



Case Report

Benign intracranial hypotension caused by spontaneous cervical cerebrospinal fluid leak treated with cervical epidural blood patch: a case report

Subhash Prasad Acharya, Bashu Dev Parajuli, Diptesh Aryal

Tribhuvan University Teaching Hospital, Institute of Medicine, Maharajgunj, Kathmandu, Nepal

ARTICLE INFO

Article History

Received 29.11.2015

Accepted 15.02.2016

Published 20.03.2016

© Authors retain copyright and grant the journal right of first publication with the work simultaneously licensed under Creative Commons Attribution License CC BY-NC-ND 4.0 that allows others to share the work with an acknowledgment of the work's authorship and initial publication in this journal.



Abstract

Spontaneous cervical cerebrospinal fluid leak is a rare entity and occurs because of tear in cervical dural layer. Management has been conservative in the past but here we present this case that was managed successfully with cervical epidural blood patch. A 36-year-old man presented to neurology outpatient clinic with headache in occipito-frontal region and dizziness for 15 days and managed with various modalities without benefit. The severity of headache increased in standing and sitting position but relieved in supine position. There was no history of trauma, fever, photophobia, neck pain, tinnitus, weakness of other parts. Clinical examinations including neurological examinations were normal. So, magnetic resonance imaging of head and neck was obtained which showed dural leak in C3-C4 region. Adequate hydration, caffeine and oral medications were prescribed without benefit and then after 5 days, Anesthesiology department was consulted and was planned for cervical epidural blood patch. Under aseptic precaution in left lateral position with full neck flexion, 18g Tuohy needle was inserted in c5-c6 epidural space by loss of resistance technique to air, and 15 ml of the autologous blood was injected. Then patient was kept in supine position for 24 hours and neurological status was monitored frequently. Over the next two days, patient became asymptomatic and was discharged. The patient was regularly followed up weekly for six weeks and then monthly for six months and had no reoccurrence of symptoms or other findings.

Keywords: epidural blood patch; intracranial hypotension; spontaneous cerebrospinal fluid leak

How to cite this article: Acharya SP, Parajuli BD, Aryal D. Benign intracranial hypotension caused by spontaneous cervical cerebrospinal fluid leak - treatment with cervical epidural blood patch: a case report. Journal of Society of Anaesthesiologists of Nepal (JSAN) 2016;3:47-49. <http://dx.doi.org/10.3126/jsan.v3i1.14654>.

Corresponding Author

Subhash Prasad Acharya, MD, FACC, FCCP

Associate Professor, Department of Anesthesia

Tribhuvan University Teaching Hospital, Institute of Medicine, Maharajgunj, Kathmandu, Nepal

Email: drsuvash@gmail.com

Introduction

Benign intracranial hypotension (BIH) is a rare condition, caused by CSF leak because of tear in the Dura because of unknown reasons. The management has been conservative with hydration and analgesics but epidural blood patch has been tried with good results.^{1,2} We presented this as a first reported case of epidural blood patch for BIH from this country as very few clinicians are aware of the diagnosis and the available treatment option.

Case Report

Thirty-six years old male presented with chief complain of headache and dizziness for 15 days, associated with multiple episode of vomiting. The headache was localised in the occipitofrontal region. There was positional variation of the headache, which was relieved in supine position and the severity increased in standing and sitting position. However, there was no history of photophobia, neck pain, fever, trauma, running nose, weakness of any part of the body or alteration in vision and hearing ability.

On admission, his vitals were stable and neurologic examination revealed no abnormalities. Patient was initially investigated in the line of meningitis. All haematology and biochemistry investigation were within normal limit but cerebrospinal fluid (CSF) analysis showed 6 cells, all lymphocytes with borderline elevated protein and was considered inconclusive by neurology team. MRI of brain was then performed which also revealed to be normal. With suspicion of low intracranial pressure headache, MRI of whole spine was performed and a high intensity area in the epidural space in anterior aspect with dural leak at C3-C4 cervical level was suspected.

