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Arthroscopic management lateral meniscal cysts: about 105 cysts with 5 years of follow-up

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Summary: A retrospective study was performed on 122 patients with 124 lateral meniscal cysts. These were selected from a original pool of 8100 knee arthroscopies (1.5%). Eight of the patients were lost to followup, 11 patients had chronic anterior cruciate ligament deficiency or previous medial meniscectomy, therefore 105 of 124 cases were included in this study. A physical examination was performed on each knee emphasizing, motion, pain, swelling, and ligament evaluation. Radigraphs were graded for degenerative changes for each knee. Average follow-up was 5 years (range of 1 to 12.5 years). The mean age was 33 years (range of 12 to 69 years). All patients had presented tenderness over the joint line with a palpable mass. All were noted to have a meniscal tear at the time of surgery and 60 (57%) had a horizontal cleavage component. All cases were managed by arthroscopy. Meniscal tears were treated by arthroscopic partial lateral meniscectomy in 104 cases and meniscal repair in one case. Cysts were treated by intra-articular debridement in 91 cases and open cystectomy in 14 cases. Eleven cysts recurred and a second arthroscopy was required. The clinical results, including those cases with recurrent cysts, were excellent or good in 87% of cases and in the 13% remaining cases, the results were fair or poor. Osteoarthritis following treatment for meniscal cysts occurred in 9% of cases. When there was a cyst and no other intra-articular damage, the resultss were excellent. For lateral meniscal cysts, arthroscopic partial meniscectomy with intra-articular debridement alone or associated with open cystectomy yields predictable results.

Key words: Knee - Lateral Meniscus - Lateral Meniscal cyst - Arthroscopy - Meniscectomy

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Cysts of the knee meniscus are rare. These lesions have been reported to be more frequent in the lateral meniscus than in the medial meniscus. The ratio of lateral to medial meniscus cysts reported by Maffuli [23] and Seger [34] were 3:1 and 10:1 respectivly. The incidence of meniscal cysts has been reported to range from 1.9% to 22% [1, 30, 36) depending on context of the review.

The first description of a meniscal cyst in the literature is credited to Nicaise [28] in 1883. Ebner [11], in 1904, reported in detail the first clinical meniscal cyst, and believed that mucoid degeneration of abnormal fibrocartilage was the cause. Since this report, diverse theories concerning the etiology of meniscal cysts and their association with meniscal tears have been proposed. These theories have included: trauma [36], degeneration [4, 12, 13], secretory activity of cells similar to a ganglion [17], or true tumors (1). According to the microscopic and histological studies by Barrie [4] in 1979 and Ferrer-Rocca [12, 13] in 1980, the formation of intrameniscal cysts begins as mucoid degeneration of the meniscal collagen and progresses from the central part to the periphery of the meniscus. This explains the association between cysts and meniscal tears. Barrie [4] found a horizontal cleavage in all 112 meniscal cysts. On the other hand, Smillie [36], in his extensive review of 448 lateral meniscal cysts, found that only 86% of these cysts had an associated lateral tear. Before the advent of arthroscopy, the accepted treatment was total meniscectomy and excision of the cyst [4, 12, 13, 36, 39]. Other authors found increasing evidence of late degenerative change after total meniscectomy [2, 19]. Still others suggested an alternative treatment: local cystectomy [15] or simple puncture of the cyst [17, 25] without meniscectomy when no tear of the meniscus was found during the procedure.

The lateral meniscus carries up to 70% of the load across the compartment, and load-bearing is increased threefold when the meniscus is absent [40]. The widespread availability of arthroscopy has changed the surgical approach. The purpose of our study is to review the incidence, treatment, and long term results of lateral meniscal cyst treatment at our institution over a 10 year period.

Materials and methods

We conducted a retrospective study of 124 knees which recieved arthroscopic treatment following diagnosis of palpable, symptomatic lateral meniscal cyst between December 1981 and April 1992. Patients with anterior cruciate ligament deficiency (9 patients) or previous medial meniscectomy (2 patients) were not included. Eight patients were lost to followup. Therefore, 105 stables knees with lateral meniscal cysts of 124 knees were included in this study.

