



# Posttraumatic Retropharyngeal Pseudomeningocele—A Case Report

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## Abstract

A retropharyngeal pseudomeningocele after cervical vertebral fracture dislocation is an extremely rare complication and often associated with hydrocephalus. It usually presents with respiratory difficulty and dysphagia, sometimes as an incidental finding in radiological study. We reported a case of 45-year-old female patient who had posttraumatic lower cervical prevertebral retropharyngeal pseudomeningocele, found as an incidental finding in a routine radiological workup. Patient underwent ACDF but expired 2 weeks postoperatively due to respiratory failure. Although the prognosis of retropharyngeal pseudomeningocele depends upon the severity of initial trauma, early recognition and management can prevent enlargement of cyst and development of respiratory difficulty and dysphagia.

## Keywords

- Cervical spine
- pseudomeningocele
- retropharyngeal

## Introduction

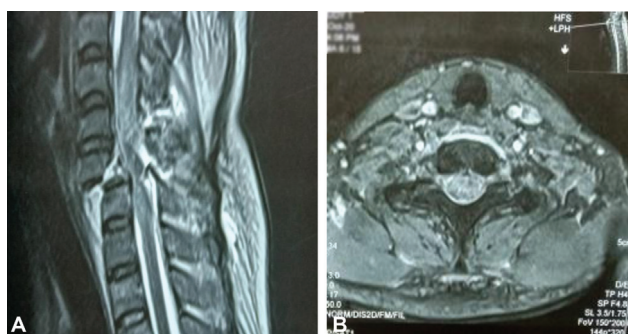
A pseudomeningocele develops as a result from a tear of the dura, leading to the accumulation and extravasation of cerebrospinal fluid (CSF). These lesions are typically iatrogenic, a complication from spinal surgery.<sup>1,2</sup> A retropharyngeal pseudomeningocele after cervical vertebral dislocation is an extremely rare complication and often appears associated with hydrocephalus.<sup>1</sup> It usually appears in delayed fashion some weeks after initial trauma and usually presents as respiratory difficulty or dysphagia, although sometimes it can be an incidental finding in a radiological study.<sup>3</sup> We reported a relatively rare case of posttraumatic anterior cervical prevertebral retropharyngeal pseudomeningocele with no associated hydrocephalus, which was found incidentally in radiological study.

## Case Report

A 45-year old female patient presented to neurosurgery emergency department with an alleged history of road traffic accident and cervical trauma. On neurological examination, she had Glasgow Coma Scale (GCS) score of 15 and complete spinal cord injury below C5 level (American Spinal Injury Association [ASIA] grade A) with abdominothoracic breathing pattern. Imaging (X-ray, CT) showed C6-C7 bilateral facet dislocation with fracture of posterior elements of C5 and C6 and chip fracture of anterosuperior part of C7 body (➤ **Fig. 1**). MRI demonstrated complete cord transection at the level of C6-C7, with cord contusion extending from C4 to C7, and CSF collection in prevertebral retropharyngeal space extending from C7 to T2 (➤ **Fig. 2**). Close manual reduction was done under general



**Fig. 1** CT cervical spine suggestive of anterolisthesis of C6 over C7 with spinous process fracture of C5-C6.



**Fig. 2** MRI cervical spine. (A) Sagittal imaging showing cord contusion and prevertebral retropharyngeal pseudomeningocele. (B) Axial imaging showing avulsed left C6 nerve roots with prevertebral cerebrospinal fluid (CSF) collection.

anesthesia, and patient underwent C6-C7 anterior cervical discectomy and fusion (ACDF) (► **Fig. 3**). Intraoperatively, on removing the chip fracture segment of C7 body, gush of CSF came out; then, C6-C7 discectomy was done and no dural tear was seen. However, on doing Valsalva maneuver, CSF was found coming from left lateral aspect of dura at C6-C7 level. Fibrin glue with fat graft was applied; after which, no CSF leak was observed. Postoperative period was uneventful; drain was removed on postoperative day 7, and no CSF leak was found through sutured wound. Unfortunately, patient went into respiratory failure and expired after 2 weeks postoperatively.

## Discussion

Pseudomeningocele is an extradural collection of CSF which diverts through a dural tear, and the most common etiology is iatrogenic, especially as a consequence of lumbar spine



**Fig. 3** Postoperative X-ray showing plate and screw in situ with reduction of subluxation.

surgery, cervical spine surgery, posterior fossa surgery, or lumbar puncture.<sup>4-6</sup> Less frequently are traumatic and congenital causes. Posttraumatic pseudomeningoceles, usually in the posterior spinal region, are rare complications of root avulsions, fractures and dislocations of vertebrae, and minor traumas, often located in the lumbar spine.<sup>4,6,7</sup> While posttraumatic pseudomeningocele is rare, a prevertebral retropharyngeal pseudomeningocele is believed to be extremely rare, the incidence of which is not clear due to its rarity, and is usually associated with cervical trauma. To the best of our knowledge, we found only 10 reported cases of retropharyngeal pseudomeningocele, seven of them as a sequelae of atlanto-occipital dislocation (AOD), two of them as case of atlantoaxial dislocation, and one of them as a case of C5-C6 subluxation (► **Table 1**).<sup>1,3,8-14</sup> To our knowledge, this is the second reported occurrence of a prevertebral retropharyngeal pseudomeningocele, following dislocation of the lower cervical spine.

