

Transnasal Sphenopalatine Ganglion Block for Postdural Puncture Headache Treatment after Spinal Anesthesia – Case Report

Vakhtang Shoshiashvili MD, PhD*

Research Institute of Clinical Medicine, European University, Tbilisi, Georgia.

*Correspondence:

Vakhtang Shoshiashvili, Research Institute of Clinical Medicine, European University, Tbilisi, Georgia.

Received: 10 June 2019; Accepted: 24 June 2019

Citation: Vakhtang Shoshiashvili. Transnasal Sphenopalatine Ganglion Block for Postdural Puncture Headache Treatment after Spinal Anesthesia – Case Report. *Anesth Pain Res.* 2019; 3(1): 1-4.

ABSTRACT

Postdural puncture headache (PDPH) is a major complication of neuraxial anesthesia that can occur following spinal anesthesia and with inadvertent dural puncture during epidural anesthesia. Risk factors include female sex, young age, pregnancy, vaginal delivery, low body mass index, and being a non-smoker. Needle size, design, and the technique used also affect the risk. A diagnostic hallmark of PDPH is a postural headache that worsens with sitting or standing, and improves with lying down. Conservative therapies such as bed rest, hydration, and caffeine are commonly used as prophylaxis and treatment for this condition.

We are presenting a case report of PDPH after pilonidal cystectomy. The patient was a 23 years old male, non-smoker. Spinal puncture – with BBraun Spinocan 25 G Quincke type needle on the L3-4 level. 5 minutes later after injecting of 3.5 ml Marcaine (“Astra Zeneca”) there was an acceptable depth of spinal anesthesia. Surgery and anesthesia – without complication. On second day patient was ambulated at home, no headaches. On third day after surgery patient felt severe postural headache. Hydration and caffeine was not helpful. We decided to relieve this pain condition by the bilateral sphenopalatine ganglion block with 0.5 ml 2% lidocaine application through the transnasal cotton ended catheter-stick. Pain relieved immediately. Duration of the application 5 minutes. Procedure was repeated with 1 h. intervals three times. PDPH relieved completely.

We are concluding that sphenopalatine ganglion block with transnasal 2% lidocaine application is a simple, effective and safe tool for PDPH treatment, which is usable for ambulated patients.

Keywords

Post-dural puncture headache, Neuraxial anesthesia, Conservative treatment.

Introduction

Post-dural puncture headache (PDPH) is a major complication of lumbar puncture and neuraxial anesthesia. It can occur following spinal anesthesia and with inadvertent dural puncture during epidural anesthesia. Risk factors include female sex, young age, pregnancy, vaginal delivery, low body mass index, and being a non-smoker. Needle size, design, and the technique used also affect the risk [1].

The symptom of PDPH is a constant headache that gets worse

when upright and improves when lying down. More than 85% of PDPH resolves with conservative treatment. Patients who do not respond to conservative treatment within 48 h require more aggressive interventions [1]. An epidural blood patch (EBP) is considered the treatment of choice for moderate and severe PDPH, with success rates of 61–98% but procedure itself could cause dural puncture and number of complications including bleeding, infection, radiculopathy, hair loss, meningitis, subdural hematoma [2-4]. Several authors have suggested the use of greater occipital nerve block as an alternative to an EBP since it is less invasive and leads to prompt symptom relief [5]. In 2001 sphenopalatine ganglion block (SPGB) has been used for PDPH and after this several authors confirmed the effectiveness and safety of this method [2,6-10].

Case Report

We are presenting a case report of PDPH after pilonidal cystectomy. The patient was a 23 years old male, non-smoker. Spinal puncture – with BBraun Spinocan 25 G Quincke type needle on the L3-4 level with first attempt. 5 minutes later after injecting of 3.5 ml Marcaine (“Astra Zeneca”) there was an acceptable depth of spinal anesthesia. Surgery and anesthesia – without complication. On second day patient was ambulated at home, no headaches. On third day after surgery patient felt severe frontal headache, which was aggravated by sitting and standing positions and alleviated lying down. Hydration and caffeine was not helpful. We decided to relieve this pain condition by the bilateral sphenopalatine ganglion block with 2% lidocain application through the transnasal cotton ended catheter-stick. Catheter-stick was inserted through the middle nasal turbinate of each nostril until resistance occurred (Figure 1).