Patient evaluation included physical evaluation, radiographs, and completion of a questionnaire. The physical examination focused on patello femoral pain, joint line pain, joint effusion, swelling, locking, alignment and range of motion. The questionnaire recorded subjective qualities of the knee function and the activities of daily life. The clinical results were rated according to four categories previously described by Reagan [32]: excellent (no pain, no swelling, full range of motion, full return to athletics of choice), good (occasional discomfort, no swelling, full return to athletics of choivce but not at the same level), fair (pain with strenuous activity with or without occasional swelling and return to modified athletics), poor (pain with daily living, locking, painful, catching and cessations of athletics). Preoperatively, all the patients were given anteroposterior standing and lateral radiographs. At the last follow-up radiographs were obtained for 68 of the 105 knees (65%). The radiographic results were rated according to four grades [26] for degenerative changes for each knee: Grade 1 (normal X-rays), Grade 2 (remodelling, characterized by a very limited flattening with marginal lipping of the femoral condyle and occasional marginal thickening of the tibial plateau; but without narrowing of the joint space [10]), Grade 3 (joint space narrowing less than 50%), Grade 4 (joint space narrowing more than 50%). This post meniscectomy «remodelling» has been described by Neyret and Trillat [26, 39] and is different of the prearthritis described by Fairbanks.

There were 80 males and 23 females. There were two bilateral cases and the right knee was involved 56 times. The average age was 33 years (range 12 to 69 years) at the time of initial arthroscopy. Only 13 patients were more than 50 years old at the time of surgery. The time from beginning of the symptoms to arthroscopy was 2 years (range one month to twelve years). The average time from arthroscopy to follow-up was 5 years (range 1 to 12.5 years).

Among these 105 cases, 68 participated in sports. Thirty three (31%) had sustained an acute injury and there were 72 (69%) for which a specific injury could not be recollected. The main complaint was pain isolated on the lateral side of the knee in 71 cases (68%). In an additional 33 cases (31%) the lateral knee pain was associated with another symptom. Finally one patient presented occasional locking. The cyst itself was a complaint only for 15 patients. On physical examination, there was lateral joint line pain and tenderness with a localized mass in 99 cases. Pain and tenderness were located to the mid portion of the knee joint line in 83 knees (79%). Thirty knees (29%) had patello femoral pain; 13 knees (13%) had an effusion and 8 (7%) had restriction in range of motion.

Surgical technique

All patients underwent arthroscopy either as an isolated procedure or, if the cysts was large (more than 2 centimeters) and in some of the earliest cases, in combination with open percutaneous cystectomy. Arthroscopy was performed on all the knees using standard medial and lateral parapatellar portals. Local anesthesia was used in 82 cases (78%)

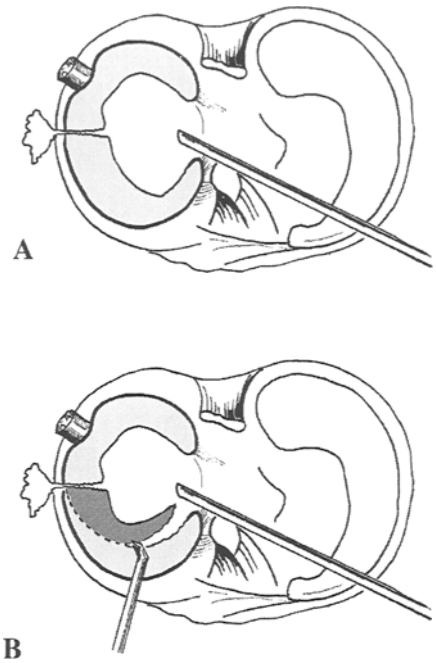

Fig 1 a,b. a, careful inspection of both surfaces of the lateral meniscus to search a meniscal lateral lesion, b, resection of the anterior part of the lateral meniscus and leaving a meniscal bridge at the periphery of the meniscus

