



ARTHROSCOPIC MANAGEMENT OF POPLITEAL CYST : A RETROSPECTIVE ANALYSIS

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ABSTRACT

Popliteal cyst, commonly known as Baker's cyst is a common clinical entity in patients of different age group. Many etiopathogenesis have been described and so are many treatment methods including conservative treatment, aspiration, open cystectomy and arthroscopic procedures. Arthroscopy of knee addresses the intraarticular pathologies and hence is commonly done now.

We did the retrospective analysis of eight patients (4 males, 4 females) of mean age of 45.75 years who underwent Arthroscopic treatment of popliteal cyst and followed up for an average of 34.25 months. All the patients had some other intraarticular pathologies (chondromalacia, meniscal tears, loose bodies) associated which were dealt with along with excision of valvular opening to the cyst done through posteromedial portal.

There was significant improvement in VAS score, WOMAC score, Oxford knee score and Rauschnig and Lindgren score ($p < 0.01$ in each) in all patient post procedure.

Arthroscopic management of popliteal cyst is an effective way to manage the intraarticular pathologies frequently associated with this condition along providing a minimally invasive procedure.

KEYWORDS : Baker's cyst, popliteal cyst, arthroscopy

Background:

Popliteal cyst, mostly referred to as Baker's cyst, was first described by Adams in 1840. [1] A popliteal cyst can be produced by herniation of the synovial membrane through the posterior part of the capsule of the knee or by escape of fluid through the normal communication of a bursae (semi-membranous/ medial gastrocnemius) or with the knee, either a semimebranosus bursa or a medial gastrocnemius bursa. Adams observed these swelling in knees affected by 'chronic rheumatoid arthritis' and that they communicated with the joint cavity by 'a species of valvular opening'. [2]

One third to half of these cysts may be noted in children. [reference:1] Differential diagnoses include lipoma, xanthoma, vascular tumors, aneurysms, or a pyogenic abscess. [reference:1]

Intraarticular pathologies noted during arthroscopy in the patients with popliteal cysts include patellofemoral chondromalacia, degenerative tears of posterior horn of medial meniscus or loose bodies. [reference:1] Arthroscopic or Open Surgeries are both described. Here we analyse the clinical outcome after arthroscopic excision of valvular mechanism of popliteal cyst.

Methods:

The study was descriptive in design, with retrospective analysis. A convenient data sample size was chosen. Nine patients who had underwent Arthroscopy of knee and decompression from the period November 2013 to January 2017 were included in the study. They were interviewed based on VAS, WOMAC score, Oxford knee score and Rauschnig and Lindgren score. The pre operative scores and the scores on last follow up were recorded and analysed.

The study was analysed using MS excel for Mac.

Operative method:

Patient was placed on the operation table after Spinal anaesthesia. EUA was done for all patients. Thigh was placed in the leg holder with the leg hanging down from the end of the table after breaking. The other limb was placed in lithotomy position. This helped to give adequate space for surgeon to work from posteromedial portal.

The landmarks were marked after application of pneumatic tourniquet and sterile draping. Standard anteromedial and anterolateral portals were made. Diagnostic arthroscopy was

completed and findings noted. Meniscal tears noted were managed with partial meniscectomy and balancing. Chondromalacia was managed with abrasion chondroplasty, radiofrequency ablation chondroplasty and microfracture.

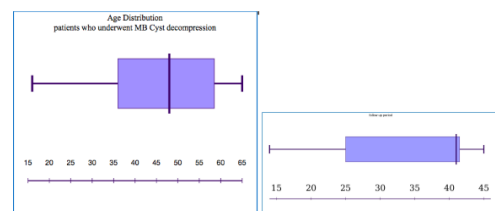
Posteromedial arthroscopy was done. The synovial fold at the mouth of cyst acting as a valve was noted. With gentle pressure posteriorly on the cyst, fluid expressed into the joint was noted which confirms the mouth of the cyst. The synovial fold was excised using duckbill punch (Smith and Nephew). Shaver was used only in 2 cases to excise the synovial fluid. The cyst wall was not excised with shaver. Wounds were closed with 3-0 Nylon.

Post operatively; patient was managed with knee mobilization, quadriceps strengthening, partial weight bearing was started if no work on cartilage was done.

Results:

Consecutive eight patients, who had underwent Arthroscopy of knee and decompression of MB cyst (along with additional procedures), were included in the study and retrospective analysis was done.

