

## Beware while Treating Post-Spinal Headache!

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### ABSTRACT

Central Neural Block (CNB) is administered frequently for caesarean section. Post-spinal Headache (PSH) is the most frequent and discomforting late complication of spinal anesthesia. PSH is an important cause of iatrogenic maternal co-morbidity and maternal dissatisfaction. Expedited discharge of the mother or delayed onset of PSH in some women may not capture all the mothers developing PSH after hospital discharge. The mother having PSH might first report to the obstetrician. A pilot study in our institute, regarding knowledge and practice of treatment of PSH amongst obstetricians demonstrated limited knowledge of PSH. Even though PSH is a self-limiting condition, a subset of patients will suffer from potentially life-threatening neurological consequences. Such a patient needs urgent referral to an anesthesiologist, neurologist and special radiological investigations for definitive diagnosis and treatment. Awareness needs to be there amongst obstetricians regarding PSH to avoid medico legal problems and patients also are to be educated about red flag symptoms once they develop PSH.

This article reviews the pathophysiology, clinical picture and management of PSH with special considerations during the postpartum period.

**Keywords:** Complication; Spinal; Epidural block; Post spinal headache; Spinal anaesthesia; Headache; Treatment; post-spinal headache; Obstetric anaesthesia; Analgesia

## INTRODUCTION

Spinal anesthesia is the most commonly used regional block in anesthetic practice. 60% of surgeries in India are carried out using regional anesthesia, mostly under Central Neuraxial Blocks (CNB) [1]. CNB is administered frequently for caesarean section [2,3]. Post Spinal Headache (PSH) is the most frequent and discomforting late complication of spinal anesthesia. According to available literature, the incidence of PSH after spinal anesthesia in obstetric patients ranges from 0.3% to 11% of patients and 25-40% in patients having accidental dural puncture following epidural block [4,5].

PSH is an important cause of iatrogenic maternal co-morbidity. There may be a problem during feeding the baby leading to maternal dissatisfaction. Parturient is at great risk of developing PSH because of young age, hormonal changes and the widespread application of regional anesthesia in obstetric patients. Expedited discharge of the mother or delayed onset of

PSH in some women may not capture all the mothers developing PSH after hospital discharge. The mother having PSH might first report to the obstetrician.

A pilot study (2023) was carried out in our institute regarding knowledge and practice of treatment of PSH amongst obstetricians. This study involving 64 obstetricians from two tertiary institutes in the city demonstrated limited knowledge of PSH.

Even though PSH is self-limiting condition, a subset of patients will suffer from potentially life-threatening neurological consequences and a profound impact on the postnatal period. Such a patient needs urgent referral to an anesthesiologist, neurologist and special radiological investigations for definitive diagnosis and treatment [6].

This article reviews the pathophysiology, clinical picture and management of PSH with special considerations related to obstetric patients.

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## LITERATURE REVIEW

### Pathophysiology of PSH

The exact mechanism of headache following PSH is not clear. Leakage of Cerebrospinal Fluid (CSF) from the subarachnoid space leading to a fall in CSF volume and intracranial CSF pressure may be responsible [7]. Depletion of fluid supporting the brain and meningeal vascular coverings leads to traction on the pain-sensitive intracranial structures. This results in a headache which worsens when the patient is upright and is relieved on lying down position [8].

A mother may have PSH following epidural block, most probably due to inadvertent or undetected subarachnoid puncture [9].

### Definition of PSH

According to the definition by the International Headache Society (IHS) 2018, PSH is a headache attributed to low Cerebrospinal Fluid (CSF) pressure occurring within 5 days of a lumbar puncture caused by CSF leakage through the dural puncture [10].

The IHS definition in (2013) contained a postural component a headache that worsens within 15 minutes after sitting or standing and improves within 15 minutes after lying down after dural puncture has occurred or is suspected [11]. This definition helps to avoid confusion with migraine or headache after lumbar puncture. Even though the onset of PSH is usually within 24-48 hours after dural puncture, it could be delayed by up to 12 days or months [9].

### Diagnosis

This is essentially a clinical diagnosis. The history of spinal anesthesia, combined spinal epidural anesthesia or epidural block and the postural nature of the headache with associated symptoms usually confirms the diagnosis [12]. 30% of mother's report headaches after childbirth, but only 4.7% of headaches may be attributed to PSH [13,14]. History, symptoms and physical examination help to differentiate PSH from other causes of headache in the postpartum period.

