Case Report

Spontaneous intracranial hypotension following spinal anesthesia initially misdiagnosed as postdural puncture headache

ABSTRACT

Spontaneous intracranial hypotension (SIH) is not rare, but its diagnosis remains challenging. SIH tends to be misdiagnosed as postdural puncture headache when orthostatic headache develops subsequent to spinal anesthesia because both have similar symptoms. We report the case of a 35-year-old man with orthostatic headache following spinal anesthesia, who did not respond to conventional therapy for postdural puncture headache. SIH was confirmed after epidural fluid collection was identified at the thoracic spine level on magnetic resonance myelography. Physicians must consider SIH despite a history of neuraxial block. Diagnostic work-up is necessary to identify potential cerebrospinal fluid leakage in refractory cases.

Key words: Blood patch, postdural puncture headache, spontaneous intracranial hypotension

Introduction

Spinal cerebrospinal fluid (CSF) leakage is recognized as a cause of orthostatic headaches associated with intracranial hypotension. Most spinal CSF leakages are either iatrogenic, occurring after lumbar puncture or surgery, or they may be caused by dural laceration resulting from spinal trauma.[1] Spontaneous intracranial hypotension (SIH) is not rare, but an initial misdiagnosis remains common, causing a significant delay in the initiation of effective treatments.[2,3] The prototypical symptom of SIH is postural headache, which generally occurs or worsens within 15 minutes of assuming an upright position.[2] This key manifestation is very similar to that of postdural puncture headache (PDPH); therefore, it is difficult to distinguish between SIH and PDPH based on symptoms alone. As PDPH is a major complication of neuraxial interventions that can occur following block with dural puncture,[4] physicians might overlook the possibility of SIH in patients with orthostatic headache following spinal anesthesia. We report a rare case of a patient who received a spinal block and developed orthostatic headache; magnetic resonance (MR) myelography confirmed that it was a finding of SIH at the thoracic spine level.

Case Description

A 35-year-old man was referred to our hospital for intractable headache. The patient presented with a 1-year history of headache (NRS; numeric rating scale: 50–60/100). The headache worsened significantly when sitting up or standing up, and reduced on lying down; he had no other neurological

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symptoms, except for headache and mild dizziness. The patient had undergone knee arthroscopy under spinal anesthesia at a local clinic 1-year ago. He reported that the spinal procedure was uneventful. At the end of the surgery, the patient experienced a postural headache (NRS 70–80) in the fronto-occipital region when getting up from the supine position. He reported that this symptom was initially accompanied by mild dizziness and nausea; the patient had no history of headache. The patient received conventional treatment consisting of bed rest, analgesics, and hydration for 1 week based on the diagnosis of PDPH, but the headache persisted. He received a blood patch in the lumbar spine. After the procedure, the symptom improved by 30%, and the patient was discharged as his symptoms were tolerable. He confirmed that the medications had provided little relief; however, the headache did not improve further and had begun to worsen recently. The patient was therefore referred to our hospital for evaluation.

MR myelography at our hospital showed CSF leakage at the dorsal epidural space of T4 through T7 levels [Figure 1]. There was no evidence of any other morphological abnormalities. We believe that SIH was the most likely cause. Laboratory tests for underlying connective tissue disorders also presented nonspecific findings. An epidural patch using 15 ml of autologous blood was performed at the T8–T9 level under fluoroscopic guidance [Figure 2]. An 80% reduction in the headache was evident after 1 week, and it resolved completely following an additional blood patch using the same method; there were no complications.

Discussion

The incidence of PDPH among patients administered neuraxial anesthesia, including both spinal anesthesia and accidental dural punctures following epidural anesthesia, is 1:144.[5] According to the criteria for the diagnosis of PDPH, headache develops within 5 days after dural puncture and disappears spontaneously within 1 week, or up to 48 h after a blood patch.[4] Spontaneous spinal CSF leaks are considerably less common but are now increasingly recognized as a cause of orthostatic headaches associated with intracranial hypotension.[6] Previous reports suggest that the combination of a weak thecal sac such as a diverticula and trivial trauma involving sharp increases in intra-abdominal pressure, such as coughing, sneezing, pulling, pushing, or physical exertion may result in CSF leaks.[7-9] However, the specific etiology of underlying spontaneous CSF leaks remains largely undetermined, and a clear triggering factor has not been identified in many cases.[9] Many techniques for spinal imaging in SIH have been employed as initial studies that have high sensitivity for epidural fluid collection and problem-solving techniques that are tailored to the suspected site of leakage in case a high-flow leak is found to be present on initial imaging studies.[8] MR imaging has disadvantages, including decreased sensitivity for low-flow leaks, decreased contrast resolution compared with computed tomography myelography, inability to detect subtle osseous pathologic features, and artifacts, but it is widely used as an initial imaging test in SIH owing to the main advantages of spinal MR imaging; these include its wide availability, noninvasive nature, and lack of radiation.[8]

