Hemilaminectomy for large spinal extradural meningeal cysts: A case report and review of surgical techniques

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ABSTRACT

Spinal extradural meningeal cysts (SEMC) are uncommon causes of back pain. The literature contains only case reports of this pathology, and treatment remains controversial due to its rarity. We present a case of SEMC and describe an approach via hemilaminectomy, with the choice of side guided by radiological imaging, followed by complete excision of the cyst and repair of the underlying dural defect.

KEYWORDS

Spine – Meningeal – Cyst – Back pain – Laminectomy

Accepted 17 January 2016

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Spinal extradural meningeal cysts (SEMC) are an uncommon cause of back pain and may also present with myeloradiculopathy, depending on their location and size. Congenital SEMC are the most common form of the condition, and they favour the thoracic spine, tend to present in adolescence, and have a male preponderance. Traumatic, iatrogenic, inflammatory and infectious forms of SEMC have also been reported.¹ While SEMC may be diagnosed radiologically using magnetic resonance imaging (MRI), computed tomography (CT) myelography shows the communication between the SEMC and the subarachnoid space, as well as the level of the dural defect.²

Case presentation

A 43-year-old gentleman presented to the neurosurgical department with a 6-month history of persistent back pain and shock-like radiation down both legs, with associated lower limb paraesthesia, following a fall from a height of about 3 metres. He had osteoarthritis of the right hip, with pain-related loss of range-of-motion, but this was not a novel finding and he was otherwise well. The patient denied having muscle weakness or sphincter dysfunction, and the physical examination was likewise unremarkable.

Imaging at the time of injury ruled out any bony pathology but revealed a large dorsally situated SEMC spanning the vertebral levels of T10–L1, with ventral displacement and compression of the conus medullaris and cauda equina. This cyst also extended out the neural foramina bilaterally at the levels of T11 and T12, with associated enlargement of the neural foramina. The cyst was erratically placed more

to the left and the largest foramen was on the left at T11/12 (Fig 1).

Needle aspiration of the cyst under CT fluoroscopic guidance, accessed from the right side, provided good initial symptom relief, but this lasted for only 6 months. Repeat MRI revealed recurrence of the cyst and surgery was recommended.

A left-sided approach was planned due to the enlargement of the neural foramina being greater on that side. A paramedian incision from T11 to L1 was followed by hemilaminectomies, forming a trench in which the cyst lay exposed. The cyst was then delivered from both cranial and caudal ends, which revealed the cyst pedicle on the T11 nerve root on the left (Fig 2). The pedicle was encircled and detached from the main theca, and the defect overlaid with DuraSeal spine sealant (Covidien, Waltham, MA, USA).

The patient experienced no perioperative complications, and was symptom-free at 2 years' follow-up, with no cyst recurrence nor kyphosis on MRI (Fig 3).

Discussion

Treatment of SEMC is controversial due to the rarity of the pathology, but conservative measures such as observation, steroid injections and cyst aspiration, rupture or fenestration all appear to have poorer outcomes than surgical management.⁵ This is unsurprising, as the underlying cause of cyst expansion is not addressed by these methods. Several theories have been suggested to explain the mechanism for SEMC enlargement. Rohrer *et al* described the

Figure 1A–F T2-weighted magnetic resonance imaging of the thoracolumbar spine. * denotes the T12 vertebral body. Above: Sagittal view showing a large extradural cyst dorsal to, and compressing, the conus medullaris and cauda equina from T10–L1. It is worse on the left side (C) compared to the midline (B) and the right side (A). Below: Axial view through T10/T11 (D), T11/T12 (E), and T12/L1 (F) levels, showing ventral compression of the thecal sac by the cyst, with cyst extension through the neural foramina. It is worse on the left side.

Figure 3A–F T2-weighted magnetic resonance imaging of the thoracolumbar spine at 2 years' follow-up. * denotes the T12 vertebral body. Above: Sagittal view of the right side (A), midline (B), and left side (C). Below: Axial view through T10/T11 (D), T11/T12 (E), and T12/L1 (F) levels. All images show resolution of cyst, relief of compressive effects, with no evidence of recurrence or instability.

Figure 2 Intraoperative pictures of extradural cyst. Above: lying in the trench created from hemilaminectomies. Below: lifted to reveal the fistula on the T11 nerve root.

intraoperative visualisation of a ‘ball-valve’ mechanism communicating directly between the SEMC and the subarachnoid space, suggesting that this created a two-way system of unequal flow, thus resulting in SEMC expansion.⁴

The most common surgical approach is bilateral laminectomies followed by complete excision of the cyst, with primary repair of any underlying dural defect. This invasive technique carries with it a significant risk of kyphosis, especially when the cyst is large, spans several vertebral levels and the patient is young. Some authors have described spinal fusion to counteract this risk.⁵ More recently, some groups report that cystectomy was not required, and primary suture of the dural defect alone, with the choice of side and level guided by CT myelography, was sufficient.⁵ This would seem to be the least invasive surgical approach while minimising risk of recurrence, but carries with it the need for CT myelography and is technically more challenging, as locating and then repairing the dural defect may be more difficult.

We agree with previous authors that the key to success is the location and treatment of the underlying communicating dural defect. We propose that, when the cyst is relatively erratically placed, the side of the dural defect may be localised to the side of the spinal canal occupied primarily by the cyst. The site of the dural defect may also be localised to the largest neural foramina on that side. This then allows hemilaminectomies to be performed without the need for CT myelography and with good exposure of the cyst, thus allowing easy access to the underlying dural defect for subsequent repair. The risk of kyphosis is reduced with our approach, and confirmed with long-term imaging of our case, due to preservation of the midline tension band. Hemilaminectomy not only results in less kyphotic deformity, but is also associated with shorter stays and lower analgesic usage when compared with bilateral laminectomy for intraspinal tumour

resections.⁶ In our case, we were fairly confident of the side of the dural defect but, if this is uncertain, we suggest a median incision instead to facilitate contralateral exploration, if required.

Conclusions

In summary, we present a case of SEMC in a 43-year-old gentleman. We performed hemilaminectomies followed by simple cyst excision and ligation of the cyst pedicle, with the choice of side chosen guided by MRI, and report a good outcome.

Acknowledgements

The authors report no conflicts of interest and funding.

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