JOURNAL OF CLINICAL AND HEALTH SCIENCES

CASE REPORT

# Case Report: Transnasal Sphenopalatine Ganglion Block for the Treatment of Postdural Puncture Headache – A Successful Avoidance of Epidural Blood Patch

Siti Aznida Ab Karim[1], Rusnaini Mustapha Kamar[1], Zawiah Kassim[1], Mohd Fahmi Zakariah[2]

1 Department of Anaesthesiology and Intensive Care, Faculty of Medicine, Universiti Teknologi MARA, Sg Buloh, Selangor, Malaysia
2 Gleneagles Hospital Medini Johor, Iskandar Puteri, Johor, Malaysia

**Received**
17th April 2021
**Received in final revised form**
4th July 2021
**Accepted**
23rd August 2021
**Published**
1st September 2023

**Corresponding author:**
**Rusnaini Mustapha Kamar.**
Department of Anaesthesiology and Intensive Care,
Faculty of Medicine,
Universiti Teknologi MARA,
47000 Sg Buloh,
Selangor, Malaysia.
Email: rusnaini@uitm.edu.my

## ABSTRACT

Postdural puncture headache (PDPH) is a known complication following neuraxial anaesthesia and inadvertent dural puncture in obstetric patients. Epidural blood patch (EBP) is widely recognized as the gold standard in the treatment of PDPH. However, it is invasive and is associated with serious complications such as meningitis, infection, cauda equina syndrome, and risk of creating second inadvertent dural puncture. Topical transnasal sphenopalatine ganglion (SPG) block has recently emerged as a non-invasive treatment of PDPH. We describe our first experience in performing transnasal SPG block using lignocaine and dexamethasone mixture in a patient who presented with recurrent PDPH after failed conservative management.

**KEYWORDS: Transnasal sphenopalatine ganglion block, postdural puncture headache**

## INTRODUCTION

Postdural puncture headache (PDPH) is a debilitating complication of neuraxial anaesthesia and inadvertent dural puncture. Obstetric patients are at particular risk of PDPH because of their gender predisposition, younger age, and the widespread use of neuraxial blocks during labour and delivery [1].

Conservative management of PDPH such as hydration, bed rest and caffeine have limited evidence [2]. Epidural blood patch (EBP), which is currently the gold standard in managing PDPH, was reported to have an efficacy ranging from 33 - 75% [3,4]. However, it is invasive and is associated wit h rare but severe complications such as meningitis, infection, and cauda equina syndrome [2,5]. EBP also carries risk of introducing second inadvertent dural puncture, especially in patients with difficult anatomy. More recently, topical transnasal Sphenopalatine Ganglion (SPG) block has been proposed as a simple, non-invasive, and effective treatment for PDPH [6–8].

We presented our first experience in performing transnasal SPG block to an obstetric patient who had a severe PDPH despite conservative management.

## CASE PRESENTATION

A 27-year-old primigravida at 40 weeks of gestation, with no underlying medical illness had an emergency lower segment Caesarean section (LSCS) for fetal distress. She was obese with a body mass index (BMI) of 34. Otherwise, her vital sign was normal. She received spinal anaesthesia at intervertebral level L3/L4 in sitting position. There were multiple attempts at performing the subarachnoid block with 25 and 27 -

gauge (G) pencil-point needles. A total of 2.2 milliliter (ml) mixture of hyperbaric bupivacaine 0.5%, morphine 0.1 milligram (mg), and fentanyl 10 microgram (mcg) were given intrathecally. The patient was laid down immediately after the block. The surgery was uneventful, and she was haemodynamically stable in the post-natal ward.

The next day, she complained of severe occipital headache upon ambulation which was relieved by lying down. No other associated neurological symptom was elicited, and her blood pressure was normal throughout. A diagnosis of PDPH was made based on her clinical presentation with a history of multiple attempts of subarachnoid block. She was started on conservative management which includes oral hydration, intravenous hydration with normal saline, oral analgesics, caffeine drink, and bed rest. Her symptoms resolved after 12 hours, and she was discharged on postoperative day 3 with advice to continue adequate oral hydration.

