



Major Complication of Neuraxial Anesthesia: Post-Dural Puncture Headache (PDPH)

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DESCRIPTION

Postdural Puncture Headache (PDPH) is a common complication after inadvertent dural puncture. Risk factors include female sex, young age, pregnancy, vaginal delivery, low body mass index, and non-smoker. The size, design and technique of the needle also affect the risk. Since PDPH can be incapacitating, prompt diagnosis and treatment is mandatory. The diagnostic feature of PDPH is 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 to prevent and treat this condition; however, there is no substantial evidence to support regular bed rest and aggressive hydration. An epidural blood patch is the most effective treatment option for patients who have failed conservative management. Many other prophylactic and therapeutic interventions have been proposed. However, due to the lack of convincing evidence to support their use, the potential benefits of such interventions must be carefully weighed against the risks.

Postdural Puncture Headache (PDPH) is a major complication of neuraxial anesthesia that can occur with inadvertent dural puncture after spinal anesthesia and during epidural anesthesia. Due to gender, young age, and the widespread use of neuraxial blocks, Obstetric patients are considered to be at high risk of this condition. Inadvertent dural puncture during epidural anesthesia is a more common cause of PDPH than spinal anesthesia. This is because a small pencil tip needle is used for spinal anesthesia in this population. Inadvertent dural puncture occurs at a rate of 1.5% during epidural placement, and more than half of these patients develop PDPH. Recent studies have shown that the incidence of PDPH after epidural needle puncture can be as high as 76%-85%.

PDPH usually resolves spontaneously, but it can cause serious morbidity in obstetric patients. It can also affect the mother's ability to care for herself and her baby, extending hospital stays

and developing chronic headaches. A retrospective case-control study reported that 28% of obstetric women developed chronic headache after inadvertent dural puncture with a 17-gauge Tuohy needle. Prevention of PDPH should be a major goal of physicians dealing with this patient population. In fact, with proper attention to procedural factors, the incidence can be significantly reduced. Occasionally, inadvertent dural puncture and PDPH are unavoidable complications. Therefore, anesthesiologists need to be familiar with treatment and prevention.

In 1899, August Bier pioneered the field of spinal anesthesia and first described PDPH. This suggests that it may be due to a loss of Cerebrospinal Fluid (CSF). The exact mechanism of this condition remains unknown, but a possible cause of headache is a decrease in CSF pressure due to CSF leakage through the epidural space through the dural puncture site. When the CSF pressure drops, the cushioning effect normally provided by the intracranial fluid is lost. The resulting traction is applied to pain-sensitive structures within the skull, causing pain. The second possible cause is dilation of the cerebral blood vessels. When the CSF pressure drops, vasodilation of the intracranial blood vessels occurs, the intracranial volume is kept constant, and the pathophysiology similar to that of vascular headache occurs. The beneficial effects of vasoconstrictors such as caffeine and theophylline on PDPH support this mechanism.

PDPH presents as dull, throbbing pain with frontal-occipital distribution. Headaches are usually aggravated by sitting or standing and relieved by lying down. If there is no postural component of headache, the diagnosis should be questioned. At least partial relief should occur when taking the supine position. According to the international classification criteria for headache disorders for the diagnosis of PDPH, headache develops within 5 days after dural puncture and disappears spontaneously within 1 week or up to 48 hours after epidural blood patch. Headache may be accompanied by stiff neck, tinnitus, hypoacusia, photophobia, and nausea. However, recent

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studies have shown that PDPH occurs within 3 days of dural puncture and that up to 29% of patients have headache as the only symptom. In rare cases, headaches can last for months or years. Postpartum headaches are very common and occur in 39% of women, and tension and migraine headaches are more common in pregnant women than in non-pregnant women. Therefore, when diagnosing PDPH in obstetric patients, it is important to consider other causes of headache, including

Functional headaches. Less common complications of accidental dural puncture include reversible encephalopathy, pneumocephalus, and subdural hematoma. Therefore, if changes in headache characteristics such as neurological signs or non-postural headache occur, serious causes such as subdural hematoma, cerebral thrombosis, and reversible encephalopathy should be excluded.