University Hospitals of Derby and Burton NHS Foundation Trust

Accidental Dural Tap and Post Dural Puncture Headache – Full Clinical Guideline

Reference No: WC/OG/39

Contents

Section		Page
1	Introduction	2
2	Diagnosis	2
3	Intrapartum management	3
3.1	Accidental dural puncture recognised following epidural needle placement	3
3.2	Recognition of accidental dural puncture following epidural catheter placement	4
3.3	Following establishment of analgesia	4
4	After delivery	5
5	Postpartum	6
6	Epidural blood patch	7
6.1	Epidural blood patch procedure	7
7	PDPH in patients with no history of accidental dural puncture during epidural insertion in labour	8
8	Discharge	9
9	Monitoring compliance	9
10	References	10
	Document control	11
Appendix 1	Dural tap audit form	12
Appendix 2	Flowchart for new acute neurological symptoms	13
Appendix 3	Pathway for management of central neuraxial complications in anaesthesia	14-15
Appendix 4	GP discharge letter following PDPH	16

1.0 Introduction

An accidental dural puncture during placement of an epidural catheter or less likely with spinal anaesthesia in a parturient, has implications for safety, analgesia and development of postpartum headache and other complications. Good management is important both for the patient and in reducing the risk complications.

The incidence of a recognised accidental dural puncture during epidural insertion is around 1%. Although a Post Dural Puncture Headache (PDPH) is not usually associated with an increased mortality it can significantly increase morbidity and length of hospital stay, and impair the mother's ability to care for her newborn child.

Dural puncture may be caused by the epidural needle or rarely the epidural catheter at the time of placement (a "catheter tap", in which the accidental dural puncture is recognised because the catheter proves intrathecal, is usually secondary to an initial breach of the dura by the epidural needle).

A post dural puncture headache occurs in approximately 70% of patients with a recognised accidental dural puncture, usually commencing 12 to 48 hours postpartum. A small number of patients with a PDPH do not have a recognised accidental dural puncture. The headache occurs within 5 days and is usually accompanied by neck stiffness and/or subjective hearing symptoms (tinnitus or deafness). The headache is throbbing in nature in the frontal and occipital regions, is usually severe and interferes with the patient's ability to look after her baby. The defining feature of a PDPH is its relationship to posture. It is classically worse in the upright position and better or absent in the supine position. However, 5% may present with no postural element. It usually remits spontaneously within 2 weeks, or after sealing of the leak with autologous epidural lumbar blood patch.

2.0 Diagnosis

A diagnosis of accidental dural puncture is made in the following ways:

(1) A CSF via epidural needle. This is usually obvious with a steady stream of CSF from the needle.

(2) A significant sensory/motor and /or sympathetic block (hypotension +/-

bradycardia) following a test dose

(3) A typical post dural puncture headache in a patient who has had an epidural in whom other causes for the headache have been excluded.

3.0 Intrapartum Management

3.1 Accidental dural puncture recognised following epidural needle placement There are two options following recognition of accidental dural puncture with CSF from the epidural needle.

(1) Intrathecal catheter placement

- An attempt can be made to thread the epidural catheter through the needle into the subarachnoid space. This has the advantage of providing good analgesia with a minimal delay and avoiding potential complications associated with a further epidural attempt.

- Labour analgesia via intrathecal catheter should be delivered using anaesthetist only top-ups. There is a pre-set pump programme available at RDH, however anaesthetist manual top-ups remain first line management.

- The intrathecal catheter should be labeled, the epidural chart should clearly state that an intrathecal catheter is in place, and it should be written on the white-board. The midwife, anaesthetic and obstetric teams, and labour ward co-ordinator should be informed, and the intrathecal catheter highlighted at handover.

- The patient with an intrathecal catheter should **not** be mobilised in labour.

Intrathecal catheter top-ups (administered ONLY by the anaesthetist):

- 1ml 0.25% levobupivacaine with a flush of 1.5ml 0.9% saline. Further flushed top ups of 0.5ml 0.25% levobupivacaine can be given at 5 minute intervals with careful monitoring to achieve satisfactory analgesia. 25mcg of fentanyl can be given with the first dose, no further fentanyl should be given in labour.

