

Case Report

Epidural Blood Patch for Chronic Daily Headache with Postural Component: A Case Report and the Review of Published Cases

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Post dural puncture headache (PDPH) can be observed after any trauma to the dura. The hallmark of PDPH is an increasing headache when assuming the upright position and improvement with the supine position. Diagnosis of PDPH is essentially based on history of dural puncture and clinical presentation. In most cases, if initial conservative therapies fail to provide the relief of symptoms, an epidural blood patch is the therapy of choice.

Epidural blood patch is a safe and effective treatment for PDPH and routinely done for acute onset of postural headache after spinal or epidural anesthesia or analgesia.

Here, we report the successful treatment of chronic daily headache with a postural component via an epidural blood patch one year after the onset. We also review the literature pertinent to the use of epidural blood patch in chronic daily headache patients with postural component.

Key words: Post-dural puncture headache, postural headache, chronic daily headache, epidural blood patch

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Post-dural puncture headache (PDPH) can be seen after any trauma to the dura. This may include spinal or epidural anesthesia, spine surgery, diagnostic lumbar puncture, or myelography. August Bier first reported the symptoms of PDPH after successful spinal anesthesia (1). At the turn of the twentieth century the incidence of PDPH was reported between 50 – 66%. Modern small gauge, pencil point needles have decreased the incidence significantly. The risk for the development of PDPH after a dural puncture is higher with a large bore needle, cutting bevel needle, and orientation of the bevel to dural fibers, multiple attempts, young age, and female sex.

Two prevailing hypotheses attempt to explain

why PDPH occurs. First, it is known that dural trauma leads to cerebrospinal fluid (CSF) leak and decreased CSF volume, causing intracranial hypotension. Lowered CSF pressure causes traction on intracranial structures. These structures are pain sensitive and become stretched when assuming the upright position leading to pain. Second, intracranial volume is constant and equal to the sum of CSF, intracranial blood and brain matter. A compensatory increase in venodilation is seen after a loss in CSF volume. Some speculate that this venodilation causes pain (2).

Ninety-nine percent of PDPH patients present symptoms within 3 days of dural puncture (3). Diagnosis of PDPH is essentially based on a history of du-

ral puncture and clinical presentations. Symptoms are described as frontal and occipital headache worsened with assuming the upright position and improved with lying down. Other symptoms include neck and shoulder pain, nausea, vomiting, hearing loss, cranial nerve deficits, and dizziness. Postural features remain the key diagnostic feature of PDPH. Radiological study is useful to diagnose PDPH in those cases where clinical history and symptomatology are less clear. Intracranial hypotension can be confirmed using magnetic resonance imaging (MRI) and computerized tomography. Cardinal signs on MRI include meningeal enhancement, caudal displacement of the cerebellar tonsils, and subdural fluid collection. Neuraxial MRI often shows paraspinal and/or epidural fluid collections with tenting of the dura, although this test will not directly show the site of leakage (4). Radionuclide cysternography can both directly and indirectly detect CSF leakage. With this diagnostic test, radionuclide is introduced into the CSF via dural puncture. Imaging is then performed. Characteristic findings include decreased CSF flow over the cerebral convexities, actual CSF leak, and early appearance of radioisotope in the bladder secondary to vascular uptake and renal clearance. This technique has multiple disadvantages. First, it is highly invasive. Performing a dural puncture may worsen headache symptoms. Second, multiple reports have shown a failure to demonstrate a site of CSF leakage. Similarly, the sensitivity of radionuclide cysternography is only 60% and will only diagnose an active leak. Radionuclide cysternography is more sensitive at detecting leakage, whereas MRI and CT are more sensitive at detecting anatomic abnormalities (5). Despite advancing technology, the majority of PDPH is diagnosed via history. Imaging may be useful in select complex cases.

The treatment of PDPH begins with simple conservative measures since most headaches will resolve without intervention. Dripps and Vandam followed 10,098 patients who underwent spinal anesthetics. Headache occurred in 11% of these patients. Of this population, 72% resolved within 7 days and 87% by 6 months (3). A number of simple therapies are used to alleviate symptoms. They include lying in a comfortable position, rehydration, and caffeine intake. Further intervention requiring epidural blood patch is seen in a subset of patients.