using a technique previously described in the literature [21]. Partial arthroscopic lateral meniscectomy with the concept of «preserving the meniscus» [22] was done where appropriate using standard techniques. We would emphasize three aspects of this meniscectomy. First, on superficial inspection the lateral meniscus seemed to be intact, but careful probing of its under surface with a hook often revealed a meniscal tear and especially an horizontal cleavage [22] (Fig 1A). Second, we often used a 90-degree rotary basket punch to perform the anterior resection of the tear. Third, we took great care to preserve the meniscal wall and we kept a meniscal bridge in front of the popliteal hiatus [22] (Fig 1B and 2A). Punch forceps or a hook were then passed through the anteromedial portal to create a hole through the meniscus into the cyst to allow the content of the cyst to drain into the joint. In most cases the cyst decompressed spontaneously and a gelatinous fluid escaped. Sometimes a debridement of the cyst cavity was performed with a motorized shaver introduced through

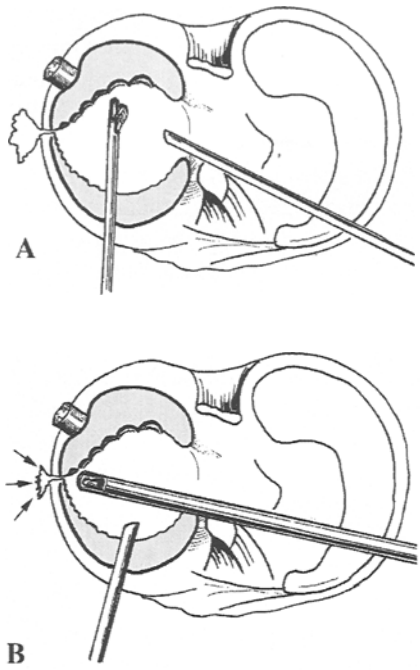

Fig 2 a,b. a resection of the posterior part of the lateral tear, b, intra-articular debridement of the lateral cyst through the meniscal tear, sometimes a shaver is useful

Table 1. Types of meniscal tears associated with lateral meniscal cysts

Meniscal pathology	n	%
Horizontal cleavage	30	28.5
Horizontal cleavage plus radial split	30	28.5
Radial split	31	29
Complex lesion	10	10
Vertical tear	4	4

the track into the cystic mass (Fig 2B). When the cyst was too large (more than 2 centimeters) we performed an open percutaneous cystectomy.

Postoperatively, patients were allowed full weight bearing and performed isometric quadriceps contractions. All patients were discharged within 24 hours. Sutures were removed eight to ten days after surgery. Early return to work and sports was encouraged.

Statistical analysis was performed with the use of demographic, clinical, radiographic and arthroscopic variables. A significance level of $p < 0.05$ was established. When comparing more than two groups, analysis of variance (ANOVA) was used, while Student's t-test was used when comparing two groups. Categorical variables were compared in a similar manner using the chi-square non parametric test.

Table 2. Topography of the meniscal tear

Localization	anterior	mid portion	posterior	global
Meniscal tear (cases)	24	74	1	6
Percentage (%)	22	71	1	6

Results

Meniscal tears were identified in all 105 knees with a lateral meniscal cyst. Arthroscopy revealed meniscal tears in 104 cases. In the last case, a 12 year old patient, the meniscus appeared to be intact at the time of arthroscopic inspection. Following open cystectomy, the remaining meniscal wall presented an incomplete horizontal cleavage tear that did not extend to the surface of the meniscus. This meniscal tear was in the peripheral portion of the meniscus and for this incomplete tear a meniscal repair was performed. We considered that case a meniscal tear. A horizontal cleavage tear, either isolated or associated with other tear patterns was found in 60 cases (57%) (Table 1). The meniscal tear was located most often in the mid portion of the meniscus but also was infrequently seen (23%) in the anterior portion of the meniscus (Table 2).

The cysts were treated with arthroscopic debridement in 91 cases and with open cystectomy in 14 knees. Other lesions noted during arthroscopy were 11 medial meniscal tears treated by partial medial meniscectomies (8 vertical tears, 3 degenerative tears) and 39 cases of severe chondromalacia of the patella (stage III and IV from Locker and Beguin [5]).

11 second arthroscopies (10%) and 3 non specific complications (3%) that did not influence the final results (one septic arthritis, one reflex sympathetic dystrophy, one persistent swelling) occured in this group of 105 knees.

