

# Guidelines for the management of Post Dural Puncture Headache

By Philip Anderson

## 1 Introduction

### 1.1 Definition of a PDPH

A PDPH occurs if there has been a puncture of the dura mater with a spinal or epidural needle, and the rate of CSF production is insufficient to cope with the CSF loss through the tear. It may range from a mild to a debilitating headache, and may be associated with neurological symptoms.

Headache per se is common in the post partum period, and affects up to 40% of all parturients. The classical picture of a PDPH is well described, but not all PDPHs will necessarily present in the classical way. Differential diagnoses should therefore be sought to exclude other serious causes of headache post partum.

### 1.2 Differential diagnosis

Alternative diagnosis	Signs and symptoms
Pre-eclampsia headache	Recent labour complicated by pre-eclampsia (up to 10 days post partum)
Migraine headache	History of migraine
Meningitis	Neurological symptoms, signs of infection
Intracranial heamorrhage	Signs of intracranial hypertension
Intracranial mass lesion	
Cortical vein thrombosis	Convulsions, intracranial hypertension, fever, deteriorated level of consciousness
Post natal depression	
Non specific post natal headache	Dehydration, having strained during labour, adjusting to new baby

## 2 First visit

### 2.1 Symptoms and Signs

The first visit should include an extensive history about the headache and should categorise the patient according to the Lybecker classification.

60% of PDPHs will begin within 2 days of having had an epidural, 90% within 3 days,<sup>1</sup> though it may occur up to 14 days later. It is very rare for it to occur immediately post dural puncture.

A PDPH is classically a bilateral fronto-occipital headache, radiating to the neck and shoulders. It is exacerbated within 15 minutes of standing or sitting, is aggravated by coughing or straining and is alleviated within 30 minutes of recumbency<sup>2</sup>, and further so by lying prone. It may be associated with nausea (up to 60% of cases), vomiting, hearing loss, tinnitus, vertigo, dizziness and paraesthesia of the scalp. Photophobia, diplopia, and blindness have also been described.<sup>3</sup>

These symptoms may lead on to grand mal seizures and sub-dural haematomas.

Lybecker classifies PDPHs accordingly<sup>4</sup>

Category	Signs and Symptoms
Mild	Postural headache with slight restriction of daily activity Not bedridden No associated symptoms Responds well to non-opiate analgaesics (NSAIDs, paracetamol, Caffeine)
Moderate	Postural headache with significant restriction of daily activity Bedridden part of the day With or without associated symptoms Requires addition of opiate derivatives
Severe	Postural headache with complete restriction of daily activities Bedridden all day Associated symptoms present (photophobia, tinnitus, vomiting) Not responsive to conservative management

### 3 Treatment

Patients should be categorised according to Lybecker's classification of PDPH, and an appropriate treatment regime implemented.

Lybecker category	Treatment
Mild	Adequate rehydration Regular simple analgaesia Oral caffeine, 200mg tds

<sup>1</sup> Leibold RA, Yealy DM, Coppola M, Cantees KK. Post dural puncture headache: Characteristics, management and prevention. Ann Emerg Med 1993; 22: 1863-70

<sup>2</sup> International classification of headache disorders(1st ed.) International headache society

<sup>3</sup> Vandam LD, Dripps RD. Long term follow up of patients who received 10098 spinal anaesthetics. JAMA 1956; 161:586-91

<sup>4</sup> Lybecker H et al. Post dural puncture headache: Onset, duration, severity and associated symptoms. An analysis of 75 consecutive patients with PDPH. Acta Anaesth Scand. 1995;39:605-12

Lybecker category	Treatment
<b>Moderate</b>	Conservative management as above Weak opioids, eg codeine 30-60mg qds or tramadol 50-100mg qds Consider laxatives Discuss epidural blood patch
<b>Severe</b>	Conservative management including weak opioids Offer epidural blood patch Measure HR, BP and Temp Request FBC, U&E

### 3.1 Rationale behind treatment

#### 3.1.1 Spontaneous resolution

Approximately 72% of PDPH will resolve spontaneously within 7 days<sup>5</sup> and 88% of PDPHs will have resolved spontaneously by 6 weeks<sup>6</sup>. Treatment of PDPH aims to relieve the symptoms while the tear in the dura seals itself. It is only the minority of patients in whom the headache lasts for months to years.

#### 3.1.2 Posture and Bed rest

Although bed rest alleviates the symptoms of PDPH, there is no evidence that Bed rest or specific postures enhance recovery. The incidence of PDPH at 48 hours is the same for those who were ambulant and those who followed strict bed rest. A patient with a moderate to severe PDPH will more than likely resort to bed rest throughout the period of their headache anyway. Because of the hypercoagulable state of a post partum woman, routinely encouraging bed rest should be avoided.

### 3.3 Supplementary fluids

The purpose of the hydration is to ensure that the rate of CSF production is appropriate. Although the degree of CSF leak does not correlate with the severity of the symptoms in a PDPH, it is assumed that improvements in the ratio of CSF production to CSF leak will improve the clinical picture. Dehydration can result in a decrease in CSF production. However, if someone is appropriately hydrated, and the rate of CSF production is normal, there is no evidence that overhydration will increase the rate of CSF production any further. Therefore, there is no point in administering fluids to a patient who is already appropriately hydrated.

