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Ossified pseudomeningocele following laminectomy: case reports and review of the literature

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Abstract To date, four cases of ossified extradural pseudocyst have been described, the first being in 1951 by Verbiest who described unusual forms of compression of the cauda equina including a case of a lumbo-sacral extradural cyst and a case of 'knotting' of a caudal nerve root. We present an additional two cases.

Key words Meningocele · Pseudocyst · Degenerative spondylolisthesis

Introduction

A postlaminectomy pseudomeningocele is a fluid-filled space with a fibrous capsule lying dorsal to the thecal canal in the laminectomy opening, which occasionally develops after spinal surgery [6, 10]. It has also been described as a diverticulum-like outpouching created by tearing of the arachnoid covering of the nerve roots. Occasionally nerve roots are entrapped in a pseudomeningocele after lumbar laminectomy and patients exhibit delayed radicular symptoms and signs after disc surgery [1, 4, 13]. Teplick et al. [9] reported eight cases in 400 symptomatic patients undergoing CT examination, of whom none had surgical exploration.

Ossified extradural pseudomeningoceles are very rare, four cases being reported to date. We present a further two cases and review the literature.

Case reports

Case 1

A 70-year-old extremely active general surgeon presented in August 1994 with uncontrollable bilateral leg pain, in the L5 distrib-

ution, and progressive weakness in both legs, which had occurred since his last operation.

He had suffered a degenerative spondylolisthesis and had undergone two separate laminectomies in the area. The first in 1980 and the second in 1989.

After the first operation, he had noted a marked reduction of his sciatica and had been able to continue his surgical practice. After the second procedure, in which a CSF leak had occurred, he recovered well until approximately 1 month after the procedure, when he suddenly experienced excruciating back and leg pain and from that time became aware of very profound leg weakness. He was also aware of some back instability, in that any movement of his back caused excruciating pain.

He underwent a long period of recumbency and convalescence and eventually the back pain disappeared; however, the leg pain progressed and the bilateral sciatica increased. The condition progressed to almost complete bilateral L5 weakness. There were no sphincter disturbances.

A series of postoperative studies revealed the development of an operative pseudomeningocele and the last MRI scan confirmed that the lesion appeared to be distorting and compressing the dural sac. He was referred for excision of the pseudomeningocele as a possible treatment for the pain.

On examination he walked with a flapping gait, he had marked atrophy of muscles in the L5 distribution and quadriceps and evidence of widespread autonomic neuropathy. There was dysaesthetic sensation in both legs.

At surgery, on 12 August 1994, for excision of the cyst and titanium pedicle screw and plate fixation, the pseudomeningocele

was found to be uniformly and completely ossified apart from the tiny communication between the dural sac and the meningocele.

The whole of the ossified pseudomeningocele was removed with microdissection technique around the nerve root, and the L4 and L5 nerve roots were decompressed bilaterally.

A dural patch of fat, Tisseel and Surgicel was used to close the identified dural defect at the site of the original meningocele.

Postoperatively, the patient reported an immediate significant reduction in leg pain and was ambulant on the 3rd day.

Case 2

A 45-year-old man first presented in 1975 with back pain and sciatica and, after failed conservative treatment, underwent a laminectomy. He relapsed 2 months later and had a second operation.

A third operation revealed ossification of the dura and, during this operation, a CSF leak occurred.

In 1994 he had a further episode of sciatica, and MRI revealed a prolapsed disc at the L3/4 level and a large meningocele.

A fourth exploration in 1994 revealed a completely ossified pseudomeningocele dorsally with ossification of the dura ventrally. There was a tiny communication between the dural sac and the pseudomeningocele, and this was repaired with fat, Tisseel and Surgicel. A lumbar CSF drain was inserted for 5 days.

Discussion

Pseudomeningoceles are relatively rare postoperative complications, with an estimated incidence of 0.068% in 1947 (4 of 1700 laminectomies) [8]. The literature refers to pseudomeningoceles as spurious meningoceles [3] or postsurgical pseudocyst [2] in order to distinguish it from a true arachnoidal cyst, from which it differs in that the cyst wall is not lined by arachnoid membrane but has a fibrous tissue wall.

Ossified pseudomeningoceles are extremely rare and we believe there have only been four reported cases worldwide to date [5, 7, 11, 13]. Rosenblum and Derow [5] referred to it as an ossified spinal extradural cyst and, for sake of continuity, we shall use the same definition.

Shimazaki et al. [7] suggested that iatrogenic pseudocysts may result from dural leaks where there is an imbalance between intradural and extradural pressure such that CSF absorption is slower than the leakage process. A small dural hole could act as a valve.

Concerning the process of ossification, it has been postulated [7, 11] this occurs by metaplasia of surrounding soft tissue to cartilage and then to bone. The subsequent extradural mass this forms compresses the underlying dural sac and nerve roots and produces delayed radicular symptoms and signs. Our cases had undergone only MRI prior to their definitive operation to reveal the ossified pseudocysts and even in retrospect, it was difficult to appreciate that the wall was ossified.

Higher resolution MRI would be more likely to show the ossification, as the continuous dark line demarcating the wall, seen in Fig. 1, could be distinguished reliably

Fig. 1 Midsagittal T2-weighted image (long TE/TR) of the lumbar spine showing a mild anterolisthesis of L4 on L5 and a large meningocele compressing the thecal sac from the posterior aspect extending from L3 to S1, encased in a thin continuous black line that probably represents the ossified wall

from a very fibrous acellular capsule or haemosiderin/feritin staining of the walls.

CT of the spine or even plain radiographs would have been more specific, and modern CT in particular would probably have shown the ossified wall very well indeed. However, this would not have altered the management, since the compressive nature of the cysts were well demonstrated by MRI.

Conclusion

Extradural pseudocysts may give rise to a characteristic syndrome of compression of the nerve roots. A few ossify by metaplasia and the resulting solid cavity acts as a significant compressing mass over the exposed dura.

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