Case Report

Non-Union of Intertrochanteric Fracture Right Femur with Limb Shortening

ABSTRACT

Nonunion of intertrochanteric fracture is uncommon because there are excellent blood supply and good cancellous bone in the intertrochanteric region of the femur. A diagnosis of primary intertrochanteric nonunion is made when at least 15 weeks after the fracture there is radiological evidence of a fracture line, with either no callus (atrophic) or with callus that does not bridge the fracture site (hypertrophic).

The patient was subsequently treated successfully with an open reduction procedure. Open reduction and internal fixation with right DHS (Dynamic Hip Screw) with 8 screw holes plate inserted first and then 6 screws inserted under the guidance of Image Intensifier (C Arm).

We would like to report a case of right intertrochanteric fracture with non-union. A 60 years old patient presented with the history of pain in the right hip, off and on for many years after the operation. The pain was associated with stiffness of the right hip joint.

This case is selected for reporting because it's a relatively rare incidence.

Keywords: Hip disorder, Intertrochanteric fracture, Hip pain. Old age,

INTRODUCTION

The incidence of hip fracture has been increasing with the aging population and about 50% of hip fracture are intertrochanteric fracture [1]

Nonunion of intertrochanteric fracture is uncommon because there are excellent blood supply and good cancellous bone in the intertrochanteric region of the femur [2]. A diagnosis of primary intertrochanteric nonunion is made when at least 15 weeks after the fracture there is radiological evidence of a fracture line, with either no callus (atrophic) or with callus that does not bridge the fracture site (hypertrophic)[24]. Most intertrochanteric fractures treated by conservative methods or internal fixation heal [3,4]. Occasionally, nonunion or early failure of fracture fixation occurs, the reasons being delayed treatment, unfavorable fracture patterns, poor bone quality, or suboptimal internal fixation [5-9]. Nonunion results in pain and functional disability.[7]

In the elderly, hip arthroplasty (Total Hip Replacement surgery) is the preferred treatment for intertrochanteric nonunion with the damaged articular surface or inadequate bone stock, but in the physiologically young with good bone quality preservation of the femoral head is preferred.[2]

CASE REPORT

A 60 years old male came to the emergency department with complained of alleged Motor Vehicle Accident (skidded motorbike as he tried to avoid being hit by a car) on 5th February 2010. He fell on the ground, and then the right hip was hit on the road divider. No loss of consciousness, no retrograde amnesia, no ear, nose, throat bleeding. The right hip was painful, swollen, and unable to ambulate or stand. Past medical history had a history of Pulmonary Tuberculosis in 1975 and completed the treatment. Moreover, he was treated for the right hip Tuberculosis and completed in 1994. Since then he had shorting of the right lower limb due to the destruction of the right hip joint. He was initially smoker and stopped already for 10 years. He was self-employed as a car wash.

He lived with his daughter. Physical examination was done in the A&E department immediately. GCS was full, 15/15, and no cervical spine tenderness. Pelvic spring test was positive, chest and clavicle spring test was negative. The patient was afebrile, BP 100/60, P/R 78/ min, SpO2 95% on air. In local examination; tenderness was present at the right hip, no other bony tenderness, peripheral pulses were palpable, sensation intact, capillary refill time (CRT) > 2 sec, no foot drop was found. The respiratory system was normal and equal air entry, vesicular breath sound was heard. The cardiovascular system was dual rhythm, no murmur. In abdominal examination, liver and spleen were not palpable, and there was no tenderness. The right lower limb was examined and saw shortening gait, limb length shortening of 6 cm with restricted ROM (Range of movement) right hip joint. Neurovascular was intact.

The diagnosis was sustained closed intertrochanteric fracture with extending to subtrochanteric region of the right femur with a history of TB right hip joint (Completed treatment at 2008)

Renal profile and liver function test were normal. Hb was12.0, Platelet 320, total WBC 11.2 was seen.

Swab Culture & Sensitivity test result was shown that *Pseudomonas aeruginosa* cod negative *Staphylococcus aureus* sensitive to Fusidic acid and Rocephine.