Intrathecal catheter infusion (pre-set program):

- 2ml/h of the premixed local anaesthetic infusion bag (0.1% bupivacaine with 2mcg/ml fentanyl)

Tachyphylaxis may occur and larger doses than expected may be required more often to obtain adequate analgesia especially in the later stages of labour.

CTG monitoring should be performed and maternal blood pressure and heart rate should be recorded every 5 minutes for 20 minutes after each top up.

LSCS / trial of instrumental delivery:

- Top-ups must be done in theatre. Incremental 0.5-1.0ml boluses of 0.5% heavy bupivacaine to be given slowly.

(2) Epidural catheter placement

- The epidural needle is removed and an epidural inserted into an adjacent space. This may be done by choice, where it is impossible to thread the catheter into the subarachnoid space or where there is inadequate analgesia following placement of a subarachnoid catheter. It has the advantage of a more familiar technique but is associated with a higher repeat dural puncture rate and the possibility of failure to locate the space.

- On re-siting the epidural, you should administer a test dose and first top-up dose of local anaesthetic. If the epidural catheter appears to be subarachnoid after the test dose then management should be as above.

- When you are happy that satisfactory analgesia has resulted and that the distribution of the block, determined by cutaneous testing, is appropriate for the volume of anaesthetic given, the usual epidural PCEA can be commenced.

LSCS / trial of instrumental delivery:

- Slow, incremental top-ups using usual epidural top-up mix with careful monitoring of effects of block. Spinal analgesia should be considered in an urgent situation.

3.2 Recognition of accidental dural puncture following epidural catheter placement

This occurs either when CSF is seen in the epidural catheter (confirmed as above) or following the test dose where a subarachnoid block develops. Management is the same as intrathecal catheter placement in 3.1

3.3 Following establishment of analgesia

- Inform the patient about what has happened. Give them the OAA leaflet on PDPH (copies in folder in consultant office on delivery suite and also available at https://www.labourpains.com/assets/_managed/cms/files/Headache_after_epidural.pdf) and make sure they know they should not leave hospital until they have been followed up by an anaesthetist.
- Inform the midwife looking after the patient.
- Inform the consultant anaesthetist covering delivery suite during the day (no need to phone the consultant at night to inform them unless you have a question/concern about managing the patient).
- Document the dural tap on the green follow up sheet (QHB) or the data base register and communication book (RDH).
- Ensure that the patient with a dural tap is handed over at each handover for three days.

Email the obstetric anaesthetic clinic with the patient details so that outpatient follow-up can be arranged if required.

There is no need to advise instrumental delivery although avoidance of prolonged pushing in the second stage may be advised.

4.0 After Delivery

- Remove the epidural catheter. Do ***NOT*** infuse saline through the catheter.
- If no headache is present, allow the patient to mobilise. Lying flat in bed will not prevent the incidence of post-dural puncture headache.
- If a postural headache develops, encourage oral fluid intake to maintain hydration, and oral analgesics. Prolonged bed rest is not recommended as it may increase the risk of thromboembolic complications.
- Thromboprophylaxis should be considered for women whose mobility is reduced due to PDPH.

Caffeine:

There is limited evidence to support the use of caffeine in the treatment of obstetric PDPH.

If used, treatment with caffeine should **not exceed 24 hours**. Oral therapy is preferred and doses should not exceed 300 mg with a maximum of 900 mg in 24 hours. A lower maximum dose of 200 mg in 24 hours should be considered for women who are breastfeeding particularly those with low birth weight or premature infants.

Women receiving caffeine therapy should have their intake of caffeinated drinks monitored and the recommended daily dose should not be exceeded. One cup of coffee contains about 50–100 mg of caffeine and soft drinks contain 35– 50 mg.

Therapeutic doses of caffeine have been associated with central nervous system toxicity and atrial fibrillation.

If the mother is breast-feeding the baby, stop caffeine treatment if the baby becomes restless/irritable etc.

5.0 Postpartum

All women who have had a dural puncture should be visited daily by an obstetric anaesthetist while they are an inpatient and management of the case should be discussed with the consultant anaesthetist covering labour ward.

- If the patient has no headache and is going home, please make sure they have the OAA leaflet and the phone number for triage. They should be advised to contact the on call anaesthetist via triage (QHB) / PAU or labour ward (RDH). Document the dural puncture and advice given in the notes and on Meditech (if QHB). If they agree, please make a note of their phone number on the green follow-up sheet/in the diary. They should be followed up daily for 3 days following the dural puncture, since most headaches will occur in this period.

