Post-operative Pseudomeningocele after Spine Surgery: Rare Cause of Failed Back Syndrome

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Background and Importance: Pseudomeningocele is a rare complication of spine surgery, and it is the collection of cerebrospinal fluid in paraspinal tissue. Giant pseudomeningoceles are still rare, and very few cases have been reported in literature. It is usually occult in presentation, and patients do not have any symptoms ascribable to it.

We routinely came across numerous operated patients with persistent symptoms of low back and radicular pain. These patients should undergo a thorough clinical and radiological evaluation to determine the cause of their symptoms. We came across two patients with post-operative pseudomeningoceles in the past year. A literature review was done to determine the incidence of this entity and its optimal management.

Abstract

Background and Importance: Pseudomeningocele is a rare complication of spine surgery, and it is the collection of cerebrospinal fluid in paraspinal tissue. Giant pseudomeningoceles are still rare, and very few cases have been reported in literature. It is usually occult in presentation, and patients do not have any symptoms ascribable to it.

Case Presentation: We came across two symptomatic patients with post laminectomy pseudomeningoceles in past one year at our institution. The patients were managed with surgical closure of the dural defect. Both patients were asymptomatic post-operatively and doing well on follow up.

Conclusion: Reappearance of neurological symptoms in a patient undergoing spine surgery previously needs careful evaluation. Rarely the symptoms of failed back surgery are seen to be arising due to a pseudomeningocele.

Keywords: Pseudomeningocele; Incidental Durotomy; Laminectomy; Failed Back Syndrome

We routinely came across numerous operated patients with persistent symptoms of low back and progressive fluctuating swelling over the operative site (Figure 1). There was associated low back and radicular pain over both lower limbs for last 6 months. The patient had history of having undergone a right sided keyhole L4 laminotomy with microsurgical excision of a filum terminale dermoid cyst with detethering of low-lying cord 10 months ago. The patient gave history of an uneventful post-operative period. Immediate post-operative MRI scan did not reveal evidence of any cerebrospinal fluid (CSF) collection or residual tumor (Figure 2).

Repeated MRI scan revealed the presence of a 8.1×6.1×5.6 cm lobulated CSF intensity collection overlaying the laminotomy defect opposite L4 vertebral body (Figure 3). The collection was extending cranio-caudally from L3 to L5 level and anteroposteriorly from subcutaneous plane to dorsal aspect of thecal sac. The patient was diagnosed as a case of giant lumbar pseudomeningocele. He was initially managed with a lumbar drain for four days. The swelling subsided on lumbar drain insertion and reappeared on closing the drain.

In view of established communication between the dura and...
subcutaneous tissue plane, surgical exploration was
done. Tiny dural tear was seen medial to site of previous
dural repair with egress of CSF (Figure 4). Extirpation
of pseudomeningocele sac was done. Dura was repaired with silk
4-0 and reinforced with fat graft and fibrin glue. The patient
had an uneventful post-operative stay and was discharged on
the 10th post-operative day. He is on regular follow up and
has no recurrence of any swelling or pain. Post-operative MRI
showed substantial reduction in size of CSF collection with no
communication with thecal sac (Figure 5).

CASE 2
A 50-year-old female patient with complaints of swelling over
lower back and recurrence of radicular pain in both lower
limbs referred to neurosurgery department. The patient had a
history of having undergone a laminectomy and discectomy
for L4-L5 and L5-S1 prolapsed in intervertebral disc three
years ago at another institution. There was no associated
lower limb weakness, bowel or bladder dysfunction noted on
present clinical examination. The patient had a fluctuating
swelling over the previous operative site. Previous MRI
scans revealed progressively increasing cystic collection
in lumbar paraspinal area. An MRI scan was performed on
the present admission, which showed an extradural
CSF intensity cystic collection in the lumbar paraspinal
area (Figure 6). The cyst cavity was connected with the
subarachnoid space, and was diagnosed as a post-operative
lumbar pseudomeningocele. On re-exploration, a three mm
dural rent was visualized intraoperatively with egress of CSF.
Extriration of the pseudomeningocele sac was done. Dural rent
was repaired with a silk 4-0 suture and reinforced with a fascia
patch. The patient had gradual improvement in her symptoms
in the post-operative period. A post-operative MRI showed
resolution of the lobulated CSF intensity lesion (Figure 7). The
Post-operative Pseudomeningocele

