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Clinical Article

Retrospective study of 77 patients harbouring lumbar synovial cysts: Functional and neurological outcome

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Summary

Background. Synovial cysts represent an uncommon and probably underestimated pathological entity of the degenerative lumbar spine. The authors report a retrospective analysis of the clinical presentation, radiological studies and operative findings in 77 patients surgically treated for symptomatic lumbar synovial cysts at their institution.

Materials and method. Between January 1992 and June 1998, a total of 77 patients presenting with symptomatic lumbar synovial cysts were operated on in the author's department. Operative procedure, complications, results and pathological findings were correlated with preoperative assessment. There were 41 men and 36 women with an average age of 63 years (range 44–90 years).

Results. On the basis of their symptom complex on presentation, two populations were identified: patients who presented with a single radicular pain (group I = 51 patients), and patients who presented with bilateral neurogenic claudication (group II = 26 patients). Neurological examination on presentation demonstrated motor deficit (12%), sensory loss (26%) and reflex changes (35%). Degenerative disc disease and facet joint osteoarthritis was a frequent finding in patients with pre-operative MRI. Facet joint orientation was >45° in 76.6% of patients. Preoperative spondylolisthesis was found in 48% on radiological studies. All the patients were treated surgically with resection of the cyst. No fusion was performed as a first line procedure. However subsequent fusion was necessary in one patient who developed symptomatic spondylolisthesis. Mean follow-up period was of 45 months ranging from 18 to 105 months. Only one recurrence occurred during the follow-up period. An excellent or good functional outcome was seen in 97.4% of cases, and 89% of the patients with motor deficit recovered.

Conclusions. Surgical resection of lumbar synovial cysts is an effective treatment associated with very low morbidity. Synovial cysts are associated with increased grade and frequency of facet joint asteoarthritis but not with increased grade or frequency of degenerative disc disease compared with patients without cysts. In the author's opinion, at the present time, there is no reliable criterion which allows the development of a symptomatic spinal instability to be predicted in patients with a preoperative spondylolisthesis and therefore fusion as a first line procedure is still debatable.

Keywords: Synovial cyst; radiculopathy; spondylolisthesis; lumbar spinal fusion; spinal instability.

Introduction

The original description of synovial cysts goes back to Baker in 1877 [3], who defined it as being a para-articular cyst secondary to processes occuring within an adjacent degenerative joint. The first description of a spinal synovial cyst was made by Von Gruker in 1880 [17], in a post-mortem examination description. In 1950, Vosschulte and Borger reported the first case of spinal synovial cyst which caused root compression [17]. In the Anglo-Saxon terminology, the terms ''synovial cysts'' and ''ganglion cysts'' are used to describe lesions which are, or are not, continuous with the joint synovium, respectively. In 1974, the term ''juxtafacet cyst'' was coined for the first time by Kao, to describe these two types of cyst, which in fact both correspond to the same pathological entity [11]. In this paper, we will employ the term ''synovial cyst'', which is the most widely used, without differentiating those communicating or not with the facet joint.

The Aetiopathogenesis of synovial cysts remains controversial, however spinal instability and spinal trauma seem to be the main causative factors [6, 9, 13, 15, 17]. At the end of the last decade several publications on

lumbar synovial cysts have led to a re-appraisal of its incidence in lumbar spine degenerative diseases. Actually, this pathological entity is more common than previously thought. Recently, Doyle and Merrilees reported a retrospective MRI study of 303 patients with symptomatic (low-back pain or radiculopathy) degenerative lumbar spine disease and found synovial cyst in almost 10% of cases [5]. Anterior and posterior cysts represented respectively 30% and 70% of these cases. The goal of this study is to evaluate the management and outcome of symptomatic anterior synovial cysts. If surgical resection of the cyst is widely accepted in the therapeutic management of lumbar synovial cysts, debate continues regarding the indication of concomitant fusion.

We report here a retrospective study of 77 cases of anterior lumbar synovial cysts treated surgically, focusing on the functional and neurological results and the surgical management strategy.