Initially the headache was attempted to relieve by adequate hydration, rest and codeine-paracetamol analgesic combinations. He was observed for 5 days but since his symptoms didn't improve, he was planned for Cervical Epidural Blood Patch. After counselling and written consent about the procedure and the possible outcomes, patient was transferred to the operating room. Base line vitals were recorded which was normal. The patient was kept in left lateral position and under aseptic precaution; epidural space was identified in C5-C6 space with loss of resistance technique using 18 G Tuohy needle. Then 15ml of blood was aspirated from left antecubital vein, which was injected slowly in the epidural space. After dressing, the patient was kept supine and observed for an hour and was uneventful. Patient was then shifted to general ward with advice to lie supine for 24 hours and check limbs power regularly. Over the next two days, the patient's headache slowly got relieved. There were no complications noted. So patient was discharged home after three days of procedure on as per need analgesics for headache. The patient was followed up at the out patient clinic after one week, then weekly for six weeks and monthly for six month of discharge and he was completely relieved of headache and did not require any analgesics.

Discussion

Benign intracranial hypotension is a syndrome of low CSF pressure characterized by postural headaches in patients without any history of dural puncture, surgery or penetrating trauma.^{1,2} Originally described by Schaltenbrand in 1938,³ BIH is thought to occur from occult CSF leak resulting in decreased CSF volume and consequently, in low CSF pressure.^{1,2} It occurs mainly in young adult females.⁴ The characteristic headache is similar to Post Dural Puncture Headache (PDPH) which is mainly in the occipitofrontal region but can be diffuse and worsen within 15 minutes of sitting or standing position and improves within 15-30 minutes in recumbent position.^{1,5} The pain may be exacerbated by laughing, coughing, jugular venous compression and Valsalva manoeuvre. The other features include nausea and vomiting, stiff neck, vertigo, tinnitus, photophobia and blurred sight.⁵ Lumbar puncture is usually not recommended as it may aggravate the intracranial hypotension, but it usually reveals a low opening CSF pressure less than 60 mm H₂O or sometimes the measurement of pressure may not be possible.¹ CSF analysis may be normal or reveal increased protein, xanthochromia, or lymphocytic pleocytosis. In our patient, the neurology team was suspecting meningitis and thus send CSF analysis, which revealed mildly elevated proteins and lymphocytes. As this was inconclusive, and ruled out infectious cause, MRI was planned suspecting BIH as a possibility.

Intracranial MR imaging findings of BIH are diffuse, intense meningeal enhancement and downward displacement of brain structures.¹ Spinal MR imaging can show spinal extradural CSF collection but the exact site of CSF leak may not be seen.¹ The intracranial scanning was normal in our patient however, high signal intensity area in the epidural space in anterior aspect with suspicion of dural leak at C3-C4 cervical level was seen.

In 2008, Schievink described three criteria for diagnosing BIH.⁶ Criteria A is considered when spinal CSF leak is demonstrated in any imaging modality by the presence of extrathecal CSF. If no spinal CSF leak can be shown, Criterion B can be considered if the brain features of intracranial hypotension in addition to a low opening pressure (< 60 mmHg), spinal meningeal diverticulum or improvement of symptoms by epidural blood patch. If Criteria A and B are not met, Criterion C can be considered in the presence of all or at least two of the following: typical orthostatic headache, low opening pressure, spinal meningeal diverticulum and symptomatic improvement following epidural blood patch. In our patient, Criteria A was present as MRI demonstrated a leak in dura in the cervical region.

The usual clinical course of BIH in most patients is spontaneous resolution over a period of weeks to months.⁶ Conservative management for headache in BIH are similar to PDPH and include bed rest, analgesic,

sedatives, oral caffeine, intravenous hydration.^{1,7} For cases not responding conservative management, epidural saline infusion⁵ or epidural blood patch is the treatment.^{8,9} Intrathecal saline infusion or artificial CSF should not be expected to seal a CSF leak but may be required as an effective temporizing measure to restore CSF volume until the leak can be permanently repaired in patients who require urgent treatment, such as those with a decreased consciousness level.⁵