Epidural blood patch (EBP) is a safe and effective treatment of PDPH (6). The success rate is 92% following acute lumbar puncture (7). It is believed that the introduction of blood into the epidural space immediately increases the intrathecal pressure, and also forms

a clot occluding the CSF leak. Patients may complain of immediate back pain, neckache, and radicular pain that are usually short-lived (8). Radicular pain is likely due to nerve root compression from lateral spread of blood within the epidural space.

Here, we report the successful treatment of chronic daily headache with postural component via an epidural blood patch 1 year after the onset. We also review the literature pertinent to the use of epidural blood patch in chronic daily headache patients.

CASE REPORT

A 28-year-old woman was referred to our pain clinic by her neurologist with a 1-year history of chronic daily headache. One year prior to presentation, the patient suffered a witnessed, generalized seizure while riding in a train. Subsequently, she complained of daily headache and described the headache as aching and throbbing, involving the frontal, parietal, and occipital area. She denied any significant pain between the shoulder blade, posterior shoulder, and lower neck area. On a typical day, her chronic headache was predominantly fronto-parietal rather than occipital. She complained of associated nausea, vomiting, photophobia, and dizziness. These symptoms increased with activity. She also described a significant postural component of her pain, 0/10 while in a supine position, which increased to 10/10 within a few minutes of standing. For her dizziness she underwent an exercise tolerance test, Holter monitoring, and cardiac MRI, all of which were negative. She also underwent lumbar puncture 3 months after the onset of her headache. Almost immediately after the LP, she developed markedly severe occipital headache and neck pain associated with nausea and vomiting. As part of the conservative therapy, she received IV caffeine, which helped her acute occipital headache. These symptoms lasted about 2 weeks, after which, the intensity of her occipital pain improved; however, her chronic daily postural headache remained.

An MRI of the brain, cervical, and thoracic spine was done to evaluate for CSF leak. There was no evidence of paraspinal or epidural CSF collection.

Nearly a year after the onset of her pain the patient was thought to have some component of low-pressure headache and was referred to our pain center for a possible epidural blood patch. On presentation to the pain center, she reported using caffeinated beverages, particularly Mountain Dew, as they helped reduce her pain. She tried multiple medications including, Phenytoin, Tramadol, Acetaminophen/Butal-

bital/Caffeine, Zolmitriptan, Lamotrigine, Topiramate, and Methylprednisone without improvement. After evaluation, 14 ml of autologous blood was placed in the epidural space at the L4-5 level under fluoroscopic guidance. She complained of pressure in her lower back and left leg pain at the end of the injection. At the time of her discharge, she denied any headache but continued to complain of left leg and lower back pain, which resolved within 48 hours. Five months after the EBP, she was free from headache and active in her daily life working full time as a bank employee.

Discussion

While most PDPH symptoms resolve with supportive therapy or early EBP, a small percentage of patients, left untreated, will go on to develop chronic headache (3).

Our patient was not referred for EBP until 12 months after symptom onset. She underwent an extensive workup including brain MRI, EEG, and cardiac workup for dizziness. Interestingly, she presented after seizure with headache, noting a postural compo-

nent 3 months prior to undergoing an LP that acutely worsened this postural aspect of her headache. The intensity of her post LP headache improved but she continued to have chronic symptoms. This confusing clinical presentation and unclear etiology likely delayed referral for EBP. After EBP, she achieved complete relief and at the time of this publication, she continues to be symptom free.

A literature search was performed for case reports of chronic headache with postural component and chronic postdural puncture headache treated with EBP. Case reports describing the treatment of diagnosed spontaneous intracranial hypotension were excluded. During the years 1986 – 2006 9 cases in 5 English publications were found (6,9-12). An additional 2 case reports in German and French were found but not included in this report (13,14). Table 1 illustrates the clinical features of these reports. Headache duration varied from 6 weeks to 20 years. In 3 of 9 cases a preceding dural insult is noted. Eight of 9 patients described a postural component to the pain. Five of 9

Table 1. Case reports of epidural blood patch for chronic daily headache with a postural component.

