

Case Series

Reviving mobility: conversion arthroplasty as a solution for failed proximal femur fixation

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ABSTRACT

Proximal femur fractures are very common both in young and old age group and are usually managed surgically. In case of failed fixations, young patients are managed with subsequent attempts of osteosynthesis to achieve union and maintain integrity of femoral head. However, in case of elderly patients, arthroplasty of hip joint may be considered keeping in mind the poor bone quality, loss of bone or injury to the articular cartilage. This study is aimed to assess the outcomes and consequences of conversion arthroplasty following unsuccessful fixation of intertrochanteric fractures. We report 3 cases of proximal femur fixation, who were initially managed with intramedullary nailing subsequent to trauma. But patients post operatively developed complications like implant failure, non-unions and post traumatic arthritis of hip for which conversion arthroplasty was done as a rescue procedure following failed fixation.

Keywords: Conversion arthroplasty, Intertrochanteric fracture, Implant failure, Non-union

INTRODUCTION

Proximal femur fractures are common following road traffic accidents or high energy trauma in cases of young individuals, and trivial trauma in elderly population with an incidence of around 1.6 million cases occurring globally each year and by 2050 6.3 to 8.2 million cases are expected to occur globally.¹

Out of which, about 50% are intertrochanteric fractures which are traditionally managed using cephalomedullary nail (CMN) fixation or a dynamic hip screw (DHS). For unstable intertrochanteric hip fractures, proximal femoral nail fixations are found to be superior to DHS because it provides a better functional outcome (more favourable Harris Hip Score), a lower incidence of fixation failure and a lower rate of reoperation.²

Acute arthroplasty is less frequently done in these fracture situations due to greater distant extent of fracture and

complications resulting from trochanteric involvement. However, arthroplasty can be used successfully as the first treatment in cases of severe osteoporosis or underlying arthritis.³ Internal fixation is the recommended method of treatment for the majority of intertrochanteric fractures.

But failures of fixations are associated with complications like nonunion, fixation loss, femoral head osteonecrosis, posttraumatic arthritis, malunion, infection, or hardware that can cause symptoms. Conversion hip arthroplasty is defined as patient who underwent prior open or arthroscopic hip surgery with or without retained hardware that is removed and replaced with arthroplasty components.⁴

We treated 3 patients in our unit who presented with implant failure, non-union or post traumatic arthritis following primary proximal femur fixation. A single surgeon performed hip arthroplasty. In all 3 cases, uncemented femoral stem was used and choice

between hemi arthroplasty or total hip arthroplasty (THA) was decided intra operatively.

CASE SERIES

Case 1

79-year-old male presented following trauma to left hip. He was diagnosed to have intertrochanteric fracture of left hip for which cephalomedullary nailing was done. Postoperative rehabilitation protocol was followed and was mobilized 1-month post-surgery.

2 months post-surgery patient presented with pain and instability over left hip while mobilizing. There was no history of trauma or fall. On examination, wound site was found to be healthy. Tenderness was present on deep palpation. Range of movements were restricted in all planes.

Radiological evaluation showed proximal femur implant failure and was subsequently converted to a hemi arthroplasty of hip. Intraoperative and post operative period was uneventful. Wound progressed to heal without any complications. Patient was started on full weight bearing mobilization with walker support immediately after surgery. Subsequent follow ups in OPD were uneventful and patient improved symptomatically.

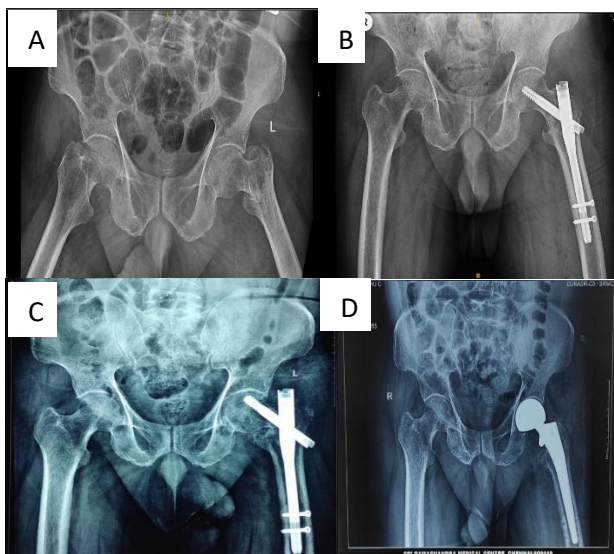


Figure 1: (A) Initial injury; (B) immediate post operative radiograph; (C) X-ray of hip show screw cut through and varus collapse and subsequent implant failure; (D) conversion hemiarthroplasty was done keeping in mind age and acetabular status of patient.

