



## Case report

## Epidural blood patch in the treatment of severe post dural puncture headache after spinal anesthesia: A rare case report

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## ABSTRACT

**Introduction and importance:** Spinal anesthesia is a type of regional anesthesia that involves injecting a local anesthetic directly into the cerebrospinal fluid. In Ethiopia, the prevalence of PDPH was 42.6%, with large spinal needles and repeated attempts being independently associated risk factors.

**Case presentation:** A 20-year-old woman is undergoing a cesarean section while under spinal anesthesia. On the second postoperative day, the patient begins to complain of PDPH-like headaches. The headache was severe according to the VAS score, and the team attempted to manage it using the WHO analgesic ladder, but it was refractory to supportive and pharmaceutical therapy. We then used EPDBP, and the headache was promptly reduced. The treatment had a considerable impact on the movement, satisfaction, and discharge conditions of the patients.

**Clinical discussion:** A prospective research conducted in Helsinki found that EBP was effective in 88–96% of the patients in the various study groups.

One randomized, double-blind trial on the therapeutic efficacy of EPDBP found that it is an effective treatment for PDPH. It provides complete symptom relief in a high number of people. In the remaining patients, it lessens the severity of their headaches and allows them to resume their normal activities.

An epidural blood patch is a highly successful treatment option for a subset of people suffering from post-Dural puncture headache. It is an elective procedure with a low risk of complications.

**Conclusion:** The epidural blood patch procedure that we use proved helpful in treating severe PDPH after spinal anesthesia for cesarean delivery. There were no complications associated with the procedure until she was discharged from the hospital.

## 1. Introduction

Spinal anesthesia is a type of regional anesthesia in which a local anesthetic is administered directly into the cerebrospinal fluid that surrounds the spinal cord and nerve roots [1]. Because of its high safety margin, it is the most commonly used anesthetic procedure. It is an invasive technique that may result in several problems such as total spinal cord injury, cardiovascular collapse, meningitis, paralysis, post-Dural Puncture Headache (PDPH), and even death [2].

Ten to 40% of Dural punctures are complicated by headache. This PDPH can occur immediately after a spinal tap, but it usually begins within 48 h in more than 90% of individuals. Symptoms have been observed eventually disappear in 80% of patients in 7 days or less, but in

a minority, symptoms may remain for weeks or even months [3].

At Debre Tabor General Hospital, the prevalence of PDPH was 20.2% [4]. According to a more recent study, the incidence of PDPH following a Dural puncture with an epidural needle could be as high as 76–85% [5].

The prevalence of PDPH was 42.6% in a study conducted at Felege Hiwot Referral Hospital in Bahirdar, Ethiopia, and large spinal needles and repeated attempts were independently associated risk factors for PDPH [4].

According to the findings of a study conducted at Wilayat Sodo University Teaching Referral Hospital, the incidence of post-Dural Puncture Headache was 28.7%, and a study conducted at Gondar University Comprehensive Specialized Hospital revealed that 38.8% of PDPH cases occurred [6].

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A Systematic review and meta-analysis conducted in Ethiopia estimated the pooled prevalence of PDPH among parturients who gave birth via cesarean section under spinal anesthesia to be 23.7% [4].

This occurrence may have an impact on maternal satisfaction and healthcare quality. A normal BMI, frequent spinal injection attempts, and spinal injection with a needle size less than or equal to 22 gauge were all related to PDPH [4].

Dural Puncture Headache manifests as a dull throbbing pain with a frontal-occipital distribution. Typically, sitting or standing aggravates the headache, whereas lying down relieves it [7].

Several controllable risk variables, including needle size, needle design, bevel orientation, and the number of lumbar puncture attempts, contribute to the development of headache after lumbar puncture [6].

August Bier pioneered work on spinal anesthesia and originally identified PDPH in 1899, suggesting that it could be induced by CSF depletion. Although the actual mechanism of this condition is uncertain, the headache is thought to be caused by decreased CSF pressure caused by CSF leakage in the epidural space via the Dural puncture site [5].

The epidural blood patch (EPBP) is a technique used to treat headaches that can arise when the dura (the membrane lining the spinal cord) is mistakenly punctured during an epidural or, less frequently, when the hole in the membrane is produced by a spinal needle during a spinal block [8].

PDPH may subside spontaneously within 1 week or up to 48 h following an epidural blood patch. Conservative therapy such as bed rest, water, and caffeine are frequently utilized as management measures [9–11].

## 2. Method

This study is a rare case report on Epidural Blood Patch, a treatment used to treat post-dural puncture headache after spinal anesthesia for cesarean section. This work has been reported in accordance with the SCARE 2020 criteria [12].

This study has been registered at [researchregistry.com](https://www.researchregistry.com) under the registry's name: [https://www.researchregistry.com/browse-the-registry#field\\_2|asc](https://www.researchregistry.com/browse-the-registry#field_2|asc) and the registration ID: researchregistry7869.

## 3. Presentation of the case

A 20-year-old woman with gravida III, para II, and otherwise normal pregnancy underwent a cesarean surgery under spinal anesthesia at Finote Selam general hospital. She has no family history of diabetes, hypertension, asthma, epilepsy, or any other familial illness. She has no known allergies to food, clothing, or medications, and she is not on any regular medicine. The patient has no history of smoking or drinking.

