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Hemiarthroplasty in failed intertrochanteric fracture- A case report

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Abstract
Introduction: Intertrochanteric fractures in elderly are very common, mostly caused by trivial fall. Majority of these fractures are treated by internal fixation. Failed fixation or unstable fractures with severe osteoporosis require hip arthroplasty.
Case report: We present here a 74-year female patient with reverse oblique, comminuted fracture with failed internal fixation managed with calcar substituting long stem bipolar prosthesis with one year follow up with good functional result.
Conclusion: Arthroplasty is an effective salvage option for elderly patients with osteoporotic unstable intertrochanteric fractures leading to early ambulation and fewer complications.

Keywords: Intertrochanteric fracture, failed fixation, arthroplasty

Introduction
Intertrochanteric fracture is a common injury in the elderly. The primary treatment for intertrochanteric fracture is internal fixation. However, senile intertrochanteric fractures treated with internal fixations are often associated with complications due to poor bone quality, such as implant failure, non-union and femoral head perforation. Hip arthroplasty is always used as a salvage procedure for internal fixation failure [1, 2].
Unstable inter-trochanteric fracture in the elderly patient is associated with around 20% mortality. Intertrochanteric femur fractures comprise approximately half of all hip fractures caused by a low-energy mechanism such as a fall from standing height. Poor bone quality, Excessive collapse, loss of fixation, and cut-out of the lag screw are the common problems of attempts to fix these fractures. Some surgeons have recommended prosthetic replacement in such fractures, but this has not gained widespread support [3-6].
Failure rate of unstable intertrochanteric fractures with osteoporosis treated with osteosynthesis has been reported to be between 4% and 16.5% [7]. Incidence of general complications such as pulmonary embolism, deep venous thrombosis (DVT) and pneumonia ranges from 22% to 50% when internal fixation was adopted [8, 9]. Due to high failure rate and complications associated with internal fixation, prosthetic replacement has been recommended by some authors as primary treatment for unstable intertrochanteric fractures [3, 10, 11].

Case Report
A 74-year-old female patient presented with history of trivial fall at home complaining of pain in her right hip and restricted range of movements. She was hypertensive with no other co morbidities. After clinical and radiological evaluation, she was diagnosed with unstable inter-trochanteric fracture with comminution (reverse oblique). She underwent closed reduction and internal fixation with proximal femoral nail anti-rotation (PFNA) for the same. Post operatively she was started with physiotherapy exercises. Weight bearing mobilization was not allowed. On the tenth post-operative day patient complained of intense pain in the operated hip. After evaluation she was diagnosed to have posterior cut out of the blade along with the displacement of the fracture. Implant removal followed by hemi-arthroplasty with long stem modular bipolar prosthesis was planned.

Operative Technique: After epidural anaesthesia patient was positioned in left lateral position. PFNA was removed by the same incisions. The entry wound of PFNA was extended and converted into posterior approach for hip. The head and neck of the femur was

extracted taking care of the integrity of greater trochanter with attachments, which was a separate piece. The head size was noted. The greater trochanter was reduced and stabilized with tension band wiring technique. The femoral medullary canal was reamed to the appropriate stem size and trial reduction was performed keeping a note of restoration of neck length, offset and version to maximise the stability of the hip joint. Final prosthesis was inserted, the tension band was tightened, and the hip was reduced. Capsule was closed, incision closed in layers and drain was kept in situ for 48 hrs. Abduction pillow was used while patient was lying on bed. Check dressing and x ray was done on 3rd post-operative day and patient was ambulated with help of a walker from fourth day. Patient was discharged on 12th post-operative day after suture removal.

Follow up: Patient was followed up clinically and radiologically at 6 weeks, 3 months and one year. Functional assessment was done using Harris hip score. Visual analogue scale was used for pain intensity. At the one year follow up Harris hip score was 80.