Material and methods

Between 1992 and 1998, 77 patients with symptomatic lumbar synovial cysts have been treated surgically in our department of Neurosurgery (La Timone University Hospital Centre, Marseille, France). This study includes 32 patients previously described by Metellus *et al*. From the same neurosurgical department. There were 41 men and 36 women with a mean age of 63 years old (44–90 years old). Patient charts were reviewed for their complex symptoms on presentation, duration of symptoms, preoperative radiological testing, presence of segmental instability or spondylolisthesis (Meyerding's classification), facet joint osteoarthritis, degenerative disc disease, facet orientation and time of hospitalization. Operative procedure, fusion, complications, results and pathological findings were correlated with preoperative assessment. Follow-up review was performed by office examination supplemented by a phone call as necessary. Patient outcome was graded as "excellent", "good" or "poor". An "excellent" outcome meant the total disappearance of the symptoms with no further discomfort; "good" meant normal neurological examination and minimal complaints of back or leg pain corresponding to an improvement of at least 75% of the preoperative functional symptoms; "poor" meant an improvement of less than 75% or persisting neurological deficit.

Results

Clinical presentation

Seventy-seven patients were operated on for a symptomatic lumbar synovial cyst. From a clinical point of view, two sub-populations were identified: patients with unilateral radicular pain (group I) and those with bilateral neurogenic claudication (group II). Fifty-one patients (66%) presented with unilateral radicular pain, mimicking the symptoms of a prolapsed disc (group I). Of these patients, 32 presented with painful radiculopathy and 19 with unilateral neurogenic claudication. Twenty-six patients (34%) presented with bilateral neurogenic claudication consistent with the diagnosis of degenerative lumbar spinal stenosis. For the 51 patients with unilateral radicular pain (group I), the synovial cyst was always on the same side as the clinical symptoms. Low-back pain was found in 73 patients (95%). No patient complained of change in bowel or bladder function. The mean duration of symptoms was 6 months (0–28 months). Chronic symptom progression was found in 71 patients (92%). Acute-onset symptoms (<7 days) occurred in 6 patients (7%). Neurological examination on presentation demonstrated motor weakness in 9 patients (12%), sensory loss in 20 patients (26%) and altered tendon reflexes in 27 patients (35%). All of the patients with a motor deficit suffered from unilateral radicular pain (Table 2). In the past history, we noted that one patient had suffered lumbar trauma without surgical operation. No history of inflammatory rheumatological disease was found. Three patients had been operated on for a prolapsed disc several years previously, one at the level of the synovial cyst, the other two at the level below.

Table 1. *Radiological and treatment characteristics (n = 77)*

Radiological workup	
– Standard x-rays film/CT-scan	77 (100%)
– MRI	64 (83%)
– Saccoradiculography + CT-scan	19 (25%)
– Pre-operative spondylolisthesis	37 (48%)
Cysts location	
– L2–L3/L3–L4	13 (17%)
– L4–L5	52 (68%)
– L5–S1	12 (15%)
Radiological findings	
– Degenerative disc disease*	57 (89%)
– Facet joint osteoarthritis*	64 (100%)
– Sagittal orientation of facet joint (>45°)	59 (76.6%)
Conservative treatment	
– Epidural infiltration	27 (35%)
– Cyst aspiration and/or intracystic corticosteroid injection	6 (8%)
Surgical treatment	77 (100%)
– E + HLy + PF + MF (group I)	51 (69%)
– E + Ly + PF + MF (group II)	26 (31%)
– Complete excision of the cyst	75 (97%)
– En bloc resection of the cyst	31 (40%)
– Concomittant fusion	0 (0%)
– Secondary fusion for symptomatic spondylolisthesis	1 (1.3%)
Complications	3 (3.9%)
Hospitalization stay (days)	5.2 (3–17)
Mean follow-up (months)	45 (18–105)
Recurrence	1 (1.3%)

E Excision; *Ly* laminectomy; *MF* medial facetectomy; *PF* proximal foraminotomy; *HLy* partial or total hemilaminectomy.
* Only in patients with preoperative MRI (n = 64).

Radiological findings

All of the patients benefitted pre-operatively from radiological examinations, including standard antero-posterior and profile x-rays of the lumbar spine and a lumbar CT-scan. The patients who presented with spondylolisthesis also had dynamic flexion-extension profile x-rays. Sixty-four patients (83%) benefitted from Magnetic Resonance Imaging (MRI) examination and 19 patients (25%) from saccoradiculography coupled with a CT-scan (Table 1).