The 11 reoperations were done for failure to relieve pain in all cases, alone in four cases or associated with recurrence of the cyst in 7 cases. The average time between the two arthroscopies was 27 months with a range of 4 to 87 months (Table 3). In all the reoperations, we performed an arthroscopic meniscectomy and an open cystectomy. The findings at the second surgery were 8 horizontal cleavage tears, 2 transverse tears, 1 vertical tear. In 7 of these patients, there was an extension of the original tear which may suggest a incomplete meniscectomy during the first arthroscopy. and in 4 cases there was a new tear (Table 3). The average time between second arthroscopy and the last follow-up was 4 years and the final result was excellent or good in all cases according to our classification.

Table 3. Relationship between interval for second surgery and the type of tear

Recurrences	Type of tear at second surgery	
Interval	New tear	Identical tear
Short (< 1 year): 3	0	3
Long (> 1 year): 8	4	4

Overall, including the patients requiring reoperation, the objective results were 64% excellent, 23% good, 6% fair, and 7% poor. Patients with patello femoral pain at the last clinical evaluation had statistically significant greater number of fair and poor results ($p = 0.001$). There was no correlation with the type and the location of the meniscal tear.

Among the 68 patients active in sports, 77% returned to their sport at the same level, 16% decreased their level because of their knee, and 7% stopped for reasons unrelated to their knee.

Radiographically, among the 68 patients with X-rays at final follow-up, 58 Patients (85%), had normal radiographs and 4 had «remodeling» of the joint line. Six patients (9%) had osteoarthritis at last follow-up. The osteoarthri-

tis was located in the lateral compartment in 2 knees, in the medial compartment in 3 knees and in both compartments in one knee. Patients older than 60 years old at the time of surgery seemed to developp more osteoarthritis at last follow-up than patients younger than 60. The mean age of the 58 patients with normal X-rays was 32 years old as compared with 34 years old for the 4 remodelling and 62 years old for the 6 cases of osteoarthritis.

Discussion

Frequency

The incidence of lateral meniscus cysts must be considered in the context of the type of review. Studies discussed the incidence as a percentage of the total number of arthroscopies done. Passler [30] reported a incidence of 1.03% of 1160 arthroscopies. Our study has diagnosed lateral meniscal cyst in 124 patients of 8100 arthroscopies (1.5% incidence) over a ten year period and in the same time found only one medial meniscal cyst. Mills [24] reported 20 medial meniscal cysts of 7435 arthroscopies (incidence: 2.7 per thousand). There is a general agreement that the lateral meniscus is more commonly involved than the medial meniscus.

Etiology

The etiology of meniscal cysts is controversial. What remains in question is whethe meniscal tears, reported the progression from degenerative change to horizontal cleavage.

As with arthroscopic studies by Glasgow [16], Parisien [29] or Seger [34], we also found a meniscal tear in the knee with lateral meniscal cyst in all cases. On the other hand, Reagan [32] found only 27 associations between cysts and meniscal tears in 32 cases (86%). Our arthroscopic findings support Barrie's view that lateral meniscal cysts are associated with meniscal tears. There appear to be three reasons for the view they are not always related. First, many minor cleavage tears lie on the under surface of the meniscus and very careful probing is required to make the diagnosis. Second, Reagan [32] describes an interesting pathway-the cyst may begin as a degenerative focus in the meniscal periphery. It may only spread peripherally in the thickness of the meniscus producing a cyst with no demonstrable intra-articular pathology visible during arthroscopy, as with our young case of 12 years old. It depends where the degenerative lesion begins and when the arthroscopy is performed because if the lesion does not reach the free rim of the meniscus, the meniscal tear will not be visible. This is called an incomplete tear. Third, a superficial ganglion overlaying the lateral side of the knee is easily confused with a true degenerative cyst.