Case 2

67-year-old male presented with history of fall and was diagnosed to have intertrochanteric fracture for which he underwent open reduction and internal fixation with proximal femur nail at an outside hospital. Patient was

started on weight bearing 6 weeks post surgery. Post operative period was uneventful 9 months post-surgery, he had history of trivial fall and was unable to weight bear after the fall. On examination, wound was healthy. Tenderness was present over Scarpa's triangle. Range of movements could not be assessed due to pain. No neurovascular deficit was noted.

Patient was diagnosed to have left proximal femur fracture with non-union and implant failure. Patient underwent implant exit and conversion arthroplasty was done using an uncemented femoral stem. Post operatively wound healed completely and no wound complications were noted. Patient was started on full weight bearing mobilization post operatively.

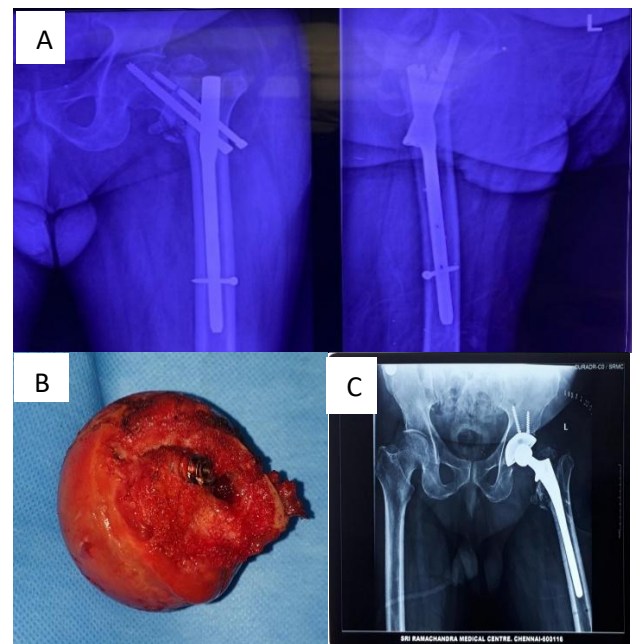


Figure 2: (A) X-ray showing a PFN with non-union of fracture site and subsequent breakage of antirotation screw; (B) showing femoral head with broken anti-rotation screw; (C) total hip arthroplasty with uncemented stem subsequent to implant removal.

Case 3

54-year-old male following road traffic accident had polytrauma with injuries to left hip and thigh. He initially underwent external fixator application of left femur which was later replaced by open reduction and internal fixation with recon nail and left acetabulum posterior column reconstruction with plate osteosynthesis. Patient was started on weight bearing following 6 weeks of surgery and was subsequently followed up on outpatient basis.

Patient on regular follow ups was diagnosed to have post traumatic myositis of left hip and subsequent myositis release and removal was done and was followed up for 2 years. He developed post traumatic arthritis of the hip post acetabulum fixation. On examination surgical scar was

healthy with no wound complications. Range of movements were restricted in all planes. Patient underwent left femur implant exit after 2 years of initial surgery keeping in mind stability of the femur shaft fixation and was converted to a left total hip replacement with an uncemented femoral stem.

Subsequently patient was followed up on OPD and developed surgical site wound infection and was started on appropriate antibiotics as per sensitivity. Patient was started on full weight bearing mobilisation. Periodic wound inspection and rehabilitation was given. Patient is on regular follow up and has improved symptomatically and local site infections has been subsided.