However, she presented to the Emergency Department (ED) on postoperative day 4 with recurrent severe occipital headaches. Upon further questioning, she admitted to not taking adequate fluid intake due to her confinement practice. On examination, she appeared dehydrated, and her blood pressure (BP) was high with systolic BP ranged between 150 -160 mmHg and diastolic BP between 90-95 mmHg. Urine protein showed significant ketonuria. Otherwise, there were no other focal neurological deficits, as well as any symptoms and signs suggestive of pre-eclampsia. Her blood investigations which include full blood count, coagulation profile, renal profile, and liver function test were all within normal range. Brain imaging was not performed as there were no focal neurological deficits. A diagnosis of recurrent PDPH was made with a differential diagnosis of late-onset pregnancy-induced hypertension (PIH). Conservative management which included oral and intravenous hydration, and oral paracetamol was started in ED. Upon our review in the ward, she reported Numeric Rating Scale (NRS) pain score of 9/10 on erect position, and 7/10 on supine position. She was offered a transnasal SPG block, failing which an epidural blood patch would be the next course of management. She agreed to receive SPG block, and consent was taken. She was not required to fast for the procedure.

The SPG block procedure was performed in the ward with an immediate access to resuscitation trolley. The patient was instructed to lie supine with her neck extended. Standard monitoring of blood pressure, pulse oximeter, cardiac monitors and intravenous access were applied.

A cocktail of 5ml Lignocaine 2% (100mg) and dexamethasone 8mg solution were prepared in a container (Figure 1). Two cotton tip applicators were soaked in the mixture. The cotton tip applicators were inserted in each nostril in sequence, parallel to the nasal floor and advanced until resistance was felt. The applicators were left in the nostrils for 8 minutes (Figure 2). No immediate complication was observed, and she was haemodynamically stable throughout the procedure.

The patient was then put in semi-recumbent position to reassess her symptoms. Her NRS pain score improved to 5/10 at 30 minutes and 3/10 at 90 minutes. Her pain resolved with NRS score of 0 at 24 and 48-hours follow-up. Her blood pressure remained high despite the resolution of headache, and she was further managed for late-onset PIH.

**Figure 1** Topical preparation of lignocaine/dexamethasone mixture for SPG block



Vol 8(2) (2023) 57-61 | jchs-medicine.uitm.edu.my | eISSN 0127-984X
https://doi.org/10.24191/jchs.v8i2.13147

**Figure 2** Bilateral topical transnasal SPG block using cotton tip applicator

## DISCUSSION

The International Classification of Headache Disorders (ICHD-3) defines PDPH as headache occurring within 5 days of a lumbar puncture, caused by cerebrospinal fluid (CSF) leakage through the dural puncture [9]. The incidence of PDPH among parturients following neuraxial blocks is estimated to be between 0 - 1% [10,11]. Currently, there is no published data on the incidents of PDPH among Malaysian mothers. The first line of treatment includes conservative management such as adequate hydration. With proper education and explanation on the impact of adequate hydration to their headache severity, most mothers with PDPH will comply with hydration advice. However, non-compliance to hydration therapy may be an issue in some Malaysian mothers who restrict their fluid intake as part of their traditional postpartum practice [12]. Epidural blood patch is typically the next step following the failure of conservative therapy.

While the exact mechanism of PDPH remains unclear, it is hypothesized to be due to changes in the cerebrovascular dynamic following cerebrospinal leak into the epidural space from the dural tear. Meningeal traction due to CSF leak, and compensatory cerebral vasodilatation are the possible mechanisms responsible for the excruciating headache after dural puncture [1,13]. Furthermore, a higher level of circulating oestrogen during pregnancy may alter vascular tone and increased cerebral vascular distension in response to CSF hypotension [1].

The sphenopalatine ganglion (SPG) is a collection of parasympathetic ganglia located in the pterygopalatine fossa. It is located approximately 3 mm from the mucosal surface of the posterior wall of the nasal cavity at the middle turbinate level. SPG block has been reportedly used in the management of cluster headaches, trigeminal neuralgia, migraine, and as an analgesia technique for endoscopic sinus surgery [14,15]. The proposed mechanism of SPG block in PDPH is through blockade of parasympathetically-mediated cerebral vasodilation, which then leads to symptomatic relief of headache [16]. SPG block could be performed either by transnasal, transcutaneous, or intraoral approaches. Transnasal approach is commonly used in PDPH as it is technically simple, minimally invasive, and relatively safe.

