Post-operative Giant Pseudomeningocele Following L3-L4 Discectomy: A case report and Literature Review

Ram Prasad Subedi[1], Nikunja Yogi[2], Suraj Thulung[3], Pratyush Shrestha[4], Suresh Bisokarma[5], Sagar Koirala[6]

[1,2,3,4,5,6] Department of Neurosurgery, Upendra Devkota Memorial National Institute of Neurological and Allied Sciences

Date of Submission: 21st April 2025 Date of Acceptance: 1st August 2025 Date of Publication: 15th September 2025

Abstract

After Lumbar spine surgery many of the patients improve but few develop post-operative lumbar giant pseudomeningocele causing symptomatic trouble in rare cases. In our case a 21-year-old male who was operated in other hospital for symptomatic Prolapsed lumber intervertebral Disc where microdiscectomy was done. After 5 months he developed symptomatic pseudomeningocele over the operative scar area, confirmed by clinical examination and Imaging. Due to headache and annoyable swelling in the lower back, L3-L4 Laminectomy with duroplasty with dural sealant fibrin glue with Lumbar drain was performed. His post operative period was uneventful, His giant pseudomeningocele resolved and he was discharged on 11th post-operative day.

Keywords: Pseudomeningocele. Lumbar spine surgery, duroplasty

Introduction

Pseudomeningocele is an extradural Cerebrospinal Fluid collection(CSF) collection that communicates with arachnoid space through the dural rent.[1,2] Generally, pseudo meningoceles are asymptomatic and usually self-resolving without any treatment. However, in fewer cases, they are symptomatic and troublesome to both patient and the treating surgeon.[2] The types of pseudomeningocele are Congenital, Post-operative and traumatic.[2,3] Post spine surgery pseudomeningocele was first forecasted in 1946 by Hyndman and Gerber.[3] Pseudomeningocele most commonly result from the lumbar spinal surgery. The exact incidence of the post-operative Pseudomeningocele is still unknown because majority of the patients are asymptomatic, as well as spine surgeons are most of the time reluctant to publish negative outcome. Pseudomeningocele more than 8 cm in length are considered as giant pseudomeningocele whereas more than 5 cm are called large one.[2,4] Pseudomeningocele are being managed worldwide in both the spectrum of conservative treatment and surgery. Small and symptomless are usually treat expectantly in virtue of spontaneous resolution.[1,4,5] Giant Pseudomeningocele are often proceed with surgery. If nerve roots are present within the cavity, then a careful dissection should be done followed by gentle put back into the thecal sac. Fibrous tract if evident it should be excised. A patch of deep fascia is used to heal the dural repair site. A watertight closure achieved , a subarachnoid catheter is inserted into the skin muscle, and fascia to rest over the prior dural rupture.[2,6] We present a case report of giant pseudomeningocele, with clinical presentation investigation, surgical management and follow up and management strategies. This case report is written according to the SCARE guidelines.[7]

Access this article online

Website: https://www.nepjol.info/index.php/NJN

DOI: https://doi.org/10.3126/njn.v22i3.77804

HOW TO CITE
Subedi RP, Yogi N, Thulung S, Shrestha P, Bishokarma S, Koirala S. Post-operative Giant Pseudomeningocele Following L3-L4 Discectomy: A case report and Literature Review. NJNS. 2025;22(3):60-63

Address for correspondence:

Ram Prasad Subedi, MBBS, MS
Department of Neurosurgery, Upendra Devkota Memorial National Institute of Neurological and Allied Sciences (UDM-NINAS), Bansbari, Kathmandu,
E-mail:dr.ramprasadsubedi@gmail.com

ISSN: 1813-1948 (Print), 1813-1956 (Online)

CASE REPORT

A 21 years old male known case of underwent L3-L4 discectomy for L3-L4 Prolapsed Intervertebral disc in other medical centre 5 months earlier. He has past medical history of Gilbert syndrome. There was no evidence of cerebrospinal fluid leak intra-operatively during the first surgery. He presented in our neurosurgical outpatient department with the complaints of swelling over lumbar region for 5 months, which was gradual in onset after the discharge from the hospital in 7th post-operative day 5 months ago, progressive in nature, without skin changes. There is a history of headache, intermittent, aggravated on movement of head and during change of posture. During physical examination there was a 10x6 cm soft, cystic, non-tender, fluctuating, brilliantly transilluminating swelling on back with visualized old surgical scar over the swelling without any discharge and local temperature was normal. MRI Lumbosacral spine was done which showed Laminectomy defect L3-L4 and extradural paraspinal collection of 10x06 cm with continuity to

