

A Rare Case of Revision Bipolar Hemiarthroplasty in a 75-Year-Old Female

Shantanu Hemant Patil, Santosh Borkar, Sameer Desai, Ameya Nandanwar,
Vijith Hegde

Department of Orthopaedics, MIMER Medical College, Pune, Maharashtra, India

ABSTRACT

Fractures involving bones containing a component of a prosthetic joint are becoming more common. The causation is multifactorial, but most of these injuries are associated with trivial trauma. The options available for operative management of these fractures include, internal fixation of the fracture alone, fixation of the fracture with revision of the prosthesis, and reconstruction of proximal femur with either modified impaction bone grafting or proximal femoral replacement. We present here a case of bipolar prosthesis stem breakage, in which the broken implant was removed with great difficulty. This case is being presented on account of its unusual presentation and difficulties encountered in revision of broken bipolar prosthesis. A broken prosthesis is not a common incident. Thus the treatment had to be individualized. Since the prosthesis was well fixed, and the proximal part of broken stem was easily removed, the distal part of broken stem could only be removed with great difficulty from the femur after removing the fixing cement with specialized instruments and through a vertical window created into the femur. Subsequently this was replaced with a long stem custom made bipolar prosthesis to complete the rehabilitation.

Key words: Prosthesis, rare case, revision bipolar hemiarthroplasty

INTRODUCTION

Periprosthetic femoral fracture is a devastating complication after total hip arthroplasty and is associated with a high rate of postoperative complications and often a poor clinical result.^[1,2] The exact prevalence of postoperative periprosthetic fracture is more difficult to determine but is estimated to be approximately 1% over the life of the prosthesis.^[3]

The causation is multifactorial but most of these injuries are associated with trivial trauma. The various risk factors for post-operative periprosthetic fractures are loosening of the femoral component, osteolysis due to wear debris and most importantly cortical stress risers.^[4,5] Currently the Vancouver classification system is used for classifying Periprosthetic fractures.^[6] The options available for operative management of these fractures include internal fixation of the fracture alone, fixation of the fracture with revision of the prosthesis, and reconstruction of proximal femur with either modified impaction bone grafting or proximal femoral replacement. We present here a case of periprosthetic fracture Vancouver type B1 with a broken prosthesis in-situ. The distal broken stem of the implant was firmly fixed in the bone and could only be removed with great difficulty by making large window and carefully removing the fixing cement. The rehabilitation was

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Address for correspondence:

Shantanu Hemant Patil, Department of Orthopaedics, MIMER Medical College, Pune, Maharashtra, India.
E-mail: shantanupatil0808@gmail.com

accomplished by replacing the broken implant by a steel long-stem prosthesis. Following the extensive and challenging revision surgery, the patient was managed by use of femur brace and bed rest. Further, a small undisplaced fracture which had developed at the end of new bipolar prosthesis eventually healed without any problem.

CASE REPORT

An 75 year old female presented to outpatient department of a tertiary care centre in rural India. Patient had been operated as a case of left neck of femur fracture with Bipolar Hemiarthroplasty in 2018. The patient subsequently had history of fall over same left hip 1 year later in November 2019. She had complaints of inability to stand and walk since then. Patient then got admitted in our hospital and fitness was done and patient was posted for surgery. While in hospital patient had a myocardial infarction so the surgery was postponed as the patient then underwent angioplasty in February 2020. Patient again got admitted in our hospital for further management. Patient was known case of hypertension since 1 year and on medications. Patient was also a known case of hypothyroidism on treatment. Patient was on Tab Aspirin 75mg bid and Tab Clopidogrel 75mg bd.

On examination, tenderness was present over left hip joint. Range of motion at left hip joint was painful and restricted. Active straight leg rising test was not possible on left side. Active ankle and toe movements were present. No distal neurovascular deficit was present. Capillary refill was normal.

Investigations

A plain radiograph of Pelvis with both hips anteroposterior view and left hip lateral view was taken. Radiographs showed Vancouver type B1 periprosthetic fracture with a broken cemented bipolar prosthesis in-situ. Bone was completely healed around the broken stem of implant. All routine blood investigations were done. Lab reports were normal. Fitness was done and then patient was planned for revision bipolar hemiarthroplasty with long stem implant.

Pre-operative Workup

Cardiorespiratory fitness was done along with anaesthesia fitness. Patient was counselled about

the operative procedure and a written and informed consent were taken from the patient and relatives. 3 days prior to surgery antiplatelet medications were put on hold. The day before surgery patient was advised nil by mouth. Part preparation was done. Xylocaine sensitivity test was done. Inj TT was given, Foleys catheterization was done. Patient was given enema at 6 pm day before surgery with betadine scrub bath at 6pm in the evening and early morning.

