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Original Research Paper

Orthopedics

A CASE-SERIES ON OUTCOME OF KOCHER LANGENBECK APPROACH WITH TROCHANTER FLIP OSTEOTOMY FOR TREATMENT OF ACETABULAR FRACTURE AT A TERTIARY CARE CENTER IN BIHAR

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ABSTRACT The Kocher–Langenbeck approach provides adequate surgical exposure and is recommended in the majority of posterior acetabular injuries and some selected fractures involving both columns. Methodology: This is a retrospective study of prospectively collected data from patients operated between August 2018 to July 2020. The follow-up period was 1 year that completed for all cases in June 2021. Results: From August 2018 to July 2020, 25 displaced acetabular fractures were treated by open reduction and internal fixation using this approach. The fractures were managed using a Kocher–Langenbeck approach along with trochanteric flip osteotomy. The mean age of the patients was 35.6 years (range 19–67 years) with a mean follow-up of 9.9 months (range 6-12 months). Conclusion: The trochanteric flip osteotomy is a very effective technique to fix certain acetabular fractures especially with dome involvement. It is a precise surgery without associated significant complications.

KEYWORDS : Acetabular fracture, Kocher Langenbeck approach

Introduction

The Kocher–Langenbeck approach provides adequate surgical exposure and is recommended in the majority of posterior acetabular injuries and some selected fractures involving both columns. However, in certain posterior wall fractures with significant superior dome involvement, especially in obese patients, visualization of the superior portion of the acetabulum provided by this classical approach is insufficient. In order to visualize such fractures, excessive retraction can damage the abductor muscles and neurovascular structures (superior gluteal neurovascular bundle). In this condition, trochanteric osteotomy can be used to extend the exposure of the Kocher–Langenbeck approach superiorly and anteriorly. In addition, certain transverse, transverse plus posterior wall, T-type and associated posterior column plus posterior wall fracture patterns may be treated using this approach. [1] However, the fear of possible complications like non-union of the osteotomy site, abductor weakness as well as extra implants for fixation, constrains the surgeons to avoid using this procedure. [2, 3] To overcome these problems, trochanteric flip osteotomy is a modified technique which has been described and recommended by many authors. [4, 5] In contrast to standard procedure, in the trochanteric flip approach, the tendinous attachments of the gluteus muscles are left intact proximally and the tendinous origin of the vastus lateralis is left intact distally, which provides a neutralizing force to that of the gluteal muscles and thereby reduces the tendency of the trochanter to migrate proximally. [1, 4] This study aims to report our experience with this technique for the management of acetabular fractures.

Methodology

This is a retrospective study of prospectively collected data from patients operated between August 2018 to July 2020. The follow-up period was 1 year that completed for all cases in June 2021. The study was done at the Darbhanga Medical College &Hospital, Darbhanga, Bihar. The inclusion criteria were any patient with (1) posterior fracture dislocation of hip with significant posterosuperior wall fractures, (2) posterior column acetabular fractures or combined posterior column and wall fractures and (3) transverse fractures with posterior wall fractures.

We kept a low threshold for performing this digastric osteotomy in posterior and transverse acetabulum fractures with dome or cranial extension, with posterosuperior comminution in which we felt that direct visualization of the fracture lines would be better served.

The patients included in study were those who received operation August 2018 to July 2020. Out of the 63 total operated acetabular fractures, 25 patients were operatedusing this approach. Complete examination of all the patients with such fractures was done both clinically and radiologically including Judet views (Fig.1, Fig.2) after preliminary stabilization of patient and reduction of hip.

Fig 1: AP view of the pelvis showing a posterior column with posterior wall acetabular fracture on the right side

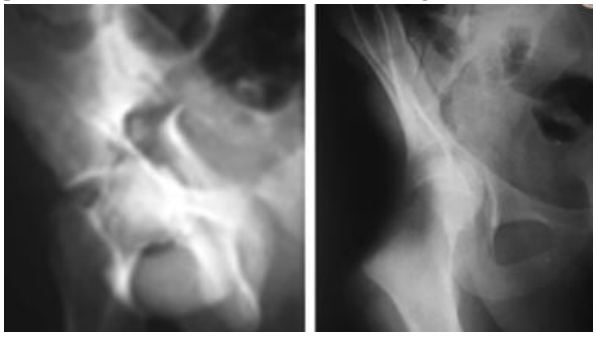

Fig 2: Judet views of the acetabular fracture, a) Iliac view b) obturator view

Under suitable anesthesia, patient was placed in lateral decubitus position and Kocher–Langenbeck approach was used. In this approach fascia is incised in line with skin incision in the distal part of the incision while gluteus maximus is split in the proximal part. The trochanteric bursa was incised and reflected to expose the surface of the greater trochanter. The leg was internally rotated to view the posterior border of gluteus medius and postero-superior edge of the greater trochanter. The osteotomy site was marked with the cautery, starting proximally from the posterosuperior edge of the

greater trochanter to the posterior border of the vastus lateralis ridge distally. Then, with a thin oscillating saw, osteotomy is done, with its plane in line with the direction of external rotators (Fig 3).

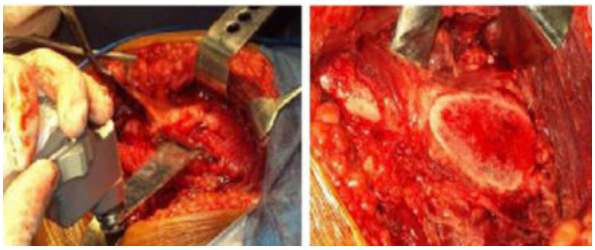

Fig 3: Osteotomy being done with a thin oscillating saw. The direction of osteotomy is in line of external rotators. The greater trochanter has been flipped anteriorly long with the gluteus medius and vastus lateralis.