SIH could be misdiagnosed as PDPH in patients who have undergone a neuraxial intervention because of their common clinical symptoms, even if dural puncture was not observed during the procedure. A rare case of SIH following lumbar epidural block without dural puncture has been reported.[7] The physicians considered the possibility of unintentional dural puncture, initially misdiagnosing the patient with PDPH. However, further evaluation showed multiple meningeal diverticula in the cervicothoracic junction and extensive extradural fluid collection at the level of C5–C6 on MR imaging. In our case, MR myelography showed CSF retention at the dorsal epidural space of T4 through T7 levels. We could not find any underlying structural weakness that could have caused SIH of the thoracic thecal sac. The patient also

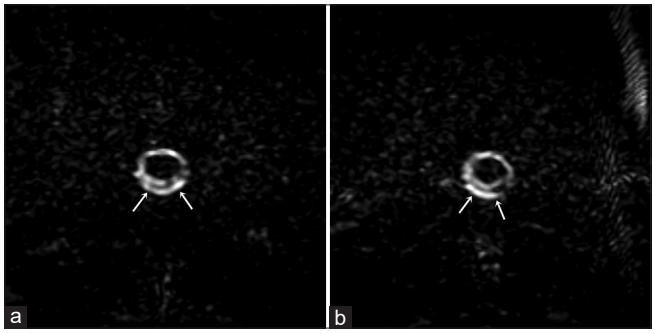

Figure 1: Magnetic resonance myelographic images demonstrating leakage in the dorsal epidural space. Arrows indicate epidural fluid collection on the dorsal aspect. Axial images at T4 (a) and T7 (b) levels.

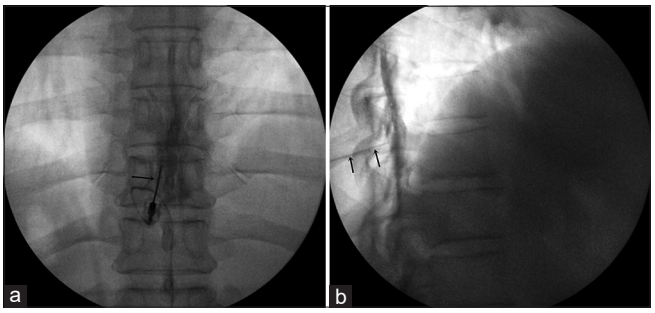

Figure 2: Fluoroscopic images of epidural contrast injected through the T8–T9 interlaminar space. Arrows indicate a Tuohy needle at its final position during the blood patch procedure. Anteroposterior (a) and lateral (b) images.

did not provide a history of any mechanical factors known to trigger SIH. We could not define the exact cause of SIH at the thoracic spine level. However, we did not perform subsequent studies to localize the origin of the leakage as the symptoms had resolved completely after administration of targeted blood patches and did not worsen for more than 6 months. Recent articles have suggested the high efficacy of a targeted patch because it can be performed safely and efficiently under fluoroscopic guidance, although these procedures can increase the risk of complications in the cervical and thoracic regions.[8,10]

In conclusion, we report a rare case of SIH initially thought to be PDPH following spinal anesthesia. A typical symptom and definite history of a neuraxial block with dural puncture may lead to misdiagnosis of SIH as PDPH. However, physicians should consider SIH as a possible cause of orthostatic headaches, even when they occur subsequent to a neuraxial block, and conduct a timely, adequate diagnostic work-up to guide management of the patient.

Declaration of patient

The authors certify that they have obtained all appropriate patient consent forms. In the form, the legal guardian has provided consent for images and other clinical information to be reported in the journal. The guardian understands that names and initials will not be published and due efforts will be made to conceal identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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