All patients in group I presented with a unique synovial cyst (Fig. 1). In goup II, 4 patients (5%) presented with bilateral synovial cysts at the L4–L5 level. The cysts were located at the L4–L5 level in 52 patients (68%), L3–L4 level in 13 patients (17%) and L5–S1 in 12 patients (15%). The location was postero-lateral in 76 patients and extra-foraminal in one. There was equal distribution of left- and right-sided cysts.

Degenerative disc disease according to Doyle and Merrilees' classification was determined by the degenerative status of the disc in sagittal T2-weighted images (grade 0 = normal, grade 1 = decreased nucleus signal, grade 2 = decreased nucleus signal + decreased height, grade 3 = black disc, flattened ± prominent adjacent vertebral marrow changes) [5]. Among the 64 patients who benefitted from preoperative MRI, 57 (89%) patients presented disc degeneration (7 grade 0, 35 grade 1, 19 grade 2, 3 grade 3). Among the other 13 patients, 2 displayed decreased disc height on preoperative plain x-ray film.

Facet joint osteoarthritis was divided into four grades in axial spin-echo T1 as defined by Doyle and Merrilees [5]. Grade 0 indicates normal, grade 1 indicates mild

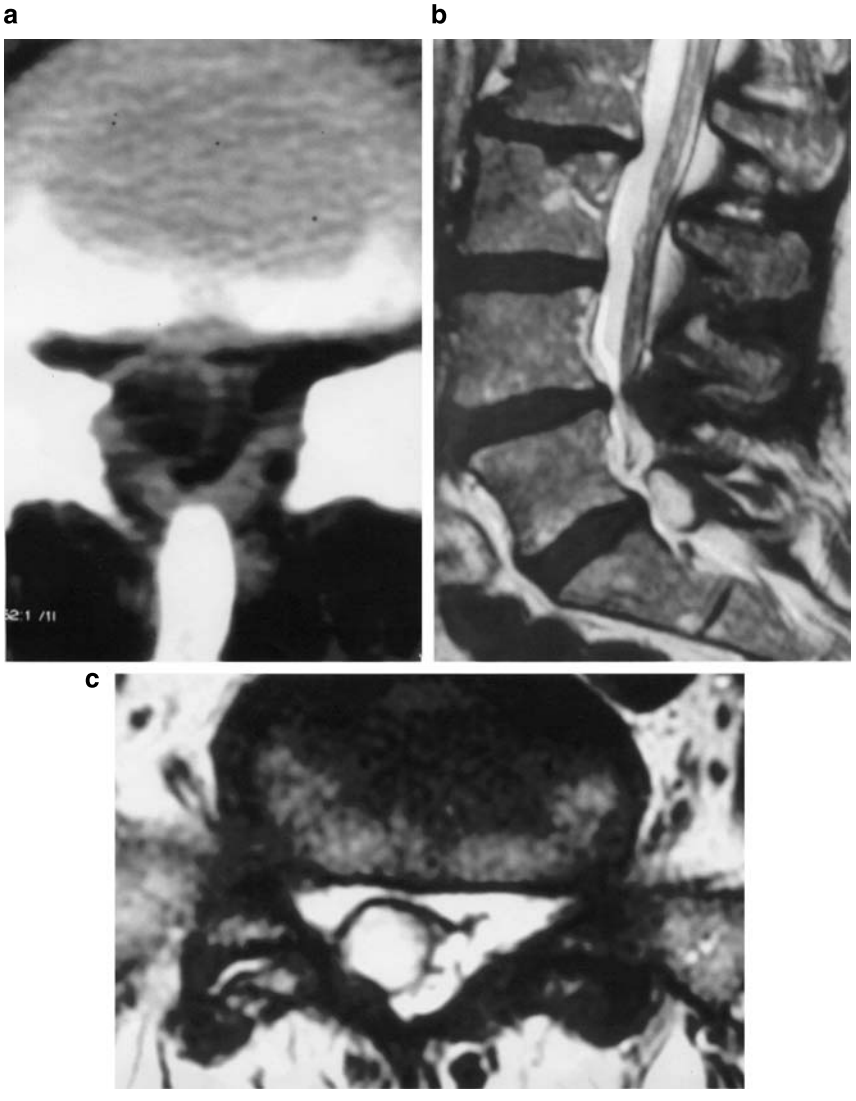

Fig. 1. (a) Lumbar CT-scan obtained in a patient presenting a right S1 sciatica and demonstrating a typical right L5–S1 synovial cyst adjacent to the degenerative facet joint with a posterolateral compression of the thecal sac and the S1 nerve root. (b) Sagittal T2-weighted image obtained in the same patient demonstrating an increased signal with the mass and a thin rim of hyposignal around the epidural mass. Note the preservation of the disc height (c) Axial T2-weighted image in the same patient showing the close association of the cyst with the degenerated facet joint