Discussion

Although most intertrochanteric hip fractures can be treated successfully with reduction and internal fixation using either medullary or cortical fixation devices, failed treatment of these fractures typically leads to severe functional disability and pain [12]. Failure of intertrochanteric fracture fixation often occurs in patients who have poor bone quality, severe osteoporosis or unstable fracture patterns [13]. The reported failure rate with internal fixation is in the range of 3-12%, with device penetration (2-12%), non-union (2-5%) and mal-union causing varus deformity (5-11%) [14]. Salvage options consist of either revision of internal fixation or proximal femoral replacement with or without acetabular resurfacing. Factors that guide the choice of salvage treatment include the anatomic site of the mechanical failure, the quality of the remaining proximal bone and articular surface and patient factors (such as age and activity level) [13]. In the younger patients with a well-preserved hip joint, treatment typically involves revision of internal fixation with or without osteotomy or bone grafting. However, in older patients, it is more common to encounter poor remaining proximal bone stock or a badly damaged hip joint from hardware cut-out. In this situation, salvage by replacement is more optimum [14].

An intertrochanteric fracture for which treatment has failed poses a difficult and unique challenge to the orthopaedic surgeon, especially if he or she is planning to perform conversion hip arthroplasty. The challenges include the need for selecting the femoral implant, acetabular resurfacing if indicated and managing discontinuity of the greater trochanter. Furthermore, there are additional technical challenges that may be encountered, such as broken hardware, bone deformity and femoral or acetabular bone defects. Loss of anatomical landmarks, for example lesser trochanter, makes assessment of limb length more difficult. Autograft, allograft or head-and-neck substitution components should be available for reconstruction of bone defects and to restore limb length. The extrusion of bone cement from the holes of the removed screws must be considered [15]. The non-united head and neck fragments are usually in a deformed position and must be mobilized before being excised. This process requires careful dissection to avoid damaging nearby neurovascular structures and muscles. Extreme care must be taken to avoid fracture and penetration of the femoral shaft [16]. Because of all these reasons, the technique is associated with a high incidence of intraoperative and postoperative complications. The choice of implant whether cemented or uncemented, total hip replacement or bipolar arthroplasty will depend upon the age of the patient, activity level, co-morbidities, quality of bone stock and acetabular damage. Patients with acetabular damage due to implant penetration must be dealt with total hip replacement [17].

In our case we used calcar substituting long stem bipolar prosthesis to restore the bone deficiency present at the calcar region due to failed treatment, bypass cortical defect left at the site of failed fixation device and bridge the hole of distal screw. The cause for failure of initial surgery can be attributed to the fracture pattern and severe osteoporosis. Hemi-arthroplasty was chosen as there was no destruction of the acetabular cartilage. Post operatively patient can be ambulated early with support which can prevent many potential complications and patient can be back to the normal life earlier than those who are treated with internal fixation. Based on result of our case report, hip arthroplasty seems to be satisfactory salvage procedure after failed treatment of an intertrochanteric fracture or as a primary intervention in unstable intertrochanteric femur fracture.

Conclusion

Hip arthroplasty provides a stable, pain free, mobile joint in unstable intertrochanteric fracture femur and in failed intertrochanteric fracture femur. It can provide an effective salvage option for elderly patients with osteoporotic unstable intertrochanteric fractures leading to early ambulation and fewer complications.

