

# **GUIDELINE FOR DIAGNOSIS AND MANAGEMENT OF POST DURAL PUNCTURE HEADACHE IN OBSTETRICS**

## **Background**

CSF acts as a cushion supporting and protecting the brain. Leakage of CSF from the subarachnoid space through a dural breach, can lead to loss of this support. The resulting traction on the innervated tissues around the brain can be responsible for the headache that follows. This headache, called post-dural puncture (PDPH), or low-pressure headache (LPH), is postural and usually self limiting, appearing on the first or second day after dural puncture and lasting less than seven days. However, in cases where the headache is severe enough that the mother is unable to cope with her normal daily tasks and look after her newborn baby, conservative management becomes unsustainable. Epidural blood patch (EBP), if not contraindicated, is the treatment of choice in these cases, especially if symptoms suggestive of cranial nerve involvement are present. The incidence and severity of headache is directly related to the size and the design of the needle used. The majority of parturients suffering inadvertent dural puncture with a Tuohy needle will develop a PDPH, severe enough to require EBP, while the introduction of small-gauge needles with pencil points has greatly reduced the incidence of headaches after spinal anaesthesia. Although the headache is self limiting, the possibility, however remote, of a serious complication such as a subdural haematoma to occur if the hole in the dura is not sealed, has to be kept in mind.

## **Symptoms of PDPH**

PDPH is classically fronto-occipital and is often associated with neck stiffness. Sometimes the pain radiates to both temples, may be felt behind the eyes, or is more diffuse than localised. The headache typically has a postural element, with the pain exacerbated by sitting or standing and alleviated by lying flat. The postural feature of the headache differentiates it from other serious intracranial causes of headache such as a subdural haematoma. The headache may be associated with other symptoms such as nausea, vomiting, hearing loss, tinnitus, vertigo and dizziness. Visual disturbances such as diplopia, and photophobia may also occur.

The severity of the headache can be classified, using a modified Lybecker (1) classification, into:

### **Mild PDPH**

- slight restriction of daily activities.
- Patient not bedridden.
- No associated symptoms.
- Responds well to non-opiate analgesics.

### **Moderate PDPH**

- Significant restriction of daily activities.
- Patient bedridden most of the day.
- Associated symptoms may or may not be present.
- Requires the addition of opiates.

### **Severe PDPH**

- Complete restriction of daily activities.
- Patient is bedridden all day.
- Associated symptoms present.
- Not responsive to conservative management.

## **Onset**

90% of headaches will occur within 3 days of procedure (2) and two thirds within the first 48 hours (3). However, it can develop up to 14 days of the procedure, or very rarely, it can occur immediately.

## **Duration**

Most cases of PDPH will resolve spontaneously within 7 days if left untreated (4,5). In a minority of patients, the headache can persist, occasionally to years.

## **Diagnosis**

Symptoms of a postural headache and a history of dural puncture are usually sufficient to make a diagnosis. If in doubt, additional investigations such as MRI may be needed to confirm the clinical findings and rule out other causes of headache. MRI scanning of the brain may demonstrate evidence of reduced CSF pressure. Myelography or thin-section MRI can be used to locate the source of the CSF leak (6). Doppler ultrasound reveals higher flow velocities in cerebral vessels in patients with PDPH (7).

## **Differential Diagnosis of PDPH**

Exacerbation of symptoms with the upright position does not occur with other forms of postpartum headache except pneumoencephalus. Other conditions that may cause postpartum headache are:

1. Non-specific postnatal headache.
2. Migraine (history of migraine, unilateral pulsatile headache, associated with vasomotor signs).
3. Pre-eclampsia (recent labour complicated with condition up to 10 days postpartum).
4. Septic and aseptic meningitis (increasing headache, nausea, vomiting & neck stiffness).
5. Intracranial haemorrhage/mass lesion (signs of intracranial hypertension).
6. Cerebral vein thrombosis (a headache of increasing intensity, convulsions, intracranial hypertension, deteriorating consciousness and fever. MRI and MRA are diagnostic).
7. Postnatal depression headache.
8. Pneumoencephalus (sudden headache, due to injection of air in the subdural or subarachnoid space, associated with epidural using loss of resistance to air technique. Headache is worse in sitting position and relieved by lying down. It disappears after few hours).

## **Further Investigations**

1. Markers of infection such as pyrexia, raised WBC and CRP should be checked and if signs of infection present, blood culture and urine samples should be sent for microbiological examination. It should be emphasised, however, that WBC count, especially neutrophils, increases naturally during pregnancy. A further rise occurs in labour even in the absence of infection. A count of up to 16,000 cells/mm<sup>3</sup> in the 3rd trimester and up to 20,000-30,000 in labour and early postpartum period may thus be normal. It is therefore important that when evaluating for infection, other clinical indicators as mentioned above, should be looked for.
2. Early consultation with a neurologist / radiologist should be considered in non-PDPH cases for advanced investigations (CT, MRI, LP), precise diagnosis and management.
3. A hearing test prior to EBP is a useful diagnostic tool, as hearing can be decreased in a women suffering from a PDPH. The test can be arranged by ringing the audiology department at the Lister on ext 4166.

**Patients with suspected PDPH should be kept up to date with simplified information about the possible differential diagnosis and management plan.**

## **Management of PDPH**

1. All cases of suspected PDPH should be discussed with a consultant anaesthetist as soon as possible.
2. Patients with recognised accidental dural puncture should be reviewed daily by an obstetric anaesthetist.
3. Assess severity, onset and duration of PDPH once a diagnosis is reached.
4. Discuss with the patient the available treatment modalities and its success rates.

Management can be divided into conservative or active in the form of EBP.

