

Case Report:**Cervical pseudomeningocele following posterior cervical spine surgery: an uncommon cause of neurologic deterioration**

V.A. Kiran Kumar, B.C.M. Prasad, V.V. Ramesh Chandra, M.A. Jagdish Kumar, V. Jayachandar
Department of Neurosurgery, Sri Venkateswara Institute of Medical Sciences, Tirupati

ABSTRACT

Cervical pseudomeningocele causing late onset neurological deterioration is a rare entity. We report our experience with surgical management of a patient with symptomatic cervical pseudomeningocele. A 49-year-old man who underwent posterior cervical laminectomy for cervical ossified posterior longitudinal ligament had neurological deterioration 7 years after undergoing surgery. On evaluation, magnetic resonance imaging of the cervical spine showed cervical pseudomeningocele extending from C2-C6 level causing cord compression at C2-C7 levels. He underwent C2, C7 laminectomy and excision of pseudomeningocele and closure of the communication with dural tube. The post-operative course was uneventful. We present this rare case specially emphasizing the pathogenesis, clinical features and management issues concerning late onset pseudomeningocele. Awareness of this rare possibility of late onset neurological deterioration from posterior cervical pseudomeningocele and its treatment options can help in early diagnosis and treatment.

Key words: *Pseudomeningocele, Dural tear, Complication, Laminectomy, Cerebrospinal fluid*

Kiran kumar VA, Prasad BCM, Ramesh Chandra VV, Jagdish Kumar MA, Jayachandar V. Cervical pseudomeningocele following posterior cervical spine surgery: an uncommon cause of neurologic deterioration. J Clin Sci Res 2014;3:274-7. DOI: <http://dx.doi.org/10.15380/2277-5706.JCSR.13.038>.

INTRODUCTION

Post-operative pseudomeningocele is a rare complication of spine surgery. It occurs due to cerebrospinal fluid (CSF) leakage into the paraspinal tissues and present as a CSF filled pouch.¹ A pseudomeningocele is an abnormal collection of CSF that communicates with the arachnoid space. The causes have been classified into three categories, namely, congenital, traumatic and iatrogenic. Pseudomeningocele occurs more frequently in the lumbar than cervical region.² Computed tomography (CT) and magnetic resonance imaging (MRI) are useful in the diagnosis of this entity. Surgical treatment is required in symptomatic cases. In rare cases cervical pseudomeningocele can produce neuro-logical deterioration secondary to cord herniation and/or cord compression.³ CSF

leaks are relatively uncommon after cervical spine surgery. Postoperative leakage may occur at dural suture line after intradural procedures or can be caused by inadvertent durotomy during discectomy or laminectomy.⁴ The true incidence of pseudomeningocele following incidental durotomy is unknown. The incidence of pseudomeningocele after laminectomy has been reported to be 0.068%⁵ and 2%⁶. We report a patient who presented with symptomatic post-laminectomy cervical pseudomeningocele.

CASE REPORT

A 49-year-old man had history of fall after giddiness following which he developed weakness of handgrip bilaterally with hyperesthesia in both upper limbs. Past

Received: 27 January, 2014.

Corresponding author: Dr V.A. Kiran Kumar, Assistant professor, Department of Neuro Surgery, Sri Venkateswara Institute of Medical Sciences, Tirupati, India.
e-mail: drananth21@gmail.com



Online access

http://svimstpt.ap.nic.in/jcsr/oct-dec14_files/6cr414.pdf

DOI: <http://dx.doi.org/10.15380/2277-5706.JCSR.13.038>

history suggested that he underwent C3-C6 posterior cervical laminectomy for cervical ossified posterior longitudinal ligament (OPLL) 7 years before (Figure 1). On examination, motor power was normal in both upper and lower limbs except for decrease in hand grip by 20% of the normal on either side. The sensory examination revealed hyperesthesias in C5, C6, C7 dermatomal distribution. There were no signs of meningitis or cerebellar signs. On evaluation, MRI cervical spine showed a region of hypointensity on T1-weighted images (Figure 2) and hyperintensity on T2-weighted images (Figure 3) consistent with CSF, suggestive of pseudomeningocele extending from C2-C6 level causing C2-C7 cord compression. He underwent C2, C7 laminectomy and excision of pseudo-meningocele and closure of dural rent with crushed muscle piece, Surgicel and fibrin sealant (Tissel- Baxter International Inc Westlake village, CA, USA.) application. Intraoperatively thinning of C3 to C6 laminae, extradural pseudomeningocele from C3-C6 level were noted. There was a dural rent of size 4 mm

noted at C3 level on right side at root exit zone and CSF leak noted through the dural rent (Figure 4). Multiple adhesions were noted between the dural tube and lamina at C2, C7 levels. There was kinking of the cord at C6 level. Cord pulsations were noted after adequate decompression. The post-operative course was uneventful.

