Post-Laminectomy Lumbar Pseudomeningocele; Report of Three Cases and Review of the Literature

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ABSTRACT

Lumbar pseudomeningoceles are uncommon complication of lumbar disc surgeries. This pathology is an extradural encapsulated cerebrospinal fluid collection that develops as a consequence of an incidental durotomy or unrepairable dural tear. Iatrogenic lumbar pseudomeningocele has received scant attention and review of the literature reveals only a single case report or small series of two to four cases. With careful review of the literature since the first description of the problem in 1946 by Hynman and Gerber, we found 58 more cases. Herein, we wish to describe three new symptomatic cases with a review of relevant literature. Diagnosis in all these cases was by magnetic resonance imaging. All of the patients underwent surgery with primary closure of the dural defect with a good postoperative result. KEY WORDS: Complication, incidental durotomy, lumbar laminectomy, OLF, pseudomeningocele

INTRODUCTION

Iatrogenic lumbar pseudomeningoceles are extradural cystic collections of CSF with no dural covering that result from a breach in the dural-arachnoid layer. This rare complication mostly result from an incidental dural tear during laminectomy either for lumbar disc herniation or degenerative lumbar spinal stenosis (2-12). However it has been reported following a lumbar puncture, myelography and intrathecal catheter (1,38). Iatrogenic pseudomeningocele is estimated to occur from 0.07% to 2% of the patients undergoing lumbar laminectomies according to Swanson and Teplick retrospectively (34,36). Post-discectomy iatrogenic pseudomeningocele was first reported by Hynman and Gerber in 1946 and since then only 58 cases have been reported so far (7,12,19,26,28,32,34,37). The terms, meningocele spurious, pseudocyst and false cyst have also been used to describe the condition (23,26,29). During the last ten years we have encountered three symptomatic cases, two of which had undergone laminectomy for lumbar disc herniation and one for isolated lumbar OLF. In these three cases, the initial surgical interventions were done in other institutions.

CASE 1

This 28-year-old male who had undergone lumbar discectomy at another institution was admitted after a year with recurrence of his initial complaints. With diagnosis of recurrent disc herniation, MRI was done which surprisingly showed a huge pseudomeningocele (Figure 1A-C). He was operated, the sac was with a rather thick wall was opened where the defect and a root protruding through the defect were seen (Figure 1D). The defect was enlarged and the root that was attached to the opening by a tiny scar tissue was dissected and reduced into the thecal sac. Later, the defect was closed tightly. All complaints of the patient disappeared once he was seen a month after surgery.

CASE 2

This 32-year-old female had a history of neurogenic claudication had laminectomy for mid lumbar region for two level isolated OLF (Figure 2A). This had been complicated with CSF leakage that was stopped with a few lumbar punctures. The postoperative course was uneventful till six months later that she noticed low back pain of increasing intensity day by day. The intensity of the pain was increasing
with straining. MRI taken after her admission revealed a pseudomeningocele at the level of L2-L3 (Figure 2B,C). She underwent reoperation, the sac of the cyst was opened a small defect became visible which was closed tightly (Figure 2D). The excess of the cyst was excised. Post-Operatively the patient’s back pain was subsided dramatically.

**CASE 3**

This 37-year old man had undergone L5-S1 discectomy 9 months before admission. His chief complaint was reappearance of right sciatica and low back pain which could increase with coughing and sneezing. MRI should a

![Figure 1: A) T1-weighted image showing hypointense mass posterior to the thecal sac at L5-S1 level. B,C) T2 weighted images sagittal and axial images showing a hyperintense cystic mass compatible with CSE. D) Intra-operative photography demonstrating the pseudomeningocele as a huge cystic mass.](image-url)
large pseudomeningocele arising from the dura of L5-S1 level (Figure 3A,B). At operation, a balloon shape cyst was identified. The thick wall of the sac of the pseudomeningocele was incised till a small defect was seen at the bottom with a root had entering the cavity through the orifice of the defect. The roots were not adherent to the defect, so they were easily manipulated into the theca after enlargement of the defect. Subsequently, the defect was closed with interrupted silk sutures. Post-operatively the patients complaints disappeared completely.

DISCUSSION

Unnoticed dural tear with intact arachnoid with a ball valve mechanism will result in development of a true cyst lined with arachnoid. This type of iatrogenic cyst is called true meningocele where surrounding connective tissue might reinforce the arachnoid capsule over time.

