

Bilateral greater occipital nerve block for headache after corrective spinal surgery: a case report

Edmundo Pereira de Souza Neto**¹, José Luis Martinez^b, Kathryn Dekoven^b, Francoise Yung^b and Sandra Lesage^b

^aDépartement d'anesthésie, Centre Hospitalier de Montauban, Montauban, France

^bDépartement d'anesthésie, Hôpital Sainte Justine, Montréal, Canada

*Corresponding author, email: edmundo.pereira-de-souza@hotmail.fr



Background: Post-dural puncture headache is a common complication for patients with dural puncture and if untreated can result in complications such as subdural hematoma and seizures.

Aim: The aim of this case report is to present a case of headache after corrective spinal surgery for idiopathic scoliosis resolved with a bilateral greater occipital nerve block (BGON).

Keywords: bilateral greater occipital nerve block, corrective spinal surgery, headache

Introduction

Post-dural puncture headache (PDPH) is a common complication for patients with dural puncture and if untreated can result in complications such as subdural haematoma and seizures.^{1,2} Epidural blood patch is an effective treatment but it is also an invasive method that can cause neurological sequelae such as arachnoiditis, early and late back pain, radiculopathy, infection, and spinal-subdural and intrathecal haematoma.^{1,2}

Bilateral greater occipital nerve block (BGON) has been reported for the successful treatment of PDPH.³⁻⁵ Authors suggest that treatment of PDPH with BGON block seems to be a minimally invasive, easy and effective method and may be considered before the application of a blood patch.⁵ The analgesia obtained after the BGON block may be explained by the central neuromodulatory effect that causes decreased central sensitisation due to the temporary interruption of afferent input to the dorsal roots and trigeminal nucleus.^{5,6}

The aim of this case report is to present a case of headache after corrective spinal surgery for idiopathic scoliosis resolved with a BGON block. To our knowledge, there are no papers on the use of this block after corrective spinal surgery for scoliosis and our report suggests that a BGON block may be an interesting alternative treatment.

Case report

An 18-year-old girl (55 kg/1.60 m) was scheduled for corrective spinal surgery for adolescent idiopathic scoliosis. The patient had a negative past medical history, no history of abnormal clinical bleeding and was not taking any medications. She had a spinal curve of 50° (Cobb method) but she had no pain or neurological abnormalities preoperatively.

An uneventful posterior corrective spinal surgery approach (spinal arthrodesis from 2nd thoracic to 3rd lumbar vertebrae) was done under general anaesthesia. At the end of surgery the patient received an intraoperative dose of intrathecal morphine administered by the surgeon after confirming cerebrospinal fluid

return through the spinal needle (BD™ Whitacre 25G spinal needle with pencil point—Vygon (UK) Ltd, Swindon, UK).

On the second postoperative day she was referred to the anaesthesia service to assess and treat her headache. As the headache worsened in the standing position and improved upon resuming the supine position and since a dural puncture had been performed we evoked a post-dural puncture headache (PDPH). Vital signs were within normal limits and there were no signs of meningeal irritation. Magnetic resonance imaging could not be done due to her spinal instrumentation (Figure 1). Cerebral computed tomography was normal.

Initially, symptomatic analgesia (acetaminophen-caffeine combination) with fluid administration was used as the conservative management of PDPH. On the sixth postoperative day, once the conservative management was deemed ineffective in treating the PDPH, a bilateral greater occipital nerve block was proposed.

BGON block was performed while monitoring the patient's blood pressure, pulse oximetry, and three-lead electrocardiogram. Intravenous access was obtained beforehand. The BGON block was done by an anaesthesiologist experienced in scalp nerve blocks (EP Souza Neto) using the method which is based on the anatomical landmarks.^{7,8} A detailed description of the technique can be obtained elsewhere.^{7,8} Briefly, the greater occipital nerve is located approximately two-thirds of the distance on a line drawn from the centre of the mastoid to the external occipital protuberance. The greater occipital nerve is near to the occipital artery and can also be located by palpating the occipital artery. The occipital region was prepped in a sterile manner. The external occipital protuberance was palpated and a needle was inserted between 1.5 cm and 2.5 cm lateral to the external occipital protuberance parallel to the superior nuchal line. Then 5 ml of ropivacaine (2 mg/mL) was injected on each side. No adverse effects during or after the block were recorded. Ten minutes after BGON block the patient was asked to stand upright. Her headache was no longer present. The patient was examined every day after the block until discharge and the headache never returned. The patient was discharged on the seventh postoperative day.

