

## Case report

## Proximal femur shaft fracture in a case of ipsilateral resection arthroplasty of a tuberculous hip - A rare case report



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## ABSTRACT

Femur shaft fracture is a common entity in orthopaedic practice, but how commonly does one encounter a subtrochanteric femur fracture in ipsilateral resection arthroplasty of a tuberculous hip after a decade of uneventful unassisted ambulation post resection procedure? Till date only 2 patients have been reported worldwide with femur diaphyseal fracture with a history of ipsilateral resection arthroplasty all performed within a year of fracture occurrence. The intriguing factor of our case was the fact that post resection, patient was ambulatory for a decade and the fracture occurred at a subtrochanteric level. Thus we report a case of 35 year old male with subtrochanteric femur fracture due to minor trauma to right thigh, with a history of tuberculous arthritis of right hip for which surgical management in the form of resection arthroplasty was done 10 years back. After a thoughtful decision making and plan formulation we managed the patient with surface fixation with a pre contoured GT (greater trochanter) configuration plate after taking into consideration status of intact GT, osteoporosis, pseudoarthrosis level and post operative ambulation and rehabilitation.

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## 1. Introduction

In day to day practice, orthopedic surgeons commonly encounter fracture shaft femur. The management of such fractures is also well established in the literature including intramedullary nailing, surface plating etc. Occurrence is usually following road traffic accidents. Fractures of pathological nature are mainly due to osteoporosis and other pre existing femoral pathology, etc.<sup>1</sup> Resection arthroplasty of the hip is done to remove the necrotic dead bone in proximal femur and to provide a pain-free mobile hip. It is a procedure with well established long term results and is described as a treatment option for recurrent hip dislocations, septic hip and tuberculous hip infection. Though nowadays it is scarcely practiced due to the advent and advocacy of two stage exchange arthroplasty. Yet it still remains a more cost effective option with a lower risk profile in our developing healthcare system where pyogenic and tuberculous infection are common hip diseases, the other treatment option being arthrodesis in a functional position which provides a stable hip but at the cost of loss of ability to squat, sit cross legged and the ability to do ground level

chores.<sup>2</sup> Ipsilateral femoral fracture after girdlestone resection is a rare occurrence due to the loss of proximal fulcrum which facilitates fracture diaphysis of femur to occur.<sup>3</sup> We present to you a unique case scenario in which a tuberculous hip treated with resection arthroplasty ended up with a diaphysis femur fracture after around a decade of uneventful ambulation and had to be surgically managed. In this report we highlight the unusual occurrence, mechanism of injury, and the management strategy employed by us in treating this patient.

## 2. Case report

A 35 year old male came to our emergency room with a history of minor trauma to right thigh due to sudden placement of his right leg on the pavement due to loss of balance while riding a bicycle. No other injury was reported. Patient didn't give any positive history for diabetes, Hypertension or IHD. He was diagnosed 10 years back with Tubercular arthritis of right hip for which he underwent a resection arthroplasty at his hometown. He gives a history of completing his AKT therapy back then. He was ambulated thereafter and had an uneventful decade with resumption to normal daily activities of living and working.

On his arrival at our emergency room, he had no complaints regarding the hip joint but had intense pain in right upper thigh

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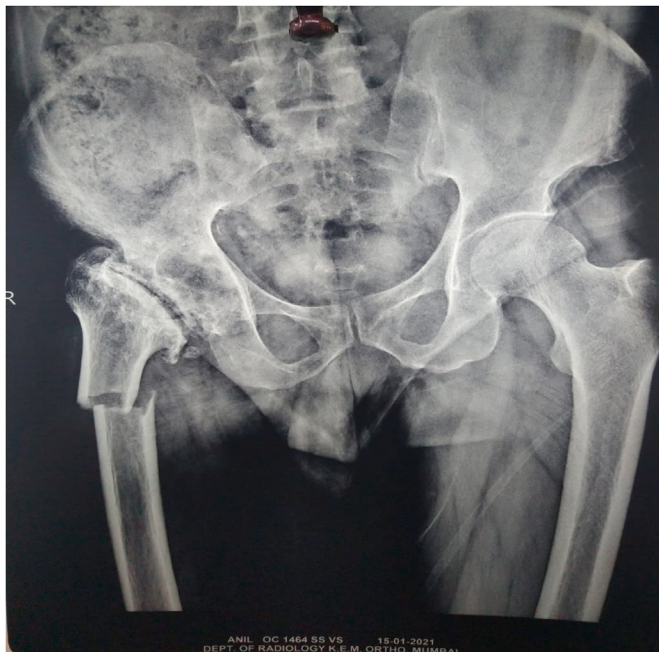


Fig. 1. PBH view of Right femur shaft fracture.



Fig. 3A. Post operative AP view femur shaft.

region. A full physical examination was performed with findings of tenderness at the local site with restricted and painful range for the ipsilateral hip with normal knee range of motion. The patient suffered no neurodeficit. We shifted the patient for a radiographic assessment which revealed to us a proximal femur shaft fracture of the right lower limb (see Figs. 1 and 2).

We immobilized and stabilized the fractured limb in a Thomas traction (T.T) splint until the operative day.

The patient then underwent an open reduction and surface fixation with a precontoured GT accommodating plate (see Fig. 3A and B and 4).