In a sitting position, a 22-gauge cutting spinal needle was used to inject spinal anesthetic at the level of L3–L4 after two attempts. The skin was infiltrated with lidocaine 2% of 2 ml as well as 2.5 ml of 0.5% bupivacaine was administered intrathecally. The intraoperative and immediate postoperative periods were not coincidental.

The patient begins to complain of severe frontal-occipital and positional headaches, neck stiffness, and impaired vision after two non-incident postoperative days, while also experiencing neck stiffness. Movement, sitting, and standing positions aggravate the discomfort, whereas laying down positions alleviate it. On the first day of her headache complaint, her pain score on the Visual Analogue Scale (VAS) was 8.

The patient was positioned laying down and hydrated, and the physicians advised her to drink caffeine-containing fluid (coffee and Coca-Cola), but the discomfort was not resolved.

At this moment, the second phase of care (with drugs) began, using diclofenac 75 mg IM (Intra Muscular) every 8 h. Our client received 1 g paracetamol per need and 50 mg Tramadol IV per need, however, none of this provided relief, and the VAS score at the time was 7–9.

At this time, we are considering an EPBP as a patient management

option, and the team (anesthesiologists, obstetricians, and gynecologists) has discussed and planned how to proceed. The epidural blood patch was not commonly used in our setting or our nation, but publications from other countries urge use for moderate and severe PDPH, even if studies on its efficacy are concerning.

The team planned to perform the procedure, and we discussed its benefits and risks with the obstetrician, patient, and attendants before obtaining written consent for the procedure. We then brought the patient directly to the operating room (OR).

In the OR, we used monitoring (NIBP, pulse oximetry, ECG) as per AGBI guidelines, then we used the standard aseptic technique, washing the skin with (Iodine and alcohol), and finally, we chose the L4-L5 intervertebral space because the spinal was given at L3-L4, which meant that the chosen space was one step lower than the space for spinal anesthesia.

The epidural needle was placed at the L4-L5 level to the epidural space level using the loss of resistance needle, and 18 ml of blood was delivered at the level at which the injection begins to resist and the patient feels heaviness at the site and little reduction of pain. The senior anesthetist (MSc) performed this EPBP per the scope of practice.

She was directed to remain supine for 2 h following the EPBP, after which the patient's pain was greatly reduced with a severity score of 3 according to VAS, and the patient begins to move around to go to the toilet on her own, something she couldn't do previously.

Her pain was checked every 2 h for the next 12 h, during which VAS scores of 2 and 1 were continually recorded, indicating mild discomfort, and the patient began to do normal things freely and comfortably (dressing, going to the toilet, and walking around).

Finally, the patient was pain-free and had no complaints regarding the EPBP when she was discharged from the hospital.

## 4. Discussion

PDPH is a headache that occurs within 5 days of a lumbar puncture and is caused by CSF leakage from the Dural puncture. Neck stiffness and/or subjective hearing issues are generally present. It goes away on its own after 2 weeks, or after an autologous epidural lumbar patch seals the leak [13].

The pathophysiology of PDPH is still unknown. The review of the literature supports two primary hypotheses. The first is the lack of buoyancy of cerebral spinal fluid (CSF) in the brain, which causes traction on structures [7].

In light of the Monroe Kelly doctrine, the second possibility can be considered. The skull is a hard vault housing CSF, blood, and brain matter, according to this view. To maintain intracranial pressure, a decrease in one of the three elements induces a compensating increase in the other two. Intracranial hypotension results from a continual loss of CSF through the Dura defect. PDPH is hypothesized to be caused by compensatory Vasodilation caused by adenosine receptor activation [14].

### 4.1. Efficacy of blood patch treating PDPH

Prospective research conducted in Helsinki in 1993 found that EPBP was effective in 88–96% of the patients in the various study groups [15].

One randomized, double-blind trial on the therapeutic efficacy of EPBP found that it is an effective treatment for PDPH. It provides complete symptom relief in a high number of people. In the remaining patients, it lessens the severity of their headaches and enables them to resume their normal activities [16].

Thirteen patients visited clinic follow-up at Queen Elizabeth University Hospital in Glasgow, UK, in 2016. Three claimed complete headache resolution, four reported improvements in severity or frequency, and six noted no change. Five of the eight questionnaire respondents experienced less pain, and the mean headache severity dropped from 9/10 to 3/10. Five of the eight patients who returned

follow-up questionnaires reported that their headache symptoms had improved over time [17].

## 5. Conclusion

The epidural blood patch procedure that we use proved helpful in treating severe PDPH after spinal anesthesia for cesarean delivery. There were no complications associated with the procedure until she was discharged from the hospital.

## Source of funding

No funding was rise for this research.

## Ethical approval

In our institution's study of the case, reports are exempted from ethical approval in a circumstance that the patient gives consent or the guarantee.

## Consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

## Author contribution

Kumlachew Geta: Conceptualization, Validation, Data Curation, Writing - Original Draft, Writing - Review & Editing.

Mekuanint Asmare: Conceptualization, Validation, Data Curation, Writing - Original Draft, Writing - Review & Editing.

Dr. Liyew Ewnetu: Discussing the possibilities, Assisting the procedure, and following the patient outcome.

## Guarantor

From now on Kumlachew Geta Belete, the corresponding author will act as a guarantor of this study.

## Declaration of competing interest

No conflict of interest, and no financial support.

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## Provenance and peer review

Not commissioned, externally peer-reviewed.

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