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Intraspinous postlaminectomy pseudomeningocele

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Abstract Pseudomeningoceles are uncommon complications of lumbar surgery. They are encapsulated cerebrospinal fluid collections developing extradurally as a consequence of incidental dural tears. They are typically located in the paraspinal compartment and occasionally reach the subcutaneous space. We describe the case of a patient in whom a post-laminectomy pseudomeningocele developed over a 10-year period within the L5 spinous process and remained completely encircled within its bony boundaries. The surgical implications of this finding are discussed.

Keywords Laminectomy · Lumbar surgery · Pseudomeningocele · Spinous process

Introduction

Pseudomeningoceles are extradural collections of cerebrospinal fluid (CSF) with no dural covering, which usually result from unnoticed dural tears occurring at the time of a lumbar laminectomy [1, 7]. Most pseudomeningoceles remain embedded in the paraspinal soft tissue and often cause no symptoms. Occasionally they extend superficially, becoming palpable as subcutaneous masses. We report here on a pseudomeningocele that remained entirely embedded in the spinous process of the L5 vertebra. The pseudomeningocele, along with a recurrent L5-S1 disc herniation on the right side, was discovered during magnetic resonance imaging investigation for a sciatic pain recurring 10 years after surgical discectomy at the same level. Surgery confirmed this unusual finding.

Case report

A 41-year-old man presented to the hospital complaining of low back pain radiating down the posterior aspect of the right leg. Ten years earlier, he had undergone surgery for a left L5-S1 disc herniation. On admission, a magnetic resonance imaging (MRI) study disclosed a right L5-S1 disc herniation; in addition, a cystic formation was apparent posterior to the thecal sac (Fig. 1). A rim of bone encircled the cyst, except on his ventral side, where a “tail” was visible linking the cyst content with the intradural space (Fig. 2). The patient underwent surgery aimed at removing both the pseudomeningocele and the disc herniation. While detaching the paravertebral muscles along with scar tissue from the intact posterior vertebral elements, we encountered a copious escape of cerebrospinal fluid (CSF). After completing the dissection we found that a very large amount of CSF kept pouring out, synchronous to respiratory cycles, from a linear bone defect along the base of the L5 spinous process. As wider bone removal was obtained, it became clear that a CSF-filled cavity with white, glistening walls was included within the spinous process itself. The inner lining of the cyst, a thin fibrous membrane, extended along the inferior wall, where it was found to adhere to the underlying dural sac. A pulsatile outflow of CSF came out through a 3-mm circular defect with rounded edges, located eccentrically in the floor of the cavity.

Fig. 1 T1-weighted magnetic resonance imaging (MRI) axial scan, showing a fluid collection isointense with cerebrospinal fluid within the L5 spinous process. The cyst is completely encircled by bone

Fig. 2 A T2-weighted sagittal MRI scan discloses the pedicle connecting the pseudomeningocele with the subdural space (*arrow-head*). The disc herniation is also apparent

Cauda equina nerve roots were clearly visible through the hole, but they were not herniating within it. The dural defect was closed with three interrupted non-adsorbable 4-0 sutures. Afterwards, the

paramedian disc herniation was removed without difficulty. Post-operatively the patient reported full relief of symptoms. The wound healed satisfactorily.

Discussion

Pseudomeningocele, defined as extradural collections of CSF, can be found in 0.19–2% of patients undergoing lumbar laminectomies [6, 7]. The term pseudomeningocele reflects the absence of a true meningeal layer lining the cyst wall. Instead, a reactive fibrous tissue is usually found to constitute the capsule of these lesions [3]. Most pseudomeningoceles develop within the paraspinal soft tissue. Occasionally, they extend more superficially, reaching the subcutaneous layer through the lumbosacral fascia. The case reported here is noteworthy owing to the purely intraspinous location of the CSF collection. The intraosseous location suggested by MRI scan was definitively confirmed at the time of surgery. Calcification of the pseudomeningocele capsule, which has been sporadically reported [5, 8], should be differentiated from this case of purely intraspinous growth of the cyst itself. It is conceivable that CSF pulsations, acting over several years, resulted in a gradual blowing of the base of the spinous process. Regardless of the location of the cyst, a communication between the pseudomeningocele and the thecal sac should be seen on preoperative imaging studies. In our case, as in others' experience [4], preoperative MRI provided an excellent definition of the neck of the pseudomeningocele.

Pseudomeningoceles can be either symptomatic or not. It may be difficult to determine the real source of symp-

Fig. 3 Schematic drawing showing the location of the pseudomeningocele (P) and its relationship with the dural sac (D)

toms in patients with a history of lumbar disk surgery and radiological evidence of a pseudomeningocele. Tension of the cyst against the lumbar nerve roots, entrapment of nerve roots into the dural defect, or periradicular fibrosis can all be responsible for the patient's complaints [2, 3]. To date we haven't got enough information to determine whether the patient's amelioration should be related to repair of the pseudomeningocele or removal of the disc herniation. However, when postsurgical pseudomeningoceles are opened, either deliberately or accidentally, they should always be repaired owing to the considerable risk of postoperative CSF fistula. Repair of a pseudomeningocele follows well-established surgical rules [3]. In our opinion, the unusual intraosseous location of the cyst reported here, carries a further technical implication. Although the scar tissue resulting from previous surgery may obscure the normal anatomy, most paraspinal pseudomeningoceles

are easily found underneath the miofascial layer. This is not the case for a purely intraspinous lesion. If such a condition has not been properly recognized on preoperative imaging studies, entering the wall of an intraspinous pseudomeningocele might give the false impression of violating the dural sac. Owing to the massive escape of CSF suggesting a wide communication with the subdural space, one might even refrain from further enlarging the opening and eventually change his strategy. The fistula actually occurs through a discrete dural defect, which is usually found at the bottom or close to the margins of the cavity (Fig.3). Therefore, the definitive treatment of such entities involves completely unroofing the bone cavity and searching for the site of CSF leakage. Nerve roots entrapped into the dural tear should be reduced at this time. In this case, simply suturing the dural defect provided an uncomplicated postoperative course.

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