On the first postoperative day, patients were allowed for sitting, side turning and pelvic lifting exercises. Toe touch weight bearing was allowed in all patients within first week if possible. Deep vein thrombosis prophylaxis involved aspirin till stitch removal and rivaroxaban for further 4 weeks. Suture removal was done on twelfth postoperative day. Follow-up of the patients was done at 6 weeks, 3 months, 6 months and at the end of 1 year.

Results

From August 2018 to July 2020, 25 displaced acetabular fractures were treated by open reduction and internal fixation using this approach. The fractures were managed using a Kocher–Langenbeck approach along with trochanteric flip osteotomy. The mean age of the patients was 35.6 years (range 19–67 years) with a mean follow-up of 9.9 months (range 6-12 months). Fifteen (60%) patients had fracture dislocation with posterosuperior acetabular wall involvement, 6 (24%) patients had posterior column fracture and 4 (16%) patients had transverse fracture associated with posterior wall fracture. Mechanism of injury in all patients was motor vehicle crash. The mean time to surgery was 5.9 days (range 1–21 days). Four (16%) patients out of 25 had marginal impaction in which bone grafting was done. Two patients had preoperative sciatic nerve involvement which fully recovered at the end of 1 year follow-up. Use of tri-cortical graft was done in 2 patients in whom posterosuperior wall was highly comminuted. Congruent reduction was achieved in all patients and all osteotomies healed within an average of 4.1 months. No special intervention was carried out in cases in which delayed healing of the osteotomy was observed on follow-up radiographs. The maximum period of union was 5 months, seen only in 4 out of 25 cases. The other 21 cases achieved union in 12–16 weeks. All our patients were allowed full weight bearing at the end of 3 months with no abductor lurch at the end of 6 months follow-up. There were no cases of avascular necrosis (AVN) at the end of the follow-up period of 1 year. To specifically observe for any sign of AVN, patients undergoing fixation of acetabular fracture with trochanteric flip osteotomy were further followed up till the end of 1 year. None of the patient had hip pain or radiological features suggestive of AVN at the last follow-up. Clinical evaluation was based on the modified Merle d'Aubigne and Postel score. The hip function and score were assessed using this method which included 3 parameters: pain, mobility and ability to walk. Clinical scoring was excellent in 16 cases, good in 6 cases and fair in 2 cases. The strength of the abductors assessed according to the Medical Research Council (MRC) grading was grade 5/5 in 16 patients, 4/5 in 6 patients and 3/5 in 2 patients at the end of 1 year follow-up. As for complications, 1 patient had postoperative sciatic nerve palsy which recovered by the end of follow-up. One patient had postoperative infection which was fully controlled by debridement. Only in two patients, Brooker's class 1 heterotopic ossification was seen. [6] No patient had trochanteric pain or symptoms suggestive of trochanteric bursitis at the end of the follow-up period.

Discussion

Improved visualization is the most important benefit and indication for trochanteric osteotomy. In trochanteric slide approach, the tendinous attachments of the gluteus muscles are left intact proximally and the tendinous origin of the vastus lateralis is left intact distally. [1, 4, 5] This provides an advantage of limiting trochanteric migration to reduce nonunion and creates additional trochanteric stability to enhance osseous union. Our results were generally favorable which is well supported in previous literature. [7, 8]

A rare but major concern in trochanteric flip osteotomy which has been stressed in literature is trochanteric nonunion which leads to migration of trochanter and impaired abductor function. [9, 10]In a study of 213 cases, only 3 cases of failure of trochanteric fixation were reported. [5]Another study showed one case of nonunion and two cases of avulsion of trochanter and migration. [11]A study of 10 patients showed no nonunion or upward migration of greater trochanter. Although one study found heterotopic ossification in 6 out of 10 patients, none of them were clinically significant. [1] Ebraheim and Wong [12] reported satisfactory clinical results with this technique for five cases of acetabular fractures and total hip replacements. In our study all osteotomies healed uneventfully. All trochanters were radiographically and clinically united at 4.1 months after surgery. The rate of nerve palsies in acetabular fractures is about 16% and this incidence increases to 40% when a posterior dislocation is present. [13]Iatrogenic nerve palsy acetabular surgery accounts for 2%–6% and mainly associated with combined and extensile approaches and the sciatic nerve is most commonly involved. [13]In our study, one patient had postoperative sciatic nerve palsy which recovered by the end of follow-up and two patients had preoperative sciatic nerve involvement which recovered at the end of 1 year follow-up. Our results of nerve palsies are comparable with previous studies. [14]Heterotopic ossification is reported [1, 13, 15, 16]but the incidence is less significant when only Kocher–Langenbeck approach is done as compared to other extensile approaches. [17]In our study only two patients had a mild grade 1 heterotopic ossification. There were mainly two reasons behind the low incidence of this complication. Firstly, overzealous retraction of gluteus medius was avoided for complete visualization of acetabular fractures because of the flip osteotomy. Secondly, the injured gluteus minimus which is mainly responsible for heterotopic ossification was sharply dissected off under vision in all our patients.

A recent study on combined transverse and posterior wall fractures and multi-fragmentary posterior wall fractures, treated by making use of the flip osteotomy to enhance fracture visualization also highlights the advantages of this technique. [18]

Conclusion

The trochanteric flip osteotomy is a very effective technique to fix certain acetabular fractures especially with dome involvement. It is a precise surgery without associated significant complications. Besides enhanced surgical and fracture exposure, it also offers advantages like preservation of abductor strength, reliable healing of the flip osteotomy and no additional risk of damaging the vascularity of femoral head.

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Conflict of interest: None declared by any of the authors

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