University Hospitals Sussex
NHS Foundation Trust

Epidurals in labour and potential complications

Maternity Protocol: MP042

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Guideline Reviewer:	Róisín Monteiro, Abby Medniuk
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Cross reference:	**MP035**: Care of women and people in labour
	MP043: Prevention of Acid Aspiration Syndrome **MP037**: Fetal Heart Monitoring

Contents

Key Principles

A protocol is a set of measurable, objective standards to determine a course of action. Professional judgment may be used in the application of a protocol.

Scope

This protocol applies to:

- Women and people having epidurals in labour.
- Women and people with complications from epidurals used during childbirth

Responsibilities

Midwives, Anaesthetists & Obstetricians:

- To access, read, understand and follow this guidance
- To use their professional judgment in application of this protocol

Management:

- To ensure the protocol is reviewed as required in line with Trust and National recommendations
- To ensure the protocol is accessible to all relevant staff

1 Indications for Epidural Analgesia

1.1 Maternal or parental request for analgesia

1.2 Obstetric or foetal indications which may increase the need for regional analgesic block for delivery, (e.g. IUGR, prematurity, multiple birth, mal presentation) or where premature pushing is causing cervical oedema

1.3 Medical indications in the mother or birthing parent (e.g. respiratory/cardiac/obesity/ diabetes/hypertensive disorders) in which reduced stress or work may be beneficial

2 Contraindications to Epidural Analgesia

2.1 Local or systemic sepsis (relative). N.b. Presumed infection is not a Contra-indication providing antibiotic therapy has been commenced. As a general guide, a mother or birthing parent with a temperature of >39 degrees and WCC > 25 or overt clinical signs of sepsis should not have an epidural. The anaesthetic team will make the final decision

2.2 Clotting disturbances and thrombocytopenia. Usually, a platelet count of <80, or abnormal clotting precludes epidural analgesia. Usually, a platelet count between 80-100 *with* abnormal clotting also precludes epidural analgesia. If in doubt discuss with consultant anaesthetist

2.3 Maternal or parental hypovolemia or cardiovascular instability

2.4 Raised intracranial pressure, or conditions where accidental dural puncture would be particularly detrimental to the patient's health

2.5 Allergy to amide local anaesthetics − very rare

2.6 Inability for the service to ensure a midwife can provide 1 to 1 care of the woman or person during labour

2.7 Epidurals can be sited if pethidine has been given in the previous 4 hours but the patient must have respiratory rate measured hourly and saturation monitoring

3 Responsibilities

3.1 Midwife

3.1.1 To ensure women and people are making an informed choice about their pain-relief in labour. If women and people are requesting an epidural for pain relief alone, the midwife providing care should ensure that all other modes of pain relief & support have been offered (as appropriate).

Midwives should give unbiased and full information to women and people about their choices and the risks and benefits of the pain relief options available. All discussions and decisions should be clearly documented in the maternal or parental notes

3.1.2 To provide a laminated epidural information card (OAA epidural information card, available in many languages on the OAA website) to any woman or person considering epidural pain relief, prior to contacting the anaesthetist

3.1.3 To check a platelet count. A recent antenatal test is fine (e.g. 28 week bloods), unless there is reason to suspect the platelet count is low or dropping (e.g. PIH, IUD, sepsis, recent COVID infection); in these cases the FBC must have been checked in the previous 24 hours, or more frequently (i.e. 6 hours) if the count is dropping rapidly. Discussion with the anaesthetist should occur for clarification if unclear

3.1.4 To ensure the correct equipment is available and working prior to the epidural commencing (see below)

3.1.5 To request the anaesthetist to review, consent and perform the epidural when able

3.1.6 Epidurals must be managed by an approved midwife with responsibility for this woman or person alone and no other

3.1.7 The woman or person must have half hourly cardiovascular observations and hourly neurological assessment (sensory and motor).Please see section 9: Maternal or parental and fetal monitoring once the epidural is sited, for further information