joint space narrowing or mild osteophytes, grade 2 is moderate sclerosis or osteophytes and grade 3 is severe osteoarthritis with marked osteophytes. Among the 64 patients with pre-operative MRI, none was grade 0, 9 were grade 1, 33 were grade 2 and 22 were grade 3. In the 13 patients without pre-operative MRI, 2 were considered grade 1, 4 were considered 2 and 7 were considered grade 3 on CT-scan findings.

Facet orientation was defined as the angle formed at the intersection of the joint line with the coronal plane, as measured on the axial magnetic resonance or CT-scans. In total, 59 patients had at least one facet angle at the level of the synovial cyst superior to 45° (76.6%). Fourty-six of the 52 patients (88.5%) with L4–L5 synovial cysts had at least a facet angle superior to 45°. In these patients, both of the facet angles were superior to 45° in 43 instances. In the 13 patients with a L3–L4 synovial cyst, both facet angles were superior to 45° in 12 instances (92.3%). At the L5–S1 level synovial cysts were associated with a sagittalized (>45°) facet joint in only one case. Spondylolisthesis was found on the pre-operative plain x-rays in 37 patients (48%). In all cases, it was a grade I degenerative spondylolisthesis, according to Meyerding's classification. The level of the spondylolisthesis correlated well to the level of the synovial cyst. Dynamic lumbar spine x-rays showed evidence of abnormal mobility in 5 of these patients. Overall correct pre-operative diagnosis was made in 60 patients (78%) but in 86% of the patients who benefitted from a pre-operative MRI scan and in 45% of the patients with only preoperative CT-scan. The cystic nature of the mass (isodense or isointense with the CSF) was only observed in 57% of cases. Calcifications in the cyst wall were found in 6 patients (8%). Intracystic haemorrhage was demonstrated in 2 patients (3%); this finding did not, however, correlate to the acute-onset of symptoms.

Treatment

All patients were treated surgically. Twenty-seven patients had prior transforaminal epidural corticosteroid injections (betamethasone 2 cc). Because of the absence of sustained benefit all these patients were referred for surgical evaluation. Of these patients, 6 received an attempted CT-guided intracystic aspiration and/or injection of 0.5 to 1 cc of betamethasone (6 mg/cc) with no significant lasting improvement and were subsequently referred for surgical management. One of these patients, who demonstrated a transient improvement, developed 6 months later a recurrent painful radiculopathy. MR imaging showed a completely calcified cyst. Successful surgical excision was undertaken but was particularly difficult due to the stiffness of the cyst and the adherence to the dura. He was totally pain free at 36 months post-operatively.

Excision of the cyst was performed under surgical microscope magnification in cases of adherence to the dura. In group I, all patients benefitted from cyst resection, medial facetectomy, partial hemilaminectomy and proximal foraminotomy. Total hemilaminectomy was performed in 12 cases for voluminous cysts (greatest diameter >8 mm). En bloc resection was possible in 12 patients (24%). Gross-total removal was achieved in 49 patients (96%) and subtotal removal in two cases because of dural sheath attachments. In seven patients with associated prolapsed disc, microdissectomy was performed. In group II, resection of the cyst, medial facetectomy and proximal foraminotomy at the level involved was associated with bilateral decompressive laminectomies more or less extended. En bloc resection was possible in 19 patients (73%) and gross-total removal was achieved in all patients (100%). In group I and II, no patient had concomitant fusion. A histopathological examination of the sample removed was obtained in all cases and was compatible with the diagnosis of synovial cyst. The mean duration of hospitalization was 5.2 days (3–17 days).

Surgery-related complications were per-operative cerebrospinal fluid leak in one case (treated with fat impaction and biological glue at the same operation), epidural hematoma in one case (patient under anti-agregant therapy stopped 7 days before and which required surgical drainage) and one case of deep venous thrombosis.

