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Proximal fibular osteotomy for medical compartment OA knee

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Abstract

Medial compartment osteoarthritis knee is a major health problem. Unicompartmental osteoarthritis can be treated with corrective osteotomy to transfer the load from pathological to normal condyle.

Proximal fibular osteotomy is emerging as new treatment modality for young patients, providing immediate pain relief and improvement in functional capacity.

A total of 72 patients of primary medial compartment osteoarthritis of the knee were included in the study. Under regional anesthesia a 1 – 1.5 cm cuff of fibula was resected, 6 – 8cm below the fibular head.

Patients were discharged on the same day with full weight bearing walking on the operated limb.

Visual Analogue Scale (VAS) and American Knee Society Score (AKSS) were calculated on 3 months and at final follow-up.

Medial joint line pain decreased in all the patient. All the patients showed significant improvement in AKSS. Post-op weight bearing radiography showed significant increase in medial joint space.

Osteotomies, specially High Tibial Osteotomy (HTO) becomes a standard treatment for unicompartment osteoarthritis of the knee. However delayed weight bearing, non-union/delayed-union, peroneal nerve palsy and wound related complication common with HTO.

PFO is emerging as a new surgical treatment in management of medial compartment osteoarthritis for providing pain recovery and improve functional outcome.

We conclude that PFO is a recommended treatment for medial compartment osteoarthritis of the knee, which is simple, safe, cheap minimally invasive procedure.

Keywords: Medial compartment osteoarthritis; Uni osteoarthritis knee; proximal fibular osteotomy

1 Introduction

Knee osteoarthritis (OA) is a major public health problem causing chronic pain and work incapacity in the elderly population.

It manifests as joint pain, limitation of joint mobility, reduction in physical functioning and diminishes the quality of life. Increasing age⁽¹⁾ and obesity⁽²⁻⁴⁾ are considered to be significant risk factors, for

development of OA knee. Previous knee injuries⁽⁵⁾ and occupational activities⁽⁶⁻⁸⁾ are also found to be associated with development of OA knee. Joint space narrowing and development of osteophytes are the characteristic pathological features.

Total knee replacement (TKR) is the main surgical remedy in such patients, which relieves pain and improves joint function and mobility. Patients with unicompartmental OA of the knee can be treated with a correction osteotomy. Corrective osteotomy works by transferring the load bearing from the pathologic to the normal compartment of the knee. High tibial osteotomy

(HTO) is the preferred treatment for osteoarthritis involving medial compartment of the knee in young patients⁽⁹⁾. Proximal fibular osteotomy (PFO) is emerging as a new treatment modality for osteoarthritis involving the medial compartment of knee. This procedure is simple, short and riskless. It provides immediate pain relief and improvement in functional capacity.

The objective of our study is evaluation of results of PFO in osteoarthritis involving the medial compartment of the knee joint, in terms of pain relief and functional improvement. PFO is economic and provides pain relief in almost all the patients. It delays the progression of degenerative changes, hence delays knee replacement. We have evaluated 72 patients in our study, who were then prospectively followed for 1-2 years.

2 Materials and methods

A total of 90 patients with medial compartment OA knee were operatively managed using PFO technique from January 2015 to December 2015 at the author's institute. Of these, 18 patients were lost to follow up. So, the present study was centered upon 72 patients. Written and informed consents were obtained from all the participants.

The patients presented with complaints of pain, intermittent swelling or restricted terminal movements of knee joints, interfering with activities of daily living in the outdoor patient department. Patients with acute traumatic history, inflammatory joint disease, OA involving lateral or bilateral knee compartment, and genu valgus deformity were excluded from the study. Detailed history was taken and bilateral knee joint examination was done. Medial joint line tenderness was a usual finding in patients with medial compartment OA knee. Standard radiographs of the involved knee joint were obtained. The antero posterior view in standing position and lateral view in 30 degrees of flexion were preferred. The ratios of the knee joint space on the medial and lateral side were calculated. Pain was assessed using visual analogue scale (VAS)⁽¹⁰⁻¹²⁾, and clinical and functional evaluation was done using American Knee Society Score⁽¹³⁾ (AKSS).

Routine hematological investigations were done. Under regional anesthesia, in supine position, involved limb was

prepared and draped. Tourniquet was routinely applied and inflated unless contraindicated. A 3-4 cm incision was given on the lateral aspect of the leg, over the fibula, 6-8 cms below the fibular head. The position of the incision was marked using the scale. Soft tissue and muscles were retracted using the Hohmann's retractor. Figure 1 shows the level of the incision used for PFO. Fibular shaft was exposed and stripped of periosteum. 2-3 holes were drilled over the exposed fibula with 2mm K wire, 1-1.5 cm apart, marking the segment of fibula to be removed. Marked fibular segment was then excised using the oscillating saw, or osteotome.

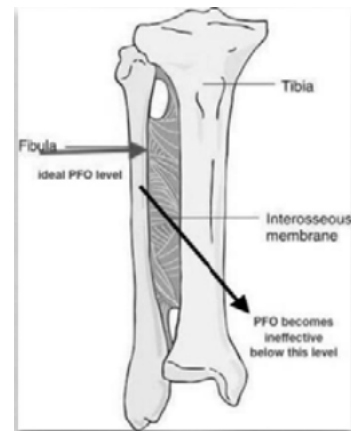


Fig 1. PFO

Figure 2 shows the excised fibular segment. Skin was closed with nonabsorbable sutures.



Fig 2. PFO

Patient was discharged on the same day and allowed full weight bearing. Standard weight bearing post operative radiographs were obtained. Patients were followed up in the outpatient department on regular basis. VAS and AKSS score were recorded at 3 months and final follow up.