3.1.8 Observations should be documented in the maternal or parental notes and deviations from the norm noted and referral to anaesthetist made

3.2 **Anaesthetist**

3.2.1 To explain the procedure, the possible complications, answer questions and gain and document informed consent. This should be documented on BadgerNet

3.2.2 Aim to attend all women and people within 30 minutes of a request for epidural analgesia, with a maximum time of 1 hour. If unable to facilitate this, attempts should be made to seek additional help

3.2.3 Responsible for giving the first test dose via the epidural catheter, and establishing adequate analgesia. Initial doses may be given either as a manual bolus or via the epidural pump. Between 15 and 20ml of Bupivacaine 0.1% with Fentanyl 2µg/ml (the low dose solution) are usually required to establish a functional block.

3.2.4 Prescribe all epidural drugs and document procedure on Badgernet

3.2.5 Ultimate responsibility rests with the initiating or on-call Anaesthetist

4 Equipment

4.1 Working IV access prior to epidural insertion is essential. The standard IV access is a 16 gauge (grey) cannula. This should be checked and crystalloid solution (Hartmann's or normal saline) must be immediately available in the room, prior to siting an epidural

4.2 The epidural should be clearly labelled to differentiate from an IV line. All epidural infusions must be given using a dedicated epidural pump and yellow giving set

4.3 Working oxygen, re-inflatable bag valve mask (AmbuBag) and suction must be available in the room, and a resuscitation trolley kept nearby

4.4 A working PCEA epidural pump must be obtained prior to siting the epidural

5 Eating and Drinking

5.1 Not all women and people with an epidural are at increased risk of surgical intervention and need restriction of oral intake to clear fluids only. Clear non-fizzy drinks and light carbohydrate foods are acceptable in most, provided labour is progressing normally

5.2 Please see Maternity Protocol: MP043 Prevention of Acid Aspiration Syndrome for further information. If unsure, the anaesthetist should decide whether the woman or person should be restricted to clear fluids only

6 Low Dose Epidurals - 'Walking Epidurals'

6.1 With low dose epidurals using bupivacaine concentrations of 0.1% or less the woman or person may be able to be mobile in bed, or walk with the support of the midwife or their birth partner. The development of motor block is variable. Before standing or walking, an assessment of motor block must be made by the midwife, as below

	Action
Step 1	*Able to fully straight leg raise*
Step 2	*Able to stand up beside the bed initially with 2 assistants for balance -* ***not support***
Step 3	*Completion of three half squats (knee bending) with the assistance of one*
Step 4	*Sensation in feet normal or very close to normal*

6.2 Walking is contraindicated if:

- not meeting above criteria**,**
- no-one is available to accompany the woman or person,
- weight is >100kg, postural hypotension,
- non-re-assuring CTG,
- risk of cord prolapse

7 On-going Management of Epidurals in Labour

7.1 Analgesia is maintained using a Patient-Controlled Epidural Analgesia (PCEA) mode; this consists of 8 ml boluses, activated solely by the woman or person via the epidural pump, with a 20-minute “lock-out”

7.2 The epidural should be prescribed by the anaesthetist on Badgernet

7.3 Midwives can change the epidural mixture bag (if trained and competent to do so)

7.4 Women and people should be encouraged to self-administer via the PCEA function when they start to feel breakthrough pain and not to wait until it becomes unbearable

7.5 A midwife may NOT give boluses via the pump, and pain not relieved by self-administered PCEA boluses should be referred to the anaesthetist

8 Bolus Top Up

8.1 PCEA modes of pain relief aim to combine maternal or parental control, titration of analgesia, and reduced motor block. Additionally, boluses have been demonstrated to produce superior pain-relief to equipotent infusions

8.2 It is usually better, to educate women and people, and encourage regular self-administrated PCEA boluses where pain is present, rather than have a background infusion. However, in the unlikely event that a woman or person requires multiple anaesthetist boluses for pain, a background infusion rate may be considered at the anaesthetist’s discretion, providing maximum safe dosage is not exceeded. The epidural should be assessed for function, and consideration also given to re-siting the epidural catheter.