Currently, the evidence of the efficacy of SPG block for relieving PDPH is limited to one recently published randomized controlled trial (RCT) and several retrospective studies and case series. The RCT done by Jespersen et al showed no statistical difference between SPG block using local anaesthetics (lignocaine 4% and ropivacaine 0.5%) and placebo (saline), but both groups had clinically significant pain relief at 30 minutes and 60 minutes [17]. They also reported that 50% of both groups ended up receiving EBP. The authors hypothesized that mechanical stimulation of SPG block may be the possible reason for the similar efficacy of local anaesthetics and placebo. However, 65% of the placebo group received open-labelled rescue SPG block with local anaesthetics, and we think this may be a factor leading to the similar efficacy in both groups.

Another retrospective study by Cohen et al demonstrated statistically significant faster onset of headache relief without any complication, from treatment with SPG block as compared to EBP [7].

SPG block is minimally invasive and easy to perform. Therefore, it could be performed earlier in the onset of PDPH such as in the emergency department. Its complications include nausea, bleeding, and temporary discomfort [14,15]. As such, it seems reasonable to



Vol 8(2) (2023) 57-61 | jchs-medicine.uitm.edu.my | eISSN 0127-984X
https://doi.org/10.24191/jchs.v8i2.13147

offer SPG block prior to EBP, since EBP is more invasive and carries risks of severe complications [2]. The contraindications for transnasal SPG block are base of skull fracture and infection in the nasopharynx [15].

With proper education, patients with uncomplicated and successful first SPG block can be taught to self-apply this procedure at home when required. It is unlikely to cause LA toxicity as the LA dose used in this block was very low. Self-administered SPG block has been reported to be an easy, safe, and cost-effective method to manage head and neck cancer pain [18].

Since local anaesthetics has limited duration of action, repeat SPG block procedures may be required for symptomatic relief while waiting for spontaneous closure of the dural tear. Currently, there is no established protocol on repeat SPG block. However, some reports have described repeat application of SPG blocks up two to three times daily [18-20].

This is the first case report that we are aware of describing co-administration of steroid with local anaesthetics in transnasal SPG block for the treatment of PDPH. We used dexamethasone as an adjuvant to lignocaine 2% to prolong the duration of analgesia. The addition of steroids to local anaesthetics in SPG block was previously shown to improve the severity and frequency of cluster headaches [21-22]. Our first experience also showed sustained relief of PDPH with dexamethasone/lignocaine 2% mixture. Although the use of lignocaine 4% in SPG block was typically described in the literature [7,17,20], we used lignocaine 2% as it was the formulation available in our centre. We suggest the use of the pipette technique to drop the solution to the cotton tip applicator to increase the volume of local anaesthetics that can be delivered.

Our first experience on performing SPG block to treat PDPH had been encouraging, with sustained relief of headache without any complication. We are planning to perform this block in a larger number of patients as well as using long-acting local anaesthetics to compare the efficacy of the block. We hope that there would be further RCT to assess the efficacy of co-administration of local anaesthetics and steroids mixture in SPG block for treatment of PDPH.

## CONCLUSION

Sphenopalatine ganglion block is an effective, technically simple, and safe treatment for postdural puncture headache. It may be considered as part of early modalities along with conservative treatment prior to performing epidural blood patch. Further RCTs would be needed to assess the efficacy of the administration of local anaesthetics and steroids mixture in SPG block for the treatment of PDPH.

### Conflict of Interest

Authors declare none.

### Acknowledgements

We would like to thank the patient for her consent to the procedure and publication. Secondly to all the staff involved in the management of the patient.

### Authors' contribution

Siti Aznida Abdul Karim and Rusnaini Mustapha Kamar contributed to the conception, design, and writing draft of the manuscript. Zawiah Kassim and Mohd Fahmi Zakariah contributed to literature review, writing, editing, and final approval of the manuscript.

## REFERENCES

1. Kwak KH. Postdural puncture headache. Korean journal of anesthesiology. 2017;70(2):136.
2. Russell R, Laxton C, Lucas DN, Niewiarowski J, Scrutton M, Stocks G. Treatment of obstetric post-dural puncture headache. Part 1: conservative and pharmacological management. Int J Obstet Anesth. 2019; 38:93–103.
3. Williams EJ, Beaulieu P, Jenkins WJ. Efficacy of epidural blood patch in the obstetric population. International journal of obstetric anesthesia. 1999; 8(2):105-9.
4. Safa-Tisseront V, Thormann F, Malassiné P, Henry M, Riou B, Coriat P, Seebacher J. Effectiveness of epidural blood patch in the management of post–dural puncture headache. The Journal of the American Society of Anesthesiologists. 2001; 95(2):334-9.
5. Russell R, Laxton C, Lucas DN, Niewiarowski J, Scrutton M, Stocks G. Treatment of obstetric post-dural puncture headache. Part 2: epidural