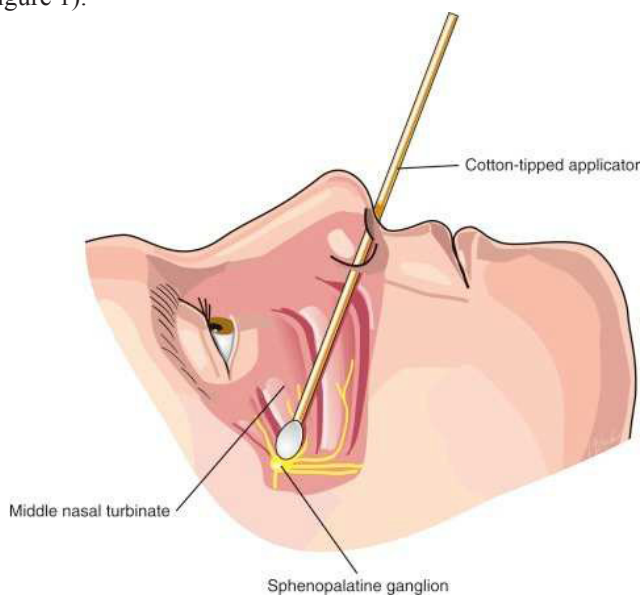


Figure 1: From Waldman SD. Atlas of interventional pain management. 4th ed. Philadelphia: Elsevier; 2015.

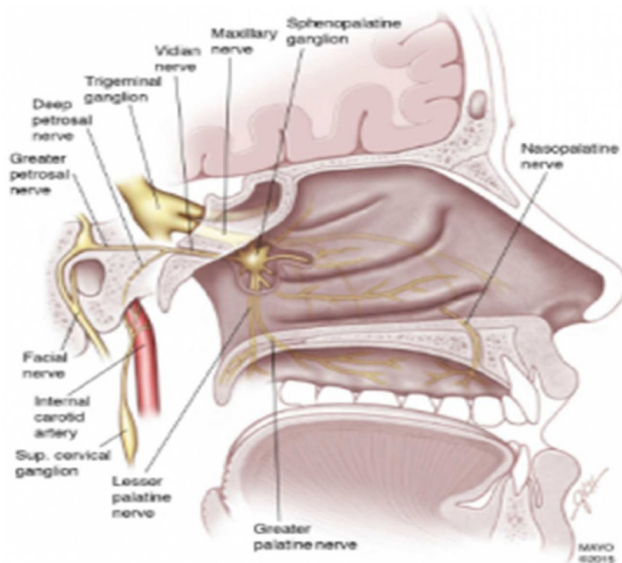


Figure 2: The SPG is associated with the trigeminal nerve, the major

nerve involved in headache disorders. Headache. 2016;56: 240-258.

For each side 0.5 ml. 2%. Lidocaine was quite enough for the application with 5 minutes of duration. After the first procedure pain relieved immediately. Patient was able to stand and walk but he felt little discomfort in frontal area. Procedure was repeated with 1 h. intervals three times. PDPH relieved completely. No other medications was needed.

Discussion

In 1899, August Bier pioneered work on spinal anesthesia and first described PDPH, suggesting that it might be caused by cerebral spinal fluid (CSF) loss. The postulated cause of the headache is reduced CSF pressure due to loss of CSF in the epidural space through the dural puncture site [11].

Decreased CSF pressure creates a loss of the cushioning effect normally provided by intracranial fluid. The resulting traction placed on intracranial pain-sensitive structures elicits pain. A second possible cause is distension of the cerebral blood vessels. Risk factors including patient and injection technique related factors: sex, age, constitution, smoking, needle type, size, direction and position of injected needle [12-14].

PDPH presents as a dull throbbing pain with a frontal-occipital distribution. Typically, the headache is aggravated by sitting or standing, and is reduced by lying down. At least partial relief should occur when the patient assumes the supine position. The headache may be accompanied by neck stiffness, tinnitus, hypoacusia, photophobia, and nausea. Headache develops within 5 days after dural puncture and disappears spontaneously within 1 week, or up to 48 h after an epidural blood patch [1,6,13]. In some cases PDPH may develop later and duration of symptoms can be lasts several months [15,16].