dura . The lesion showed a low signal intensity on T1-weighted imaged and high signal intensity on T2 weighted images with suspected dural connection. (Figure 1) Hence diagnosis of post lumbar surgery giant pseudomeningocele was made. After the pre-operative evaluation, surgery was performed. Patient underwent L3-L4 Laminectomy with duroplasty of spinal dura at L3-L4 level under general anaesthesia. Intra-operative findings was pseudomeningocele at L3-L4 level with dural rent of 0.5 mm (Figure 2) noted without any nerve roots within it. Dural closed in watertight manner with polypropylene 5-0 suture with dural sealant fibrin glue applied over repair site.

Valsalva manoeuvre done and there was no evidence of CSF leakage. Lumbar drain was kept intraoperatively to aid the healing of the repair. Muscle closed in multiple layers with absorbable suture. Subcutaneous tissue closed with absorbable suture. Skin closed with skin stapler. In post-op period, patient was managed in Intensive Care Unit (ICU), Lumbar drain was removed in 3rd post-operative day, compression dressing was done to for 1 week. Patient was discharge after 11 days of the surgery as he was doing his routine care and activities. Post-operative MRI showed disappearance of pseudomeningocele (Figure 3). There is no evidence of recurrence during outpatient follow up at 3 months as evident in MRI imaging.

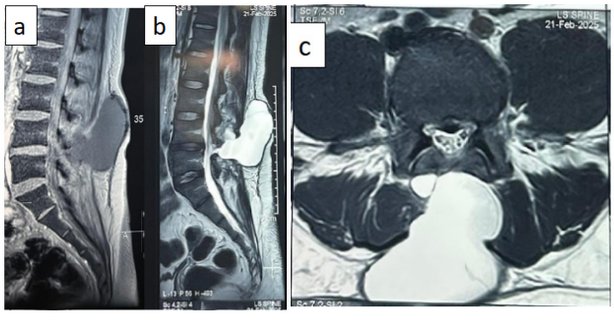

Figure 1: MRI of lumbosacral region showing a) T1 weighted sagittal image showing hypointense swelling b) T2 weighted sagittal image showing hyperintense swelling c) T2 weighted axial image showing hyperintensity of the swelling suggestive of post-operative giant pseudomeningocele.

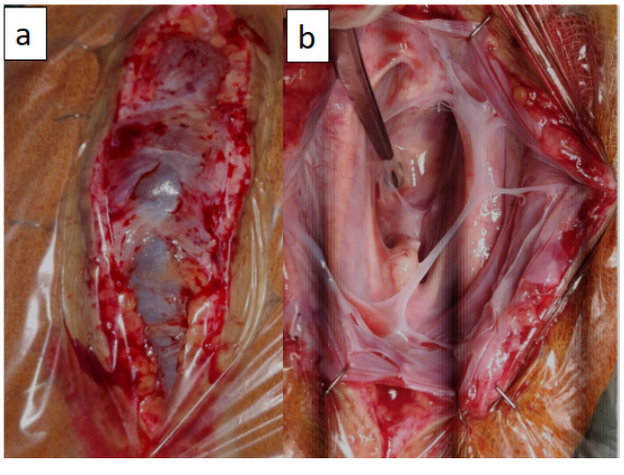

Figure 2: Intra-operative photographs showing a) Giant Pseudomeningocele with its capsule below the subcutaneous layer b) A dural rent of 5 mm at L3-L4 level as pointed by the forceps

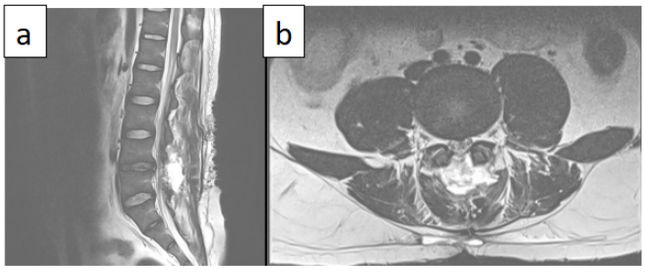

Figure 3:Post Operative MRI-Images a) T2 weighted sagittal image showing resolve of giant pseudomeningocele ,hyperintensity of fibrin glue implies no communication with dura b) T2 weighted axial image showing post operative changes with some hyperintensity signals of fibrin glue over the dura repair site .

