

# Case Report on the Efficacy of Transnasal Sphenopalatine Ganglion Block for the Treatment of Severe Post-Dural Puncture Headache after Failed Subarachnoid Block

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**Abstract** — This paper presents a case report on the management of post-dural puncture headache (PDPH) through transnasal sphenopalatine ganglion block (SPGB). PDPH, is a complication of central neural axial block, either subarachnoid block or epidural block, which is one shoot or multiple attempts and can persist from mild to severe symptoms. SPGB, targeting the sphenopalatine ganglion involved in cranial pain transmission, has emerged as a promising intervention. This case involves a patient experiencing severe PDPH after failed subarachnoid block anesthesia and the occurrence of PDPH after unsuccessful block become the novelty of this case report. SPGB initially provided back pain relief but after 2 hours the pain recurrence in the head area, indicating the need for further optimization. The case underscores the potential of SPGB as an adjunctive therapy for refractory PDPH, though long-term efficacy and optimal technique require additional investigation. The abstract highlights the importance of continued monitoring and intervention in managing PDPH, offering insights into the challenges and prospects of SPGB in clinical practice.

**Keywords** — post-dural puncture headache (PDPH), sphenopalatine ganglion block (SPGB), failed subarachnoid block, transnasal SPGB

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## INTRODUCTION

Post-dural puncture headache (PDPH) is complication following procedures in central axial block such as subarachnoid block or epidural block. It usually happen in obstetric population undergoing obstetric gynecologic procedure. It is characterized by severe head pain that exacerbates with upright posture and alleviates with lying down. Although conservative management with hydration, analgesics, and bed rest is often the first-line approach, some patients may experience persistent symptoms refractory to conventional therapies. In such cases, alternative interventions, such as the trans-nasal sphenopalatine ganglion block (SPGB), have emerged as potential treatment modalities. The sphenopalatine ganglion (SPG) plays a crucial role in cranial pain transmission, and blocking its function through a trans-nasal approach has shown promise in alleviating refractory PDPH [1]. The incidence of PDPH over 20% patients undergoing subarachnoid block. In the non-obstetric population undergoing spinal subarachnoid block had a PDPH more than 1 in 5 patients, range form mild to severe symptoms [2].

Recent research has shown how effective SPGB is at reducing PDPH symptoms, indicating that it can do it quickly, durably, and with few side effects. A randomized control trial study reported improvements in headache intensity with rapid onset and longer duration than analgesia following SPGB administration in patients with refractory PDPH [3]. Similarly, a retrospective study observed a high success rate of SPGB in relieving PDPH symptoms, with over 80% of patients experiencing complete resolution or significant improvement [4].

This case report aims to contribute to the existing literature by presenting a unique case of a patient with severe and persistent PDPH who underwent transnasal SPGB, describing the clinical presentation, procedural details, and outcomes

following intervention. Through a comprehensive evaluation of this case, we seek to provide valuable insights into the role of SPGB as a potential therapeutic option for managing refractory PDPH and its implications for clinical practice.

## CASE REPORT

A 33-year-old male patient with a weight of 70 kg and a BMI of 27.3 kg/m<sup>2</sup> presented with complaints of pain in the left leg following a motorbike accident, where he collided with a sidewalk one day prior to hospital admission. Preoperative examination revealed a conscious patient without fever, pallor, or jaundice, Mallampati class 2. A physical examination showed a blood pressure of 128/85 mmHg, a heart rate of 83 beats/minute, a respiratory rate of 16-18 breaths/minute, vesicular breath sounds, and no rales or wheezing. The left calf appeared swollen and painful on palpation. The laboratory results were within normal limits. The patient was diagnosed with a closed fracture of the left tibia, classified as PS ASA 1. After explaining the benefits and risks, the patient consented to undergo anesthesia with a subarachnoid block for the planned open reduction and internal fixation (ORIF) of the posterior tibia.

During the subarachnoid block procedure, difficulties arose in identifying the subarachnoid space. Multiple attempts, using Quincke needles of 26 G and 25 G, were made, with additional guidance from ultrasound, to penetrate the ligamentum flavum but without obtaining cerebrospinal fluid (CSF). After several unsuccessful attempts, a general anesthetic was administered, and the surgery proceeded without complications.

