

Arthroscopic management of popliteal cysts

Amite Pankaj, Deepak Chahar, Devendra Pathrot

ABSTRACT

Background: Management of popliteal cyst is controversial. Owing to high failure rates in open procedures, recent trend is towards arthroscopic decompression and simultaneous management of intraarticular pathology. We retrospectively analysed clinical results of symptomatic popliteal cysts after arthroscopic management at 24 month followup.

Materials and Methods: Retrospective analysis of hospital database for patients presenting with pathology suggestive of a popliteal cyst from June 2007 to December 2012 was done. Twelve cases of popliteal cyst not responding to NSAIDs and with Rauschnig and Lindgren Grade 2 or 3 who consented for surgical intervention were included in the study. All patients underwent arthroscopic decompression using a posteromedial portal along with management of intraarticular pathologies as encountered. Furthermore, the unidirectional valvular effect was corrected to a bidirectional one by widening the cyst joint interface. The results were assessed as per the Rauschnig and Lindgren criteria.

Results: All patients were followed for a minimum of 24 months (range 24-36 months). It revealed that among the study group, six patients achieved Grade 0 status while five had a minimal limitation of range of motion accompanied by occasional pain (Grade 1). One patient had a failure of treatment with no change in the clinical grading.

Conclusion: Arthroscopic approach gives easy access to decompression with the simultaneous management of articular pathologies.

Key words: Arthroscopy, popliteal cyst, unidirectional valve, arthroscopic decompression cyst

MeSH terms: Arthroscopy, cysts, popliteal space, arthroscopic surgical procedures

INTRODUCTION

Popliteal cysts were defined by Baker in 1877, as a collection of fluid in the semimembranosus bursae.¹ Consensus is evolving around the genesis of cysts owing to intraarticular pathologies and their persistence due to valves at the cyst joint interface.^{2,3} It's worth noting that valves are said to exist in 50% of normal adult population,⁴ thereby consolidating the view that pathology lies in unidirectional nature of flow at the valve rather than at the valve itself.

Classically managed conservatively, recurrent and functionally compromising cysts have been subjected

to various interventions in form of sclerotherapy, open resection^{5,6} and lately arthroscopic decompression.⁷⁻¹⁰

Open resection and sclerotherapy showed poor results suggesting the need to deal with the underlying cause of recurrence.^{5,6} Various studies attribute their origin to underlying pathology in the knee joint thereby advocating the arthroscopic decompression and simultaneous management of the intraarticular knee pathology.⁹⁻¹¹

In view of promising results of published outcomes of arthroscopic management of popliteal cyst,⁷⁻¹² we conducted a retrospective case series study to evaluate the clinical outcomes of arthroscopic management of popliteal cyst.

MATERIALS AND METHODS

Hospital database was evaluated for patients presenting with pathology suggestive of a popliteal cyst from June

Department of Orthopaedics University College of Medical Sciences and Guru Teg Bahadur Hospital, New Delhi, India

Address for correspondence: Dr. Deepak Chahar,
University College of Medical Sciences and Guru Teg Bahadur Hospital,
New Delhi, India.
E-mail: dc_taj@yahoo.com

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2007 to December 2012. These were diagnosed by clinical features in form of pain and swelling in the posterior aspect of knee with or without limitation of range of motion.

Diagnosis was supported by magnetic resonance imaging in all cases. Routine radiographs of knee were obtained and patients were classified as per Rauschnig and Lindgren grading. Of the thirty two patients evaluated only those who had failure of trial of conservative management in the form of RICE regimen (Rest, Ice, Compression and Elevation), nonsteroidal anti-inflammatory agents and/or physiotherapy for 3 months associated with functional compromise (Grade 2 and 3 as per Rauschnig and Lindgren)⁶ were offered surgical intervention. Seventeen such patients were identified, of these twelve patients who consented for arthroscopic intervention were included in the study. Associated intraarticular pathologies were also noted [Table 1]. Although 11 patients had classical features of popliteal cyst, one having associated osteoarthritis had confounding clinical picture, he was still included in the study on the basis of localization of pain at the posterior aspect of knee and restriction of flexion attributable largely to the mechanical block by the popliteal cyst.