The patient tolerated the procedure well without complications. He was kept immobilized in a T.T splint for a total 4 weeks duration

of time, suture removal was uneventful on 14th day, the patient was discharged subsequently, partial weight bearing mobilization was initiated after around 4 weeks with walker support. The patient had a fall at his home while going to the washroom but experienced no pain or any discomfort at the operative site, out of concern he revisited us for a follow up at 6 weeks, a check radiograph of the right thigh revealed slight bending of the plate at the fracture site but no implant failure or breakage of the plate or any of its screws. After this incident we had to err on the side of caution and we

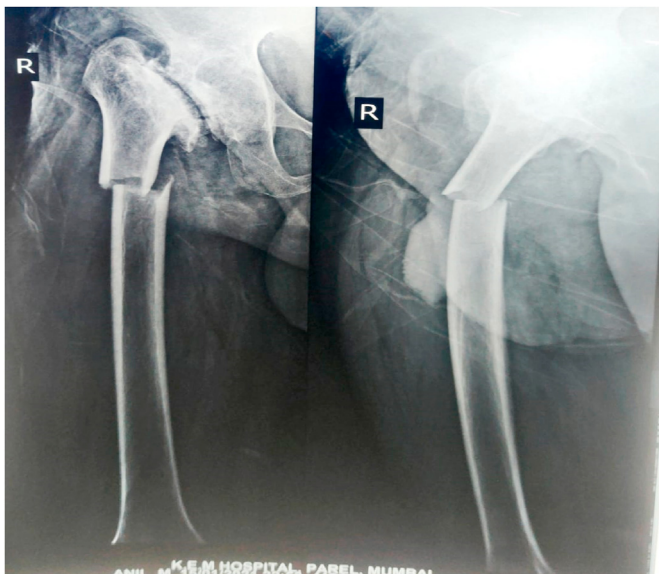


Fig. 2. AP and lateral view of right femur shaft fracture.



Fig. 3B. Post operative AP view femur shaft.



Fig. 4. Post operative lateral view femur shaft.

immobilized him again on T.T splint for the next 2 weeks. After this we gradually mobilized him with a walker and later on crutch support. Subsequent imaging revealed a healed femur fracture with stable implant positioning and no screw backout or breakage (see Fig. 5).

Now after 5 months the patient ambulates well without support and has resumed his normal daily activities without any hindrance.

### 3. Discussion

A direct blow to femur shaft is the usual mechanism for injury in femoral diaphyseal fractures. Fracture initiation occurs at the tensile site for the diaphysis depending upon the direction of force. Patients typically present with history of axial, bending or torsional

forces leading to spiral fractures.<sup>4</sup> When resection arthroplasty of hip is performed there occurs loss of proximal fulcrum due to removal of proximal femur effectively working against the fracture causing effects of torsional, axial and bending forces. Therefore biomechanically chances of fracture are rare. We are of the opinion that axial loading with a bending component due to sudden foot placement on the pavement lead to the fracture occurrence.<sup>3</sup> In such a long standing girdlestone with passage of around 10 years probably the fibrosis around the resection site provided a stable leverage for bending force to act and produce fracture in a pathologically weak bone. The weakening mostly a result of long standing previous tuberculous infection, disuse osteoporosis and vigorous resection of proximal femur done for clearance of tuberculosis during the girdlestone procedure. Similar case reported by Dunn et al. stated diaphysis fracture occurrence due to bone weakening because of cement removal attempt during resection arthroplasty in a post total hip replacement patient.<sup>4</sup> Another case reported recently by Kunal Shah et al. observed the diaphysis fracture post resection arthroplasty in femur due to mainly senile osteoporosis and cement removal attempts leading to weakening of bone.<sup>3</sup>

Resection arthroplasty aims to eradicate infection and pain with a goal to create a stable pseudoarthrosis site for mobilization. Complications for this procedure include limb length discrepancy, instability, abductor weakness, lifelong dependence on some form of ambulation, etc. The technique has undergone numerous modifications for preserving as much bone stock as possible but this isn't always feasible especially when complete clearance of infection is required.<sup>5</sup> In our case resection arthroplasty led to excessive bone loss during proximal femoral excision up to the sub-trochanteric level.

Several challenges came along when planning the management for this unique case scenario. Due to the presence of intact GT and stable pseudoarthrosis we faced a clinical dilemma for choosing the form of fixation, intact GT meant that intramedullary nailing could be attempted but at the cost of disturbance of the pseudoarthrosis site further which could lead to limb length changes and abductor weakening. The other problems which we took into account were difficulties in achieving a stable reduction by closed method and canal reaming.<sup>6</sup> Dunn et al. performed closed reduction with intramedullary internal fixation by nail but faced problems of reduction achievement and canal preparation by reaming.<sup>4</sup> We disregarded the idea of retrograde nailing due to the proximal



Figs. 5. 2 months post operative lateral and AP view of femur shaft.

location of femur shaft fracture, along with the concerns of opening the knee joint and risking it to arthritis in the future.<sup>7</sup> And so we chose plate fixation as the modality of treatment in our case with advantage of achieving a stable fixation and as the pseudoarthrosis site was undisturbed the patient returned to pre operative ambulatory status due to early initiation of joint mobilization.

The case scenario as presented by us in this case report is not a very common occurrence although not completely unexpected. There is always an expected component of osteoporosis in the ipsilateral femur after resection arthroplasty of the hip due to disuse and underuse. It is pertinent that we bear in mind that this weakened femur, under the torsional forces can always pose the risk of fracture and thus, Orthopedic surgeons should bear in mind the causative factors and the consequences leading to such a complication and undertake a careful and analytical approach in management plan formulation depending upon such a rare case scenario.

#### Declaration of competing interest

The authors declare no conflict of interest.

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