The mean follow-up period was 42 months (18–105 months). A follow-up review of at least 18 months was available in all the patients. For the 51 patients who presented with unilateral radicular pain (group I), results were excellent in 42 cases (82.3%), and good in 8 cases (15.8%) and poor in 1 case (1.9%). The patient with

Table 2. *Symptoms and signs*

	Number of patients (%)
Symptoms	
– Low back pain	73 (95%)
– Unilateral radiculopathy (group I)	51 (66%)
– Bilateral neurogenic claudication (group II)	26 (34%)
Neurological signs	
– Motor deficit	9 (12%)
– Hypesthesia	20 (26%)
– Altered tendon reflexes	27 (35%)

Table 3. *Functional and neurological results*

	Nb of patients	Pre-operative motor deficit Nb pts (%)	Post-operative motor deficit recovery		Functional results		
			Present Nb pts (%)	Absent Nb pts (%)	Excellent Nb pts (%)	Good Nb pts (%)	Poor Nb pts (%)
*Conservative treatment**	27	0	–	–	0	0	27 (100%)$
– Group I (Unilateral radiculopathy)	19	0	–	–	0	0	19 (100%)$
– Group II (Bilateral neurogenic claudication)	11	0	–	–	0	0	11 (100%)$
Surgical treatment	77	9 (12%)	8 (89%)	1 (11%)	63 (81.8%)	12 (15.6%)	2 (2.6%)
– Group I (Unilateral radiculopathy)	51	9 (17.6%)	8 (89%)	1 (11%)	42 (82.3%)	8 (15.8%)	1 (1.9%)
– Group II (Bilateral neurogenic claudication)	26	0	–	–	21 (80.8%)	4 (15.4%)	1 (3.8%)

Nb Number; *pts* patients.

* All these patients were subsequently operated on. $ 16 of the 27 patients who experienced conservative treatment had transient improvement of their symptoms but results were considered poor because all of these patients had to be operated on between one and seven months. It is worthy of note that one patient had worsening symptoms after cyst injection and that one patient who was initially improved after intracystic injection developed a totally calcified cyst.

poor outcome had a voluminous L4–L5 right-sided synovial cyst with an important L5 motor deficit (2/5). After surgery, the patient had total pain relief but still presented at 2 years postoperatively with a partial L5 deficit (4/5). Even if he was fully satisfied with the operation, our result grading system made us classify him as a poor outcome because of the persisting motor deficit. For the 26 patients who suffered bilateral neurogenic claudication (group II), the results were excellent in 21 cases (80.8%), and good in 4 cases (15.4%), but 1 patient continued to complain of incapacitating dysesthesia in his lower limbs, without any true radicular pain. This patient, aged 77 years old, was a non-insulin-dependent diabetic and probably already presented pre-operatively the combination of neurogenic claudication and diabetic polyneuropathy. In the entire population of patients, results were excellent (63 cases, 81.8%) or good (12 cases, 15.6%) in 97.4% and poor in 2 cases (2.6%). Of the 9 patients who presented with a pre-operative motor deficit, 8 (89%) had recovered normal motor function at the last follow-up examination (Table 3).

Recurrence occurred in only one case, a female patient, operated on for a right-sided L4–L5 synovial cyst, associated with a non-mobile grade I spondylolisthesis, causing unilateral radicular pain which was resistant to medical treatment, but relieved immediately postoperatively. She had a recurrent bilateral painful radiculopathy at 8 months. Imaging showed a recurrent right-sided L4–L5 cyst, but also the development of a small contralateral synovial cyst, associated with a worsening of her spondylolisthesis, which was mobile on dynamic x-rays. She was reoperated on, both cysts were excised and a bilateral single-level laminectomy and concomitant L4–L5 rigid fusion were performed. She was completely asymptomatic after 5 years of follow up.

A contralateral asynchronous cyst developed in a patient 18 months after surgical treatment of a right L4–L5 cyst and was treated surgically without fusion. The patient had a pre-operative grade I non-mobile spondylolisthesis and did not show any impairment or mobility of the antelisthesis when the contralateral cyst ocurred. Two years after treatment of the contralateral cyst dynamic profile lumbar spine x-ray films showed the same antelisthesis without abnormal mobility. It is worthy of note that the patient had a severe discopathy at this level with almost total disappearence of the interveretebral space.