3 Results

In our study, gender distribution showed female preponderance with 54 female and 18 male patients. Mean age of female and male patients was 55.4 years (Range 38-81 years) and

66.5 years (Range 44-85 years), respectively. 22 patients had bilateral knee involvement, of which 16 were operated simultaneously for both sides. In the remaining 6 patients, more symptomatic knee was operated first, followed by the other after 2- 3 weeks. The average time taken for performing unilateral PFO was 24 minutes (range 18- 38 minutes). The average blood loss was 5+2.75ml. No post operative complications were seen in any patients.

The patients were followed for a minimum period of 12 months. The average follow up period was 18.5 months (range 12- 30 months). Pain assessment was done using VAS score. Medial knee pain was relieved in all the patients. The mean VAS score in the pre operative, 3 months post operative and final follow up period were 8.35, 4.88 and 2.44 respectively. This decrease in VAS score was statistically significant as demonstrated in Figure 3.

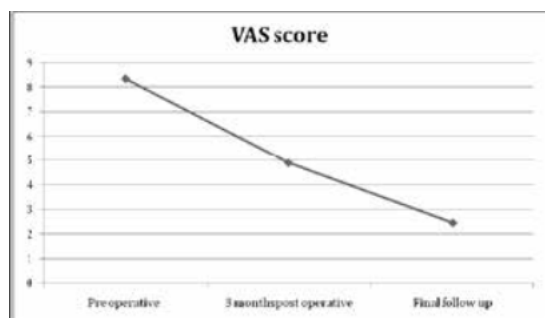


Fig 3. Graph demonstrating significant improvement in VAS score of patient treated with PFO

AKSS was used for clinical and functional evaluation. The mean knee/ functional subscores were 45.64/43.72, 62.10/70.08 and 79.72/80.72 at pre operative, 3months post operative and final follow up period respectively. The patients showed significant improvement in AKSS score (Figure 4). Table 1 shows the mean VAS and AKSS score, pre operatively and at follow up periods.

Post operative weight bearing radiographs of the involved knee joint showed significant increment in medial joint space when compared to pre operative radiograph as shown in Figure 5.

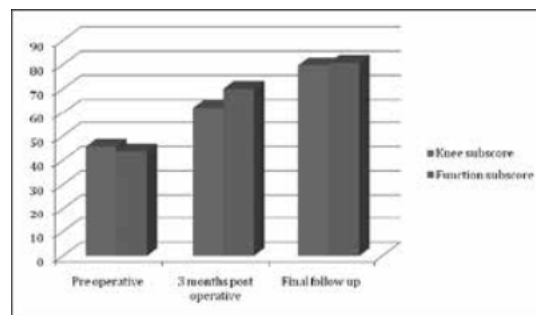


Fig 4.



Fig 5. PFO

4 Discussion

Osteoarthritis (OA) of the knee joint is a common disorder affecting the elderly, having a prevalence rate of about 30% in patients above 60 years of age⁽¹⁴⁾. OA involving the medial compartment is very common in Asian population, because of a preponderance of varus knees. This causes unbalanced weight distribution on knees, destroys articular cartilage, hence leading to OA^(15,16).

High tibia osteotomy (HTO) was first proposed in 1958 by Jackson for prophylaxis and treatment of medial compartment OA knee⁽¹⁷⁾. Osteotomies around knee became a standard treatment for unicompartmental OA knee. They alter the axis of weight bearing of the lower extremity⁽¹⁸⁾ and unload the affected compartment by transferring the weight from the affected area, hence reducing pain and slowing the degenerative process^(19,20). However, delayed weight bearing, non union or delayed union, personal nerve palsy and wound related complications, are common with HTO^(21,22). Total Knee Arthroplasty (TKA) is effective in relieving pain and improving knee function in patients with advanced stage OA

knee⁽²³⁾. It is considered to be first-line procedure for end-stage OA knee. However, in younger patients TKA is reported to be inferior with a survival rate of 76% at 10 years⁽²⁴⁾. TKA is expensive, complex and is associated with complications that may require a revision TKA^(25–27).

Recently, PFO is emerging as an new surgical technique for medial compartment OA knee, providing pain relief and functional improvement of joint. There is not much evidence regarding PFO in literature. Xiaohu Wang et al (2017)⁽²⁸⁾ conducted a study to evaluate the results of PFO in OA knee, and concluded that PFO provides immediate pain relief and significant improvement in functional capacity. Also, it corrected the axial alignment of lower limb, in some patients. PFO redistributes load between medial and lateral tibial condyles, hence improving joint medial joint space, and causing pain relief.

Yang et al⁽²⁹⁾ in 2015 reported that, PFO being a simpler surgical procedure compared to HTO and TKA can be effectively used in medial compartment OA knee. It significantly improves the functional ability and radiographic appearance of the knee. PFO also corrects the varus deformity of knee and provides long term pain relief. A total of 110 patients were included and all showed significant improvement in mean VAS and mean AKSS score. Prakash L⁽³⁰⁾ states that PFO can be used day care procedure for medial knee OA, which allows immediate weight bearing, realigns the knee joint, and reproduces the medial space.

5 Conclusion

Medial compartment OA knee is a very common disorder affecting the lifestyle of elderly population in India. A variety of remedies are available. With our prospective study, we concluded that PFO is a convincing treatment modality for osteoarthritis involving medial compartment of knee joint. It is simple, safe and minimally invasive surgical procedure providing immediate relief from symptoms. It is a cheap and reliable surgical alternative to HTO and TKA and is less technically demanding. Also, patient can also undergo TKA in future if needed.

Conflicts of interest: None

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