Six hours postoperatively, the patient complained of neck and occipital pain radiating to the forehead. Neck movement for flexion, extension, and lateral rotation was difficult. The pain, rated at 4-5 on a scale, was most pronounced in a seated position. No other neurological symptoms, such as blurred vision, hearing impairment, nausea, or vomiting, were reported. The patient received bed rest, hydration, and a combination of oral analgesics (paracetamol and NSAIDs) for three days with no improvement in symptoms. Due to persistent neck and head pain, the patient was diagnosed with severe post-dural puncture headache (PDPH). A trans-nasal sphenopalatine ganglion block was performed using 1% lidocaine, resulting in immediate relief. The patient was observed for one hour and then discharged with oral analgesics.

At home, four hours post-SPGB, the patient experienced back-of-the-nose pain rated at 7-8, unresponsive to NSAIDs, paracetamol, and tramadol. Six hours post-SPGB, the pain intensified (rated 9-10), accompanied by numbness in the nose, oral cavity up to the lips, pain in the back of the nose, hyperhidrosis (cold sweats), and tingling sensations in both hands.

The following day, the patient returned to the hospital due to worsening headache despite analgesic use. The area was behind the nose and the pain scale was 9-10 using Numeric Rating Scale. The pain was stabbing, like an electric shock and not reduced with any position or condition followed by tingling in the face and excessive sweating. The complete blood count and head CT scan results showed no abnormalities. The patient received sodium diclofenac, paracetamol, diazepam, dexamethasone, and caffeine tablets, but the symptoms persisted.

The option of repeating SPGB was offered, but the patient declined due to fear of exacerbating the pain. Due to the persistent symptoms despite medication use, nasal lidocaine drops were administered, resulting in immediate relief. Two days after using nasal lidocaine drops, the patient remained free of head and nose pain, allowing a return to normal activities. Follow-up over seven days revealed no recurrence of head pain.



Fig. 1. Equipment for the SPG block

## DISCUSSION

### *Post-dural puncture headache*

Post-dural puncture headache (PDPH) is a well-known side effect that can occur after a spinal anesthetic or lumbar puncture. It is characterized by excruciating headache pain that becomes worse while standing up or sitting and is better when lying down, occurred within 7 days after dural puncture and disappeared within 14 days. The incidence estimated to be between 30-50% after lumbar puncture diagnostic or therapeutic, 0-5% after spinal anesthesia, and up to 81% after inadvertent dural puncture during epidural insertion in pregnant women. Postdural puncture headache develops in 16%–86% of cases after attempting a block epidural with a large needle. Any penetration of the dura is possible will produce PDPH. This penetration can occur spontaneously or iatrogenic. PDPH may occur as long as 48 hours after the procedure [5]. It typically arises due to cerebrospinal fluid (CSF) leakage through the dural puncture site, resulting in decreased intracranial pressure and traction on pain-sensitive structures [6]. The complication happen in one successful attempt or multiple attempts. There was no case report, reporting PDPH in failed spinal procedure.

Conservative management of PDPH often includes hydration, bed rest, and analgesics such as acetaminophen or nonsteroidal anti-inflammatory drugs (NSAIDs) [7]. However, for patients with persistent or severe symptoms refractory to conservative measures, additional interventions may be necessary.

One such intervention is the sphenopalatine ganglion block (SPGB), which has emerged as a promising option for managing refractory PDPH. The sphenopalatine ganglion (SPG) plays a pivotal role in cranial pain transmission, and blocking its function through a trans-nasal approach has shown efficacy in alleviating PDPH symptoms [1].

### *Sphenopalatine Ganglion Block*

A number of head and facial pain conditions have drawn interest in the sphenopalatine ganglion (SPG) block as a possible therapeutic option. The SPG, located within the pterygopalatine fossa, serves as a key relay station for pain transmission in the craniofacial region. It is a collection of sympathetic, parasympathetic, and somatosensory nerve cells though commonly referred to as a parasympathetic ganglion and is located bilaterally close to the sphenopalatine foramen posterior to the middle nasal concha. It is 5 mm in size and covered by a mucus membrane and only 1–2 mm connective tissue, and thus available for topical administration of local anaesthetic via a transnasal approach [8,13]. Pain associated with diseases like migraine, cluster headache, trigeminal neuralgia, and post-dural puncture headache (PDPH) can be effectively relieved by blocking its function through a variety of methods [8,9]. The various techniques for administering SPG block include transnasal, intraoral, and percutaneous approaches, each with its advantages and limitations, table.1 [8]. Targeted pain treatment is possible with a less invasive and well-tolerated method called trans-nasal SPG block, which is administered through the nasal cavity using local anesthetics or neurolytic drugs [10].

