

## Epidural blood patch for spontaneous intracranial hypotension

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### ABSTRACT

A 32-year-old woman presented to the neurology department with complaints of holocranial headache of 1-month duration, which was getting worse on sitting up and standing. Headache was not relieved with analgesics but on lying down. A provisional diagnosis of spontaneous intracranial hypotension was considered, which was confirmed by the findings on magnetic resonance imaging. She was given an epidural blood patch, which relieved her symptoms.

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### INTRODUCTION

Epidural blood patch for idiopathic intracranial hypotension is an accepted modality of treatment. Tear in the dura mater can happen at any age. However, the condition is most commonly reported among women during their late middle age. Though a rare entity, it is now increasingly recognized with the advent of magnetic resonance imaging (MRI), which can show indirect evidence of a cerebrospinal fluid (CSF) leak. The diagnosis is often missed due to lack of awareness. The pathophysiology is either a tear in the dura mater and a CSF leak or hyper absorption of CSF. Both mechanisms produce a low CSF pressure. The classic symptom is severe orthostatic headache, which is relieved when lying flat. The mainstay of interventional treatment is epidural blood patch wherein the anaesthesiologists may be involved.

### THE CASE

A 32-year-old woman presented to our neurology outpatient department with persistent headache, which was getting worse while sitting up, but was relieved on lying down, and was associated with neck pain and vomiting. There was no history of craniospinal trauma or latest central neuraxial blockade. No neurological deficits were elicited and no papilloedema was detected. Neurological examination was normal. MRI showed mild diffuse brain oedema with excess of pachymeningeal enhancement, evidence of effacement of perimesencephalic cisterns, sagging of the brainstem and engorged dural sinuses without any evidence of thrombosis (Fig. 1). Imaging features were consistent with the diagnosis of spontaneous intracranial hypotension (SIH). No subdural haematoma or effusion was detected.

Given the clinical and radiological evidence of SIH, the patient was referred to an anaesthesiologist for epidural blood patch. The patient underwent the same under strict aseptic

conditions. Twenty millilitres of blood was withdrawn from the left cubital fossa under local anaesthesia and injected into the lumbar epidural space. The patient reported immediate relief of symptoms with reduction in headache.

### DISCUSSION

Persistent leakage of CSF can produce headache of SIH, which may not be amenable to conservative treatment; the role of epidural blood patch for the this condition is well recognized. The exact site of a CSF leak can be identified with the help of imaging studies such as CT/MR myelography and radioisotope cisternography.<sup>1</sup> Though classically it presents with orthostatic hypotension, there are case reports of patients developing dementia and encephalopathy presenting in a comatose condition.<sup>2</sup> Nausea and vomiting is reported in around 50% of cases.<sup>1</sup> Preceding trauma or a history of central neuraxial blockade of patients need not be present. Symptoms can develop due to spontaneous CSF leakage without any demonstrable cause.<sup>3</sup> Although the exact cause remains largely unknown, trauma, accidental dural puncture (iatrogenic) are the causes in most instances. Connective tissue disorders, malnutrition, short stature and female hormones (affected two–five times as males)<sup>4</sup> are reported as associations. Other causes for positional headaches such as postpartum venous sinus thrombosis and subdural haematoma should be ruled out before making a diagnosis of SIH.<sup>5</sup> Though CT myelographic studies are useful tools to identify the site of leak, in a proportion of cases, there may not be a demonstrable leak on myelographic studies (46%–55% cases).<sup>6</sup> Classical MRI changes described with SIH are dural hyperenhancement, signs of venous distension and signs associated with low pressure (drooping corpus callosum, convex pituitary superior margin, effacement of suprasellar cistern, reduced mamillopontine distance, reduced pontomesencephalic angle and crowding of tonsils at foramen magnum). However, these changes may not be observed in all cases.<sup>7</sup>



Fig 1. Sagittal T1W MRI showing mild distension of venous sinuses, effacement of suprasellar cistern, reduced mamillopontine distance, reduced pontomesencephalic angle and crowding of tonsils at foramen magnum

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There are some concerns with regard to CT myelography such as theoretical risk of worsening the already existing CSF hypovolaemia,<sup>8</sup> radiation exposure, additional human resources required and the need to place the patient in prone Trendelenburg position for a long time. The 'negative leak' in myelography could be due to slow or intermittent leaks or due to rare causes such as venous fistulas of CSF.<sup>9</sup> Hence, the efforts to locate the site of leak before blood patch by invasive techniques are debatable and in our case we proceeded with clinical and MRI evidence of SIH.

The treatment aims to prevent further leakage of CSF and restore its volume. Initially, fluid replacement and bed rest may be attempted. The epidural blood patch technique is reported to have instant relief of symptoms in 90% of cases.<sup>10</sup> Epidural blood patch therapy may be performed either at the level of the identified leak or at the lumbar level. Though by default it is done at the lumbar region, some authors suggest targeted blood patching at the cervical or thoracic space where a definite leak is identified as an alternative to the conventional method.<sup>11</sup> Irrespective of the site of injection, it has been observed that the blood injected in the epidural space reaches and pools around the site of CSF leak as far proximally as the cervical region.<sup>12</sup> The therapeutic benefit is believed to be due to two mechanisms: (i) a tamponade effect on the spinal dura (producing an immediate effect) and (ii) plugging the dural opening with the blood clot (giving a long-lasting effect). Instead of blood, targeted patching with n-butyl cyanoacrylate was attempted by Woolen *et al.* with good results.<sup>13</sup> Different medications reported in the literature for symptomatic relief include steroids, caffeine, theophylline, acetazolamide, etc. Our patient had complete relief of symptoms after the procedure and continues to be symptom-free on follow-up.

#### Conclusion

Although the exact aetiology of SIH is not known, it is believed to be due to dural thinning and dehiscence, causing a CSF leak.

This produces the characteristic headache of SIH. MRI helps in showing indirect signs of low volume of CSF, though it may not be possible to find the actual site of leak. Epidural blood patch is a well-accepted and beneficial treatment modality for SIH when conventional measures fail.

*Conflicts of interest.* None declared

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