Clinical and arthroscopic findings

The clinical features that our study recorded are similar to those published for cysts of the lateral meniscus [1, 14, 15, 16, 17, 20, 23, 31, 32, 33, 35]. Most of the patients were male, young (third or fourth decade). No particular type of sporting activities were associated with cysts. The chief complaint was lateral knee pain. Diagnosis may be obscure and a high index of suspicion must prevail to avoid delayed or missed diagnosis. In this series the interval from onset of symptoms to index arthroscopy was two years. This long delay suggests that this pathology is well tolerated for a long time and attests to the need for accurate physical examination. The diagnosis is aided by the presence of the «disappearing sign» described by Pisani [31]. It was observed that the mass disappeared into the knee joint on acute flexion and reappeared in extension of the knee. A differential diagnosis of lateral knee pain includes several diagnosis [1] and in the past, the clinical diagnosis could be improved by arthrograms [6, 35]. Actually, accuracy of the diagnosis is improved by MRI will revealed both the cyst and the meniscal tear [7, 9, 37].

The morphology of the meniscal tear is usually horizontal. In our study there was a horizontal component in 57% of the meniscal tears. It is similar to the other studies of lateral meniscal cysts except for Reagan [32], who found more radial tears (44.5%). But if we compare lateral meniscectomies [8, 18, 38] to lateral meniscal cysts, there is a higher proportion of horizontal cleavage in the latter. The main site of the meniscal tear is the mid part of the lateral meniscus with an extension to the anterior part of the lateral meniscus in 21%. Ferriter [14], Glasgow [16] and Parisien [29] support our findings and the tear is located between the lateral collateral ligament and the hiatus poplite. On the other hand, a medial meniscal tear tends to be located to the posterior segment of the meniscus.

Treatment

Historically, total meniscectomy with removal of the cyst was the treatment of choice [36]. Studies have confirmed late degenerative arthritis after total meniscectomy [2, 3, 19]. Some others, such as Flynn [15], Jaffres [17] and Muddu [25], obtained excellent results with simple excision or simple puncture of the meniscal cyst without recurrence when no meniscal tear was found. Following the introduction of partial arthroscopic meniscectomy in 1962 by Watanabe [41] reporting 92% good or excellent results at 3 years follow up, recent reports suggest that cyst of the lateral meniscus is best treated by arthroscopy [23, 29, 30] or arthroscopy plus open cystectomy [32, 35]. When conservative treatments fail, arthroscopic partial meniscectomy with intra-articular decompression is necessary. When no lesion is seen and when the cyst is too large more than two centimeters, open cystectomy is indicated.

Clinical results

Our clinical results are similar to this series [14, 20, 23, 30, 32, 35] with Excellent or Good results in 87% of the cases. The clinical result is related to the existence of associated intra-articular lesions as well as medial meniscectomy or patello femor<al pain. The recurrence in this series was 10%. Maffuli [23] reported 4 recurrences in a series of 38 cysts (10.5%) with an average follow-up

of 39 months. Similarly, Reagan [32] reported 5 cases with repeat surgery (15.6%). In all cases there was an extension of the original tear which required repeat surgery including extra-articular cyst excision. In our series (Table 3) for patients with short intervals, we did not resect enough pathological tissue. For patients with long intervals, we have two hypotheses: either, performing a large meniscectomy may have been more appropriate during the first arthroscopy; or, a new degeneration lesion occurred in the remaining meniscus which could have been the origin of a new tear. The arthroscopic partial meniscectomy must include resection of all the torn area of the meniscus, taking care not to damage the meniscal wall, and preserving as much meniscal tissue as possible.

Radiographical results

Radiographically, our incidence of osteoarthritis following treatment of lateral meniscal cysts was 9 per cent. There are few reports dealing with the incidence of osteoarthritis following treatment of lateral meniscal cysts with mid term follow-up. Appel [5] reported in 1970 the results of 23 meniscal cysts (17 lateral, 6 medial) treated by total meniscectomy with a follow-up ranging from 6 to 31 years. He found osteoarthritis in 2 cases (8.7%). Appel [5] found that a meniscectomy after the age of 40 resulted in a higher risk of osteoarthritis than in younger patients. Other series of lateral meniscectomies on stable knees reported the incidence after lateral meniscectomy to be between 10% [27] and 34% [38]. In our study, osteoarthritis seemed to be more common in patients older than 57 at the time of initial arthroscopy. The relationship between age at meniscectomy and that at following surgery for osteoarthritis has been reported by Neyret [27]. With 5 years of follow-up, the lateral meniscal cyst itself is not a source of degenerative change of the knee joint, but other intra-articular damage could be. Longer follow-up is needed to confirmed this theory. Never the less we must be careful for the radiographic analysis, because a recent study by Jaureguito [49], found that the radiographic changes appears after 5 years of evolution and increased up to 38% with 10 years of follow-up in a recent study [8].