### Signs and symptoms of PSH

PSH is usually dull or throbbing and initially in the frontal or occipital region, which can be generalized as it progresses. Pain is exacerbated by head movements, coughing, sneezing, straining or ocular compression. Other associated symptoms are seen in 70% of patients along with headache [15].

The patient may have neck stiffness, pain in the cervical, thoracic or lumbar vertebral region, nausea, vomiting, vertigo, tinnitus and rarely, diplopia due to cranial nerve palsy, blurred vision and auditory disturbances [16].

Diagnostic Lumbar Puncture (LP) should be avoided, as there is a risk of worsening the headache secondary to an additional dual puncture. If performed to rule out other pathology, a low

cerebrospinal fluid pressure or dry tap, increased CSF protein and CSF lymphocyte count will be suggestive of PSH [12].

MRI-brain imaging may be considered when the patient has a non-orthostatic headache or develops after an initial orthostatic headache and also when the onset of the headache is more than 5 days after the suspected dural puncture. If a patient develops focal neurological deficits, visual changes, alterations in consciousness or seizures, especially in the postpartum period, neuroimaging is necessary to evaluate alternative diagnoses [17]. Magnetic resonance imaging of the brain may show diffuse dural enhancement with evidence of sagging, descent of the brain stem, obliteration of the basilar cisterns and enlargement of the pituitary gland [18].

### Differential diagnosis of headache

There are other clinical conditions presenting with headache in the postpartum period which must be identified as diagnostic investigations and treatment is different from that needed for PSH (Table 1). Subdural hematoma, Posterior Reversible Encephalopathy Syndrome (PRES), cerebral venous thrombosis and other forms of intracranial hemorrhage are rare but potentially lethal complications. PSH may be a contributory factor. Headache persisting beyond five to seven days, headache with no postural relationship, presence of focal neurological signs, headache not responding to epidural patch, convulsions and altered sensorium should make one aware of such complications [19].

Sr. No.	Clinical condition
1.	Migraine or another primary headache
2.	Pregnancy-induced hypertension/eclampsia
3.	Tension headache
4.	Meningitis
5.	Reversible cerebral vasoconstriction syndrome
6.	Posterior reversible encephalopathy syndrome (PRES)
7.	Intracranial tumor
8.	Subdural hematoma
9.	Cerebral venous thrombosis
10.	Stroke
11.	Other conditions (musculoskeletal/non-specific headache/drug-related headaches)

**Table 1:** Differential diagnosis of headache during postpartum period.

## Red flags for headache

Headache with a different character and associated symptoms needs urgent consultation with an anesthesiologist if a prior referral is not there. Immediate additional laboratory investigations, CT scan/ MRI and the opinion of a neurologist are needed for definitive diagnosis [20] (Table 2).

Sr. No.	Signs and Symptoms
1	Headache with altered mentation, seizures, visual disturbances, papilledema
2	Headache associated with fever
3	Focal neurological deficit
4	Headache that awakens the patient from sleep
5	Sudden onset of severe headache
6	Change in headache characteristics
7	Headache in an immune-compromised patient
8	New-onset of headache resembling migraine
9	Headache unrelieved by analgesics
10	Non-Prescription drug overuse- includes analgesics, ergot, triptans

**Table 2:** Red flags associated with headache.

Preferred investigations needed for definitive diagnosis of headaches apart from PSH are Computerized Tomography (CT) or Magnetic Resonance Imaging (MRI) of the head. The choice of modality and need for Intravenous (IV) contrast depends on the clinical condition. For imaging of the vessels, cerebral and cervical angiography using Computerized Tomography (CTA) or Magnetic Resonance Angiography (MRA) is performed as an additional investigation and usually requires IV contrast administration [21].

## Conservative measures for treatment of PSH

Bed rest is useful to treat PSH for symptomatic relief. Intravenous fluid should be used when oral hydration cannot be maintained. Paracetamol and nonsteroidal anti-inflammatory drugs should be offered unless contraindicated. Opioids may be considered additionally if needed [22].

Oral 200-300 mg caffeine may be administered in the first 24 hours of symptoms. Available evidence does not support the routine use of drugs like hydrocortisone, theophylline, triptans,

adrenocorticotrophic hormone or cosyntropin, methergine and gabapentin in the management of PSH [23].

