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Periprosthetic Femur Fracture in a 73-Year-Old Female: A Case Report

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Abstract

Increasing use of joint replacement for various conditions has led to a new group of fractures- the periprosthetic fractures. Periprosthetic fractures are considered which are associated with an orthopaedic implant. Worldwide incidence of Periprosthetic fractures is increasing due to increased number of primary joint arthroplasties and other revision surgeries. Periprosthetic femoral fracture can be classified as intraoperative & post-operative. The intraoperative periprosthetic fractures usually occur during the insertion of the femoral stem, often preceded by an area of increased cortical thickness. The management of these fractures are complex and usually needs application of basic principles to fit an individual situation rather than having a fixed set of rules. Standard treatment protocol includes use of locking plate with encirclage wires. In this study, we provide a case of periprosthetic femur fracture pain. A 75-year-old woman presented to us with pain in her right hip and thigh. The patient was a homemaker who had cemented total hip replacement surgery due to a femoral neck fracture 27 days back. After the primary replacement surgery, the patient appeared to be doing well and adhering to the hip precautions. While getting out of bed, she tripped and fell carelessly in the morning & complained of severe pain in her right hip. After assessment of all her medical conditions and physical examination, she was advised for revision surgery. An open reduction and internal fixation of the fracture with revision of the femoral component was planned. Risks, benefits, and alternatives were discussed at length with her and her family. The patient and her family agreed to the operative plan.

Keywords:- Periprosthetic Femur Fracture, revision surgery, hip arthoplasty

INTRODUCTION

Patients with total hip replacement extent a wide age range, with elderly patients being at increased risk for low energy falls, whereas younger patients may be at risk for higher energy trauma. Data-base report of the Mayo Clinic Joint Replacement noted periprosthetic hip fracture incidence of 1% (238 of 23,980) in primary hip arthroplasties and 4% (252 of 6249) in revision hip arthroplasties. Overall incidence has been reported to be high as 18%.[1] We present a case with periprosthetic femoral fractures that we treated in the current case report.

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CASE REPORT

A 75-year-old woman came to us with pain in her right hip and thigh. We performed cemented total hip replacement on her right hip 27 days back (1st September, 2020). Patient was doing well and walking pain-free. When at 27days post-operative she tripped & fall again & landed directly onto her right side. Did not lose consciousness and only complained of rt hip and groin pain and was not able to ambulate after the fall. Her past medical history is noncontributory, and her surgical history is as previously noted. Findings on physical exam include pain with axial loading and restricted internal/external rotation of the right hip. Her skin is intact, and she has good sensation to light touch and motor function through the L4-S1 distribution. She does not have any tenderness to palpation around the knee or distally. She has 2+ dorsalis pedis and posterior tibial pulses. An antero-posterior (AP) radiograph of the left hip is obtained.

X-ray of pelvis with both hip joint shows there is a periprosthetic fracture at the shaft of right femur and acetabular component was found intact. The treatment of a periprosthetic hip fracture is guided by the Vancouver classification system.

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Photo 1: A 75-year-old woman with pain

Figure 1: Initial fracture NOF (Right).

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Figure 2: Post-operative of cemented THR (Rt.).

Figure 3: Periprosthetic fracture of the shaft of femur (Rt.).

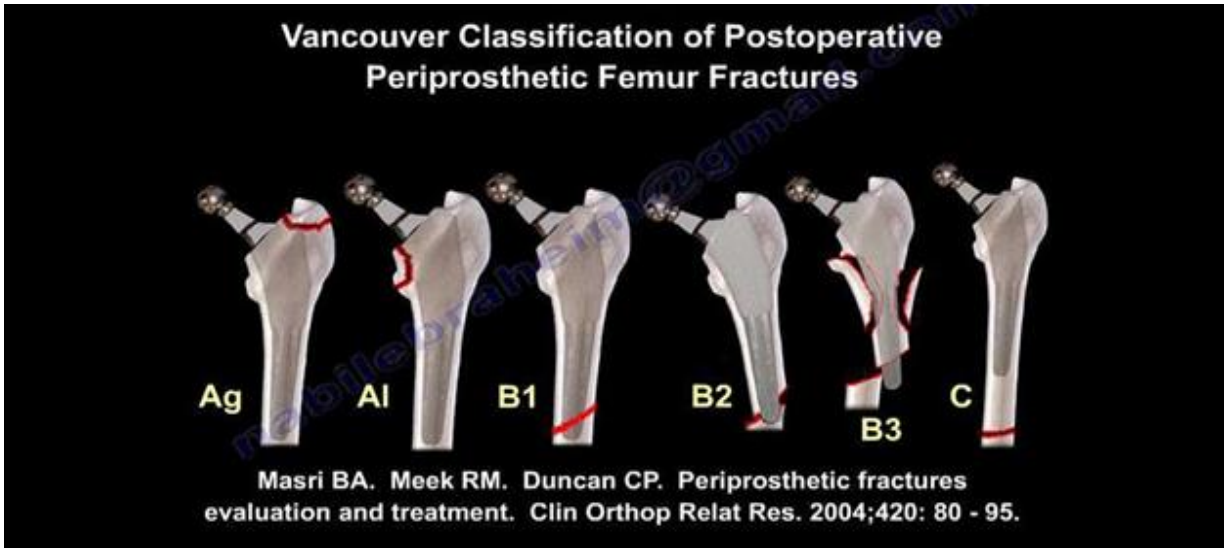

Photo 2: Vancouver classification periprosthetic hip fractures (Reproduced by Gaski GE et al., 2011)

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Figure 4: During surgery of the initial periprosthetic fracture.