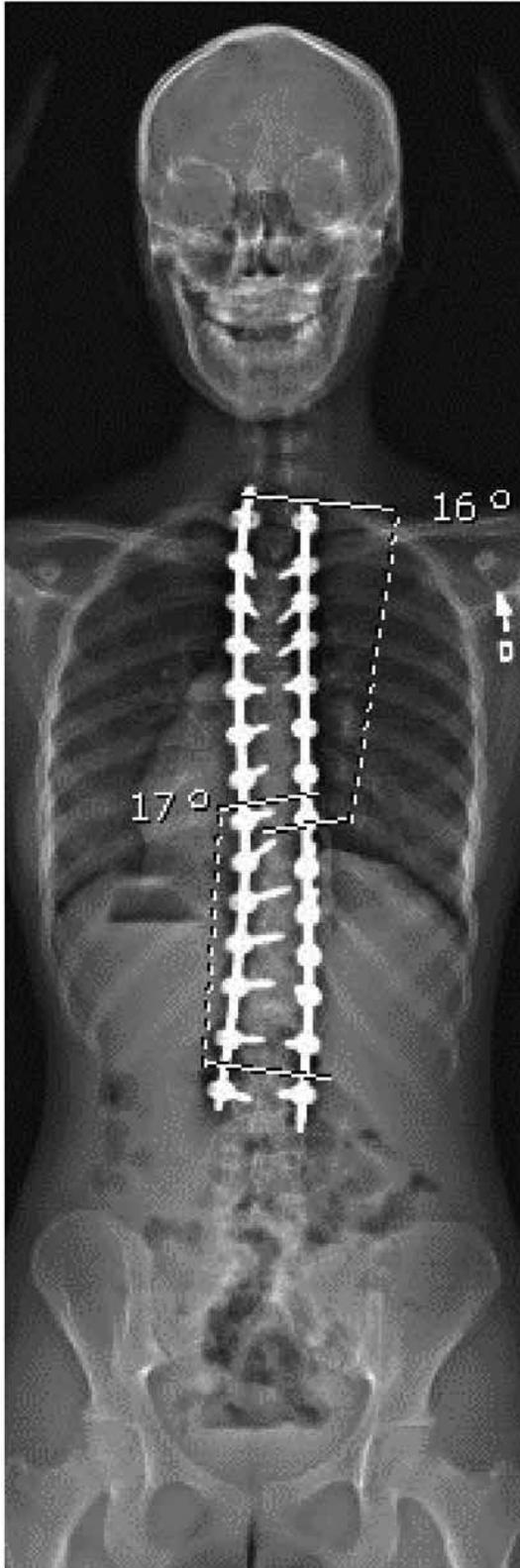


Figure 1: Radiography of the spine in the longitudinal plane in a standing position after corrective spinal surgery for scoliosis.

Discussion

It was August Bier who first reported PDPH in 1898. Since then PDPH has been described as a postural, frontal, fronto-temporal or occipital headache, worsened by ambulation and improved by assuming the decubitus position, occurring after dural puncture.^{1,2} The PDPH can have the accompanying symptoms of

nausea, vomiting and neck stiffness.^{1,2} Many invasive and non-invasive therapies for management of PDPH have been described and epidural blood patch remains the gold standard treatment.^{1,2} In adults the postulated mechanisms of action of the epidural blood patch include inflammation, as well as tamponade of the dural leakage while simultaneously raising the subarachnoid pressure.^{9,10} Epidural blood patch is an invasive procedure with approximately 70% prolonged success after initial injection but with potential complications.^{1,2,11}

Bilateral greater occipital nerve (BGON) block is an interesting alternative to epidural blood patch because it is easy to perform and, in expert hands, has a minimal risk of side effects.^{3,5,8} The evoked risks related to greater occipital nerve block are haematoma, pain, vasovagal reaction, dizziness, infection, alopecia and cutaneous atrophy.^{3-5,8,12-14} The conditions that have been treated with BGON block are occipital neuralgia and cervicogenic headache.⁷ The greater occipital nerve takes sensorial fibres from the C2 and C3 segments of the spinal cord. It separates from the dorsal ramus of the C2 segment, taking a fine branch from the C3 segment and innervating the posterior medial aspect of the scalp.^{14,15} The BGON block can initiate an inhibitory process that shuts down several symptom generators, alleviating allodynia and headache.⁸

In our case, the patient developed a postural occipital headache worsened by ambulation and improved in the decubitus position. Physical and radiological examinations were carried out before making the diagnosis of PDPH. Cerebrospinal fluid leakage into the epidural space has been proposed to be the main mechanism responsible for headache. Leakage could be provoked by either intraoperative surgical dural lesions or after injection of intrathecal morphine. Epidural blood patch would have been technically difficult because the spine was instrumented and conservative management (acetaminophen-caffeine combination with fluid administration) was unsuccessful; thus bilateral greater occipital nerve block was suggested as treatment.