All patients underwent arthroscopic decompression under regional anesthesia.

Decompression of cyst was followed by widening of its valvular connection; this was accompanied by the management of associated articular pathology as encountered. Clinical results were assessed by measuring the parameters outlined by Rauschnig and Lindgren.⁶

Operative procedure

All patients were managed using a 30° arthroscope. Three portals were used namely anterolateral, anteromedial and posteromedial. Diagnostic arthroscopy was done by the standard anterolateral and anteromedial portals. We examined the posteromedial compartment via trans condylar approach as described by Gillquist *et al.*¹³ Knee was placed in 90° of flexion, a 30° arthroscope was used via anterolateral portal to identify the interval between the posterior cruciate ligament and the lateral border of the medial femoral condyle [Figure 1]. A probe from the anteromedial portal was used to enlarge the described interval. The scope was guided through the described

interval into the posterior compartment and the various anatomic folds were identified [Figure 2].

This was followed by the creation of a posteromedial portal. The fluid outflow was closed in order to distend the knee joint and allow easy palpation of the medial wall of the posteromedial compartment. The soft spot among the medial collateral ligament, the medial head of the gastrocnemius and the tendon of the semimembranosus was palpated. An 18 G cannula needle was used to enter the posteromedial compartment under arthroscopic vision in a quadrilateral space [Figure 3] bounded by four landmarks: Anteriorly: Posterior border of medial femoral condyle at the level of equator; Posteriorly: Anterior border of gastrocnemius; Inferiorly: At or superior to capsular fold or semi membranous fold; Superiorly: Inferior to adductor folds.

A superficial longitudinal skin incision was made in the direction of the cannula needle. The portal was made under the direct vision using Trans illumination. The saphenous vein is the only structure prone to injury while this portal is created and its injury can be prevented by using Trans illumination. A probe was inserted via the posteromedial portal. It was used to identify the capsular fold and underlying uni-valvular connection to the cyst. Basket forceps were used to enlarge the opening by removing part of the capsular fold. With gentle pressure in the popliteal fossa and sequential orifice enlargement [Figure 4], the cyst was decompressed as evident by a gush of viscous light yellow fluid [Figure 5]. As decompression was found to be adequate in all cases and none showed loculations or septations in the popliteal cyst, it was not necessary to use an additional postero-medial cystic portal.

Intraarticular pathologies identified were managed as per standard protocol. Meniscal tears were found in six cases; these were managed by partial meniscectomies. The

Table 1: Intraarticular knee pathologies associated with popliteal cyst

Pathology	N
Medial meniscus tear	6
Degenerative change (chondral lesions)	3
Synovitis and synovial hypertrophy	2
Chondromalacia patellae	1

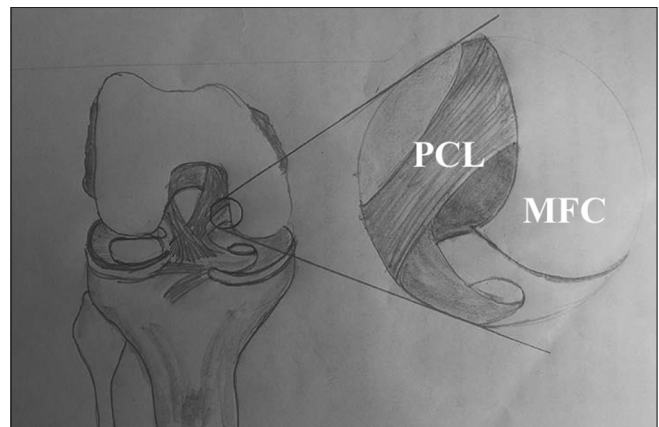


Figure 1: Diagrammatic representation of the things visualized via anterolateral portal: Identify the interval between the posterior cruciate ligament (PCL) and the medial femoral condyle (MFC)