Analgesia in the form of paracetamol, NSAIDs (where not contraindicated) and oramorph, together with lactulose should be prescribed. There is no advantage to prescribing bed rest, this just delays the onset of headache, but the woman will probably wish to remain in bed if she has a headache.

Oral fluids and avoidance of dehydration should be encouraged. However, intravenous (IV) fluids are not necessary unless the woman is not drinking adequately.

If the woman develops a headache with features matching those of a PDPH:

- An epidural blood patch should be offered (rarely before 48 hours) unless there are contraindications (e.g. pyrexia). Consideration of timing of blood patching is important in patients receiving enoxaparin (see thromboprophylaxis guideline).
- If the diagnosis of obstetric post-dural puncture headache is strongly suspected, there is no evidence that imaging is needed before performing an epidural blood patch.
- Signs of cranial nerve palsy and intracranial haematomas should be sought. If suspected, then appropriate imaging (eg. CT / MRI) should be requested urgently before performing a blood patch.

If the headache changes in nature, neurological signs develop, conscious level reduces, headache is atypical in nature, or when two epidural blood patches have been unsuccessful, urgent consideration should be given to further investigation and imaging.

6.0 Epidural Blood Patch

A blood patch should be considered for any patient with symptoms of PDPH following a dural tap or spinal anaesthesia. This is normally performed between 48 and 72 hours after the dural puncture. There is some evidence that an early blood patch may be less effective.

A blood patch gives approximately 50% total relief of headache and 39% partial relief on first attempt, and 70% total relief if a second blood patch is given.

In order to gain informed written consent, the procedure and associated risks must be fully explained to the patient. In addition to the risks of siting an epidural, explanation should include the likelihood of experiencing backache (85%, mostly resolves spontaneously within maximum of 4 weeks, however chronic backache is now a recognised complication), a repeat dural puncture, and the risk of failure of the procedure.. A consent form should be completed.

Prior to any blood patch being performed consideration must be given as to whether the headache could be from an alternate cause and this should be investigated if appropriate.

6.1 Epidural blood patch procedure

- The anaesthetic consultant must be consulted before the procedure is commenced. The patient must be apyrexial otherwise a blood patch should not be performed.
- If patients are receiving low molecular weight heparin (LMWH) such as enoxaparin, the date and time of the last administered dose should be checked. **An epidural blood patch should not be performed within 12 hours of prophylactic dose or 24 hours of therapeutic dose of LMWH being administered.** The next dose of enoxaparin may need to be delayed – it should not be given within 4 hours of the blood patch.

- Two anaesthetists are required to undertake the procedure, one to perform the epidural and one to draw the blood from the patient. They must be scrubbed and gowned, and the procedure must take place in an appropriate setting, such as theatre or the anaesthetic room.
- The woman should be positioned appropriately (frequently they are unable to sit up), and the epidural equipment prepared. Using aseptic technique the first anaesthetist should locate the epidural space, preferably one space below or at the same site of the dural puncture (blood tends to spread cranially)
- The second anaesthetist should take 20mls blood aseptically from the women immediately before or as soon as the epidural space has been reached by the first anaesthetist. Blood should be injected slowly into the epidural space and stopped when there is significant back pain. Ideally 20mls blood should be injected.
- Following the procedure the woman should be advised to lie supine for two hours and then gradually mobilize.
- The procedure should be documented on Meditech V6 (QHB) or on the data base register and communication book (RDH)

Post procedure the patient's temperature should be checked regularly as part of the postnatal maternal observations. All women who receive an epidural blood patch should ideally be reviewed by an anaesthetist within 4 hours, but certainly on the ward prior to discharge.

Often pain relief is instantaneous. Occasionally the blood patch does not work or, more commonly, achieves partial or temporary relief. In such cases where the diagnosis of post-dural puncture headache is likely and an epidural blood patch has produced complete or partial resolution of symptoms, but the headache subsequently returns, a second epidural blood patch may be offered as it is likely to be of benefit. Referral should be made to an anaesthetic consultant and the decision for a second epidural blood patch should be made by them.

Failure to respond to a second blood patch indicates the need for consideration of other forms of headache and possible further investigations. This must be discussed with the consultant anaesthetist, and involvement of other relevant specialties (neurology, medical and obstetric team) is recommended before performing a third epidural blood patch.