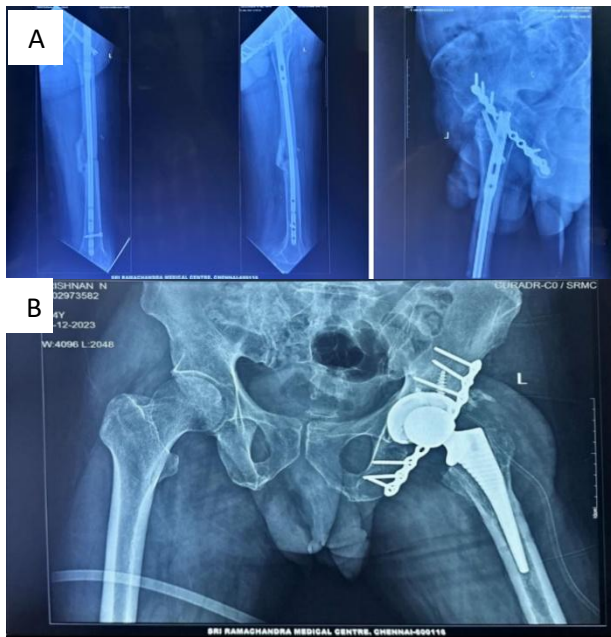


Figure 3: (A) Post traumatic arthritis of hip following fixation with a recon nail; (B) total hip arthroplasty was done without major intraoperative complications.

DISCUSSION

Failed proximal femoral fixations result in severe pain and functional impairment. Young patients usually respond well to repeated efforts at osteosynthesis in maintaining articular surface and achieving union. Elderly patients usually have low bone quality, subsequent osteopenia, bone loss or damaged articular cartilage might need conversion arthroplasty for better overall functional outcomes.⁴

Complications following conversion THA for failed proximal femur fracture are higher than primary THA, which include longer durations of surgeries, longer hospital stay, chances of infection, instability, implant loosening and periprosthetic dislocations.⁶

Both cemented and uncemented prosthesis have found to have excellent outcomes, but several complications like

extravasation of cement due to suboptimal pressurization and poor remodeling of cortical bone, higher incidence of trochanteric non-unions have been reported.^{5,7-9} Several studies have reported salvage THA with modular cementless prosthesis for failed intertrochanteric fractures to provide significant relief and good functional outcomes.^{10,11} However, fracture of modular cementless stems have been reported at mid shaft level of femur due to inadequate proximal osseous support, which can be minimized by carefully selecting the stem and use of strut grafts.¹²

Risk of periprosthetic dislocations have been higher in conversion THA as compared to primary THA's. Chronic instability may even lead to re operations in some cases and can be reduced by adequate repair of short external rotators and reconstruction of the abductor mechanism through cerclage wires.¹³⁻¹⁶ Trochanteric fractures usually united well since area is rich in blood supply and good cortical stock but non unions should always be evaluated for any infections, since infections have been a major cause of morbidity following joint replacements. Adequate medical history and comorbidities should be evaluated and risk factors like obesity, tobacco, alcohol use, diabetes mellitus, immunosuppressive drugs and coagulopathies should be kept in mind while planning for surgery. Pre-operative work up with blood counts, erythrocyte sedimentation rate, C reactive proteins should be evaluated. Adequate irrigation and debridement should be done following implant removal if presence of infection is suspected.¹⁷

Apart from it, pre operative mobility status of patient and age should be kept in mind while deciding the type of implant being used for providing adequate functional outcomes.¹⁸

CONCLUSION

In this study we oversaw failures of three different types of implants-PFN with lag screws, helical blade and recon nail with different causes like non-union of fracture, Implant failure, and post traumatic arthritis. Indicating failure of fixations is independent on type of implant used. One of our patients developed post operative surgical site infection and was managed with appropriate culture sensitive antibiotic cover and patient went on to have an uneventful post operative period. Although our study showed conversion arthroplasty to provide excellent results in case of failed proximal femur fixations, larger scale study and more number of cases have to be studied to conclude the findings. Also, larger study can provide information on the type of implant used, which could relate to failed fixations of proximal femur.

Clinical message

Failed fixations of proximal femur provide better outcomes with repeat osteosynthesis in cases of young individuals at first, which if fails can go ahead with

conversion arthroplasty. But in cases of adults, keeping in mind bone stock and osteopenia, conversion arthroplasty is the ideal choice.

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