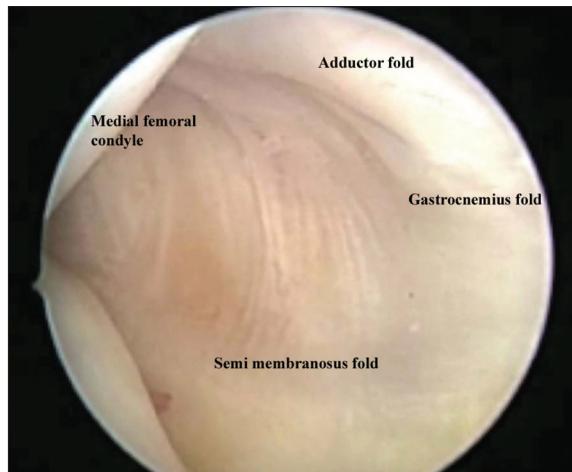


Figure 2: Arthroscopic view via anteromedial portal showing the various folds

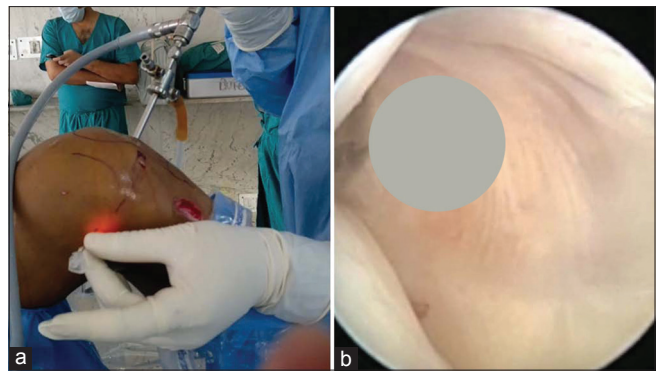


Figure 3: (a) Peroperative photograph showing external landmarks of posteromedial portal: Soft spot among medial collateral ligament, the medial head of the gastrocnemius and the tendon of semimembranosus was identified. (b) Arthroscopic view showing the entry point of posteromedial portal (as shown by cricle)- Anteriorly: Posterior border of medial femoral condyle at the level of the equator, Posteriorly: Anterior border of gastrocnemius. Inferiorly: At or superior to capsular fold or semimembranosus fold. Superiorly: Inferior to adductor fold

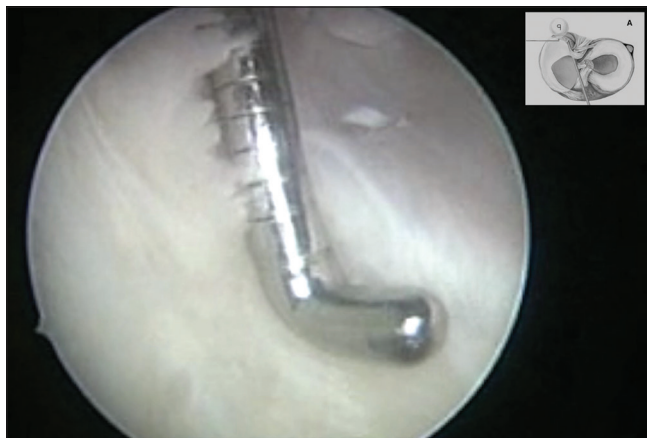


Figure 4: Arthroscopic visualization of capsular fold at mouth of the cyst

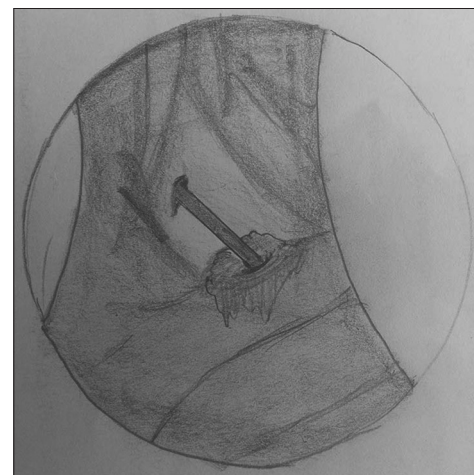


Figure 5: Sketch diagram of decompression of cyst

degenerative changes in the articular cartilage suggestive of chondral lesions were seen in three cases. Two cases had lesions on the femoral side only, as they were Outerbridge¹⁴ Grade 1, thus were managed by debridement. The third case had lesions in both femur and tibia and was managed by micro fracture technique. Partial synovectomy was done in two cases showing features of chronic synovitis while a lone case of chondromalacia patellae was managed by debridement. The knee range of motion and weight bearing was allowed as per pain tolerance except in one patient who required microfracture, for whom weight bearing was delayed for 12 weeks.