DISCUSSION

CSF fistula and pseudomeningocele are uncommon complications of spinal surgery. The term “pseudomeningocele” is preferred because atleast initially the lesion is not arachnoid lined and, therefore, does not represent a true meningocele. Pseudomeningoceles have also been referred to as spurious meningoceles, false cysts and pseudocyst. Myelopathy secondary to post-surgical posterior cervical pseudomeningocele is rare.^{3,4,7,8} Neurological decline can result from cord herniation into the pseudomeningocele or direct pressure on the cord by the fluid- filled sac or both.³ Review of previous reports^{3,7,8} seems to indicate that herniation and incarceration of spinal cord through the dural defect presents



Figure 1: CT of the cervical spine showing previous laminectomy defect (arrow)
CT = computed tomography



Figure 2: MRI T1- weighted image showing cervical pseudomeningocele extending from C2-C6 (arrow)
MRI = magnetic resonance imaging



Figure 3: MRI T2-weighted image showing cervical pseudomeningocele extending from C2-C6(arrow)
MRI = magnetic resonance imaging

in a delayed fashion (6 months to 15 years) whereas direct compression by an enlarging pseudo-meningocele may present as early as 12 days. The likely explanation for delayed deterioration following spinal cord herniation and incarceration is a gradual and prolonged ischemia of the cord.⁹

Depending on the location of the lesion, patients with a pseudomeningocele can remain asymptomatic or can have varied clinical presentations like, posture related headaches, localized neck pain, radiculopathy and myelopathy.^{9, 10}

The present case is one of the rare cases, where post-cervical laminectomy neurological deterioration occurred secondary to pseudomeningocele and MRI demonstrated the pseudomeningocele compressing the cord. We feel that the injury was very trivial and probably has no relation to the pseudomeningocele which would have been present even before the occurrence of injury. Probable reasons for the formation of the pseudomeningocele in the present case include (i) unintended durotomy during earlier surgery, that was not been noted at that time;

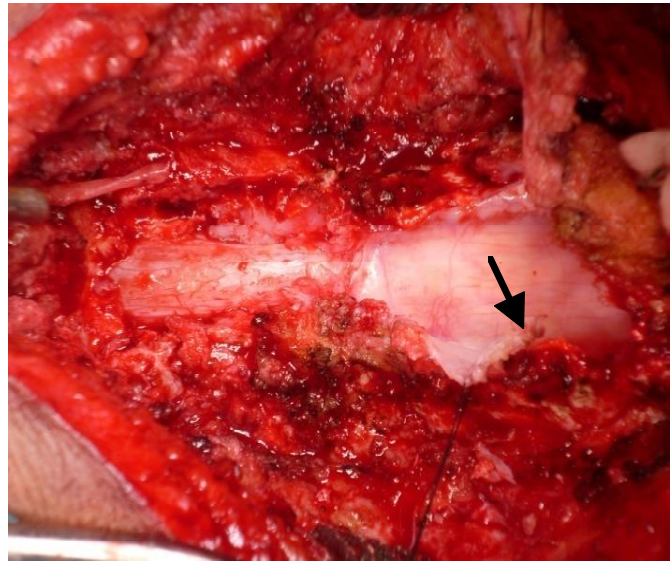


Figure 4: Intraoperative photograph showing dural rent at C3 level on right side and the site of the pseudomeningocele (arrow)

and (ii) due to chronic pressure of CSF, the dura would have been thinned out leading to a dural defect. In this case the neurologic decline has occurred 7 years 3 months after previous surgery.