Some treatment modalities can be used for prophylaxis of PDPH including bed rest and hydration but there is no evidence to confirm their effectiveness [1,14]. A prophylactic EBP can be performed through the epidural catheter, which is re-sited after inadvertent dural puncture, just before the epidural catheter is removed. The placement of an intrathecal catheter through the dural puncture hole for up to 24 h. is also possible. Saline injected into the epidural space may decrease CSF loss by reducing the pressure gradient between the epidural and subarachnoid spaces [4].

More than 85% of PDPH resolves with conservative treatment. These measures include bed rest, intravenous hydration, caffeine supplementation, and analgesic medication – gabapentoines and sumatriptan [1]. Caffeine increases cerebral vasoconstriction by blocking adenosine receptors and leads to augmented CSF production by stimulating sodium-potassium pumps. Gabapentoines are similar in structure to the endogenous neurotransmitter gamma-amino-butyric acid, but their exact mechanism for treating PDPH is unclear. Sumatriptan is a serotonin receptor antagonist used for the treatment of migraine as a cerebral vasoconstrictor.

Patients who do not respond to conservative treatment within 48 h require more aggressive interventions. An EBP is considered the treatment of choice for moderate and severe PDPH, with success rates of 61–98% [4,21]. Greater occipital nerve blocks have been used for the treatment of different types of headache. Several authors have suggested its use as an alternative to an EBP since it is less invasive and leads to prompt symptom relief [5].

Another alternative of EBP is a SPGB which was first published in 2001 by Cohen S, et al. [7]. Sphenopalatine ganglion (SPG), Pterygopalatine ganglion, Meckel's ganglion, or the nasal ganglion, is a triangular parasympathetic ganglion located superficially in the pterygopalatine fossa, posterior to the middle nasal turbinate and anterior to the pterygoid canal. It measures 5 mm in size with a 1 to 1.5 mm layer of connective tissue and mucous membrane surrounding the ganglion. SPG is a junction that has sympathetic, parasympathetic, and sensory innervation overlapping in a small area. Postganglionic parasympathetic and sympathetic neurons and the somatic sensory afferents can all be blocked by an SPG block (Figure 2). Therefore SPGB is useful for different types of headache, facial, back, head and neck pain conditions [16-20].

In PDPH, there is a continuous cerebrospinal fluid (CSF) loss, which leads to decreased intracranial volume. The intracranial volume is restored by compensatory vasodilation mediated by parasympathetic activity, which, along with traction on the pain sensitive intracranial structures, leads to a throbbing headache. Even after the restoration of the intracranial volume the parasympathetic activity continues. SPG block inhibits this activity, which inhibits vasodilation. This relieves PDPH [5,13]. Effectiveness of SPGB for PDPH is evident by the limited number of publications in form of case report or small study [2,5-10]. In retrospective study (Cohen 2018) has been shown, that SPGB works much faster than the epidural blood patch and as effectively when you look at it over the long-term.

There are different mechanisms of action of EBP and SPGB: EBP restricts CSF leakage and results in restoration of its volume. SPGB inhibits parasympathetic activity and cerebral vasodilation. After EBP serious complications, including motor and sensory defects, meningitis, seizure, hearing loss, and subdural hematoma, can and do occur on rare occasions. Repeat use of this method is difficult. Transnasal SPGB is safe and it can be used repeatedly. We agree that SPGB must be the first line treatment for PDPH. If successful there will be no need in epidural blood patch but in some cases such as PDPH after intrathecal drug delivery system implantation, seems that EBP is a method of choice [21].

Conclusion

Bilateral SPGB is a safe and effective method for alleviation of severe PDPH. It can be used repeatedly both for prophylactic and treatment goals.

References

1. Ona XB, Osorio D, Cosp XB. Drug therapy for treating post-dural puncture headache. (review) Copyright © 2015. The

Cochrane Collaboration. Published by John Wiley & Sons, Ltd.