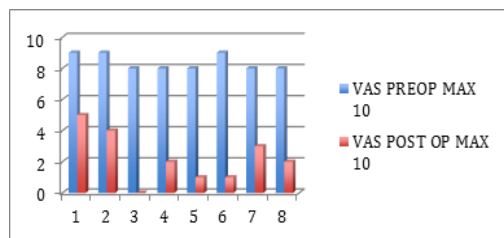
Four patients were male, four were female. The mean age of the patients was 45.75 years ranging from 16 years to 65 years.



The patients were encouraged to come for regular follow up, and their VAS, WOMAC score, Oxford knee score and Rauschnig and Lindgren score were noted along with note of any complaints, complications (including recurrence). The mean follow up period for the patients was 34.25 months; the median was 41 months. The box and whisker plot showing median value is depicted.

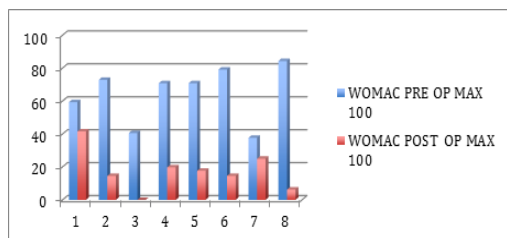
Pain was one of the presenting complaints for all the patients. Pain VAS score is a unidirectional measure of pain intensity. The average pre-operative VAS score of the patients who underwent the

procedure was 8.375. The VAS score had significantly improved after the procedure for each patient. The average VAS score of patients at the last follow up post procedure was 2.25. This improvement was significant when a paired t test was done (0.00000339275).



WOMAC score (Western Ontario and McMaster Universities Arthritis Index) is widely used patient reported outcome measure patients with Hip and Knee Osteoarthritis. It is a self-administered questionnaire consisting of 24 items divided into three subscales- Pain, Stiffness and Physical function

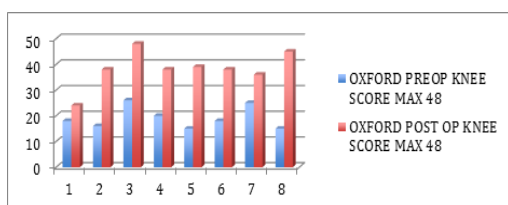
The average pre- operative WOMAC score of the patients who underwent the procedure was 64.46125. The WOMAC score had significantly improved after the procedure for each patient. The average WOMAC score of patients at the last follow up was 17.4375. This improvement was significant when a paired t test was done between the pre op and post op group. (0.00029420446939)



Oxford knee score is another patient reported outcome measure developed in 1996 to evaluate total knee replacement outcomes, and since then its scope has broadened to other joint disorders and surgical treatment.

The average Oxford knee score pre-operatively in the patients was 19.125.

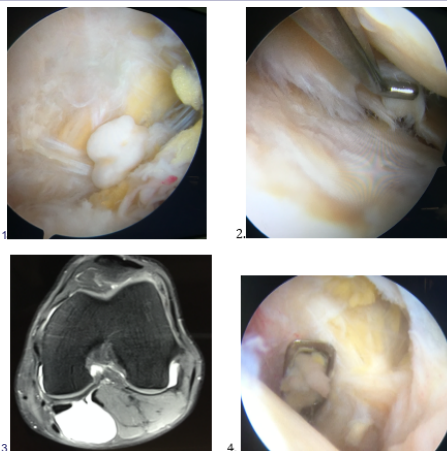
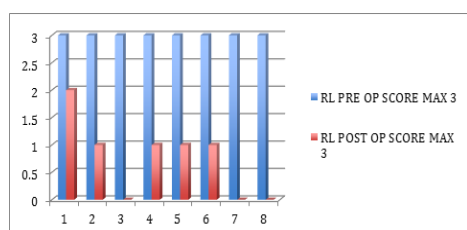
The post operative average Oxford knee score was 38.25.



The paired T Test done showed significant improvement (0.000091393926).

The Rauschnig and Lindgren score is used by most authors who had evaluated the outcome of surgery for popliteal cyst.

The average score pre-operatively was 3 which improved to within 0.75 post operatively at last follow up.(0.0000213285046)



1. Loose body in posteromedial compartment at moth of valvular fold, Nb: attached pedicle
2. Meniscal tear with cartilage degeneration in same patient
3. MRI demonstrating the popliteal cyst along with possible valvular mechanism
4. Excision of valvular fold with duckbill forceps

Intraarticular pathologies of knee apart from popliteal cysts were observed in all the patients who underwent this surgery. They are noted in the table below. It thus becomes imperative that intraarticular pathologies should be looked into all the patients who present with a symptomatic popliteal cyst.