BGON block was done using the anatomical landmarks but ultrasound-guided bilateral greater occipital nerve block has been described.¹⁶

To our knowledge, there are no papers on the use of this block after corrective spinal surgery for scoliosis and our report suggests that a BGON block may be a successful alternative treatment for patients with PDPH. Further studies must be done to confirm that BGON block may be an effective treatment for patients with PDPH after corrective spinal surgery for scoliosis.

Disclosure statement – No potential conflict of interest was reported by the authors.

ORCID

Edmundo Pereira de Souza Neto  <http://orcid.org/0000-0001-6921-235X>

References

1. Ahmed SV, Jayawarna C, Jude E. Post lumbar puncture headache: diagnosis and management. *Postgraduate Medical Journal*. 2006;82(973):713–16. <https://doi.org/10.1136/pgmj.2006.044792>
2. Candido KD, Stevens RA. Post-dural puncture headache: pathophysiology, prevention and treatment. *Best Pract Res Clin Anaesthesiol*. 2003;17(3):451–69. [https://doi.org/10.1016/S1521-6896\(03\)00033-8](https://doi.org/10.1016/S1521-6896(03)00033-8)

3. Akin Takmaz S, Unal Kantekin C, Kaymak C, et al. Treatment of post-dural puncture headache with bilateral greater occipital nerve block. *Headache*. 2010;50(5):869–72.
4. Matute E, Bonilla S, Gironés A, et al. Bilateral greater occipital nerve block for post-dural puncture headache. *Anaesthesia*. 2008;63(5):557–58. <https://doi.org/10.1111/ana.2008.63.issue-5>
5. Uyar Türkyılmaz E, Camgöz Eryılmaz N, Aydın Güzey N, et al. Bilateral greater occipital nerve block for treatment of post-dural puncture headache after caesarean operations. *Braz J Anesthesiol*. 2016;66(5):445–50. <https://doi.org/10.1016/j.bjan.2015.12.001>
6. Bartsch T, Goadsby PJ. Stimulation of the greater occipital nerve induces increased central excitability of dural afferent input. *Brain*. 2002;125:1496–509. <https://doi.org/10.1093/brain/awf166>
7. Levin M. Nerve blocks in the treatment of headache. *Neurotherapeutics*. 2010;7:197–203. <https://doi.org/10.1016/j.nurt.2010.03.001>
8. Young WB, Marmura M, Ashkenazi A, et al. Greater occipital nerve and other anesthetic injections for primary headache disorders. *Headache*. 2008;48:1122–25. <https://doi.org/10.1111/hed.2008.48.issue-7>
9. DiGiovanni AJ, Galbert MW, Wahle WM. Epidural injection of autologous blood for postlumbar-puncture headache. II. Additional clinical experiences and laboratory investigation. *Anesth Analg*. 1972;51(2):226–32.
10. Gaiser RR. Postdural puncture headache: an evidence-based approach. *Anesthesiol Clin*. 2017;35(1):157–67. <https://doi.org/10.1016/j.anclin.2016.09.013>
11. Allegri M, Lombardi F, Custodi VM, et al. Spontaneous cervical (C1–C2) cerebrospinal fluid leakage repaired with computed tomography-guided cervical epidural blood patch. *J Pain Symptom Manage*. 2010;40(3):e9–e12. <https://doi.org/10.1016/j.jpainsymman.2010.04.010>
12. Lavin PJ, Workman R. Cushing syndrome induced by serial occipital nerve blocks containing corticosteroids. *Headache*. 2001;41:902–04. <https://doi.org/10.1046/j.1526-4610.2001.01165.x>
13. Shields KG, Levy MJ, Goadsby PJ. Alopecia and cutaneous atrophy after greater occipital nerve infiltration with corticosteroid. *Neurology*. 2004;63:2193–94. <https://doi.org/10.1212/01.WNL.0000145832.26051.3C>
14. Strauss L, Loder E, Rizzoli P. Transient facial nerve palsy after occipital nerve block: a case report. *Headache*. 2014;54(10):1651–55. <https://doi.org/10.1111/head.12403>
15. Mueller O, Hagel V, Wrede K, et al. Stimulation of the greater occipital nerve: anatomical considerations and clinical implications. *Pain Physician*. 2013;16(3):E181–89.
16. Akyol F, Binici O, Kuyruklyildiz U, et al. Ultrasound-guided bilateral greater occipital nerve block for the treatment of post-dural puncture headache. *Pak J Med Sci*. 2015;31(1):111–15.

Received: 07-09-2017 Accepted: 09-01-2018