8.3 Discontinuing an epidural at the start of the second stage is more likely to result in pain that interferes with pushing than in an increased likelihood of spontaneous delivery. Epidurals should NOT therefore be discontinued in the second stage, and women and people should be encouraged to self-administer if pain is present.

9 Maternal or parental and fetal monitoring once the epidural is sited

9.1 Maternal or parental pulse and blood pressure must be recorded at five minute intervals for twenty minutes after initial establishment of the epidural, or longer if the woman or person is hypotensive

9.2 Maternal or parental blood pressure should be recorded half hourly whilst PCEA is in progress. If further boluses by the anaesthetist are given, maternal or parental pulse and blood pressure must be recorded at five minute intervals for twenty minutes, prior to resuming usual half hourly monitoring

9.3 Distribution of the block should be recorded every hour according to NICE guidance, together with the presence or absence of pain. Distribution is usually determined using ethyl chloride spray, and the upper level of the block is where normal cold sensation is found, compared to the arm or face. Blocks should be tested working upwards from the thighs, bilaterally

9.4 Documentation of level of block should be in terms of when sensation changes at the indicated dermatome (see Appendix A) . A block up to T10 (level of umbilicus) is usually required for good analgesia

9.5 If the woman or person complains of pain, its site and nature must be documented in the maternal or parental notes. Complaints of pain require confirmation of the distribution of the block by the midwife, prior to action being taken. Action usually involves a bolus being administered by the patient in the appropriate position (according to block assessment)

9.6 Motor block should be assessed hourly along with sensory block. The woman or person should be asked to lift her heel off the bed (straight-leg raise, SLR)

9.7 The anaesthetist should be notified when:

9.7.1 analgesia is inadequate after block testing and 2 patient-controlled boluses in an appropriate position

9.7.2 profound motor block during labour (unable to SLR, even briefly)

9.7.3 high sensory block (above T6, breasts or chest)

9.8 During the recovery phase after a spinal anaesthetic or epidural top-up for a procedure, motor block should be tested by the midwife 4hours after last dose of anaesthetic. The woman or person should be able to SLR by 4 h. If unable to SLR at 4 h from the last dose of epidural/spinal local anaesthetic, the anaesthetist should be called to assess whether the woman or person's care should be escalated to investigate the possibility of reversible causes of neurological injury. Women and people should be informed of this likely timescale for resolution of their neuraxial block and encouraged to alert staff should this be delayed.

9.9 If any concerns regarding extensive block when epidural in situ or after removal, the anaesthetist must be informed. Please refer to national guidance for further information: Safety guideline: neurological monitoring associated with obstetric neuraxial block 2020: A joint guideline by the Association of Anaesthetists and the Obstetric Anaesthetists' Association.

9.10 Women and people with epidurals are at increased risk of developing a pressure sore. For every woman and people with an epidural the Maternity Adapted Pressure Ulcer Risk Assessment should be completed and the Skin Care Bundle followed.

9.11 Continuous fetal heart monitoring should be conducted for 30 minutes after initial establishment of the epidural. Thereafter, intermittent auscultation every 15 minutes in 1st stage and 5 minutes in 2nd stage as in normal labour

9.12 Where an epidural is working well and the mother or birth parent's pain is well controlled with PCEA epidural analgesia, continuous EFM is only required for 30 minutes after the initial loading dose. When an epidural is not working sufficiently well and requires anaesthetic review, all bolus doses should be followed by continuous EFM for 30 minutes, or longer if there is haemodynamic instability

9.13 Contractions should be palpated abdominally regularly by the midwife and documented in the maternal or parental notes as to their strength, frequency and rate