DISCUSSION

Pseudomeningocele results due to breach of dura and the arachnoid matter where CSF leak happen into the paraspinal muscular region. Small tears in the dura may lead to one way CSF flow like a valvular mechanism which leads to formation of cyst surrounded by fibrous capsule followed by pseudomeningocele as result.[1,2] Up to now, there are only few studies postulated the lumbar postoperative pseudomeningocele.[5] The incidence rate of dural tear are rare (from 0.07 % to 2%). Most of the instance pseudomeningocele are asymptomatic, when they are symptomatic, they may increase in size, causes low back pain, aggravated with increase intra-abdominal pressures, straining, and during Valsalva manoeuvres. Mechanical compression to the pseudomeningocele is efficient measures for the smaller size pseudomeningocele.[8] Ahmadi and Roomizadeh in their case report also narrated about conservative management with pain killers, rest, exercise, and physiotherapy.[9] Another promising result for Non-operative management mentioned by Kavishwar et al. is epidural blood patch application under ultrasonic guidance.[10]

Solomon et al., described non-operative management can be feasible in asymptomatic cases of post-operative giants pseudomeningocele, where close observation is mandatory. Surgical intervention and repair should be limited to symptomatic patients with clinical signs of intracranial hypotension, deteriorating neurological function, external fistula, or infection, thereby mitigating morbidity and possible risks linked to surgical intervention.[2] But in our case, we proceed with surgery in view of giant pseudomeningocele.

During lumbar spine procedures, it is imperative for the surgeon to maintain a high index of suspicion for occult dural tears and cerebrospinal fluid (CSF) leaks. In situations where a dural breach is suspected, intraoperative techniques such as the Valsalva manoeuvre or positioning the patient in reverse Trendelenburg can be employed to facilitate early detection. Once identified, dural tears must be meticulously repaired. For significant dural defects, repair using a fat graft or fascial graft reinforced with fine nonabsorbable sutures (5-0 or

6-0) is recommended.[2] Additionally, a watertight closure of the overlying fascia is crucial, and the integrity of the repair should be confirmed with repeat Valsalva manoeuvres. These strategies are essential to minimize the risk of postoperative complications, particularly the formation of pseudomeningocele.[1,2,4,5,6]

Weng et al. in a case series of 11 patients of symptomatic pseudomeningocele, most of the patient has swelling in back, back pain, headache and nausea and vomiting, size of the pseudomeningocele was maximum 8.9 cm x 5.7 cm, dural repaired with patch deep fascia in most of the patients without any recurrence.[2] In our study our patient had similar symptoms of swelling in back and headache, underwent surgical repair of dura with dural sealant agent fibrin glue with lumbar drain.

Takamatsu et al., reported a case, which was managed successfully with surgery and FXIII replacement therapy for a case of thoracic lumbar post-surgical intractable pseudomeningocele.[1] Another case report by Fermeli et al narrated the need of revision surgery for recurrent pseudomeningocele case with duroplasty.[5]

Study done by Tu et al, enlightened that Ninety percent of the surgeons manage post spinal surgery pseudomeningocele non-operatively for 7-14 day before the revision surgery. Whereas most famous steps forwarded is to prevent the pseudomeningocele by watertight closure of the dura, fascia graft duroplasty and the dural sealant fibrin glue.[8]

Roommizadeh et al showed surgical management of 2 cases of Pseudomeningocele with better outcome.[9] We also proceeded with surgery in our case.[9]

In the modern era of endoscopic spine surgery, where the spectrum are broader for endoscopic procedures , the chances of the injury to the dura increases, Unseen dural injury with associated nerve root herniation may cause permanent nerve damage, hence meticulous surgical intervention is commendable for Lumbar spine surgery.[12] More future studies with larger cohorts is necessary to drive the better evidence in this regard.

CONCLUSION

Being a rare complications of lumbar spine surgery, post-surgical pseudomeningocele is troublesome to the patient as well as to the surgeons. Small and asymptomatic pseudomeningocele can be deal with conservative management, in case of large/giant pseudomeningocele, watertight surgical repair of dura with tissue graft and fibrin glue halt the recurrence. Best way is to prevent the formation of pseudomeningocele is meticulous and carful dissection in the first surgery.

ACKNOWLEDGEMENT

We are thankful to the patient and his relatives for giving consent and participation in the study.