Pelvic and Right hip X-ray showed that fracture intertrochanteric extending to subtrochanteric right femur. Chest X-ray was normal.

Management was started with DHS (Dynamic Hip Screw) right femur, Tablet Fusidic acid (Fucidin tablet) 500 mg tds for one week, morphine, and Rocephin given for one week after operation.

The suture was taken out on day 14.

Figure 1. Pre-operative radiograph of the right femur, Anteroposterior view, (05/02/2010)

Figure 2. Pre-operative radiograph of the right femur. Anteroposterior view, (05/02/2010)

Figure 3. Post-operative radiograph of the right femur, Anteroposterior view, (15/02/2010)

Figure 4. Post-operative radiograph of the right femur, Oblique view, (15/02/2010)

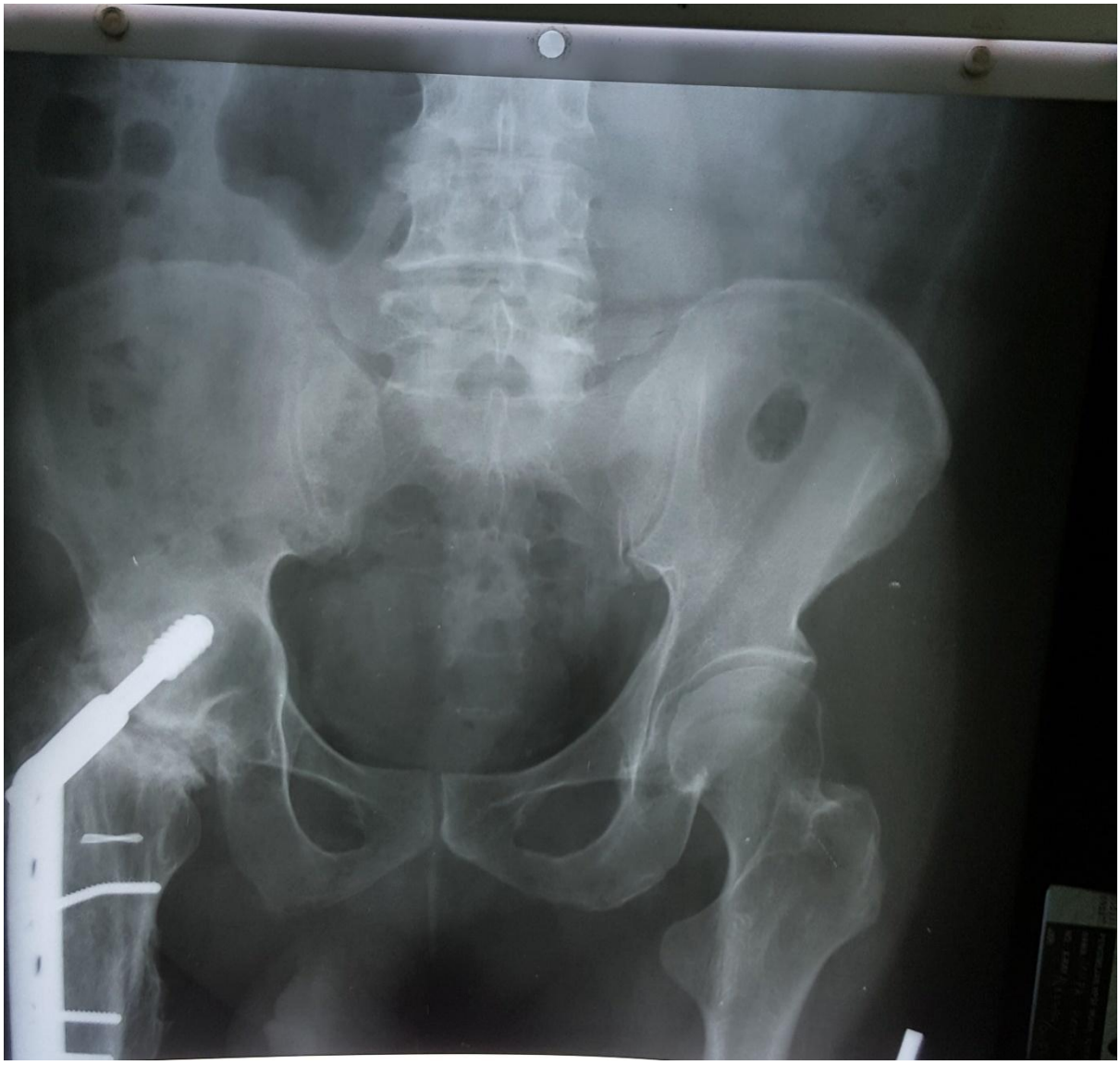

Figure 5. Post-operative radiograph of Pelvis and both Hip joints, Anteroposterior view (15/02/2010). Plain x ray showing "stage of arthritis", pathology involving articular surface. Irregular and hazy joint margins with diminished joint space on the right side.

Preoperative diagnosis was closed intertrochanteric fracture with extension to subtrochanteric right femur. The name of the operation was Dynamic Hip Screw (DHS) Right femur. The patient was in a supine position under spinal analgesia. A vertical incision was made at the lateral aspect of the right thigh. The patient was subsequently treated successfully with open reduction and internal fixation procedure. Open reduction and internal fixation with right DHS (Dynamic Hip Screw) with 8 screw holes plate was inserted first and then 6 screws were inserted to keep the bone in their places, under the guidance of Image Intensifier (C Arm).

The patient was discharged after 7 days when wound healing was good.

Rehabilitation was initiated immediately after surgery, and weight-bearing was deferred for 3 months. No weight-bearing was advised postoperatively for six weeks. Partial weight-bearing was allowed after the seventh week and started full weight-bearing walk after three months of surgery.

On 17th March 2010, Knee flexion 0 to 90 degrees and hip flexion was 0 to 45 degrees, not tender, no swelling and no inflammation. But the patient still complained of unable to bear weight without crutches. Unable to flex the knee and hip fully. Wound was clean, the suture was intact, no gapping and well healed. X-ray right hip showed that good alignment and no obvious callus seen.