10 Catheters

10.1 Women or person should be actively encouraged to attempt to void their bladder prior to insertion of the epidural

10.2 It is NOT necessary to routinely pass an indwelling urinary catheter on all women and people with an epidural. The aim is to maximise mobility as much as possible

10.3 Women and people without a catheter should attempt to pass urine at least 3-4 hourly in labour, on a bedpan if required. If they are unable to void then a catheter should be sited in order to prevent urinary retention and long term bladder damage

10.4 If labour is prolonged an indwelling catheter is more likely to be necessary

10.5 The denser the epidural block, the greater the risk of urinary retention being unnoticed

10.6 Where an indwelling urinary catheter has been inserted for labour it should be a 12FG Foley catheter with 10ml in balloon only. Deflate catheter balloon for vaginal birth

10.7 Consider re-catheterisation post-delivery for 6 hours or until can mobilise independently

10.8 It must be checked that the woman or person has passed urine following removal of the urinary catheter. See Maternity Protocol MP040: Bladder Care

11 Complications of epidural analgesia

11.1 Complications may include, but are not limited to:

- Hypotension or bradycardia

- High block
- Local anaesthetic systemic toxicity
- Accidental dural puncture +/- headache (PDPH)
- Intrathecal (spinal) catheter
- Neurological injury – please refer to section 9.9
- Pressure ulcer injury prevention – please refer to section 10.8

11.2 Hypotension or bradycardia

11.2.1 Hypotension < 90 mmHg systolic or maternal or parental bradycardia < 60bpm

11.2.2 Management:

- 02 10L/min by mask
- Turn woman or person onto left side
- Speed IV fluids.
- Stop epidural infusion
- Call Anaesthetist

11.3 High block

11.3.1 If woman or person complains of numbness in arms or difficulty breathing:

- Stop epidural pump and request anaesthetic review. Check maternal or parental pulse, blood pressure and level of block. If block above T6 this will require a more urgent anaesthetic review
- Ask woman or person to squeeze your hands and pull you towards them. If weak then remain with the woman or person and pull emergency buzzer. Give 02 10L/min by mask. Fast bleep anaesthetist and fetch resus trolley.
- The epidural pump can be recommenced after review and agreement with the anaesthetist

11.3.2 If woman or person stops breathing institute immediate resuscitative management (see below)

11.4 Immediate Emergency Resuscitative Management

- Call for help via emergency bell
- Call **2222** Ask for Obstetric Emergency Team and Cardiac Arrest Team
- Commence Basic Life support (A.B.C.)
- Give oxygen
- Lie flat with left tilt (wedge under R buttock)
- Obtain venous access x 2
- Initiate fluid resuscitation to correct hypotension
- Institute Advanced Life Support (intubation/ventilation/inotropes) for persistent hypoxia, hypotension or reduced level of consciousness

11.5 Local Anaesthetic Toxicity

11.5.1 This event usually occurs within 20 minutes of the administration of local anaesthetic. It may occur after inadvertent intravenous local anaesthetic or after a higher dose of anaesthetic in the correct place

11.5.2 Specific features:
Metallic taste in mouth or ringing in ears, confusion, disorientation and dyspnoea. Ptosis and miosis may occur followed by respiratory muscle paralysis, cyanosis, and apnoea. Cardiac arrest may occur due to anoxia or direct effect of the drug

11.5.3 Specific Management
Immediate Emergency Resuscitative Management (ABC as above)

11.5.4 Lipid rescue
The protocol is attached to the cardiac arrest trolley. The anaesthetist will advise in special management. (Usually 1.5 mL/kg of 20% Intralipid as an intravenous bolus followed by 0.25 - 0.5 mL/kg/min for 30 - 60 minutes to an initial maximum of 500 mL in an adult)

11.6 Accidental dural puncture during epidural insertion in labour, intrathecal (spinal) catheter and management of headache