in literature since the first case was reported in 1946 (6). If the tear is limited to the dural layer with an intact arachnoid layer, the cerebrospinal fluid collects in the extradural space. The cerebrospinal fluid accumulation is subject to a ball valve phenomenon, and results in formation of an extradural cyst. Tear of both the dural and arachnoid layers results in extravasation of cerebrospinal fluid in the paraspinal tissue. The cerebrospinal fluid is absorbed easily initially, but as the reactive fibrous septations are formed the reabsorption is hindered. The reactionary process results in formation of a fibrous capsule forming, in turn, the pseudocyst wall. The extravasation of cerebrospinal fluid may also result in herniation of nerve roots in the cyst cavity. Pseudomeningocele causes signs and symptoms due to mass effect exerted over neural structures. A pseudomeningocele usually presents with low back pain which is exacerbated on sneezing and coughing. Patients may also present with radicular symptoms in event of herniation of nerve roots in the cyst cavity. Rarely motor deficits and sphincter dysfunction may be seen in patients. Delayed infection of pseudomeningocele was reported by Koo et al.(7) in 1986 and James et al.(8) in 1996. The interval between primary surgery and the formation of a pseudomeningocele usually ranges from a few months to years. The size of the pseudomeningocele depends on the size of the dural tear and also on the level of incidental durotomy. The lumbar spine has a higher intraspinal pressure in erect posture, and hence there is a greater incidence of pseudomeningocele formation noted at this level. Giant pseudomeningocele is a pathology where the size of the lesion is ≥ 8 cm in diameter (9). It is a very rare entity and only 22 cases have been reported in literature so far (10-14). MRI is the gold standard for diagnosis of a pseudomeningocele. A pseudomeningocele appears as a hypointense lesion on T1 weighted sequences, and hyperintense lesion on T2 weighted sequences.

The treatment modalities are varied, the small asymptomatic pseudomeningoceles are monitored periodically and are managed conservatively (3), whereas the symptomatic, large pseudomeningocele are managed with surgery. Extirpation of pseudomeningocele sac with repair of incidental durotomy and post-operative subarachnoid drain remains the standard treatment. If nerve roots are present within the cyst, they need to be repositioned inside dural cavity. Some patients are seen to benefit from a trial of lumbar drain prior to open surgery. Aoki (15) reported the treatment of ten patients with post-operative pseudomeningoceles with lumbar drains.

**Conclusion**

The reappearance of neurological symptoms in a previously operated patient of spine surgery needs careful evaluation. An accidental durotomy needs careful repair as it may lead to formation of a pseudomeningocele. An MRI scan is the investigation of choice in diagnosis of a pseudomeningocele. Surgery is advised in all symptomatic patients to prevent neurological deterioration.

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None.

**Conflicts of Interest**

The authors have no conflicts of interest.

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Patient had no recurrence of similar symptoms for the past 12 months of follow-up.

**Discussion**

Pseudomeningocele is a rare complication of an unintended durotomy during spinal surgery. Three types of pseudomeningoceles have been reported in literature; congenital, postoperative and traumatic (2). The post-laminectomy pseudomeningocele was first described by Hyndman and Gerber in 1946 (3). The incidence of post-operative pseudomeningocele in lumbar laminectomy patients varies from 0.07% to 2% according to studies by Swanson (4) and Teplick (5), respectively. Approximately 61 cases of post-laminectomy pseudomeningoceles have been reported so far...
Table 1: Cases of Giant Pseudomeningocele in Literature

<table>
<thead>
<tr>
<th>Author</th>
<th>Number of Cases</th>
<th>Level</th>
<th>Size (in cm)</th>
<th>Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weng et al. (9)</td>
<td>11</td>
<td>Cervical (2)</td>
<td>Lumbar (9)</td>
<td>Extirpation of pseudomeningocele, dura repair with fascia patch.</td>
</tr>
<tr>
<td>Liu et al. (10)</td>
<td>1</td>
<td>Lumbar</td>
<td>8.3</td>
<td>Extirpation of pseudomeningocele, dura repair with fascia patch.</td>
</tr>
<tr>
<td>Hamilton et al. (11)</td>
<td>1</td>
<td>Lumbar</td>
<td>10</td>
<td>No surgery</td>
</tr>
<tr>
<td>Jame A.</td>
<td>1</td>
<td>Lumbosacral</td>
<td>10-12</td>
<td>Surgery</td>
</tr>
<tr>
<td>Miller et al. (1)</td>
<td>3</td>
<td>Lumbar</td>
<td>3</td>
<td>Surgery</td>
</tr>
<tr>
<td>Srilomsak P et al. (12)</td>
<td>1</td>
<td>Lumbar</td>
<td>15</td>
<td>Fat graft + fibrin glue + CSF lumbar drain</td>
</tr>
<tr>
<td>Hader WJ, Fairholm D  (13)</td>
<td>3</td>
<td>Cervical (C3-L4, C2-T10, C2-L1)</td>
<td>Not Specified</td>
<td>Surgery</td>
</tr>
<tr>
<td>Kotani et al. (14)</td>
<td>1</td>
<td>Cervical</td>
<td>Not Specified</td>
<td>Surgery</td>
</tr>
</tbody>
</table>

References


Comments

We appreciate the authors’ efforts on presenting two patients with symptomatic post laminectomy pseudomeningoceles in past one year at their institution. The patients were managed with surgical closure of the dural defect. Both patients were asymptomatic post operatively and doing well on follow-up.

I believe that the authors could best present the cases in two different reports. No post-surgery examination is mentioned in the paper. Further discussion seems necessary for these post-surgery lesions. There also seems to be little reference to literature which is not scarce.

It is recommended that future research on such cases take these points into consideration.

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