Based on our study and review of the literature, we suggest the following management for patients presenting with a lateral meniscal cyst requiring surgery. The positive diagnosis is clinical and MRI [37] is necessary to identify the anatomy of the lesion before operation. Arthroscopy should be performed with a diligent search for a lateral meniscus tear. If a tear is found, then a partial meniscectomy removing all the unstable and pathologic meniscus should be performed, all the while preserving the meniscal wall. Next decompress the cyst into the joint through the cyst track with a basket forceps or a motorized shaver if necessary. Open cystectomy may be required if the cyst is too large. If no tear is found during arthroscopy, then extra-articular cyst removal should be performed in addition to searching for an incomplete meniscal tear.

Conclusion

Lateral meniscal cysts are associated with meniscal tears with a horizontal component.

In patients younger than 50 years old, lateral meniscal cysts are not related to degenerative change of the knee joint. They are only related to degeneration of the meniscus.

Arthroscopic management is the treatment of choice with good or excellent results in 87% of cases. Partial meniscectomy should be performed, as well as arthroscopic debridement of the cyst. When the cyst is too large or no tear is found at arthroscopy, open cystectomy is advised.

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Traitement arthroscopique des kystes du ménisque latéral

Résumé : Entre 1981 et 1992, nous avons observé 124 kystes du ménisque latéral traités par arthroscopie. Durant la même période nous avons réalisé 8 100 arthroscopies, ce qui représente 1,5 p. 100 de nos indications. 19 cas ont été exclus; il s'agissait de 8 patients perdus de vue, de 9 ruptures associées du ligament croisé antérieur, et de 2 méniscectomies médiales préalables. Ainsi 105 kystes avec un recul moyen de 5 ans ont été analysés dans cette étude.

Les objectifs de ce travail sont d'étudier le type de lésion méniscale rencontré et les résultats cliniques et radiographiques de 105 kystes traités par arthroscopie.

Il y avait 80 hommes, le genou droit était atteint 56 fois. L'âge moyen était de 33 ans. Le principal motif de consultation était une douleur du compartiment latéral avec un antécédent traumatique dans 32 p. 100 des cas. Tous les patients ont eu une arthroscopie qui a retrouvé une lésion méniscale. Il s'agissait d'une lésion horizontale (63 p. 100) isolée ou associée à un autre type de lésion. Cette lésion intéressait le plus souvent le segment moyen (71 p 100) avec parfois une extension antérieure (22 p. 100). Toutes ces lésions, sauf une suturée, ont été traitées par méniscectomie partielle avec conservation du mur méniscal périphérique. Le kyste a été traité par vidange intra-articulaire dans 91 cas. Un complément d'évacuation per cutanée a été nécessaire dans 14 cas (taille > 2 cm). 11 arthroscopies itératives ont été réalisées avec un délai moyen de 27 mois.

Les résultats cliniques sont TB ou B dans 87 p. 100 des cas. L'évolution radiologique a été analysée pour 68 genoux seulement. La fréquence de l'arthrose est de 9 p. 100 avec 5 ans de recul et est liée ($p = 0{,}0001$) à l'âge du patient au moment de la méniscectomie.

L'arthroscopie est une méthode de choix pour traiter le kyste du ménisque externe. Le traitement comporte une méniscectomie partielle mais large et un débridement intra-articulaire du kyste.

Le pronostic des kystes du ménisque externe est bon, au recul de cette étude qui n'est malgré tout que de 5 ans en moyenne, chaque fois qu'il s'agit d'une lésion isolée sans lésion cartilagineuse associée.

Mots clés : Genou - Ménisque lateral - Kyste du ménisque lateral - Arthroscopie - Méniscectomie