Of the 34 patients who presented with non-mobile spondylolisthesis pre-operatively, only one had secondary worsening with the appearance of mobility on the dynamic x-rays (the case with recurrence). Of the 3 patients whose spondylolisthesis showed mobility on dynamic x-rays, control x-rays did not show any worsening, and the patients remained asymptomatic at 3 and 4 years.

Discussion

The most frequently accepted hypothesis about the pathogenesis of synovial cysts is the appearance of defects of the joint capsule, secondary to microtrauma and degenerative phenomena, through which a hernia of the synovial membrane develops [9, 13, 19, 23]. This new para-articular cavity filled with synovial fluid, forms the

synovial cyst, which initially communicates with the joint line. It is believed that the synovial cyst may degenerate and lose its connection with the adjacent joint, and mixoid or mucoid degeneration can occur.

The role of segmental spinal instability and spinal trauma has been suggested as being involved in these lesions. The role of trauma most likely plays a role in a small number of cases, as determined by the past medical history in 1 of our 77 patients. In fact, segmental hypermobility seems to play an important role in the development of synovial cysts [15, 17]. Indeed, spinal synovial cysts have been described at all of the mobile levels of the vertebral column. The most frequent location is the lumbar region, particularly L4–L5, the most mobile level, which represents 70% of sites. The frequent association with spondylolisthesis, as in our series (48%), is in favour of instability playing a major role [6, 9, 10, 13, 15, 17, 19, 20]. In the same way, we found osteoarthritis to be associated with synovial cysts in all patients. This has been reported already in other series [5, 16, 22]. Fujiwara *et al*. recently demonstrated that facet joint osteoarthritis was significantly and positively associated with anterior translatory instability of the degenerative lumbar spine [8]. Degenerative disc disease was also a frequent finding in our series. Actually, 89% of patients with preoperative MRI demonstrated disc degeneration. It is noteworthy that only 4.7% of these patients had grade 3 discopathy according to Doyle and Merrilees definition [5]. Many biomechanical studies report the relationship between disc degeneration and segmental instability [5, 7, 8]. Most of these studies indicate that moderate disc degeneration is responsible for decrease in disc stiffness (increased motion) whereas severe disc degeneration results in a restored stiffness of the disc. Orientation of the lumbar facet joint is known to be associated with disc degeneration [4]. In our series, we found that in 76.6% of cases the facet joints were sagittally oriented. Boden *et al*. showed a strong relationship between segmental instability and sagittal orientation of at least one facet joint [4]. All these findings taking together, consistent with the literature data strengthen the major role played by segmental spinal instability in the genesis of lumbar synovial cysts.

Conservative treatment has been proposed by certain authors [2, 14]. Bed rest, oral analgesics, physical therapy, bracing and chiropractic care has been suggested by some authors [10], but with disappointing results and are not reported to be efficacious [21]. Epidural steroid injection (transforaminal or translaminar), intra-articular joint injection or cyst puncture have also been attempted [16]. In this series, failure rates reached 30% to 60% respectively at 1 and 6 months. Moreover, in several case reports with questionable length of follow-up period, success rates range from 20 to 75% [2, 14]. These results are consistent with our experience. Indeed, the 27 patients treated initially conservatively, experienced surgical excision at one year in 100%. In other respects, complications secondary to fluoroscopically- or CT-guided intra-articular steroid injection or cyst aspiration (hematoma, infection, acute worsening of symptoms, extensive calcifications, ...) have never been thoroughly addressed. In our series, one patient experienced a worsening of his symptoms after intra-cystic corticosteroid injection and one patient developed a totally calcified cyst which was difficult to remove surgically.

In the numerous reported surgical series, success rates range from 87 to 93%, mean follow-up periods range from 10 to 42 months and complications rates even in large series range from 0 to 4% [6, 9, 10, 13, 16, 19, 23]. For all these reasons, there appears to be limited evidence supporting the efficacy of non operative care and surgical treatment of synovial cysts is largely recommended in all cases of intractable pain and neurological deficit [1, 12, 13, 15–20, 23].