### **1. Conservative Management**

Aims to relieve symptoms while waiting for the dural tear to heal by itself, or to seal the puncture with epidural blood patch. This may be enough for mild cases of PDPH.

It includes:

#### **Posture**

There is no evidence to support bed rest or specific postures following PDPH. Although it relieves the symptoms, it does not prevent them(8). Patients thus should be encouraged to adopt the position which they find most comfortable. Patients whose headache is severe enough to make them bedridden should be given elasticated stockings and prescribed clexane, around 6pm, in order not to delay a possible EBP the next day.

#### **Hydration**

Although there is no evidence to support the therapeutic effect of vigorous hydration, no patient with PDPH should be allowed to become dehydrated and adequate fluid intake should be encouraged.

#### **Simple analgesics**

Regular paracetamol and NSAIDS (if not contraindicated) may be enough in mild cases. A weak opioid such as codeine, as required, is usually needed as well in moderate and severe cases. Laxatives should be prescribed in conjunction with codeine to prevent constipation.

#### **Other pharmacological treatment**

##### **Caffeine**

Since PDPH results in part from dilation of the intracranial veins, caffeine, a cerebral vasoconstrictor, has been found in some studies to be an effective therapy in some cases(9,10). It can be considered for treatment of PDPH where simple analgesics are ineffective and, EBP contraindicated. The dose recommended for PDPH is 300-500mg oral or IV once or twice daily. However, therapeutic doses has been associated with convulsions and arrhythmia. Medicated caffeine is not currently supplied by pharmacy at the Lister Hospital. Caffeine containing beverages such as coffee, tea, coke, and red bull can be suggested to patients as an alternative to medicated caffeine. The average caffeine content of these drinks are as follows:

A 200 ml cup of brewed coffee : 160mg  
A 200ml cup of instant coffee: 120mg  
A shot of espresso: 100mg  
A cup of tea: 40mg  
A can of red bull: 80mg  
A can of coke: 35mg

### **DDAVP**

Was found to be ineffective in treating PDPH following LP (11).

### **Sumatriptan**

A controlled trial found no evidence to support the use of Sumatriptan, a 5HT<sub>1D</sub> receptor agonist, in the treatment of PDPH (12).

### **Epidural saline / Dextran 40**

Trials showed that compared for EBP, they did not demonstrate any long term efficacy(13).

## **2.Epidural Blood patch**

The high success rate (68-90% after first patch and 97% after the second) (14,15) and the low incidence of complications have established it as the definitive treatment of PDPH. EBP in the first 24 hours after dural puncture has a lower success rate and a higher risk of bacteraemia, and therefore not recommended. Prophylactic EBP is also not recommended.

### **Procedure and aftercare**

1. A written, informed consent should be obtained from the woman following a careful explanation of the procedure. The chances of success, significant side effects and the possibility of requiring a second blood patch should also be discussed.
2. The patient is advised to feed the baby and pass urine before the procedure as she will have to remain flat in bed after the blood patch for a period of time.
3. Procedure is carried out in a maternity theatre or a room at the delivery suite. If the patient is receiving prophylactic clexane, ensure that the last dose was given at least 12h before performing EBP.
4. Two anaesthetists are required, one of whom should be a consultant.
5. The procedure is preferably carried out in the lateral position to decrease CSF leakage and thus dilution of the injected blood.
6. The procedure should be done under strictly aseptic conditions with both anaesthetists scrubbed.
7. As blood injected into the epidural space predominantly spreads cephalic, the 1st anaesthetist should thus locate the space a level below the supposed dural puncture. If not possible, the same level of the puncture is used.
8. Once the space has been located, the 2nd anaesthetist withdraws 2 samples of blood (2x20ml syringes) from a suitable vein which has been prepared with antiseptics and draped. One sample is to be injected into the epidural space while the other is to be sent for blood culturing.
9. Blood should be injected into the epidural space slowly to a maximum of 20ml via the Tuohy needle. If pain in the back or paraesthesia in the legs is experienced by the patient during the injection, temporarily stop and then continue when symptoms have disappeared.

10. An immediate relief of symptoms may be experienced by the patient due to the injected blood exerting a mass effect, and thus increasing the CSF pressure, before a definitive clot has been established.
11. If the first blood patch is ineffective, or initially effective but the headache recurs, a second EBP would be normally offered.
12. Following the procedure, the woman should be taken to the recovery area for close observation. The patient should be encouraged to lie still for two hours. After this time, she can be transferred to the ward where she should be encouraged to get out of bed and start mobilising slowly.
13. While an inpatient, it is prudent that the woman is regularly assessed by an obstetric anaesthetist, and if appropriate, she may go home the same day.
14. Prior to going home, advice must be given regarding the need to contact the labour ward or present to the Accident and Emergency department in the case of any complications. Patients should be specifically told about features of cauda equina syndrome and epidural abscess.
15. As far as possible, the patient should be advised to avoid straining, lifting heavy objects, or excessive bending for at least 48 hours although there are obvious limitations when a woman has a newborn baby to look after.
16. A follow-up appointment should be arranged in the high risk obstetric anaesthesia clinic in 4-6 weeks.

### **Risks and Complications**

1. Failure to work or recurrence of PDPH.
2. Backache, mild to moderate in severity, may occur in around 16% of cases and may last from few days to up to three months. Radiculitis with severe back pain radiating down the leg has been also infrequently reported (16).
3. Another accidental dural tap.
4. Nerve damage, which can be temporary (1:1000) or permanent (1:13000).
5. Meningitis, epidural abscess, epileptic fits and cranial nerve palsy are extremely rare complications.

### **Contraindications**

1. Systemic infection and fever.
2. Localised infection on the back.
3. Coagulopathy.
4. Patient refusal.

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