### 3.4 Simple analgaesia

Paracetamol and NSAID's (if not contra-indicated) remain the mainstay for the treatment of PDPH. Along with anti-emetics they reduce the need for further interventional therapy. Opioids do not appear to provide any further benefit.

### 3.5 Further pharmacological therapy

Beyond the theory that PDPH is caused by sagging of the brain in the volume depleted cranium, it is likely that as the body assumes a vertical posture, the hydrostatic gradient across the brain increases, forcing more CSF to exit the dural puncture. The body then

<sup>5</sup> Vandam LD, Dripps RD. Long term follow up of patients who received 10098 spinal anaesthetics. JAMA 1956; 161:586-91

<sup>6</sup> Jayaraman A. Post Dural Puncture Headache. Up to Date Anaesthesia 2008 June:33-35

attempts to compensate for the loss of intracranial volume by vasodilation. Much of the pain in a PDPH would then be related to vascular distention. This process would reverse itself when the patient again became supine. The importance of this different understanding of the mechanism of aetiology is that the headache would then be expected to respond like a vascular headache. It is assumed that the cerebral vasoconstrictive effects of caffeine are responsible for the analgaesic effect it gives to patients with PDPH.

Sumitriptan, Desmopressin or ACTH have not been shown to have any benefit over placebo.

Consider laxatives to reduce straining during defaecation.

### **3.6 Epidural Blood patch**

The mechanism of action of an EBP is 2 fold, firstly, the blood injected into the epidural space compresses the dural sac, and raises the intracranial pressure resulting in immediate relief from symptoms. Secondly the blood clots over the dural hole forming a seal to prevent further CSF leak. Prior to performing an EBP, the consultant in charge should always be informed. The EBP should take place in theatre or recovery room under sterile conditions, by 2 doctors, one of whom should be a consultant anaesthetist.

#### **3.6.1 Timing of EBP**

Early blood patching, prior to 24 hours after dural puncture is not recommended, and may be associated with a lower success rate, and higher incidence of bacteraemia. The success rate of epidural blood patch carried out from 24 to 48 hours from puncture ranges from 70-98%, and if the first attempt fails, the same success rate can be expected after the second attempt<sup>7</sup>. EBP requires 2 trained clinicians, and should therefore preferably not be done out of hours, as it would remove 2 anaesthetists from other services they could be providing to the hospital.

#### **3.6.1 Complications of EBP**

Complications of EBP include exacerbation of symptoms, failure(1:10) further dural puncture(1:100), temporary nerve damage(1:1000) infection, and short term radicular pain, long term complications are very rare, and there is no evidence of reduction of efficacy of future epidural analgesia.

#### **3.6.2 Contraindications**

Systemic infection, fever, infection in the back, coagulopathy and patient refusal are all contraindications to EBP

#### **3.6.3 Procedure**

1. Informed consent must be obtained.
2. The patient should be afebrile, haemodynamically stable and have a normal WCC and CRP.
3. The patient should be supine for 2 hours prior to the EBP to minimise CSF leak into the epidural space.
4. 2 operators are required, one epiduralist and one phlebotomist, both are to work in a sterile manner, at the site of venepuncture (usually ante cubital fossa) and at the epidural site.
5. Injected blood usually spreads cephalad, so the EBP should be performed at the site of the previous epidural, or a space below it. Having the woman in the lateral position will minimise CSF pressure in the lumbar dural sac.
6. On identifying the epidural space, the phlebotomist should obtain 20mls blood and pass the syringe to the epiduralist, maintaining sterility of the syringe.

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<sup>7</sup> Abouleish E, Vega S, Blendinger I, Tio TO. Long term follow up of epidural blood patch. *Anaesth Analg* 1975; 54:459-63

7. The epiduralist should slowly inject the blood into the epidural space until the headache resolves. If the patient experiences pain in the back or legs the injection should pause and wait for the pain to resolve. When the pain is resolved the injection can continue. If the pain recurs, or doesn't resolve then the injection should stop.
8. The patient should maintain bed rest for at least 2 hours to allow the blood to clot, then allow slow mobilisation.
9. Straining or excessive lifting should be avoided for at least 48 hours, this may prove difficult bearing in mind that the woman has a new baby to care for.

#### **3.6.4 Follow up**

The patient should have a follow up visit 2 hours post procedure and within 24 hours of the EBP the EBP pro-forma must be filled in. If the headache has resolved, the patient can be discharged home. It would be preferable that the patient is kept in overnight, but if circumstances prevent this she should be followed up with a phone call the next day. The patient must have clear instructions on how to contact the hospital again if symptoms recur. If the headache does recur a further EBP should be discussed. If the second EBP fails to resolve the PDPH then a CT brain or MRI should be sought to exclude alternative diagnoses.

Every patient should be given a follow up appointment at 6 weeks to see an anaesthetist at the anaesthetic assessment clinic.