Fig 1: Pre op x rays
a) Pelvis with both hips showing reverse oblique IT fracture **b)** Lateral view of right hip **c)** AP view of right hip

Fig 2: Immediate post op x-rays showing satisfactory reduction and PFNA in situ in **a)** Pelvis with both hips, **b)** AP view and **c)** Lateral view

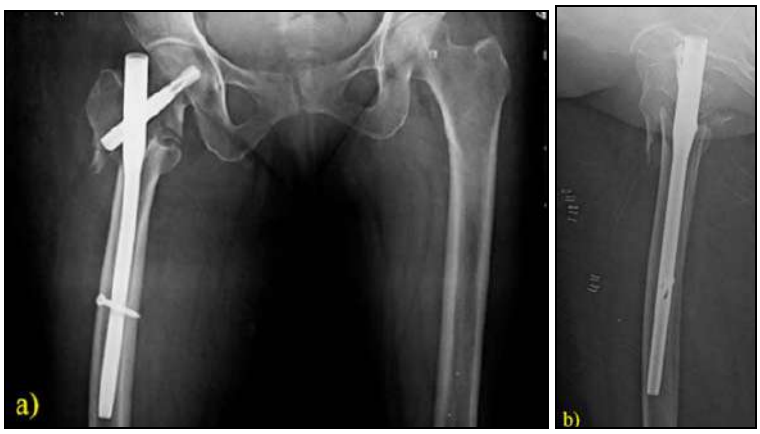

Fig 3: X-rays on tenth op day **a)** AP view showing displacement of the fracture **b)** Lateral view showing displacement cut out of the blade

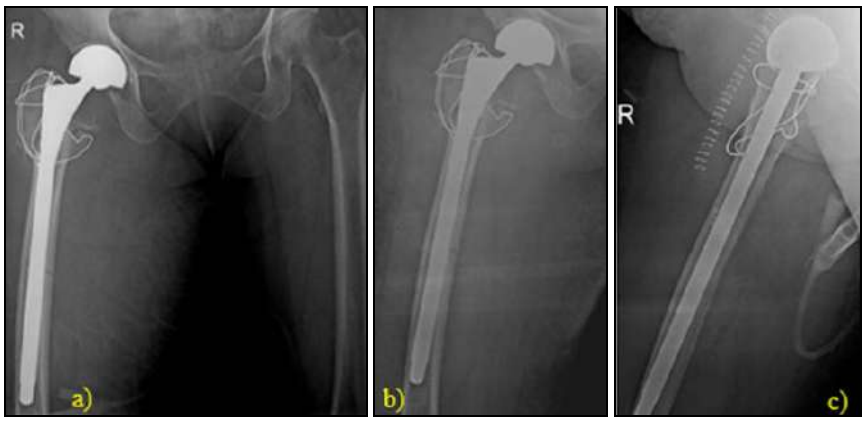

Fig 4: Immediate post of x-rays showing long stem bipolar prosthesis with GT wiring in **a)** Pelvis with both hips **b)** AP view and **c)** lateral view

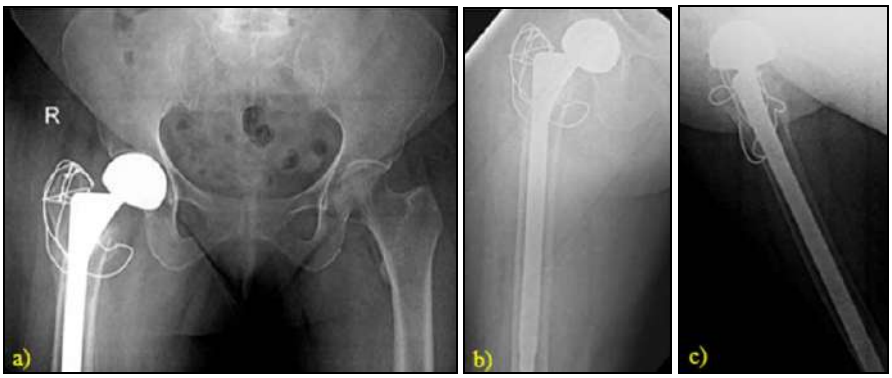

Fig 5: Follow up x-rays at 1 year **a)** Pelvis with both hips, **b)** AP view of right hip and **c)** Lateral view of right hip showing long stem bipolar with TBW of GT which is united with the shaft.

Fig 6: Clinical pictures 1 year post hemi-arthroplasty

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