Trauma can cause a nerve root avulsion, a joint dislocation, or a vertebral fracture that, at the same time, originates from a dural tear, which offers low resistance and helps CSF outflow to surrounding soft tissues, leading to pseudomeningocele formation.<sup>4,6</sup> If hydrocephalus is present, as observed in four of the seven cases previously reported of retropharyngeal pseudomeningocele secondary to AOD, increased CSF pressure may force its diversion through dural tear and leads to pseudomeningocele formation.<sup>9,11,12</sup> In our case, dural tear was not found, but CSF came out from right lateral aspect of dura at C6-C7 level on applying Valsalva maneuver.

Retropharyngeal pseudomeningocele usually appears in delayed fashion, days to weeks after the initial trauma. Symptoms often derive from the mass effect when the cyst

**Table 1** Reported cases of posttraumatic retropharyngeal pseudomeningocele

S. no.	Authors	Age/sex	Etiology	Symptoms	Hydrocephalus	Treatment	Outcomes
1.	Williams et al <sup>12</sup>	3.5/M	AOD	Respiratory + dysphagia	Yes	Cervical fusion + VP shunt	Resolution
2.	Naso et al <sup>11</sup>	26/M	AOD	Respiratory + dysphagia	Yes	VP shunt	Resolution
		11/M	AOD	Respiratory	Yes	—	Died
3.	Natale et al <sup>7</sup>	33/M	Transient C1-C2 dislocation	Respiratory + dysphagia	Yes	LP shunt	Resolution
4.	Reed et al <sup>9</sup>	9/M	AOD	Incidental	No	fixation	died
5.	Cognetti et al <sup>10</sup>	19/M	AOD	Dysphagia	No	LP shunt	Resolution
6.	Achawal et al <sup>13</sup>	38/M	C1-C2 dislocation	Quadriplegia	No	Halo traction	Died
7.	Gutiérrez et al <sup>3</sup>	29/F	AOD	Respiratory	No	—	Died
8.	Louati et al <sup>1</sup>	64/M	C5-C6 bilateral facet dislocation	Incidental	No	Halo traction	Died
9.	Alotaibi et al <sup>14</sup>	21/M	AOD	Dysphagia	Yes	Dural defect repaired + EVD	Resolution
10.	Present case	45/F	C6-C7 bilateral facet dislocation	Incidental	No	ACDF	Died

Abbreviations: ACDF, anterior cervical discectomy and fusion; AOD, atlanto-occipital dislocation; EVD, external ventricular drainage; LP, lumboperitoneal; VP, ventriculoperitoneal.

reaches significant size. The most common initial symptoms are respiratory failure and dysphagia, although sometimes the cyst is an incidental finding in a radiological study performed for a different purpose.<sup>3</sup> In our case, patient is having abdominothoracic breathing pattern, and considering the radiological findings, it seems reasonable to consider cord contusion as the cause of the respiratory difficulty, and the prevertebral retropharyngeal pseudomeningocele in our case can be considered as an incidental finding in the radiological study conducted prior to the surgery.

MRI is superior to CT in terms of diagnosing spinal cord and soft-tissue injuries; therefore, it is considered the main diagnostic procedure to confirm the presence of retropharyngeal pseudomeningocele. Pseudomeningocele is characteristically identified as a cystic collection with signal intensity consistent with CSF on all sequences. Other studies such as CSF flow imaging or CT myelography can be helpful to identify the communication between the cyst and subarachnoid space in those cases where conventional MRI yields negative.<sup>4,6</sup> Once the diagnosis is confirmed, performing a cranial neuroimaging study is recommended to assess for the presence of hydrocephalus, as these two pathologies often appear associated.<sup>3</sup> However, CT of the brain ruled out the presence of concomitant hydrocephalus in our case.

Retropharyngeal pseudomeningocele can be managed either conservatively or surgically. Conservative management such as bed rest, head of bed elevation, and acetazolamide and/or osmotic diuretics may be initially attempted. Nevertheless, this therapeutic option failed in those cases reported by Natale et al. and Cognetti et al.<sup>7,10</sup> Surgical alternatives include ventriculoperitoneal shunt in the presence of hydrocephalus, lumboperitoneal shunt in the

absence of hydrocephalus, removal of collection, and direct repair of defect.<sup>3</sup> However, surgical repair of retropharyngeal pseudomeningocele was challenging for some cases, because of the following: difficulty in approaching the site of the defect, increased risk of developing meningitis, or severe morbidity such as poor neurological function.<sup>14</sup> Alotaibi et al reported the first case of direct repair of defect using muscle graft and TISSEL fibrin sealant.<sup>14</sup> In the present case, there were no direct visual evidence of dural tear, and CSF was seen only on Valsalva maneuver; therefore, the repair was done using fat graft and TISSEL fibrin sealant at C6-C7 level after discectomy followed by C6-C7 fusion.

## Conclusion

Posttraumatic lower cervical prevertebral retropharyngeal pseudomeningocele is a rare complication. The prognosis and outcome of such an entity depends upon the severity of initial trauma. However, early recognition and management can avoid delayed complications like enlargement of cyst, which may lead to respiratory distress and dysphagia.

## Conflict of Interest

None declared.

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