**Table 1.** Sphenopalatine Ganglion Block techniques

Approach	Advantages	Limitations
Transnasal	Simple procedure, short procedure, low risk,	Requires the diffusion of local anesthetic across mucous membrane
Intraoral	Provide more direct access to ganglion	Invasive with needle, technically challenging, greater complication, patient discomfort, unpredictable result
Percutaneous	Direct administration to ganglion, long term neurolysis block	High cost, guiding fluoroscopy, radiation exposure, greater complication

The case study that is being given highlights the difficulties in treating post-dural puncture headache (PDPH) and the prospective use of trans-nasal sphenopalatine ganglion block (SPGB) as a substitute therapeutic approach. In this case, the patient experienced a persistent headache following more than 5 unsuccessful attempts of subarachnoid block anesthesia. SPGB provided initial relief, highlighting its efficacy in alleviating refractory PDPH. This finding is consistent with previous studies demonstrating the effectiveness of SPGB in providing rapid and sustained pain relief in patients with PDPH [3,4].

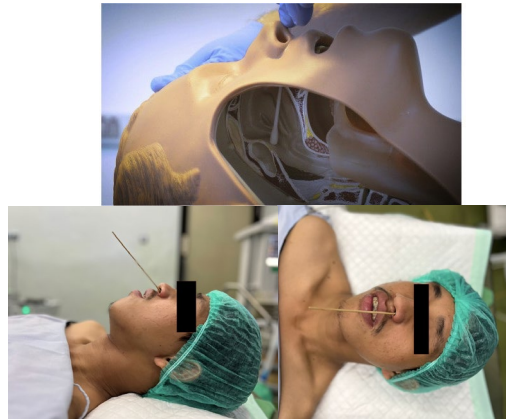
However, the recurrence of headaches four days later emphasizes the need for continued monitoring and prompt intervention in managing PDPH. Despite the initial success of SPGB, the transient nature of pain relief suggests the possibility of incomplete blockade or underlying mechanisms contributing to headache recurrence. This phenomenon aligns with the findings of Obah et al., who emphasized the importance of optimizing the SPG blockade technique to achieve adequate pain relief and prevent recurrence [11].

The immediate relief observed following nasal lidocaine drops suggests the involvement of local anesthetic effects in alleviating headache symptoms. Lidocaine acts by inhibiting neuronal excitability and blocking pain signals, providing rapid and targeted relief in this case [12]. This finding supports the notion of combining SPGB with adjunctive therapies, such as local anesthetics drops, to enhance treatment outcomes and prolong pain relief. This technique was simple, easy to perform and effective.

Furthermore, the recurrence of headaches raises questions regarding the long-term efficacy and sustainability of SPGB in managing refractory PDPH. While SPGB offers a promising therapeutic option, its optimal dosage, frequency, and duration of effect warrant further investigation. Long-term follow-up and additional studies are needed to assess the durability of pain relief and identify factors influencing treatment response in patients with PDPH. Despite the growing evidence supporting the use of SPGB for refractory PDPH, further research is warranted to elucidate its optimal technique, dosage, and long-term efficacy.

## CONCLUSION

In conclusion, this case report highlights two points. First, a postdural puncture headache could happen in the failed subarachnoid block, even though no liquor cerebrospinalis came out during the procedure. This is the novelty of this case report, the failed subarachnoid block could result in severe PDPH as a complication. Second, trans-nasal sphenopalatine ganglion block has the potential to be an effective adjuvant treatment for post-dural puncture headaches that are refractory. Despite the transient nature of pain relief and the recurrence of symptoms, SPGB demonstrates efficacy in providing rapid relief and improving patient outcomes. Further research is needed to elucidate the mechanisms underlying headache recurrence and optimize treatment strategies for the long term management of PDPH. We recommend another study to trace the incidence of PDPH in failed subarachnoid blocks.



**Fig. 2.** Anatomy and clinical positioning during the sphenopalatine ganglion block procedure.

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