Unrepaired small dural tear with concomitant arachnoid breach result in one way CSF flow and its accumulation in extradural region. Abnormal connective tissue reaction

Figure 2: A) Reconstructed sagittal image showing a calcified OLF at L2-L3 level. B,C) T1 and T2-weighted image showing a CSF containing cystic mass posterior to the theca at L2-L3 level. D) Intraoperative photography demonstrating the pseudomeningocele.
of surrounding the CSF collection leads to formation of a capsule and ultimately an encapsulated pseudocyst or so-called pseudomeningocele. Roots might herniate through the dural opening into the sac and act as barrier to the healing of the defect (2,7,9,18,24,25,30,32,36).

Despite of the fact that incidental durotomy is rather a frequent complication of lumbar laminectomy, but development of a pseudomeningocele at the site of an untreated dural tear is a rare entity, probably because many of such cases remain occult and asymptomatic (11,13). On the other hand, the relentless enlargement of the pseudomeningocele

Figure 3: A) T1-weighted image demonstrating a hypointense mass posteriorly located at L5-S1 level. B,C) T2-weighted sagittal and axial MR images depicting a cystic mass at L5-S1 level.
might be a self-limited process and never exhibit its presence clinically. Nonetheless, careful survey of the literature disclosed that from report of a case by Hyndman and Gerber in 1946, only 58 more cases of iatrogenic pseudomeningocele following lumbar laminectomy/discectomy have been reported so far (2,9,11,19,21-37). With passage of a few months to several years after laminectomy where sufficient enlargement of a pseudomeningocele occur where the affected patient will start to complain of low back pain which is aggravated with straining and Valsalva maneuver (1,2,4-5,7,9,11,15,18,19,23-28,30,31,34,35,37). However, if a root is herniated through the breach and trapped in the car, the cardinal feature of the event will be radiculopathy, which is very similar to the recurrence of a lumbar disc herniation. aldret akhader (5,7,9,15,18,19,24,25,29,30,36). Occasionally, lower limb motor dysfunction and incontinence and even cauda equina syndrome might be seen (4,33). Even in one rare occasion, hydronephrosis secondary to flaccid paralysis of the bladder has been reported (10). Headache due to orthostatic hypotension and chronic subdural hematoma has been described in iatrogenic lumbar pseudomeningoceles (8,16). If the pseudocyst extends through the lumbar fascia, then there were be a palpable mass which may enlarges with Valsalva maneuver (11,18). If a pseudocyst is infected, it will be manifested with signs and symptoms of chronic meningitis. Nonetheless, pseudomeningocele should be included in the differential diagnosis of the pathologies which are associated with recurrence of low back pain and radiculopathy even years after lumbar laminectomy (7,11,15,18,21,24,25,29,36).

The shell of ossified pseudomeningocele might be seen in plain radiographs and in long standing cases erosion of the surrounding bone might be visible (2,14,17,22,37).

MRS is the most useful diagnostic method for demonstration of a pseudomeningocele. Obviously, this CSF-containing mass is located posterior to the dural sac, although it might rarely grow into the intervertebral disc space. The cyst content is of low intensity in T1-weighted and with high signal intensity in T2-weighted images (3,11,21).

In the pre-MRS era, CT scan and CT metrizamide were used frequently. Nowadays, CT scan with its ability to demonstrate bone is the best tool when the wall of the cyst has undergone ossification (21,35,37).

There are some controversies in the management of small and asymptomatic pseudomeningoceles. However, general belief is to be left untreated. The key of treatment in symptomatic iatrogenic pseudomeningocele is closure of the dural defect. Wide opening of the cyst, identification of the dural breach and its obliteration with 6/0 round silk sutures are the steps of surgery (2,5-7,9,1015,18 29,30,36). In the case of roots entrapment, enlargement of the breach, releasing the roots from adhesions to the edge of the opening and their reduction into the thecal sac should be done before closure of the defect (2,9,18,21,24,29,32,36). Once the correct diagnosis is done before establishment of a motor deficit, the prognosis for recovery will be satisfactory. With more delay, permanent neurological deficit might be the sequel (11,18).

In conclusion, accidental dural tear with CSF leakage during lumbar laminectomy and discectomy should be properly handled as it otherwise it might in some instances at least, but certainly not in all cases result in formation of a pseudomeningocele. Lumbar pseudomeningocele should be suspected in the patients with delayed reappearance of the neurological symptoms even years after initial laminectomy. Appropriate surgical intervention should be decided and carried out once the diagnosis is made.

REFERENCES


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