blood patch. International journal of obstetric anesthesia. 2019; 38:104-18.
6. López T, Sastre JA, Gómez-Ríos MA. Sphenopalatine block with lidocaine spray for treatment of obstetric postdural puncture headache. J Clin Anesth. 2021; 68:110069.
7. Cohen S, Levin D, Mellender S, Zhao R, Patel P, Grubb W, 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(8):880–4.
8. Kent S, Mehaffey G. Transnasal sphenopalatine ganglion block for the treatment of postdural puncture headache in obstetric patients. J Clin Anesth.2016; 34:194- 6.
9. Olesen J. Headache Classification Committee of the International Headache Society (IHS) The International Classification of Headache Disorders, 3rd edition. Cephalalgia [Internet]. 2018 [cited 2021 Jul 4];38(1):1–211. Available from: www.uk.sagepub.com
10. Velde M Van de, Schepers R, Berends N, Vandermeersch E, Buck F De. Ten years of experience with accidental dural puncture and post-dural puncture headache in a tertiary obstetric anaesthesia department. Int J Obs Anesth. 2008; 17:329–35.
11. Tien JC, Lim MJ, Leong WL, Lew E. Nine-year audit of post-dural puncture headache in a tertiary obstetric hospital in Singapore. Int J Obstet Anesth. 2016; 28:34 –8.
12. Fadzil F, Shamsuddin K, Wan Puteh SE. Traditional postpartum practices among Malaysian mothers: A review. J Altern Complement Med. 2016; 22(7):503–8.
13. Turnbull DK, Shepherd DB. Post-dural puncture headache: pathogenesis, prevention and treatment. Br J Anaesth. 2003; 91(5):718–29.
14. Ho KWD, Przkora R, Kumar S. Sphenopalatine ganglion: block, radiofrequency ablation and neurostimulation - a systematic review. J Headache Pain. 2017; 18(1).
15. Robbins MS, Robertson CE, Kaplan E, Ailani J, Charleston L, Kuruvilla D, et al. The Sphenopalatine Ganglion: Anatomy, Pathophysiology, and Therapeutic Targeting in Headache. Vol. 56, Headache. Blackwell Publishing Inc.; 2016. p. 240–58.
16. 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. The Korean journal of pain. 2017; 30(2):93.
17. Jespersen MS, Jaeger P, Ægidius KL, Fabritius ML, Duch P, Rye I, et al. Sphenopalatine ganglion block for the treatment of postdural puncture headache: a randomised, blinded, clinical trial. Br J Anaesth.2020; 124(6):739 –47.
18. Sanghavi PR, Shah BC, Joshi GM. Sphenopalatine Ganglion Block for Head and Neck Cancer Pain: Self-Administered Blocks Are Key to Improving the Quality of Life. Indian J Palliat Care. 2017; 23(3):282-6.
19. Peterson JN, Schames J, Schames M, King E. Sphenopalatine ganglion block: a safe and easy method for the management of orofacial pain. Cranio. 1995;13(3):177 –81.
20. Rocha-Romero A, Roychoudhury P, Benavides Cordero R, Lopez Mendoza M. Self - applied sphenopalatine ganglion block for postdural puncture headache: four case reports. Rev Bras Anestesiol [Internet]. 2020 [cited 2021 Jul 5];70(5):561–4. Available from: https://doi.org/10.1016/j.bjane.2020.09.002
21. Felisati G, Arnone F, Lozza P, Leone M, Curone M, Bussone G. Sphenopalatine endoscopic ganglion block: A revision of a traditional technique for cluster headache. Laryngoscope. 2006; 116(8):1447–50.
22. Kirkpatrick DL, Walter TTC, Clark L, Alli A, Fahrbach T, John Madarang E, et al. Lidocaine versus bupivacaine in the treatment of headache with intranasal sphenopalatine nerve block. Pain Physician. 2020; 23(4):423 –7.



Vol 8(2) (2023) 57-61 | jchs-medicine.uitm.edu.my | eISSN 0127-984X
https://doi.org/10.24191/jchs.v8i2.13147