Patient initial	Intraarticular pathology on arthroscopy	Management of the pathologies
KA	Chondromalacia patella	Debridement, RF chondroplasty
MB	Chondromalacia patella, Chondromalacia MFC, Degeneration A 1/2 of MM	RF chondroplasty, Meniscus balancing
SK	Complex tear of P 1/2 LM MM horizontal tear	Meniscectomy & Balancing of MM & LM
BA	PFOA + MJOA+MM tear+ Loose body	Microfracture+RFchondroplasty+ Meniscus balancing +LB removal+
KH	PFOA + MJOA	Debridement
AN	Partial ACL tear(PL) + chondromalacia LTC	Debridement of ACL and Cartilage flap+ microfracture +
DE	Partial ACL tear + CM MFC	Debridement & RF chondroplasty
DV	Chondromalacia Patella	debridement

DISCUSSION

Popliteal cysts or Baker's cyst can be disabling to the patients. These patients usually will also have some intraarticular pathologies. [3] Conservative treatment or open resection of the cyst are common treatment options.[4,5] However open procedures have been associated with high recurrence rate of 42% to 62% .[6,7] Lindgren demonstrated one way valvular mechanism of capsular fold in the posteromedial capsule of knee joint, which if not excised would not correct the unidirectional flow of synovial fluid between the posterior capsule and the gastrocnemius -semimebranosus bursa.[7]

Arthroscopic assisted procedures can help deal with both the problems seen in this condition, namely one way valvular mechanism and management of intra-articular pathologies. Many authors have reported successful outcome with this procedure.[8]

In patients with osteoarthritis of knee, BC is a secondary cyst; this synovial cyst communicates directly with joint cavity (a phenomenon of a "one-way valve" between the articular cavity and cyst) [9]; the presence of a valve-like mechanism may allow joint fluid to communicate in only one direction. Joint effusion and fibrin are pumped from the knee joint into the popliteal cyst; fibrin serves as a one-way valve blocking return of effusion into the knee joint; trapped effusion with a normal viscosity in the cyst is reabsorbed through the semipermeable membrane, leaving behind concentrations of fibrin. This explains the difficulty aspirating the thick, glutinous contents of these cysts.

Many authors have previously described arthroscopic management of Baker's cyst. [8,10] Important steps include locating the opening connection between the joint cavity and the cyst using a probe, resecting the capsular folding seen at the mouth of the cyst with basket forceps and ensuring the free flow of yellowish fluid from the cyst into the joint cavity. This establishes a bidirectional flow of the fluid between the joint cavity and the cyst. Some surgeons then proceed to excise the cyst wall with the help of a shaver after establishment of an additional postero medial cystic portal, [8] or a direct posterior portal.[11]. Kanekasu et al reported good result after cystectomy and intra articular synovectomy in patients with Rheumatoid Arthritis.[12] Some surgeon stop the procedure at establishing a bidirectional flow pattern of synovial fluid between the popliteal cyst and the joint cavity. Takahashi suggested that the arthroscopic correction of the valvular mechanism through the posteromedial portal is the most pathologically reasonable procedure to treat popliteal cysts surgically.[13] Although some surgeons proposed other pathological reasons for unidirectional flow pattern in patients with popliteal cyst, mainly a tear in posterior horn of medial meniscus[14], this was refuted by many as meniscal pathologies were not noted in many patients with BC.[15,16]

In one patient, we identified a loose body in the posteromedial compartment at mouth of the valvular mechanism to popliteal cyst, but attached with a pedicle. Intraarticular and intracystic loose bodies are reported in the previous studies too. [17]

Conclusion:

Although historically open surgeries were usually preferred for a symptomatic popliteal cyst, this and many other studies suggest that an arthroscopy of the knee should precede the procedure to address the cyst. This helps to identify the intraarticular pathologies and in many cases can address the cyst avoiding the open procedure altogether. Although popliteal cystoscopic excisional debridement along with removal of valvular mechanism of popliteal cyst is being described by other authors [18], this study and some other studies suggest that converting the unidirectional flow of synovial fluid from joint into the cyst to bidirectional flow is most important procedure to address this pathology.

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