If the women does not wish to have a blood patch, or it is contraindicated, or the headache is less severe, conservative management should be continued. Normally, the headache resolves spontaneously within two weeks

7.0 PDPH in patients with no history of accidental dural Puncture during epidural insertion in labour

Some patients present with symptoms consistent with a post dural puncture headache with no obvious dural puncture during their epidural insertion. It is important that other causes of headache are excluded in these patients. If it is concluded the cause of the headache is an accidental dural puncture, management should be as above for postpartum women and epidural blood patch.

8.0 Discharge

An anaesthetist should discharge all women from anaesthetic care. (See section 5.0 Postpartum).

If the woman is well, she can be discharged home on the day of the epidural blood patch. All women who receive epidural blood patch require follow up by phone for three days.

A letter to their GP should be sent out with the discharge summary (letter attached Appendix 4). The letter should be printed off and given to the midwife looking after the mother. If unable to do that, the letter should be sent out separately to the GP.

Inform patients that they will be offered an appointment in the obstetric anaesthetic outpatient clinic approximately four weeks after delivery. This offers the opportunity to establish that symptoms have resolved, deal with any chronic problems, allow a more detailed explanation of what has occurred and discuss management of future labours. Please ensure the clinic have been emailed about the patient in order for the appointment to be made.

9.0 Monitoring Compliance

Regular audit of compliance with the standards identified within this document should take place. The audit will be identified as part of the Department of Obstetrics and Gynaecology Annual Audit Forward Plan, and registered in accordance with the Trust Clinical Audit Policy. (Please see Appendix 1 for the audit tool).

Where an audit demonstrates compliance below 100% an action plan will be required. The aim of this action plan will be to strive for compliance of 100%. Content of the action plan will include the actions required, target date for completion of the actions, an identified lead for each action and a progress section. The action plan will always include an action which identifies how lessons learned will be disseminated to relevant staff groups and individuals.

Monitoring of actions arising from the audit will be undertaken in accordance with section 10.4 of the Trust Clinical Audit Policy, which requires completion of an audit trail form within three months following presentation to the Departmental multidisciplinary audit meeting.

The audit action may include referral as appropriate to other groups particularly where deficiencies have been identified. Any actions identified as a result of referral to another group will be monitored by that group. It is the responsibility of the departmental clinical audit lead to review progress of actions on the audit trail form. The timescale for review of the action plan will be stipulated as part of the action plan.

10.0 References

1. Treatment of obstetric post-dural puncture headache. OAA. 2018 https://www.oaa-anaes.ac.uk/ui/content/content.aspx?ID=64

2. Post-dural puncture Headache. NYSORA. https://www.nysora.com/foundations-of-regional-anesthesia/complications/postdural-puncture-headache/

3. International Headache Society. IHS Classification ICHD-3 Beta. https://www.ichd-3.org/ [

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Contact for Review	Audit Coordinator Joanna Harrison-Engwell			
Lead Executive Director Signature				

Appendix 1

Dural Tap Audit form (please complete for every patient with accidental dural puncture)

Patient Details (or Addressiograph)

Hospital No: Age: Weight/BMI:

Stage of labour:

Degree of cervical dilatation at last VE

Anaesthetist:

Grade of Anaesthetist:

Supervised: Yes / No

Procedure: Epidural / Spinal

No. of attempts:

Patient Posture: Sitting / Lateral

If Epidural:LOR method used: Air / Saline

Epidural technique: Continuous / Intermittent

Dural puncture (immediate management)

Intrathecal catheter: Yes / No

Procedure abandoned: Yes / No

Epidural resited: Yes / No

Headache:

Developed headache: Yes / No

Time of onset of headache after dural tap: ……hrs

Treatment of headache:

Analgesia: Yes / No

Blood Patch required: Yes / No

If yes, days since puncture:

Epidural Blood Patch:

Grade of anaesthetist(s) performing EBP:

Blood patch repeated: Yes / No

If yes, How many patches did the patient require:

Re-admission:

