

Incomplete resection of lumbar synovial cysts – Evaluating the risk of recurrence[☆]



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ABSTRACT

Object: Synovial cysts are generally located in the lumbar spine adjacent to facet joints. Most studies recommend surgical resection. Adhesions of the lumbar synovial cyst to the dura are common and can result in dural tears with subsequent CSF fistula or nerve injury. The recurrence rate after incomplete resection of lumbar synovial cysts is unclear. For this purpose, we report on our experience of 148 patients who underwent synovial cyst resection from 2000 to 2011.

Methods: We reviewed records of patients who underwent microsurgical resection of symptomatic lumbar synovial cysts between 2000 and 2011 with a minimum one-year follow-up to identify cases with incomplete synovial cyst resection. Patient and surgical reports were retrospectively evaluated regarding extent of cyst resection, dural tears and surgery-related complications. Patients were asked to complete questionnaires regarding their clinical outcome and to report on further lumbar operations.

Results: We identified 148 patients with lumbar synovial cysts who were surgically treated in our department. In 8 patients (5.4%), the synovial cysts were not resected completely due to dural adhesions and high risk for dural tears. Sufficient decompression was achieved in all patients. Seven of these patients were pleased with the results of the operation and would undergo surgery again. The remaining patient suffered from a facet joint syndrome, which was successfully treated conservatively, without evidence of a recurrent synovial cyst in the MRI.

Conclusions: Only in case of severe adhesions to the dura complete resection was not enforced to avoid dural tears. In none of the 8 patients symptomatic recurrence of synovial cysts occurred. Aware of the limited numbers, we suggest rather leaving remnants of an attached synovial cyst behind after a sufficient decompression than risking dural tears and surgery-related complications.

This trial is registered with DRKS00006133.

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1. Introduction

Synovial cysts were first described by Baker as cystic structures typically originating from the joint capsules of the extremities [1,2]. They are in many cases asymptomatic lesions without necessity of treatment [3]. The situation is different in the spine, as lumbar synovial cysts (Fig. 1) can cause neural compression. Patients can suffer from acute back pain, radicular symptoms and spinal claudication. The first report of spinal nerve compression by a lumbar synovial cyst was in 1950 [4]. Nevertheless, lumbar synovial cysts are a relatively rare finding [5]. However, the incidence is increasing due to improvements and the wider availability of magnetic

resonance imaging (MRI) [6,7]. The prevalence of spinal synovial cysts in a symptomatic population of 303 patients investigated with MRI is reported with 2.3% [8]. Whereas synovial cysts are rarely located in the cervical (2.6%) and thoracic (1.2%) region, the most common location is the lumbar spine with 96.4% [9]. Here, L4-L5 is the most frequently affected level with 68.0%, followed by the L3-L4 level (14.1%) and the L5-S1 level (1.6%) [9]. In cases where conservative treatment fails, some authors propose percutaneous rupture of synovial cysts as an alternative. The study of Martha et al. reports of successful cyst ruptures in 81% of cases. However, 54% of patients required subsequent surgery because of inadequate symptom relief [10]. Most studies recommend surgical resection [9,11]. Intraoperatively, adhesions of the synovial cyst to the dura are occasionally found and total resection of the synovial cyst can be surgically challenging. A too ambitious surgical approach, however, may sometimes result in dural tears with subsequent cerebrospinal fluid (CSF) fistula or nerve injury. Reviewing the literature the incidence of dural adhesions has not been reported. In clinical

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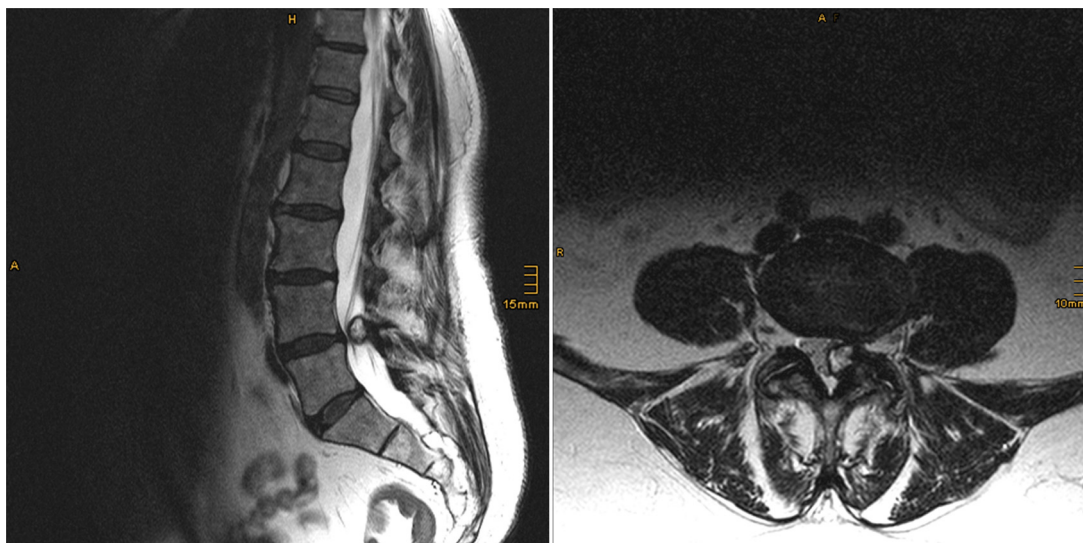