11.6.1 Dural puncture occurs during the insertion of between 1 in 100 and 1 in 300 epidural catheters. It may occur with the Tuohy needle, or CSF may be aspirated from the epidural catheter. The volume of fluid flowing usually makes the diagnosis, but testing for the presence of glucose using urine test sticks can distinguish CSF from saline

11.6.2 Catheter migration is possible at any stage during the use of an epidural. All bolus doses should therefore be fractionated, so each dose is safe if the catheter is misplaced

11.6.3 Recognition of spinal catheter:

11.6.3.1 Fluid can be aspirated from the epidural catheter prior to giving a manual bolus (only the anaesthetist should do this)

11.6.3.2 The patient gets comfortable too quickly following a dose (usually within 5-10 minutes, rather than 10-15 minutes if drug is in the epidural space

11.6.3.3 The block is more dense than expected, eg. Legs begin to feel heavy after 1st dose only

11.6.3.4 Blood pressure drops lower than expected

11.6.4 Management

11.6.4.1 Recognised dural tap during epidural insertion: The epidural should usually be re-sited at another level. An intrathecal dose of local anaesthetic and opiate can be given prior to removal of a misplaced needle or catheter, but backflow may make this unreliable. Typically 2.5-4mg bupivacaine plus up to 20µg Fentanyl can be given (e.g. 2.5 - 4ml of low dose mixture). Occasionally, especially if the epidural procedure has been particularly difficult, the anaesthetist may decide to leave the epidural catheter in the CSF and manage pain using a 'spinal catheter'. In this situation, there will be no patient-delivered boluses and ALL top-ups will be given by the anaesthetist. This plan must be agreed by the responsible consultant anaesthetist.

11.6.4.2 Recognised intrathecal (spinal) location of catheter at any other time: if catheter migration is suspected, the PCEA button should be removed from the patient (and/or stop the epidural program on the pump), they should be sat upright, a full set of observations taken, block assessment performed and the anaesthetist should be alerted for urgent review.

11.6.4.3 Once an epidural catheter has been correctly sited, it must be clearly labelled "dural tap". All top ups are given by the anaesthetist until happy the epidural is safe to use normally (note, this point might not be reached). Drug may traverse the dura, so caution is required and top ups must be fractionated. The woman or person must be informed, and the likely consequences (risk of post-dural puncture headache) must be explained. Also inform the labour ward coordinator and obstetricians covering the labour ward. The consultant anaesthetist on in day time should review the woman or person. Document on Badgernet

11.6.4.4 Delivery/birth may proceed as normal. Extreme caution is required if a high dose top up is required for caesarean section. There is no contraindication to pushing in the second stage. Instrumental delivery and post-partum bed rest do not decrease headache incidence.

11.6.4.5 Following delivery the woman or person should be prescribed regular oral analgesia, and encouraged to drink as much water as possible. Laxatives should be prescribed to limit constipation and straining. The OAA leaflet on post-dural puncture headache should be given to any woman or person with a headache which might be a PDPH. Early review by a consultant anaesthetist is required and a blood patch should be offered for symptoms of post-dural puncture headache.

11.6.5 Post-partum headache

This may be due to a range of causes. These include:

- Fatigue
- Dehydration
- Dural puncture (either with an epidural or spinal needle).
- Migraine
- Infection
- Pre-eclampsia
- Intracranial pathology including tumour, haematoma and cortical vein thrombosis.

11.6.6 A full history and neurological examination must be taken to establish the diagnosis. The PDPH presentation form should be completed on Badgernet. Further follow up IS required for this presentation, and so theywill move to the PDPH follow up list on BadgerNet for subsequent follow ups. Appropriate investigations and treatment will be organised by the relevant medical staff, depending on the likely diagnosis.

11.6.7 Dural puncture headache is usually a frontal or occipital headache extending to the neck and shoulders. It is worsened by standing and relieved by lying down. It may occur following spinal anaesthesia, and in the absence of a diagnosed dural tap. About 70% of headaches due to dural puncture resolve in the first week, but if the headache limits a woman or person's ability to care for their child, the consultant anaesthetist may recommend a blood patch.