Did the patient require re-admission following discharge for PPDH? Yes / No

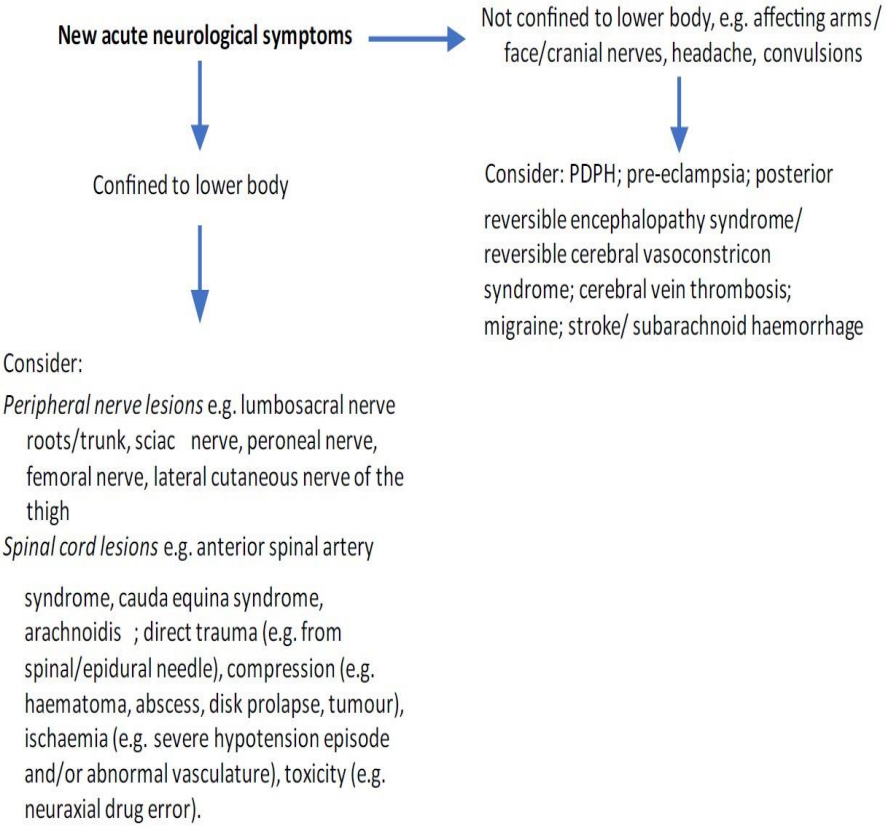
If yes, how many days following discharge?

Discharge delay:

Was there any delay in patient discharge due to PPDH? Yes / No How long in total was the patient in hospital?