Fig. 1. Sagittal and axial T2-weighted MRI of a synovial cyst.

experience dural adhesions are common intraoperative findings, which, however, seem to be underreported. To prevent a dural tear in case of adhesion or to prevent nerve injury in cases where a dural tear already occurred, sometimes part of the cystic wall has to be left to the dura. This seems to be underreported as well, as a total resection of the cystic structure is thought to be mandatory. The recurrence rate after an incomplete resection of synovial cysts is unclear. For this purpose, we report on our experience of 148 patients who underwent synovial cyst resection from 2000 to 2011.

2. Methods

We reviewed records of patients who underwent microsurgical resection of symptomatic lumbar synovial cysts between 2000 and 2011 with a minimum one-year follow-up to identify cases with incomplete synovial cyst resection. Surgical technique was either standard open microsurgery or minimally invasive tubular microsurgery (METRx[®] MD, Medtronic Sofamor Danek, Inc., Memphis, TN, USA). The surgical method depended on the surgeon's choice. Regardless of the initial approach a partial hemilaminectomy with partial arthrectomy at the level of the cyst was performed with subsequent resection of the cyst. In all cases care was taken to preserve the integrity of 2/3 of the medial articular facet to avoid instability. Various surgeons at different stages of their neurosurgical career (e.g. neurosurgical residents, attending neurosurgeons or neurosurgeons with subspecialization in spine surgery) operated on the patients. Patients under 18 years of age and patients with concomitant fusion operations were excluded.

Patient and surgical reports were retrospectively evaluated regarding extent of cyst resection, dural tears and surgery-related complications. Patients were asked to complete questionnaires to report on further lumbar operations and regarding their clinical outcome including Visual Analogue Scale (VAS) for lumbar and leg pain at rest and under physical strain, the Oswestry disability index (ODI) and the patient satisfaction index (PSI). The PSI is a modified subitem of the North American Spine Society outcome questionnaire. It is scored as seen in Table 1. The main questions of interest were clinical and radiological findings of cyst recurrence.

The local ethics committee approved the study. The study was registered in the German Clinical Trials Register (DRKS00006133).

Table 1

Patient satisfaction index – PSI.

PSI = 1	Surgery met my expectations
PSI = 2	I did not improve as much as I had hoped but I would undergo the same operation for the same results
PSI = 3	Surgery helped but I would not undergo the same operation for the same results
PSI = 4	I am the same or worse as compared to before surgery

3. Results

We identified 148 patients with lumbar synovial cysts who were surgically treated in our department. In 76 patients (51.4%) dural adhesions are mentioned in the surgery reports. In 8 of 148 patients (5.4%; 1 male, 7 female) the synovial cysts could not be resected completely due to severe dural adhesions and high risk for dural tears (see Table 2 for the subject characteristics).

Mean patient age was 53.6 years (SD 10.5, min. 46 years, max. 78 years). Duration of symptoms varied from 3 weeks to several years. None of the patients had spinal surgery in history. The level of surgery was L4–L5 in 6 patients and L5–S1 in 2 patients. 3 of the 8 patients had a concomitant hypertrophic ligamentum flavum. In 6 patients the approach was standard open microsurgery and in 2 patients a minimally invasive tubular retractor system was used. Mean follow-up time was 81 months (min. 29 months, max. 132 months).

The cyst's remnant was referred to as *minimal* ($n=2$), *small* ($n=4$) and *partial resection* ($n=2$) in the surgical reports. In one patient (Table 2, Case 4) the residual part of the synovial cyst was coagulated.

Circumscribed dural tears occurred in 2 patients (Table 2, Case 3 and 6). A suture was done and the incidental durotomy was additionally covered by a sealant or a haemostatic agent (Case 3: TachoComb[®], Nycomed; Case 6: Gelita, Braun Melsungen AG). One patient (Table 2, Case 3) developed temporary symptoms attributable to CSF leak syndrome. Besides, referring to the 76 patients with dural adhesions an incidental durotomy occurred altogether in 8 patients (10.5%; 2 patients in the incompletely resected group and 6 patients in the completely resected group). Compared to this, in the group without dural adhesions ($n=64$) an incidental durotomy occurred in 4 patients. Statistically, there is no significant association between both patient groups referring to the risk of incidental durotomy ($\chi^2(1)=0.811$; $p=0.368$).

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