There is no consensus about which surgical technique should be used. The surgical approach and technique depends on the cyst's size, the extent of its interface with the dura, the presence of spinal canal stenosis and the number of segments involved in the lumbar stenosis. In cases of unilateral radiculopathy, an interlaminar approach, with partial hemilaminectomy together with partial medial facetectomy and proximal foraminotomy, most of the time allows the cyst to be excised completely. In the author's opinion, medial facetectomy is warranted to totally excise the cyst attachment to the facet joint and thus prevent recurrence. Furthermore, we do not think that partial medial facetectomy, systematically performed in our series even in case of spondylolisthesis, compromise segmental stability since an asynchronous cyst did not occur in our series more frequently than in others. We systematically use microscope guided dissection to prevent a dural tear in group I. We observed that cyst was more frequently adherent to the dura when not associated with lumbar spinal stenosis. In this group, incomplete resection of the cyst occurred in two cases and en bloc resection was possible in only 24% of cases. When symptoms are bilateral neurogenic claudication, in the context of a lumbar spinal stenosis, the operation includes cyst resection together with bilateral decompressive laminectomies according to the number

of levels involved by the stenosis. Generally, the cysts are less adherent to the dura and the operation can be conducted without the microscope. In these cases, cysts have been excised completely in 100% of cases and en bloc resection was possible in 73% of cases.

The most frequent per-operative problem encountered is cyst adherence to the dural sheath, sometimes considerably so, making dissection laborious and in some cases, requiring incomplete excision. In our series, it was only necessary in two cases to leave a fragment of the cyst capsule in contact with the dura mater.

The indication of arthrodesis is not yet clear and is controversial in the management of synovial cysts. In our series, we did not perform concomitant segmental arthrodesis as a first-line treatment. In one patient suffering a symptomatic recurrence of a L4–L5 cyst and the development of an asynchronous contralateral synovial cyst, associated with unstable spondylolisthesis, 8 months post-operatively, we performed mono-segmental lumbar arthrodesis. In their recently published review, Lyons *et al*. collected 194 cases of lumbar synovial cysts, operated on in 3 centres over a period of 22 years. Spondylolisthesis was seen on the pre-operative x-rays in 50% of their patients [13]. Concomitant spinal fusion was performed as a first-line treatment in 9.3% of cases, and in 2.3% of cases (4 patients) subsequent fusion had to be performed, because of delayed symptomatic spondylolisthesis. In their series, concomitant fusion was undertaken when a total laminectomy or facetectomy was performed in the presence of a pre-operative spondylolisthesis although the grade (Meyerding's classification) and mobility on dynamic x-rays were not specified. It is worthy of note that in only 1 of the 4 patients who benefitted from subsequent fusion for the development of symptomatic spondylolidthesis, pre-operative spondylolisthesis was demonstrated. They found no statistically significant difference for the development of symptomatic spondylolisthesis based on the degree of laminectomy and facetectomy. However, in their series, the trend favoured total facetectomy as being more related to the development of symptomatic spondylolisthesis than the extent of laminectomy. We agree with Lyons *et al*. thorough analysis but since we never perform total or large facetectomy during surgical excision of a synovial cyst we do not recommend segmental lumbar arthrodesis as a first-line procedure [13]. Indeed, the number of reported cases of delayed instability is, at present, too few to clearly identify objective criteria warranting the decision of a concomitant fusion.

Conclusion

Lumbar synovial cysts are a degenerative spinal condition, which is frequently described and which is gradually becoming better understood. It affects a population with a mean age of around 60 years old. It is located most often at the L4–L5 level (70% of cases). The pre-operative diagnosis of these lesions has become more frequent thanks to MRI scans. Their management remains most often surgical, and the functional results are satisfactory in most cases, with very low operative morbidity. The aetiopathogenesis of these lesions involving a certain amount of segmental spinal hypermobility, is now well-documented. However, in the surgical management of these lesions, the indication of spinal arthrodesis as a first-line procedure, remains a source of debate. A prospective study aimed at evaluating systematically, both pre-operatively and post-operatively the amount of segmental spinal mobility, as well as thoroughly codifying the surgical acts performed, may provide answers to this issue.

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Comment

Dr. Metellus *et al.* report a large series of patients harbouring lumbar synovial cysts with a detailed review of the literature. The primary treatment of this disease remain microsurgical removal. Other options like CT guided percutaneous puncture or conservative treatment should be reserved for high risk patients. Due to adherence to the dura, it is difficult to prepare the cyst from it. The incidence of intraoperative CSF leak in one case speaks for the excellent experience of the authors and the meticulous microsurgical dissection of the cyst from the dura.

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