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Clinical Study

Patient-reported outcome of surgical treatment for lumbar spinal epidural lipomatosis

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Abstract

BACKGROUND CONTEXT: Spinal epidural lipomatosis (SEL) is a rare condition characterized by an excessive accumulation of fat tissue in the spinal canal that can have a compressive effect, leading to clinical symptoms. This condition has a distinct pathology from spinal stenosis associated with degeneration of the intervertebral discs, ligaments, and facet joints. Several different conservative and surgical treatment strategies have been proposed for SEL, but its treatment remains controversial. There is a lack of evidence documenting the success of surgical decompression in SEL, and no previous studies have reported the postoperative outcome from the patient's perspective.

PURPOSE: The aim of the present study was to evaluate patient-rated outcome after surgical decompression in SEL.

STUDY DESIGN: A retrospective analysis of prospectively collected data was carried out.

PATIENT SAMPLE: A total of 22 patients (19 males; age: 68.2±9.9 years) who had undergone spine surgery for SEL were identified from our local Spine Surgery Outcomes Database, which includes a total of 10,028 spine surgeries recorded between 2005 and 2012. Inclusion criteria were epidural lipomatosis confirmed by preoperative magnetic resonance imaging (MRI) scans and subsequent decompression surgery without spinal fusion.

OUTCOME MEASURES: The Core Outcome Measures Index (COMI) was used to assess patient-rated outcome. The COMI includes the domains pain (separate 0–10 scales for back and leg pain), back-specific function, symptom-specific well-being, general quality of life (QOL), work disability, and social disability.

METHODS: The questionnaires were completed preoperatively and at 3, 12, and 24 months postoperatively. Surgical data were retrieved from the patient charts and from our local Spine Surgery Outcomes Database, which we operate in connection with the International Spine Tango Registry. Differences between pre- and postoperative scores were analyzed using paired *t* tests and repeated measures analysis of variance.

RESULTS: At 3-months follow-up, the COMI score and scores for leg pain and back pain had improved significantly compared with their preoperative values ($p<.005$). The mean decrease in COMI score after 3 months was 2.6±2.4 (range: −1.3 to 6.5) points: from 7.5±1.7 (range: 3.5–10) to 4.9±2.5 (range: 0.5–9.6). A total of 11 patients (50%) had an improvement of the COMI of more than the minimal clinically important change (MCIC) score of 2.2 points. The mean decrease in leg pain after 3 months was 2.4±3.5 (−5 to 10) points. Overall, 17 patients (77.3%) reported a reduced leg pain, 12 (54.6%) of whom by at least the MCIC score of 2 points. The significant reductions from baseline in COMI and leg and back pain scores were retained up to 2 years postoperatively ($p<.02$).

FDA device/drug status: Not applicable.

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The general QOL item of the COMI improved significantly after surgery (p<.0001). Over 80% of the cohort rated their preoperative QOL as bad (n=13) or very bad (n=5), whereas 3 months after surgery, only 7 patients rated their QOL as bad, and one as very bad (36%).
CONCLUSIONS: The present study is the first to demonstrate that surgical decompression is associated with a statistically significant improvement in patient-rated outcome scores in patients with symptomatic SEL, with a clinically relevant change occurring in approximately half of them. Surgical decompression hence represents a reasonable treatment option for SEL, although the reason behind the less good response in some patients needs further investigation.

Keywords: Patient-reported outcome; Spinal epidural lipomatosis; Stenosis; Surgical decompression; Lumbar spine; Lipomatosis; Core Outcome Measures Index; Spine surgery; Neurogenic claudication

Introduction

Spinal epidural lipomatosis (SEL) is a rare condition characterized by an excessive accumulation of fat tissue in the spinal canal. In the assessment of degenerative spinal stenosis the presence of epidural fat posteriorly is considered a sign of a less severe affliction (ie, grade C according to the Schizas A–D classification of spinal stenosis) [1]. However, an excessive amount of fatty tissue in the epidural space can itself have a compressive effect and may lead to clinical symptoms. Spinal epidural lipomatosis is therefore considered to be a distinct pathology from the spinal stenosis associated with degeneration of the intervertebral discs, ligaments, and facet joints [2].

Based on histological examination, posterior lumbar epidural fat has been characterized as physiological functional tissue that provides a sliding space. The observed rarefaction of connective tissue explains its semifluid features [3]. No study has compared the histologic characteristics of physiological epidural fat and epidural lipomatosis. Only Quint et al [4] reported an overgrowth of histologically normal appearing unencapsulated fat tissue.

The underlying causes associated with the development of excess epidural fat are not clearly understood, and a multifactorial etiology has been proposed. In several cases, epidural lipomatosis has been described as a consequence of long-term steroid use [5]. Metabolic diseases such as Cushing's disease [6] and obesity [7] have also been associated with its occurrence. Other patients without these risk factors are considered to have an idiopathic form of SEL [8–11].

The diagnosis of SEL is based on clinical symptoms caused by the compression of the spinal roots (mono- to polyradicular) and spinal cord with consequent myelopathy [5,6,12,13]. The diagnosis is confirmed by magnetic resonance imaging (MRI), which is considered the most sensitive modality for the assessment of fatty tissue [4,14]. A hyperintense epidural mass on T1-weighted images with intermediate intensity on T2-weighted sequences is specific for lipomatous tissue. In the differential diagnosis of SEL, epidural hematomas and extradural lipomas have been described [15,16]. The typical findings of SEL in axial T1-weighted MRI scans, not seen in any other spinal disorders, are polygonal deformations of the dural sac [17].

Geers et al described thin but resistant fibroelastic meningovertebral ligaments extending from the outer surface of the dura mater to the osteofibrous walls of the spinal canal, which presumably function as attachment points of the dural sac to the neighboring structures [18]. They concluded that the dural sac indentations, corresponding to the dural insertion site of the ligaments, alternate with intervening depressions due to the mass effect of the excessive fat and are responsible for the typical polygonal, stellar, or Y-shaped deformation of the dural sac.

Myelography and postmyelography computed tomography scans have also been applied for diagnostic purposes, but are not as sensitive as MRI [4,17]. Furthermore, myelography does not allow a clear differentiation between degenerative lumbar stenosis and stenosis due to SEL.

Various treatment strategies leading to the remission of symptoms have been reported. Depending on the pre-existing conditions, these include weight reduction [12], decreasing glucocorticoid excess [19], epidural steroid injections [20], and different methods of surgical decompression [7,21]. Spontaneous resolution of SEL has also been described [22].

To date, studies addressing the surgical treatment of SEL indicate good postoperative outcomes. However, the studies are limited to small case series and case reports. Ishikawa et al [23] demonstrated a mean Japanese Orthopaedic Association Score recovery rate of 67.4% in seven patients treated with open decompressive surgery, which however also included patients treated with herniotomy and posterolateral spinal fusion. In their individual case reports, Frank [24] and Sairyo et al [21] each reported that leg pain fully recovered after endoscopic decompression in patients with idiopathic SEL. Lisai et al [13] reported an improvement in symptoms after fat debulking and instrumented posterolateral lumbar fusion in three patients with SEL.

Overall, the treatment of SEL appears to be varied and controversial. There is not only a lack of evidence supporting the success of surgical decompression but also a lack of studies reporting the outcome from the patient's perspective.

The aim of the present study was to analyze patient-reported outcome after lumbar decompressive surgery in the largest series of patients with SEL evaluated to date.

Patients and methods

This single center study comprised a retrospective analysis of prospectively collected data from consecutive patients