11.6.8 A Blood patch is best formed at least 24-48 hours post-delivery. Late patching is associated with a lower re-patch rate but the timing decision will also depend on the severity of the headache. Headaches are completely relieved 50% of the time after the first patch, with a requirement for re-patching of 30-40% depending on the timing of the first patch.

11.6.9 All women and people who have a confirmed or suspected dural puncture, with or without headache, should have this communicated to their GP. There is a standard letter template which should be completed and sent to the GP (Appendix B)

11.6.10 All women and people with a suspected PDPH should be given a patient information leaflet. National leaflets can be accessed through the following websites:

- https://www.labourpains.com/assets/_managed/cms/files/Headache_after_epidural.pdf
- https://www.rcoa.ac.uk/sites/default/files/documents/2019-11/10-HeadachesSpinalEpiduralweb.pdf

12 Training

Please refer to the Training Needs Analysis document for details on staff training in relation to this protocol.

Please refer to the Monitoring and Auditing document for details on monitoring compliance

13 References

National Institute for Health and Care Excellence. Clinical guideline [CG190]: Intrapartum care for healthy women and babies, 2014 (revised 2017). London: NICE, 2017. https://www.nice.org.uk/guidance/cg190

Management of Postdural Puncture Headache, OAA December 2019 https://www.oaa-anaes.ac.uk/Clinical_Guidelines

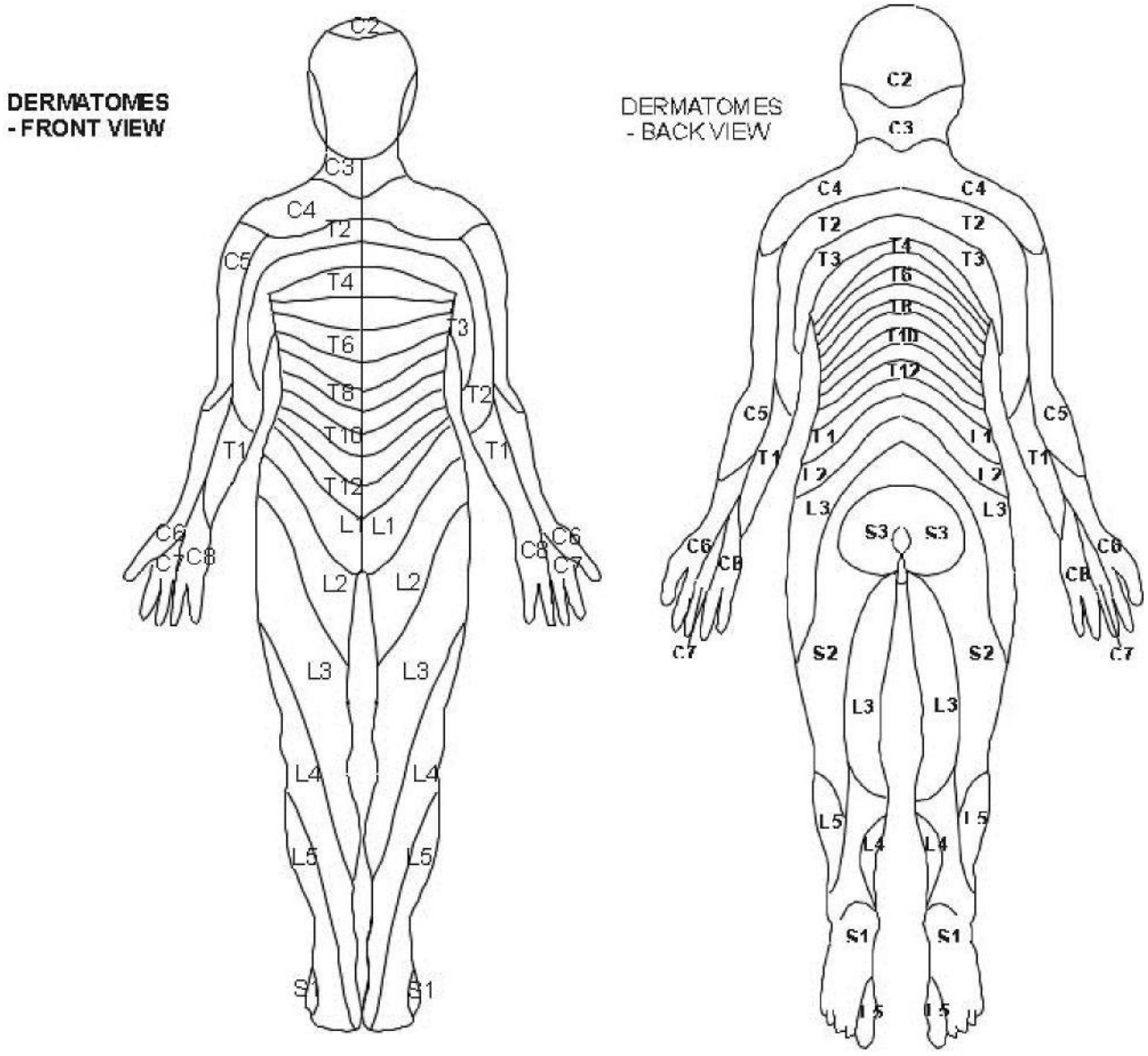
Raising the standard section 06, obstetric services. RCOA www.rcoa.ac.uk