Appendix 2

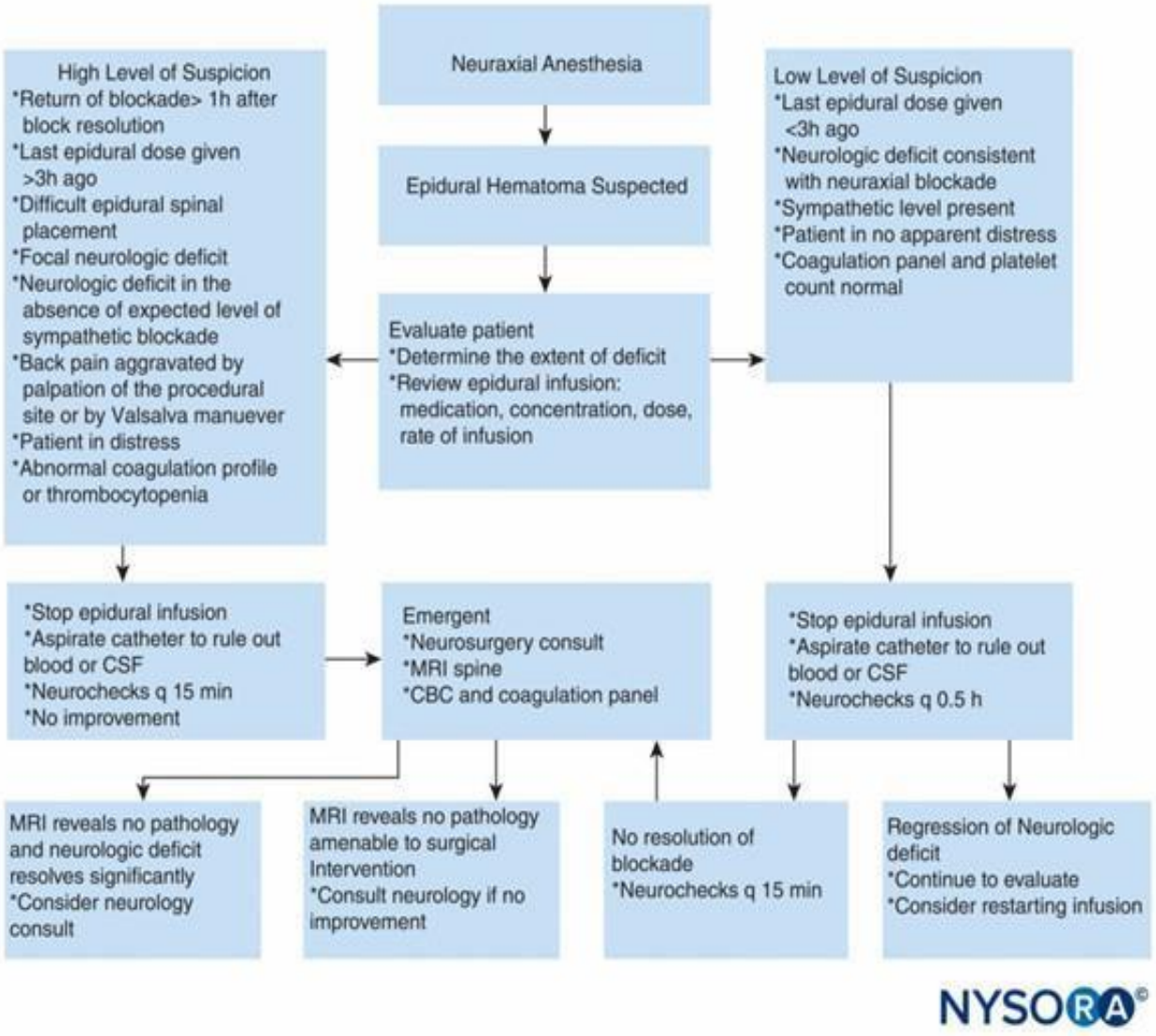
Summary of postpartum neurological deficits.