The patient suffered off and on slight hip pain. However, it was not too severe. He could tolerate it. The patient was ambulating independently and wearing a shoe raise. The right lower limb and the right hip was not tender, no swelling, reduced range of movement in flexion. The patient's hip mobility was not too much improved. The knee joint had a full range of movement. The patient was on regular follow up until 18 months after the operation.

At January 2014, the patient came to regular follow up in our ortho clinic. The case was noted with non-union intertrochanteric fracture of the right femur with limb shortening and fusion at the right hip joint. We had a plan to do an operation again for this patient. Plan of operation was the Total Hip Replacement (THR) (Hip Arthroplasty). But the patient was not keen on surgical intervention.

In 2016, the patient can walk without aid, no numbness, no muscle weakness in both lower limbs. But the right hip flex deformity and shortening of the right lower limb were still present.

DISCUSSION

Nonunion of intertrochanteric fractures is uncommon as these fractures tend to occur through well-vascularized cancellous bone.[2,8,12–15]

A diagnosis of primary intertrochanteric nonunion is made when at least 15 weeks after the fracture. There is radiological evidence of a fracture line, with either no callus (atrophic) or with callus that does not bridge the fracture site (hypertrophic) and mobility of the fragments on examination under an image intensifier.[9]

The factors resulting in primary nonunion have not been dealt with in any study due to the rarity of nonunion and because of ethical issues. Only one series exclusively describes seven primary nonunion of intertrochanteric fractures [9]; five of the patients in that series had Tronzo type 4 fractures, with a large posteromedial fragment.[9]

Most of the reported nonunion have followed unsuccessful attempts at operative stabilization of fractures.[7-8,10-12]

The critical point in the surgery is the insertion of the lag screw. It should be preferably in the posteroinferior sector of the femoral head, where we think the best bone stock is available. Release of the medial soft tissues (mainly the articular capsule and iliopsoas tendon) at the level of lesser trochanter considerably facilitates the reduction of the fragments, including lateral displacement. If this medial soft tissue release is done carefully, close to the insertion, it does not impair vascularization of the femoral head. The medial opening after valgisation is filled with corticocancellous bone graft always.