2. Puthenveetil N, Rajan S, Mohan A, et al. Sphenopalatine ganglion block for treatment of post-dural puncture headache in obstetric patients: An observational study. *Indian J Anaesth.* 2018; 62: 972-977.
3. Desai MJ, Dave AP, Martin MB. Delayed radicular pain following two large volume epidural blood patches for post-lumbar puncture headache: A case report. *Pain Physician.* 2010; 13: 257-262.
4. Safa-Tisseront V, Thormann F, Patrick Malassiné P. et al. Effectiveness of Epidural Blood Patch in the Management of Post-Dural Puncture Headache. *Anesthesiology.* 2001; 95: 334-339.
5. Abhijit S. Nair, Praveen Kumar Kodisharapu, Poornachand Anne, et al. Efficacy of bilateral greater occipital nerve block in postdural puncture headache: a narrative review. *Korean J Pain.* 2018; 31: 80–86.
6. Nair AS, Rayani BK. Sphenopalatine ganglion block for relieving postdural puncture headache: Technique and mechanism of action of block with a narrative review of efficacy. *Korean J Pain.* 2017; 30: 93-97.
7. Cohen S, Levin D, Mellender S, et al. Topical Sphenopalatine Ganglion Block Compared With Epidural Blood Patch for Postdural Puncture Headache Management in Postpartum Patients: A Retrospective Review. *Reg Anesth Pain Med.* 2018; 43: 880-884.
8. Kent S, Mehaffey G. Transnasal sphenopalatine ganglion block for the treatment of postdural puncture headache in the ED. *Am J Emerg Med.* 2015; 1714. e1-2.
9. Vallejo MC, Mandell GL, Sabo DP, et al. Ropivacaine use in transnasal sphenopalatine ganglion block for post dural puncture headache in obstetric patients-case series. *Anesth Analg.* 2000; 91: 916-920.
10. Cohen S, Trnovski S, Zada Y. A new interest in an old remedy for headache and backache for our obstetric patients: a sphenopalatine ganglion block. *Anaesthesia.* 2001; 56: 606-607.
11. Bier A. Versuche uber cocainisierung des ruckenmarkes. *Deutsche Zeitschrift fur Chirurgie.* 1899; 51: 361-369.
12. Shah A, Bhatia PK, Tulsiani KL. Post dural puncture headache in ceasarean section: A Comparative study between 25G Quinke, 27G Quinke and 27G Whitacre needle. *Indian J Anaesth.* 2002; 46: 373-377.
13. Turnbull DK, Shepherd DB. Post-dural puncture headache: Pathogenesis, prevention and treatment. *Br J Anaesth.* 2003; 91: 718-729.
14. Kwak K-H. Postdural puncture headache. *Korean J Anesthesiol.* 2017; 70: 136-143.
15. Porhomayon J, Zadeii G, Yarahamadi A, et al. A Case of Prolonged Delayed Postdural Puncture Headache in a Patient with Multiple Sclerosis Exacerbated by Air Travel. *Case Rep Anesthesiol.* 2013; 253218.
16. Barbosa FT. Post-Dural Headache with Seven Months Duration: Case Report. *Rev Bras nestesiol* 2011; 61: 3: 355-359.

-
17. Cady R, Saper J, Dexter K, et al. A double-blind, placebo-controlled study of repetitive transnasal sphenopalatine ganglion blockade with tx360® as acute treatment for chronic migraine. *Headache*. 2015; 55: 101-116.
 18. Candido KD, Massey ST, Sauer R, et al. A novel revision to the classical transnasal topical sphenopalatine ganglion block for the treatment of headache and facial pain. *Pain Physician*. 2013; 16: E769-778.
 19. Robbins MS, Robertson CE, Kaplan E, et al. The Sphenopalatine Ganglion: Anatomy, Pathophysiology, and Therapeutic Targeting in Headache. *Headache*. 2016; 56: 240-258.
 20. Waldman SD. *Atlas of interventional pain management*. 4th ed. Philadelphia: Elsevier; 2015.
 21. Markus A, Bendel, Susan M, Moeschler, Wenchun Qu, et al. Treatment of Refractory Postdural Puncture Headache after Intrathecal Drug Delivery System Implantation with Epidural Blood Patch Procedures: A 20-Year Experience. *Pain Res Treat*. 2016; 2134959.