Epidural blood patch (EBP) is a procedure in which a small amount (15-20ml) of autologous blood is injected slowly in the epidural space, which seals the dural leak/puncture site. EBP is performed only when other conservative modalities failed.^{8,9} The success rate is high if this blood patch is placed near to the same segment or within one segment of dural leakage and also when CT guided EBP is performed.^{5,7,10} After the procedure, patient is laid supine and neurological monitoring should be carried out regularly. The efficacy of first patch ranges from 85 to 90% and improves upto 98% with a repeat patch.¹⁰

Surgical treatment is reserved for those patients in whom nonsurgical measures have failed. Leaking meningeal diverticula can be ligated with suture or a metal aneurysm clip, while dural rents, holes, or other defects are repaired either with suture or, more commonly, by placement of a muscle pledget along with gelfoam and fibrin sealant. Rarely, intradural exploration may be required.¹⁰

In conclusion, presentation of spontaneous cerebrospinal fluid leak is similar as post dural puncture headache and diagnosis is done by brain and spinal MR imaging. Epidural blood patch, in our case conducted after the failure of conservative management strategy, gave a good result.

Acknowledgement: We would like to thank our Consultant Neurologist Dr. Bikram Gajurel for his support and continued patient care.

Funding: None

Conflict of interests: None

References

1. Rabin BM, Roychowdhury S, Meyer JR, Cohen BA, LaPat KD, Russell EJ. Spontaneous Intracranial Hypotension: Spinal MR Findings. *Am J Neuroradiol* 1998;19:1034-9. [PMID:9672007]
2. Mokri B. Spontaneous cerebrospinal fluid leaks: from intracranial hypotension to cerebrospinal fluid hypovolemia - evolution of a concept. *Mayo Clin Proc* 1999;74:1113-23. <http://dx.doi.org/10.4065/74.11.1113> [PMID:10560599]
3. Schaltenbrand G. Neure anshaungun zur pathophysiologie der liquorzirkulation. *Zentrabl Neurochir* 1938;3:290-300.
4. Miyazawa K, Shiga Y, Hasegawa T, Endoh M, Okita N, Higano S, et

- al. CSF hypovolemia vs intracranial hypotension in 'spontaneous intracranial hypotension syndrome'. *Neurology* 2003;60:941-7. <http://dx.doi.org/10.1212/01.WNL.0000049933.51044.81> [PMID:12654957]
5. Syed NA, Mirza FA, Pabaney AH, Hassan R. Pathophysiology and management of Spontaneous Intracranial Hypotension - A Review. *J Pak Med Assos* 2012;62:51-5. [PMID:22352103]
6. Schievink WI, Maya MM, Louy C, Moser FG, Tourje J. Diagnostic criteria for spinal CSF leak and intracranial hypotension. *Am J Neuroradiol* 2008;29:853-6. <http://dx.doi.org/10.3174/ajnr.A0956> [PMID:18258706]
7. Tosaka M, Sato N, Fujimaki H, Tanaka Y, Kagoshima K, Takahashi A, et al. Diffuse pachymeningeal hyperintensity and subdural effusion/hematoma detected by fluid - attenuated inversion recovery MR imaging in patients with spontaneous intracranial hypotension. *Am J Neuroradiol* 2008;29:1164-70. <http://dx.doi.org/10.3174/ajnr.A1041> [PMID:18417608]
8. Rozec B, Guillon B, Desal H, Blanloeil Y. Value of epidural blood patches for the treatment of spontaneous intracranial hypotension. *Ann Fr Anesth Reanim* 2004;23:1144-8. <http://dx.doi.org/10.1016/j.annfar.2004.09.009> [PMID:15589353]
9. Cousins MJ, Brazier D, Cook R. Intracranial hypotension caused by cervical cerebrospinal fluid leak: treatment with epidural blood patch. *Anaesth Analg* 2004;98:1794-7. <http://dx.doi.org/10.1213/01.ANE.0000117225.31416.36> [PMID: 15155350]
10. Binder DK, Dillon WP, Fishman RA. Intrathecal saline infusion in the treatment of obtundation associated with spontaneous intracranial hypotension: technical case report. *Neurosurgery* 2002;51:830-36. <http://dx.doi.org/10.1097/00006123-200209000-00045> [PMID:12188967]