Registration research study

None

Consent

Written informed consent was taken from the patient for relevant images, and for publication. a copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

Ethical approval

It is exempted in our Institution Upendra Devkota Memorial National Institute of Neurological and Allied Sciences (UDM-NINAS) by our Institutional IRB. Approval from ethical committee for case report is exempted by UDM-NINAS IRB.

Conflict of Interest:

There is no conflict of interest.

Sources of Funding:

This study is not funded by any organization or institution

REFERENCE

1. Takamatsu N, Manabe H, Wada K, Hirano T, Chikawa T, Sairyo K. Successful treatment of intractable pseudomeningocele with FXIII deficiency by surgery and FXIII replacement therapy: A case report. Int J Surg Case Rep. 2022 Mar;92:106851. doi: 10.1016/j.ijscr.2022.106851. Epub 2022 Feb 26. PMID: 35278986; PMCID: PMC8917295

2. Weng YJ, Cheng CC, Li YY, Huang TJ, Hsu RW. Management of giant pseudomeningoceles after spinal surgery. BMC Musculoskelet Disord. 2010 Mar 21;11:53. doi: 10.1186/1471-2474-11-53. PMID: 20302667; PMCID: PMC2848136.

3. HYNDMAN OR, GERBER WF. Spinal extradural cysts, congenital and acquired; report of cases. J Neurosurg. 1946 Nov;3(6):474-86. doi: 10.3171/jns.1946.3.6.0474. PMID: 20279144.

4. Solomon P, Sekharappa V, Krishnan V, David KS. Spontaneous resolution of postoperative lumbar pseudomeningoceles: A report of four cases. Indian J Orthop. 2013 Jul;47(4):417-21. doi: 10.4103/0019-5413.114937. PMID: 23960289; PMCID: PMC3745699.

5. Fermeli D, Panagiotopoulos V, Papadakos D, Theofanopoulos A, Zampakis P, Constantoyannis C. Post-operative gigantic lumbar pseudomeningocele: A case report. Folia Med (Plovdiv). 2024 Dec 31;66(6):911-916. doi: 10.3897/folmed.66.e126479. PMID: 39774362.

6. Rahimizadeh A, Mohsenikabir N, Asgari N. Iatrogenic lumbar giant pseudomeningocele: A report of two cases. Surg Neurol Int. 2019 Nov 1;10:213. doi: 10.25259/SNI_478_2019. PMID: 31768293; PMCID: PMC6826298.

7. A. Agha, T. Franchi, C. Sohrabi, G. Mathew, For the SCARE group: the SCARE 2020 guideline: updating consensus surgical CAse REport (SCARE) guidelines, Int. J. Surg. 84 (2020) 226–230.

8.Tu A, Tamburrini G, Steinbok P. Management of postoperative pseudomeningoceles: an international survey study. Childs Nerv Syst. 2014 Nov;30(11):1791-801. doi: 10.1007/s00381-014-2501-9. Epub 2014 Oct 9. PMID: 25296539.

9.Roomizadeh P, Ahmadi H. Conservative Management of Pseudomeningocele Secondary to Lumbar Laminectomy: A Case Report. SN Comprehensive Clinical Medicine. 2024 Dec;7(1):18.

10.Kavishwar RA, Shetty AP, Subramanian B, Rajasekaran S. Symptomatic Postsurgical Lumbar Pseudomeningocele Treated by Ultrasound-Guided Epidural Blood Patch Application. Asian J Neurosurg. 2021 Dec 18;16(4):827-829. doi: 10.4103/ajns.AJNS_83_21. PMID: 35071086; PMCID: PMC8751499.

11.Faltings L, Kulason KO, Du V, Schneider JR, Chakraborty S, Kwan K, Pramanik B, Boockvar J. Early Epidural Blood Patch to Treat Intracranial Hypotension after Iatrogenic Cerebrospinal Fluid Leakage from Lumbar Tubular Microdiscectomy. Cureus. 2018 Nov 26;10(11):e3633. doi: 10.7759/cureus.3633. PMID: 30705792; PMCID: PMC6349568.

12.Ahn Y, Lee HY, Lee SH, Lee JH. Dural tears in percutaneous endoscopic lumbar discectomy. Eur Spine J. 2011 Jan;20(1):58-64. doi: 10.1007/s00586-010-1493-8. Epub 2010 Jun 26. PMID: 20582555; PMCID: PMC3036033.