing CHP with ORIF alone for treatment of displaced comminuted acetabular fractures in the elderly (9). From total the combined hip procedure, CHP, comprises of an acetabular fracture stabilization through operation followed by acute placement of a total hip arthroplasty. The justification of this procedure is that one operation could be completed for those elderly patients with acetabular fractures that have a disadvantageous prognosis and have possibility of requiring arthroplasty conversion later.

Indications for the combined hip procedure include conditions such as the presence of a femoral neck fracture or significant femoral head damage, including abrasions, impaction, or fracture to the femoral head; severe, unreconstructible comminuted acetabulum and impaction involving 30% of its surface; preexisting hip arthrosis; multiple associated fractures; and those who have a low likelihood for a satisfactory outcome following ORIF, and in whom ORIF has been shown to compromise the success of a subsequent arthroplasty.

The combined hip procedure can typically be performed through a single Kocher-Lagenbeck approach, but in our hospital, dr. Soetomo General Hospital, we use postero-lateral approach to gain access to the posterior wall of acetabulum and to perform THA, and anterior approach, through modified Stoppa approach, was used to gain access to anterior acetabulum column.

The objective of reduction and stabilization of the acetabular fracture is not to merely achieve an anatomic reduction, but rather to provide a stable construct for cup placement.

CONCLUSIONS

Our goal is to diminish the need for secondary surgery by using combined hip procedure (CHP), to our patients, as indicated, instead of using open reduction and internal fixation (ORIF) alone in treatment of complex acetabular fractures in elderly patients.

REFERENCES

1. Melton LJ III, Sampson JM, Mowey BF, et al. Epidemiologic features of pelvic fractures. Clin Orthop Relat Res. 1981; 155:43–47.
2. Ruesch PD, Holdener H, Ciaratmitaro M, et al. A prospective study of surgically treated acetabular fractures. Clin Orthop Relat Res. 1994;305: 38–46.
3. Matta JM, Anderson LM, Epstein HC, et al. Fractures of the acetabulum. A retrospective analysis. Clin Orthop Relat Res. 1986;205:230–240.
4. Mayo KA. Open reduction and internal fixation of fractures of the acetabulum. Results in 163 fractures. Clin Orthop Relat Res. 1994;305: 31–37.
5. Matta JM, Mernt P. Displaced acetabular fractures. Clin Orthop Relat Res. 1988;230:83–97.

6. Kreder HJ, Rozen N, Borkhoff CM, et al. Determinants of functional outcome after simple and complex acetabular fractures involving the posterior wall. J Bone Joint Surg Br. 2006;88:776–782.
7. Weber M, Berry DJ, Harmsen WS. Total hip arthroplasty after operative treatment of an acetabular fracture. J Bone Joint Surg Am. 1998;80: 1295–1305.
8. Bellabarba C, Berger RA, Bentley CD, et al. Cementless Acetabular Reconstruction After Acetabular Fracture. J Bone Joint Surg Am. 2001;83: 868–876.
9. Borg T, Hernefalk B, Hailer NP. Acute total hip arthroplasty combined with internal fixation for displaced acetabular fractures in the elderly: a short-term comparison with internal fixation alone after a minimum of two years. Bone Joint J 2019;101-b(4):478.
10. Mears DC, Velyvis JH. Primary total hip arthroplasty after acetabular fracture; an instructional course lecture, American Academy of Orthopaedic Surgeons. Bone Joint J 2000;82(9):1328.