RESULTS

Of the 12 patients, eight were males and four females. The mean followup was 28 months (range 24–36 months). The average age was 50.3 years (range 40–62 years) and right side was involved in seven patients while five had left sided involvement.

Among the intra articular pathologies associated, Posterior horn medial meniscal tear was the most common with association in six cases (50%) followed by chondral lesions in three cases (25%). Features of synovitis were seen in two patients while a lone case had chondromalacia patellae [Table 1].

The clinical results were assessed by measuring the parameters as outlined by Rauschnig and Lindgren *et al.* [Table 2]. Followup at 24 months revealed that among the study group six patients achieved Grade 0 status while five had a minimal limitation of range of motion accompanied by occasional pain (Grade 1). One patient had no change in clinical grading.

DISCUSSION

Consensus on management protocol for popliteal cysts is still evolving. Treatment options vary from supervised

Table 2: Clinical results of popliteal cyst excision (Rauschnig and Lindgren)

Grading	Preoperative	After 2 years
Grade 0	0	6
Grade 1	0	5
Grade 2	7	0
Grade 3	5	1

Grade 0=No pain and swelling, no range limitation, Grade 1=Pain and swelling after intense activity, minimal range limitation, Grade 2=Pain and swelling after normal activity, <20° range limitation; Grade 3=Pain and swelling even at rest, >20° range limitation

neglect, intracystic sclerosants, open excision and lately arthroscopic management. Sclerosant injections have shown variable results and supporting studies are not adequate in number to validate their role as safe and effective. Short term results for open excision have been acceptable, however, long term followup have revealed high recurrence rates which was attributed to the presence of intraarticular pathologies.^{5,6,15,16}

We encountered intraarticular pathologies in all cases, the most common being a tear of the medial meniscus. Meniscal tears and capsular flaps are postulated to contribute to persistence of effusion by a valvular mechanism,⁷ while chondral lesions and synovitis promote inflammatory response leading to the recurrence of effusion in the knee joint.

Arthroscopic management has shown promising results as reported by various authors.⁷⁻¹¹ we observed that arthroscopy allows decompression of the cyst and simultaneous management of such intraarticular pathologies. Furthermore, it has advantages in being easy, minimal wound complication and allows for early rehabilitation.

Sansone and De Ponti⁷ (1999) observed that unilateral flow at the cyst joint interface is another cause of failure of treatment. Many authors¹⁶⁻¹⁸ addressed this unidirectional valvular pathology via closure of the channel between the joint and the cysts by suturing capsular rent,¹⁶ reinforcement by a pedicle graft from medial gastrocnemius¹⁷ or by using gastrocnemius and semimembranosus tendons as checkreins.¹⁸ Lindgren¹⁹ measured the pressure changes in normal flexion extension range of knee to conclude that such repairs may be inefficient to withhold the normal pressure changes, explaining high failure rates of these procedures.

Cyst joint interface, if enlarged, disrupts the unidirectional valvular mechanism and allows bidirectional flow, thereby, reducing the entrapment of fluid within the cyst. This also allows its resorption in the joint. We managed chondral and meniscal pathologies with standard anterolateral and anteromedial portals while the cyst was approached using the posteromedial portal. Capsular fold at the mouth of the cyst was identified, followed by evacuation of the cyst and widening of the valvular connection. Widening of

posteromedial valvular area by 5 mm is adequate to disrupt the unidirectional valvular mechanism.¹¹ Also, Sansone and De Ponti⁷ observed that enlargement of the capsular orifice did not weaken the articular structure.

We observed one failure. This patient had partial relief in pain and range of motion but was still Grade 3 as per the standard classification used in the study. We attribute failure in the case to preexisting advanced osteoarthritis. The patient underwent a total knee replacement 2 years after the index procedure.

The limitations of this study are small number of patients and short followup; further studies with long term followup are warranted to establish treatment guidelines.

CONCLUSION

Arthroscopic approach gives easy access to decompression with the simultaneous management of articular pathologies and hence a good option in management of popliteal cysts.

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Conflicts of interest

There are no conflicts of interest.

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