Subsequent operative treatment for the non-union consists of endoprostheses, total hip arthroplasties, and repeated attempts at ORIF (Open Reduction and Internal Fixation). The patient can be achieved union following removal of internal fixation and bone grafting (five months) and sometimes require a total hip arthroplasty.

Total hip arthroplasty (THA) commonly used for fused hip joints but it is technically demanding because of the lack of surgical landmarks.[16]

There are reported cases of application of intra-medullary nail [17,18] and cannulated screws only with a good outcome. [19]

In this case, the intramedullary nail option was not considered due to the poor muscle status around the hip and undisplaced nature of the intertrochanteric fracture.

Although the weight-bearing walk was started later than the intramedullary case, the healing of the fracture and other rehabilitation of this patient went uneventful. We considered that a dynamic hip screw was also an option for the intertrochanteric fracture with the ankylosed hip.

Plain x ray (Figure 5) showing “stage of arthritis”, pathology involving articular surface. Irregular and hazy joint margins with diminished joint space on the right side. So, this is one of the causes may effect on the non-union fracture after post operation. Patient might have TB hip joint with hip arthrodesis because patient already complaint of shortening of right hip joint before the accident.

The TB of hip is still a common condition in developing countries. Early presentations are pain around hip and limp. Later the patient presents with deformities, shortening of limb and restriction of movements. Histological proof may not be necessary in all the cases in the endemic zones for TB. The management depends upon the stage of clinical presentation and the severity of destruction as visible radiologically. From conservative therapy in the form of ATT and traction to debridement and joint replacement, a variety of surgical procedures have been described. On an average 2-5% of patient's report back with reactivation of the disease within about 20 years after the apparent clinical healing of the first lesion. [20]

Osteoarticular TB is secondary to primary pathology in lungs, lymph nodes or any of the viscera. Through the hematogenous route, the bacteria reach either to synovium or bone. When it lodges first in synovium, the synovial membrane becomes swollen and congested. The granulation tissue from the synovium extends over the bone resulting in necrosis of sub chondral bone, sequestra and may be kissing lesion on either side of joint. [21]

LIPUS (low-intensity pulsed ultrasound) treatment was associated with a high rate of healing (86.2%) in a registry cohort of 767 non-union fractures that had failed to heal for at least one year prior to treatment. [22]. The LIPUS heal rate is comfortably within the range of heal rates reported after surgical revision, suggesting that LIPUS treatment may provide comparable benefit to surgery. So that LIPUS therapy may represent an effective, low-risk alternative to surgical revision in the setting of impaired fracture healing. So, we can consider for the LIPUS treatment if patient has non union fracture.

Surgical modalities for posttraumatic septic non-union would be treated with a free vascularized fibular graft (FVFG) including three strategies: i) a two-staged operation; ii) a flow-through anastomosis to conserve blood flow in the major vessels in the lower leg; and iii) continuous heparin infusion through an implanted arterial catheter. [23]

CONCLUSION

The treatment of intertrochanteric nonunion is guided by the age of the patient. In older patients with low-demand activities and poor bone quality or a damaged hip articular surface, arthroplasty allows earlier patient mobilization and greater certainty of outcome.

This patient also has a known case of TB hip joint with limb shortening. This might be one of the causes of the nonunion of intertrochanteric fractures.

The right hip joint was also seen with destruction and fusion present before the operation.

That's why THR is the best for this patient. But the patient refused for operation.

Cases with good bone stock, union in primary nonunion of intertrochanteric fractures can be achieved with internal fixation, valgization, and grafting procedures.

Disclaimer regarding Consent and Ethical Approval:

As per university standard guideline, participant consent and ethical approval have been collected and preserved by the authors

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