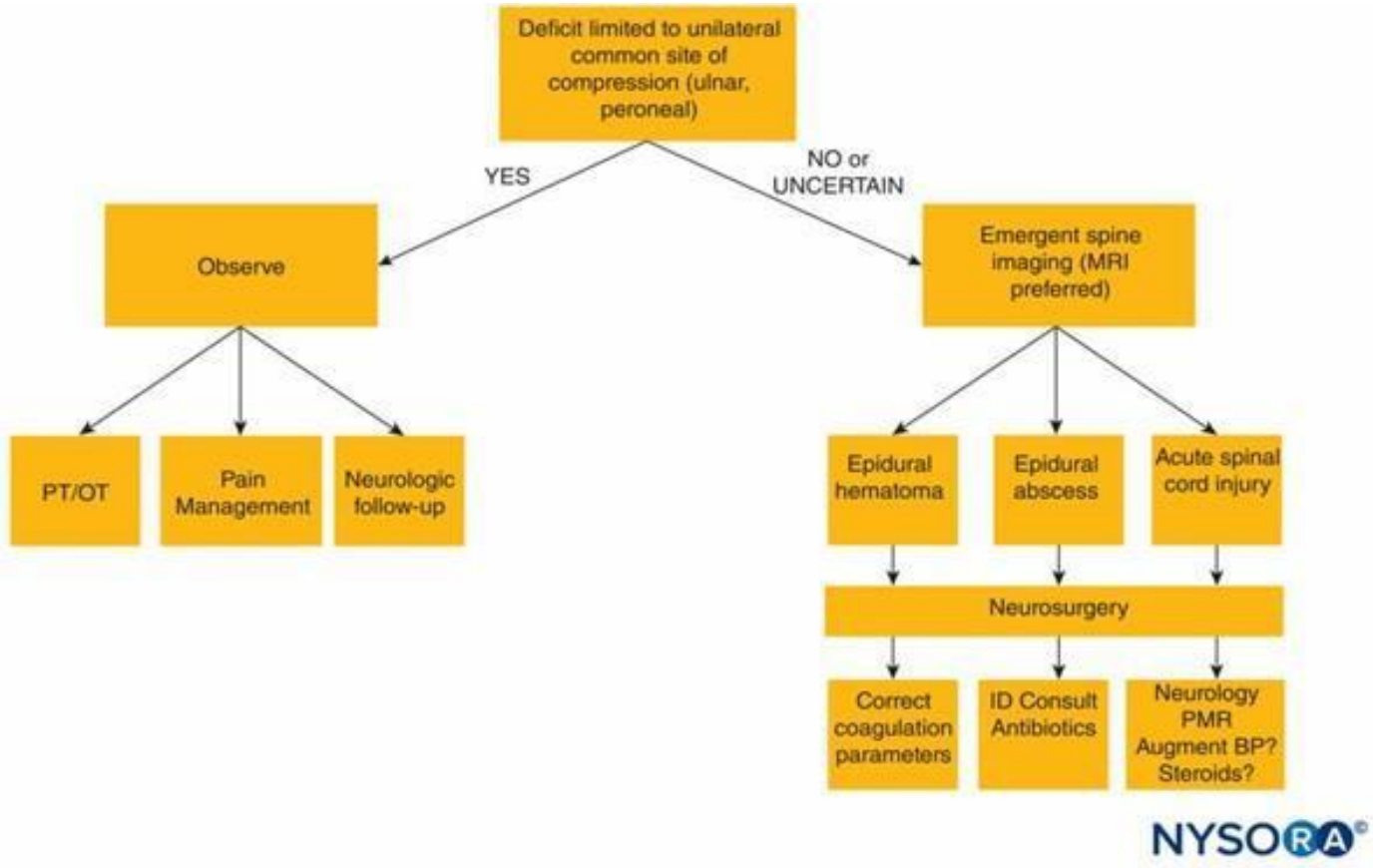


Safety guideline: neurological monitoring associated with obstetric neuraxial block 2020: A joint guideline by the Association of Anaesthetists and the Obstetric Anaesthetists' Association. Anaesthesia. 2020 Jul;75(7):913-919. doi: 10.1111/anae.14993. Epub 2020 Mar 1. PMID: 32115697.

Appendix 3

PATHWAY FOR MANAGEMENT OF CENTRAL NEURAXIAL COMPLICATIONS IN ANAESTHESIA





MANAGEMENT

1. **Contact Orthopaedic registrar (QHB) for review of the patient**.

2. **If Weekdays In Hours** – get an urgent MRI scan done at QHB after Orthopaedic review. If on MRI there is a suspicion of Haematoma/abscess/spinal cord injury then the patient needs to be referred to Spinal surgery at Royal Derby Hospital (RDH) by the Orthopaedic registrar at QHB. Parent teams would be Spinal surgery team at RDH and Orthopaedic team at QHB.

3. **If Weekdays Out of Hours or Weekends** – patient needs to have an urgent MRI at Royal Derby Hospital (RDH). Orthopaedic registrar would need to discuss and refer the patient to the Spinal surgery team at RDH for management. Parent teams would be Spinal surgery team at RDH and Orthopaedic team at QHB.

Appendix 4
Appendix 4

Post-dural puncture headache

Dear Dr

Re: ……..
…..... has a headache following an obstetric anaesthetic procedure performed on …….

Simple headaches are common in the postnatal period. However, as this headache follows a spinal/ epidural injection it is possible that it is related to dural puncture. Post-dural puncture headache (PDPH) is caused by low intracranial pressure and usually has the following characteristics:
• Fronto-occipital
• Usually postural: worse on standing/sitting compared with lying down
• Severity ranging from mild to incapacitating
• Associated features include neck stiffness, photophobia, nausea, tinnitus, cranial nerve palsies

Severe PDPH not responding to other forms of management is often treated by the anaesthetist with an epidural blood patch. This is likely to relieve PDPH, but there is a recurrence rate and sometimes a second epidural blood patch is indicated.

Epidural blood patch performed: Yes No Date: ……

Very rarely, headaches suggestive of serious pathology can occur postnatally.
Please consider the following 'red flag' headache symptoms, and if any are present, refer directly to the duty obstetric anaesthetist at the treating hospital.

•Sudden onset, or sudden increase in severity (e.g. 'thunderclap')
•Syncope or seizures
•Altered consciousness or cognition
•Focal neurological symptoms/signs including cranial nerve palsies
•Worsening of headache on exertion, coughing or straining

Please refer to the duty anaesthetist if you require further guidance regarding assessment or management of post -dural puncture headache.

Yours sincerely,