Author	Gentili	Parris	Parris	Parris	Parris	Parris	Parris	Wilton	Klepstad
Age (yrs)	31	27	52	30	47	25	62	45	20
Sex	male	female	male	female	female	female	female	female	male
Symptoms	Headache, n/v, tinnitus, vertigo, radiculopathy	Headache, piercing, sharp, throbbing	Throbbing headache	Throbbing	Throbbing	Throbbing	Throbbing	Throbbing, n/v, dizziness, photophobia	Tightness and pressure, no nausea or dizziness, relieved w/ caffeine
Location of Headache	Occipitofrontal	Frontal, radiating to occiput	Rt temporoparietal	Frontal	Occipital	Occipital	Frontal	Frontooccipital	Frontal
Postural	yes	yes	yes	yes	yes	yes	yes	yes	no
Neurologic Deficits	Left L5-S1 parasthesia	no	no	no	no	no	no	no	no
Testing	L5-S1 arachnoiditis	N/A	Negative	N/A	N/A	N/A	N/A	Negative CT	N/A
Dural Trauma	Lumbar root decompression	LP, epidural without wet tap	N/A	N/A	N/A	N/A	N/A	N/A	Spinal anesthetic x 2
Duration	6 mos.	3.5 years	10 years	15 mos.	6 years	4 years	20 years	19 mos.	11 mos.
EBP	L2-3, 15ml	L3-4, 10ml	N/A	N/A	N/A	N/A	N/A	L3-4, 10ml	L3-4, 19ml
Symptom relief	Yes, but no relief of radiculopathy	yes	yes	yes	yes	no	partial	yes	yes
Length of Followup	6 mos.	14 mos.	8 mos.	3 mos.	12 mos.	N/A	5 mos.	6 weeks	4 weeks

described pain located in the occipital area. No neurologic deficit was seen in any patient. Each patient underwent significant testing to rule out an alternative diagnosis prior to EBP. Seven of 9 patients had complete symptom relief. One patient had partial relief. In 1 patient EBP failed to cause pain relief. This patient did not have a postural component to his headache. EBP was delayed in all cases secondary to failure to refer or patient's refusal of treatment.

It is clear from reviewing published cases that a subset of patients who suffer from chronic headache may benefit from EBP. Careful patient selection may improve the success rate. Important factors include: history of dural insult, pain worsened by the upright position, decreased pain with the recumbent position, occipital, frontal, or occipito-frontal pain, and normal neurologic evaluation.

The mechanism of pain relief in these cases is unclear. It is possible that those patients with previous dural insult had a dural defect leading to low CSF pressure. In a mechanism similar to acute PDPH, EBP may form a clot over this defect preventing further CSF leak. For those patients with no history of dural puncture, the mode of action is less clear. It is possible that these patients suffered from undiagnosed spontaneous intracranial hypotension caused by a meningeal diverticulum or perineural cyst.

A detailed discussion of spontaneous intracranial hypotension (SIH) is outside the scope of this review. SIH has an incidence of 5 per 100,000 per year and is more common among women. Diagnostic criteria are similar to that of PDPH previously discussed but

can vary. Case reports detailing the treatment of SIH with EBP are numerous but to date no randomized controlled trials are complete (15).

Currently there is no published systematic data focusing on the treatment of chronic daily headache with postural component. We present several case reports illustrating success, however the interpretation of this information has several limitations. First, the efficacy of EBP for chronic headache cannot be determined. The number of patients where EBP failed to relieve chronic headache or even caused harm to the patient is not known. Second, while efficacy and safety data exists for the use of EBP in acute PDPH, one must use caution in extrapolating this information to the chronic headache patient because the etiology may be less certain as in the case of our patient. More data is needed before this technique can be recommended as a safe and effective therapy for selected patients with chronic headache.

CONCLUSION

We described the successful treatment of chronic headache with postural component in a woman who suffered for over 12 months. We also reviewed literature pertinent to the treatment of chronic daily headache with postural component with EBP. For a subset of patients with chronic daily headache with postural component and otherwise normal neurological work up, epidural blood patch may be helpful. Further studies are needed to assess the efficacy of this treatment modality for chronic headache.

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