## Role of Epidural Blood Patch (EBP)

EBP should be considered to treat PSH which impairs daily activities of the patient and is refractory to conservative therapy or the patient has other neurological sequelae of PSH like hearing loss and cranial nerve palsy. A strict aseptic technique should be observed in both the collection and injection of autologous blood. Complete headache remission is observed in the range of 33% and 91%.

Informed consent for an Epidural Blood Patch (EBP) should include the potential for repeat dural puncture, backache and neurological complications [24].

Treatment needed for headaches other than PSH is different and depends on the etiology of the headache. The patient may need anticoagulants for cerebral venous thrombosis, antibiotics for meningitis, anti-hypertensive drugs for Posterior Reversible Encephalopathy Syndrome (PRES) etc.

## Outcome of PSH

PSH is generally self-limited and benign. Headache usually resolves within a few days, but the longest reported headache after lumbar puncture lasted for 19 months [25]. Unintended dural puncture is associated with an increased risk of longer-term or persistent headaches [26].

## Long-term complications of PSH

The patient with inadvertent dural puncture may have chronic headache, backache, neck ache, depression, cranial nerve palsy, subdural hematoma or cerebral venous thrombosis. Evidence to determine whether EBP mitigates, prevents or treats these sequelae is inadequate [10].

## Follow-up of patients developing PSH

Before discharge, information regarding PSH sequelae should be conveyed to patients, with arrangements for appropriate follow-up and contact information of their anesthesiologist and obstetrician. The anesthesiologist responsible should ensure that other specialty or primary care physicians are informed about PSH management and the potential for long-term symptoms and red flags. Follow-up with patients who experience PSH should be continued until the headache resolves.

After discharge from the hospital, follow-up may be continued by the primary care physician or obstetrician [27,28].

## DISCUSSION

PSH is the most common delayed complication of spinal and epidural anesthesia. Even though PSH is postural, 5% of patients may not have postural relationship. Different associated symptoms may be there with PSH which may mimic other clinical conditions presenting as headaches. All patients with

PSH must be referred to an anesthesiologist within 24 hours of its onset and should be followed till resolution of PSH [24].

Even though it is benign, it may lead to complications at times. Consensus practice guidelines on post-dural puncture headache from a multi-society, International working group provide structured and evidence-based recommendations on all practical aspects of PSH [10]. These guidelines for PSH may reduce morbidity and mortality in patients with PSH and medico legal problems. We must incorporate the possibility of PSH in informed consent before performing neuraxial blocks.

Our hospitals should have a policy on post-discharge follow-up of patients who develop PSH. The policy should include inpatient and outpatient services for identifying and managing PSH, a plan to diagnose, manage PDPH and prevent complications of PDPH. Because symptoms of PDPH are similar to other causes of headache, including those associated with intracranial hypertension (such as subdural hematoma and cerebral venous thrombosis), one should have a high index of suspicion when typical features of PDPH are not present or when therapies for PDPH remain ineffective.

The report on Confidential Enquiries into Maternal Deaths (2009-2012) highlights two maternal mortalities that were attributed to a delay in diagnosis of subdural hematoma and cerebral venous sinus thrombosis that were associated with PSH. Subsequent recommendations emphasized the need for follow-up of patients with PDPH and communication of events to the general practitioner, who plays a pivotal role in providing care for the mother in the puerperium [29].

In another multicenter study, the timely detection and treatment of two mothers having cerebral venous thrombosis and PRES after discharge from hospital was life-saving [2].

Guidelines of the Obstetric Anesthetists Association (OAA) and the Association of Anesthetists of Great Britain and Ireland (AAGBI) recommend the routine follow-up of parturient receiving neuraxial anesthesia, to seek feedback and identify complications [6]. As the manifestation of PSH may be there after discharge from the hospital and patient may first report to the obstetrician, who needs to be aware of red-flag symptoms. The patient should also be educated about the same emphasizing the need for readmission to the hospital [30].

## CONCLUSION

Current approaches to the diagnosis, treatment and management of PDPH are not uniform in India. Multicenter study at the national level is essential to develop practice guidelines for PSH. Even though PSH is self-limiting most of the time, a high degree of suspicion is essential to detect red flag symptoms to prevent complications. Follow-up even after discharge is essential to increase the safety of patients developing PSH. The anesthesiologist responsible should ensure that other specialty or primary care physicians are informed about PSH management and the potential for long-term symptoms and red flags.

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