Figure 5: Image of after fixation with a locking plate & screws followed by surgical wiring on the lateral side of the femur.

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Figure 6: The postoperative Right hip periprosthetic fracture.

Figure 7: The revision surgery Right hip periprosthetic fracture.

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We classified the periprosthetic fracture as Vancouver B2. A B2 fractured occurs around or just below an unstable stem, and thus revision of the femoral stem is required. Typically, long porous-coated cementless stems are used to bypass the fracture and to achieve distal fixation. In addition, the fracture fragment is fixed using plates, cable or cortical strut allografts.

Meticulous preoperative planning done for the revision surgery and to ensure a successful clinical outcome. She was advised to have revision surgery after a review of all of her medical issues and a physical test. The fracture was to be treated with an open reduction and internal fixation, as well as revision of the femoral component. The risks, advantages, and options were thoroughly explored and explained to her and her family. The patient and her family agreed to the operative plan.

Operative Notes:

Preoperative diagnosis: Periprosthetic fracture of the right hip with a loose stem and subsidence.

Procedure:

The patient was brought to the operating room and anesthesia was obtained by the anesthesiologist. Before bringing the patient in, the family, as well as the patient, understood the increased risk of the revision procedure. Removal of prosthesis, followed by removal of old cement. Open reduction of fracture fragment and application of new prosthesis with bone cement. Plate screw with followed by surgical wire were applied. Open reduction of femoral head. After anesthesia was obtained, the patient was definitively positioned with right hip up in the lateral position and the right hip was then draped and prepped in the usual sterile manner.

A curved incision centered over the greater trochanter was used for the arthrotomy. Skin and subcutaneous tissues were incised. The fascia was then divided. The fracture was then identified. The hip was then placed in internal rotation and the posterior soft tissue structures were then taken down and tagged for future repair. The loose stem along with the old cement was then removed. The fracture was identified again and open reduction done. Then stabilization by plate and screws followed by cables and were placed around the fracture. The femur was then reamed.

The final distal femur was then placed into position. The proximal femur was then reamed and the head was then placed into position and the hip was then reduced and intraoperative fluoroscopy picture was then taken. The hip was slightly lengthened and the final distal component was taken out. The final component was then placed back into position with application of bone cement. The prior head was then placed into position. The hip was then relocated and trialed through a physiological range of motion and the hip was found to be stable in all physiological ranges of motion. Intraoperative C-arm radiography was obtained additionally.

Thorough lavage was given. The final proximal body was placed into position along with the final head. The cables were then tightened again and crimped. The cables were then cut. With the hip relocated, thorough lavage was given. Drill holes wem made in the greater

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trochanter and the posterior soft tissue structures were then tagged to the greater trochanter through.

DISCUSSION

There were 21 incidences of periprosthetic femoral fracture in the patient group (11%) that were described as periprosthetic.[2,3,4] The average time to union for periprosthetic and periprosthetic femoral fractures was between five and eight months, respectively.[5,6,7] For typical periprosthetic femoral fractures, Corten et al. found a mean union time of 6.4 months.[8,9,10] They noted that investigating a small number of instances made it impossible to tell what elements were crucial in reducing union time; consequently, larger-scale studies are needed to answer the question. Biological factors such as bisphosphonates and proton pump inhibitors, as well as mechanical ones such as physical force against the lateral cortex of the femur, are thought to affect periprosthetic femoral fracture.[11,12,13,14] One of the mechanical reasons is lateral bending of the femur in the frontal plane.[15,16,17] According to Oh et al., bisphosphonates were not used in 6 of 12 cases of low-energy femoral shaft fractures. They argued that stress fractures linked with a femoral shaft bending deformity occurred and that they should be recognized as a possible cause of periprosthetic femoral fractures.[18,19,20,21,22] As a preventative treatment for incomplete AFF, Kharazmi et al. presented lateral plating that might work as tension band plating against tensile pressures in the lateral side of the bowing femur and reported its efficiency. This could indicate that lateral bowing is a factor in the development of periprosthetic femoral fracture.[23]

The mechanical nature of the current fracture could explain why it did not heal after the first osteosynthesis. Bony union can be harmed by a significant gap between pieces following the first osteosynthesis. We replaced the stem with a longer stem to penetrate the sclerotic nonunion site and inserted a longer locking plate to boost rotational stability and permit a fixation of the entire femur to limit the risk of secondary fracture during the revision procedure. Furthermore, this plate enables for the implantation of polyaxial locking screws, which is beneficial for the fixation of periprosthetic fractures. As with the tension band plating described before, this locking plate may contribute to the stability of the fracture site.[23]

A growing body of research suggests that periprosthetic fractures can have a pathogenesis similar to periprosthetic femoral fractures. This sort of periprosthetic fracture must be avoided at all costs.

CONCLUSIONS

Most cases of periprosthetic femur fracture require surgery. The fixation of periprosthetic femur fracture remains a challenge to even the most experienced orthopedic surgeon despite the common nature of the problem. Treatment outcome depend upon-amount of the force involved in the injury also upon the quality and strength of the bone around the implant. Although treatment of periprosthetic femur fracture is often challenging as patients are usually older, osteoporotic bone and may have other medical conditions.

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In physically and financially compromised patients, at times one has to think of some different modes of management. In this case we have used locking plate and screw with fair result. Long term follow up of this case is awaited. We may follow up on this technique with more cases as and when required and hopefully present such cases to validate the statistical applicability of such technique.

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