Operative History

Patient was kept in lateral position. A posterolateral approach used. Previous implant proximal aspect found to be loose and could be removed fairly easily. However the distal aspect of the implant was well fixed with the cement. This cement was removed with great difficulty by making a window over the femur shaft and only then could the distal implant be removed.

After removal of the broken implant, a new long stem implant, 254mm long and of 11mm size was used as replacement. Head size of 41mm x 0° given. Distal locking bolts were inserted into the implants for additional stability.

Intra-operatively patient was given 1 pint PCV.

Post-operative History

Post operatively patient was given 3 pints of packed cell volume. Patient was stable with both lower limbs maintained in abduction with abduction bar. Patient was advised strict bed rest and non-weight bearing.

However during shifting of the patient for a post-op x-ray, the patient developed severe pain in the left thigh. The xray done showed fresh a fracture near the tip of newer bipolar prosthesis. However as the fracture was minimally displaced, the patient was given a long femur brace and advised bed rest for 3 months. The fracture eventually united after 4 months and then physiotherapy with guarded mobilisation of the patient was started and patient did not require any other surgery till last follow-up.

Outcome

Fracture line seen at distal tip of implant, however it is not displaced. Patient given femur brace. Delayed weight bearing advised. Follow up for physiotherapy



Figure 1: Pre-operative anteroposterior radiograph of the patient - Plain radiograph of the left hip and thigh region showing a Vancouver type B1 periprosthetic fracture with a broken cemented bipolar prosthesis *in-situ*



Figure 3: Post-operative X-ray anteroposterior X-ray of pelvis with both hips fresh fracture near the tip of newer bipolar prosthesis



Figure 2: Pre-operative radiograph of the patient - Plain radiograph of the left hip and thigh region showing a Vancouver type B1 periprosthetic fracture with a broken cemented bipolar prosthesis *in situ*

done. Serial X rays showing good union of distal fracture and union at window site.

DISCUSSION

Fractures of the ipsilateral femur in patients with previous hip replacements have long been recognized as a significant problem associated with the procedure. As the number of patients being rehabilitated with a hip implant are increasing, these are becoming more common. Various authors like Beals RK *et al.* have



Figure 4: Follow-up X-ray at 3 months showing uniting periprosthetic fracture

advised traction as a method of non-operative treatment of these fractures especially in patients with high risk for surgery.^[3] Casts and braces can also be used to treat these fractures as has been reported in other studies.^[7,8] Surgical options include either internal fixation using circlage wires or cables.^[3,9] One study described the use of screws with and without plates along with the use

of circlage wires and cables.^[10] Other commonly used mode of treatment is revision of the femoral component. Options for revision include cemented and uncemented stems, long stems with proximal or extensive porous coating and stems with distal interlocking screws. In rare instances the whole of the proximal femur can also be removed and replaced by proximal femoral mega prosthesis.^[11]

If the prosthesis is loose, then bone undergoes resorption and is at increased risk of failure. It therefore follows that treatment of a fracture secondary to a loose prosthesis requires revision of the prosthesis. On the other hand, a fracture in a bone with a well-fixed prosthesis following significant trauma requires treatment along the same principles as any other fracture, the only extra consideration is that of restrictions on choice of trauma implant due to the presence of an intramedullary prosthesis, unless the security of fixation is compromised by the fracture configuration. The choice of treatment is therefore determined primarily by whether or not the prosthesis is well fixed, and only secondarily by the site of the fracture. In our case the prosthesis itself was broken along with a periprosthetic fracture and the stem of the prosthesis was well fixed in the bone. There was success in removing the stem of the prosthesis and then revision bipolar hemiarthroplasty with long stem prosthesis was done. Though the patient had a challenging post-operative period, the long-term outcome has been good and patient had regained her mobility.

CONCLUSION

Case of periprosthetic fracture in a operated bipolar hemiarthroplasty patient though rare is not uncommon. It requires a lot of preoperative planning and advanced instrumentation and techniques to remove firmly fixed broken components specially if cement is used for fixation of prosthesis.

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J qy 'q'ebg<Patil SH, Borkar S, Desai S, Nandanwar A, Hegde V. A Rare Case of Revision Bipolar Hemiarthroplasty in a 75 Year Old Female. *MIMER Med J* 2021;5(1):37-40.

Uqwt eg'qilUwr r qt v<Nil. **E qphlev'qih k'pvt gw**<None declared.

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