Most of the cases of pseudomeningocele occur due to iatrogenic durotomy and a primary water tight dural closure is a key to avoid this complication. Use of silicone lumbar subarachnoid catheter has been described in 39 patients with CSF fistulas and pseudomeningocele and a 92% success rate was noted after 7 days of drainage alone.¹¹ But there were complications such as temporary nerve root irritation (24%), infection (10%) and transient headache, nausea and vomiting (63%).¹¹

One method of repairing post-surgical pseudomeningocele includes separation of dura from the arachnoid, a water tight dural repair using operative microscope and the use of overlapping local muscle flaps to reinforce the dura and obliterate the pseudomeningocele cavity. Fat is an ideal sealant because it is impermeable to water. A thin sheet of autologous subcutaneous fat covers dural repair as well as all exposed dura and can be

gently tucked into the lateral recesses. Fibrin glue is spread over the surface of fat, which is then further covered with Surgicel or gel foam. Fibrin glue has gained increasing popularity as duralsealant. Fibrin glue is solely suited for dural closure augmentation and is not a substitute for surgical technique. Muscle graft in combination with fibrin glue presumably is superior to either muscle packing alone or fibrin glue in isolation (owing to its adhesive sealing properties).^{12,13}

Close evaluation of preoperative neuroimaging studies, meticulous surgical technique, and liberal use of microscopic magnification will often avert iatrogenic pseudomeningocele and CSF fistula. Each Kerrison's rongeur bite should be preceded by the necessary dissection to ensure that the dura mater does not come between the foot plate and the bone. The movement of the drill is directed laterally so that even with a slip, a dural tear may be avoided. A cottonoid should cover the exposed dura during the drilling. When a dural tear does occur, every attempt should be made to achieve a primary water tight closure. Awareness of the rare possibility of the neurological decline from posterior cervical pseudomeningocele and treatment options can help in early diagnosis and quick remedial action to reverse the symptoms.

REFERENCES

1. Hyndman OR, Gerber WF. Spinal extradural cysts, congenital and acquired; Report of cases. *J Neurosurg* 1946;3:474-86.
2. Lee KS, Hardy IM. Postlaminectomy lumbar pseudomeningocele: report of four cases. *Neurosurgery* 1992;30:111-4.
3. Helle TL, Conley FK. Postoperative cervical pseudomeningocele as a cause of delayed myelopathy. *Neurosurgery* 1981;9:314-6.
4. Miller PR, Elder FW. Meningeal pseudocysts (meningocele spurios) following laminectomy. Report of ten cases. *J Bone Joint Surg Am* 1968;50:268-76.
5. Swanson HS, Fincher EF. Extradural arachnoidal cysts of traumatic origin. *J Neurosurg* 1947;4:530-8.
6. Teplick JG, Peyster RG, Teplick SK, Goodman LR, Haskin ME. CT Identification of post laminectomy pseudomeningocele. *AJR Am J Roentgenol* 1983;140:1203-6.
7. Hanakita J, Kinuta Y, Suzuki T. Spinal cord compression due to postoperative cervical pseudomeningocele. *Neurosurgery* 1985;17:317-9.
8. Hosono N, Yonenobu K, Ono K. Postoperative cervical pseudomeningocele with herniation of the spinal cord. *Spine* 1995;20:2147-50.
9. Morgan SL, Krishna V, Varma AK. Cervical pseudomeningocele as a cause of neurological decline after posterior cervical spine surgery. *Neurol India* 2012;60:256-7.
10. Helle TL, Conley FK. Postoperative cervical pseudomeningocele as a cause of delayed myelopathy. *Neurosurgery* 1981;9:314-6.
11. Shapiro SA, Scully T. Closed continuous drainage of cerebrospinal fluid via lumbar subarachnoid catheter for treatment or prevention of cranial/spinal cerebrospinal fluid fistula. *Neurosurgery* 1992;30:241-5.
12. Narotam PK, Jose S, Nathoo N, Taylon C, Vora Y. Collagen matrix (DuraGen) in dural repair: analysis of a new modified technique. *Spine (Phila Pa 1976)* 2004;29:2861-7.
13. Shaffrey CI, Spotnitz WD, Shaffrey ME, Jane JA. Neurosurgical applications of fibrin glue: augmentation of dural closure in 134 patients. *Neurosurgery* 1990;26:207-10.