National Institute for Health and Care Excellence. Clinical guideline [CG190]: Intrapartum care for healthy women and babies, 2014 (revised 2017). London: NICE, 2017.

Monteiro, Salman, Malhotra and Yentis. Analgesia, Anaesthesia and Pregnancy – A Practical Guide London: CUP, 2019, pp78-86, 143-158.

Yentis SM, Lucas DN, Brigante L, Collis R, Cowley P, Denning S, Fawcett WJ, Gibson A. 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.

Appendix A: Dermatomes – Front & Back View



Appendix B Post-natal review of any mother or birthing parent with a Headache after regional anaesthesia

Dear General Practitioner

This person was recently admitted under the obstetric team for delivery of their baby. During their stay a member of the anaesthetic team performed a spinal/epidural block. As a complication of this procedure they unfortunately developed a post dural-puncture headache.

- This headache didn't settle with conservative management including simple analgesia and hydration, so an epidural blood patch was performed in order to treat it. This involves sterile injection of autologous blood into the epidural space which clots and stops the CSF leakage. The headache improved and the patient agreed to continue with conservative management.

Should this patient present to your practice with headaches in the near future please be aware that post dural-puncture headaches can recur, despite the initial success of a blood patch/conservative management. The headache is typically fronto-occipital, aggravated by sitting, standing, coughing or straining and relieved by lying down. Associated symptoms can include nausea, tinnitus, photophobia and vertigo. They have been informed to contact us at the hospital should they develop any further problems and will be followed up by telephone over the next few days. Other causes of headaches should obviously still be considered.
Details of the procedures are recorded below.

Date of delivery:	
Site of Delivery	Royal Sussex County Hospital / Princess Royal Hospital
Anaesthetic procedure:	Epidural / Spinal / combined spinal epidural
Reason for procedure:	Labour analgesia / Caesarean Section
Date and any relevant details of blood patch:	

If you have any further questions or they require a review by our team please contact the on call
obstetric anaesthetist via the Princess Royal Hospital switchboard 01444 441881 bleep 6327, or Royal
Sussex County Hospital switchboard 01273 696955 bleep 8140
You will receive a further discharge summary from the obstetricians with details of the birth.
Yours Sincerely

Name: Date: