Western Health

Department of Anaesthesia, Pain and Peri-operative Medicine

Handbook of Obstetric Anaesthesia

Updated December 2023

Forward

This handbook has been produced by the Western Hospital Department of Anaesthesia and Pain Medicine to assist staff with obstetric anaesthesia. Along with local guidelines and procedure documents available on PROMPT (see appendix for list of those commonly used), it should assist rotating staff to be aware of local practices. Trainees are expected to conform to the guidelines closely and liaise with consultant anaesthetists regularly. These guidelines do not replace clinical judgment; the patient's best interest is always the priority.

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Introduction to Obstetrics at JKWC

A warm welcome to Joan Kirner Women's and Children's (JKWC). With over 6700 births here in 2023, prepare yourself for a very busy rotation in obstetrics! While some patients require referral to a tertiary center for obstetric or neonatal reasons, there are a significant number of complex patients that are managed at JKWC. Many of these are expected, but some are only recognised at the time of delivery. With the expansion of the special care nursery and the intensive care unit at Sunshine, the acuity of parturients continues to rise. The obstetric team often refers high risk patients for pre-anaesthetic assessment.

Western Health Anaesthesia Phone Book

Staff can access many of the regularly used numbers for your rotation via the following link:

https://wh.cyphix.net

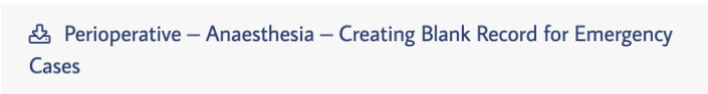
EMR Quick Reference Guides (QRGs)

Staff can access help with EMR from anywhere using the following link to the most up to date QRGs:

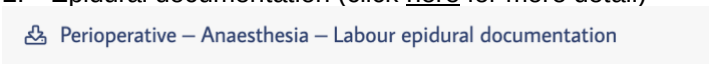
https://digitalhealth.wh.org.au/quick-reference-guides/

All anaesthesia QRGs are under P for 'Perioperative-Anaesthesia'. Most relevant to obstetrics are the following:

1. Helpful during code green/emergency C -sections to get started quickly:



2. Epidural documentation (click here for more detail)



Mandatory consultant notification

Below is a list of obstetric conditions where a consultant anaesthetist must be informed. Their level of involvement will vary depending on the condition of the patient and the experience of the trainee on duty.

Obstetric conditions

- Code Green and Cat 1 CS (immediate CS)
- CS under general anaesthesia
- Anticipated difficult CS (3 or more CS, known fibroids, past difficult)
- Pregnancy induced hypertension requiring IV antihypertensives
- Pre-eclampsia
- Placenta praevia (or accreta, increta, percreta)
- Antepartum haemorrhage
- History of postpartum haemorrhage
- Multiple pregnancy
- Intrathecal catheter (suspected or confirmed)
    - Including high block/motor block after epidural insertion

Maternal conditions

- Obesity (BMI > 45)
- Anticipated difficult airway
- Pre-existing coagulopathy
- Significant cardiovascular or respiratory disease
- Any other concerns expressed by anaesthetic or obstetric staff

Epidural Analgesia in Labour

Trainee competency program

There is a structured process for competency in epidural analgesia in labour for all trainees at JKWC. This handbook is the main reference. However, trainees are encouraged to undertake further reading of formal PROMPT documents as well as the references noted in the epidural quiz and Appendix 3.

The competency program includes:

1. **Epidural Quiz:** Click here
    a. All registrars working at JKWC are required to complete the quiz once during their training.
    b. The quiz should be completed at least 2 weeks prior to the term start date.
    c. The answers are available within this handbook as well as in the references attached to the quiz. Trainees can review their answers immediately after submission and will receive individual feedback if required.

2. **Orientation**
    a. All trainees are to attend a JKWC orientation session on Day 1 of term as part of onboarding.
    b. All ITs, trainees completely new to epidurals and other trainees available and interested are to attend a simulated epidural session Day 2 of term

3. **Supervised epidurals**
    a. Only fellows and consultants are permitted to provide epidural supervision for the purposes of competency training.
    b. Supervision should encompass the whole epidural process including history, consent, positioning, room management, the procedure and post procedural care.
    c. The number of supervised epidurals required depends on level of epidural experience as per the below table:

Trainee group	Minimum number of required supervised epidurals
○ Introductory Trainees ○ Completely new to epidurals	10
○ Have not done an epidural competency program elsewhere (trainee to provide details) ○ < 30 epidurals	5
○ None of the above ○ Not worked at JKWC in the last 2 years	1
○ Completed epidural competency at JKWC in the last 2 years ○ Post Part 2 examination Fellows ○ ED/ICU trainees (as do not rotate to JKWC)	0

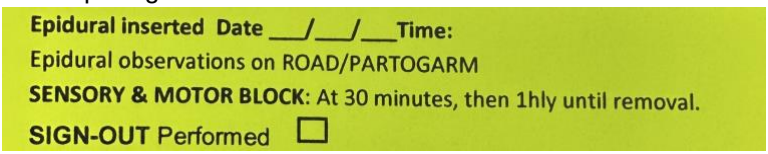
d. An electronic assessment form must be completed for each supervised epidural. Access this via the QR code on each epidural trolley and in the JKWC anaesthetic office or by clicking here. There is also a QR code on the epidural trolleys on birthsuite for this form.

An obstetric SIG member will contact all trainees before the start of the term to ascertain their level of obstetric experience and send the competency package material. Please take initiatives to complete supervised epidurals prior to being rostered onto after hours epidural shifts.

Epidural referral process and workflow

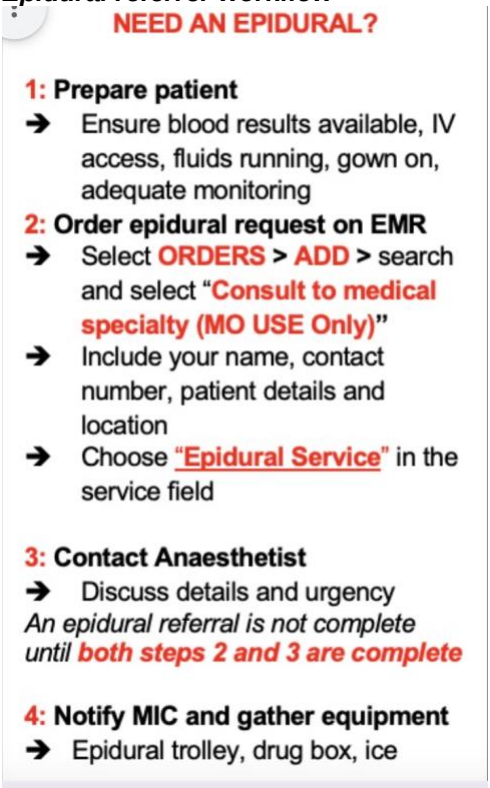
Please refer to the Obstetric Epidural Analgesia Procedure Document available on PROMPT for more detail. All referrers have received education in this, but new staff may need gentle prompting. In summary:

- The midwife will prepare the patient (ensuring necessary blood results available, iv access, fluid running, gown on and adequate monitoring) and notify the midwife in charge of the epidural request.
- A referral to anaesthetics from the midwifery or O&G team comprises two necessary steps:
    a. EMR order including patient details: (ORDERS > ADD> 'Consult to Medical Specialty: Epidural Service)
    b. Call to the anaesthetics pain registrar phone 53221 to discuss the referral. The pain registrar should confirm step 1 and 2a has been done or in progress during this phone call.
- Once the discussion has occurred, anaesthetics should click 'acknowledge' on the EMR task list and make their way to birth suite within 30 minutes of acknowledgement. If there are anticipated delays, escalation should occur to the co-registrar and, whenever necessary, the consultant in charge.
- Anaesthetics will conduct a pre-procedural consult and consent prior to performing the procedure (see section).
- Perform EMR steps of documentation (see section)
- Ensure patient is comfortable and observations stable.
- Perform sign out prior to leaving the patient in birth suite:
    a. Perform and document a sensory and motor assessment with the midwife
    b. Instructions for the epidural (connect PCEA now or wait until sensory level at x, notify me if y)
    c. Complete and place the yellow sign out epidural sticker on the partogram



    d. Handover of ongoing mandatory epidural observations to midwifery (see section)
- Day 1 after delivery, perform epidural check ward round and provide education card. Remove patient from EMR tasklist (by selecting 'complete') if all discharge criteria are met. Ensure all epidural related potential complications are reported to the anaesthetist in charge and JKWC pain team (see section)

Epidural referrer workflow



Epidural referrals requiring consultant input

The following referrals require consultant notification and input. The degree of input will depend on the level of epidural experience of the trainee and scenario factors. All ITs/BTs early in the term should seek direct supervision in these situations.

- BMI > 40
- Borderline (<100) or rapidly falling platelet count from any cause, particularly if HELLP suspected
- Coagulopathy
- Severe anaemia
- Significant lumbosacral spine anatomical pathology
- Neurological disorders

- APH during admission
- Significant current infection (obstetric and non-obstetric)
- Epidural for Foetal Death in Utero (FDIU)
- Previous PDPH
- Previous failed epidural
- Significant concern for foetal wellbeing
- If the patient will not receive care within 30 minutes of an epidural request (including multiple simultaneous requests).
    - The birth suite is aware that we will endeavour to be there within 30 minutes of EMR referral and phone call but up to 60 minutes in exceptional circumstances (ie waiting for consultant to arrive from home)

All trainees are always encouraged to seek supervisor input early for any challenging epidural, even outside of these criteria. All consultants are happy to help at any time to support trainee learning and patient safety.

Mandatory consultant escalation/notification during epidural insertion

- More than 2 attempts or >20 minutes attempt time
    - attempt: significant re-angulation or complete restart of procedure. Attempt starts at first Tuohy insertion
- Suspected or confirmed intrathecal or subdural catheter
    - Including high block (<T4) or motor block (Bromage 2-3)

Indications and contraindications

Epidural analgesia is the most effective form of analgesia available to laboring women. About two thirds of normal, healthy pregnant women suffer severe or intolerable pain during labor. The most common indication for epidural analgesia in labor is maternal request. However, parturients may be encouraged to have an epidural for the following indications;

Medical indications

- Diabetes Mellitus
- Obesity
- Difficult airway
- Significant cardiovascular or respiratory disease

Obstetric indications

- Pre-eclampsia and other hypertensive disorders of pregnancy
- Twin pregnancy for vaginal delivery
- Breech presentation for vaginal delivery
- Premature or prolonged labor
- Anticipated instrumental delivery

Contraindications

Absolute: Patient refusal

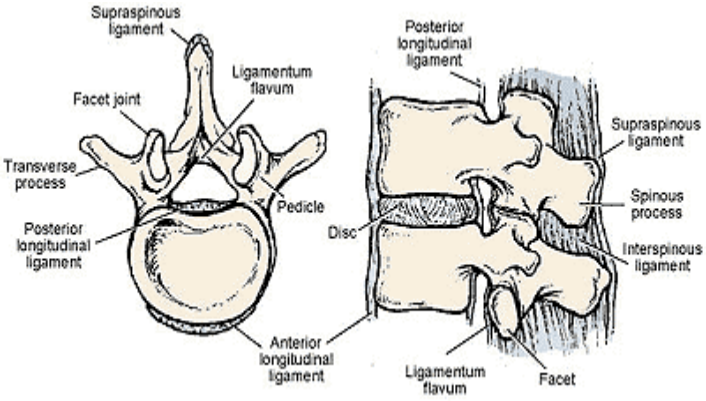
Relative contraindications:

- Local sepsis at epidural site
- Uncorrected hypovolaemia or conditions of fixed reduced cardiac output
- Coagulopathy
  - Platelet count < 70 000, or < 100 000 but rapidly falling
  - APTT > 8 seconds prolonged
  - PT/INR > 1.4 x control
  - In severe pre-eclampsia laboratory results must be less than 6 hrs old
- Thromboprophylaxis / Treatment
  - Heparin 5000 s/c within last 6/24
  - Prophylactic dose low molecular weight heparin within 12/24
  - Therapeutic dose low molecular weight heparin within 24/24
  - Times may need to be longer in the setting of impaired renal function (including in pre-eclampsia)
- Temperature > 38.5 in presence of bacteraemia
- Foetal distress. This may require management first

There may be occasions when an epidural is considered desirable or necessary despite the presence of one or more of these relative contraindications. Discussion with a consultant anaesthetist must take place prior to any epidural attempts if this is the case. PLEASE NOTE that a patient with previously known normal coagulation and platelet count and no concerns regarding hypertensive disorders in pregnancy does not routinely require bloods prior to epidural insertion.

Epidural space anatomy

The spinal cord terminates at approximately L1 in adults and L3 in infants
The line joining the iliac crests (intercristine or Tuffier's line) is approximately at the L3/4 level
The subarachnoid space ends at approximately S2 in adults.
The subarachnoid space extends laterally along the nerve roots to the dorsal root ganglia
There is a potential space between the dura and the arachnoid mater (the subdural space)
The epidural (extradural) space lies between the walls of the vertebral canal and the spinal dura mater. It is a potential low-pressure space, occupied by the spinal nerve roots, areolar tissue, loose fat, and the internal vertebral venous plexus
The ligamentum flavum is thin in the cervical region, reaching maximal thickness in the lumbar region (2–5mm)
From superficial to deep the layers which must be traversed are skin, subcutaneous tissue, supraspinous ligament, interspinous ligament, ligamentum flavum, epidural space
The average depth to the epidural space in adults is 4-5cm. However this is variable depending on body habitus.
One aims to identify these layers as the Tuohy needle is advanced to ascertain when loss of resistance should be expected



Patient assessment and consent

Communication skills throughout

- Maintain professional manner with obstetric and midwifery staff
- Introduce self and establish rapport
- Display empathy with patient's discomfort and experience of labour
- Maintain dialogue throughout procedure
- Interact with and manage partner or other support persons as required

Patient assessment (from patient and staff)

- Anaesthetic history, particularly previous epidural experience and education
- Past obstetric history (including mode of delivery)
- History of current pregnancy (including gestation, parity, abnormal lie or placentation, diabetes and/or hypertensive disorders)
- Progress of labour
- Indication for epidural and any contraindication (check MAR for antithrombotics)
- Relevant examination including airway
- Relevant past medical history
- Note BP and volume status, especially in patients with pre-eclampsia. Establishment of epidural blockade in the presence of intravascular depletion can cause profound hypotension, and foetal distress.

Explanation and consent

- Explain procedure including requiring intravenous line and urinary catheter.
- Discuss risks and benefits. Many women will have limited recall of the discussion, thus it is preferable if a support person is present. This should not preclude from proceeding. Written patient information may be useful (consider labourpains.org) . Discussion of the mechanism of complications (e.g. causes of neurological damage or the mechanisms of PDPH) is not necessary unless specifically requested.
- Answer questions and obtain consent.

Risks and Complications

Minor

- Headache related to posture, may require epidural blood patch. Risk 1/100
- Back pain. Tenderness at site for 24/24. Prolonged back pain lasting 3-6 months occurs in about 20% of all pregnant women. It is most commonly unrelated to epidural placement.
- Neuropraxia up to 1/1000. Only about 5% of these are related to epidural placement. Risk factors include prolonged 2nd stage, instrumental delivery and macrosomia.
- Shivering
- Pruritus
- Inadequate analgesia. Risk 1/10, most are salvageable.
- Block failure and need to repeat procedure.
- Increased second stage of labour and increased incidence of instrumental birth (but not C-section)

Major

- Permanent neurological damage. Risk varies; 1/13000 – 1/166667
- Epidural abscess 1/50000
- Epidural haematoma 1/170000
- Need for urgent general anaesthetic and CS. (seizure due to LA toxicity, high block or total spinal, severe foetal distress) 1/5000

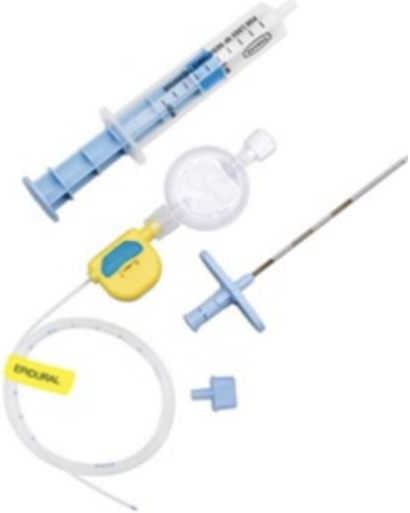
Alternatives

- ***Nitrous oxide****.* This can be effective if started 1 minute before the onset of painful contractions. This is best achieved by getting the partner or midwife to feel for tightenings. Approximately 50% of women will have some benefit, but 30% of women may find it completely ineffective.
- ***IM Opioid****.* Women in labour are commonly prescribed oral opioids and intramuscular morphine. This alone is effective in about 60% of patients, with the commonly known side effects. The dose is usually timed to be at least three hours before delivery to avoid foetal respiratory depression. Morphine may be administered with nitrous oxide; however there is a risk of hypoxia between contractions, due to a combination of respiratory depression and diffusion hypoxia.
- ***PCA fentanyl****.* Made up to a concentration of 10µg/ml (1000µg in 100mL normal saline) with no background, a bolus of 20 µg and a lockout of 5 minutes. The bolus dose may be increased if necessary.
- ***CSE (combined spinal epidural).*** Has slightly faster onset than epidural alone but associated with more pruritus and risk of untested epidural catheter. Consider this technique in late

multiparous women, repeat procedures for failed epidurals, anticipated operative or instrumental delivery and CS where an epidural is indicated for post-operative pain management. Suitable doses include *0.5% Bupivacaine 0.5mL made up to 3mL with saline*. There should be discussion with a consultant anaesthetist if this is felt to be necessary, especially for junior registrars.

Epidural equipment

At JKWC, the standard epidural kit used is the Portex System. 16G and 18G Tuohy's are available, with 18G Tuohy's being more commonly used. These kits come with a LockIt Plus device.

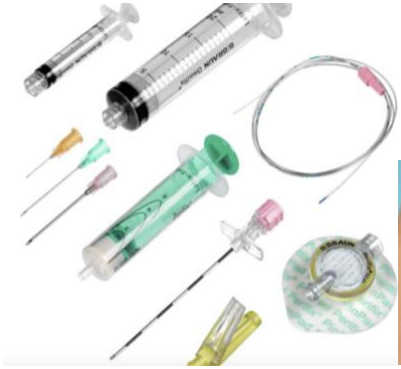


Portex Epidural (18G)

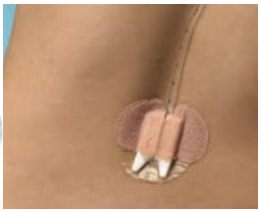
Lockit Plus

Note: needle tip to hub 8 cm, first length mark on needle is 3cm, subsequent length marks on needle 1 cm. First length mark on catheter is 5cm.

the Bruan Epidural Kit is also in circulation at JKWC and often utilized when there are stock issues with the Portex or if there is a preference for this kit. We encourage you to be familiar with both kits.



Braun Epidural (18G)



Epiguard

Key differences with the Braun kit include:

- Tuohy has 1cm markings immediately from tip
- Catheter markings are 1cm more distant than the portex. The first thick line is 6cm and the second is 11cm. The reason for this is that the injectate sprays out along the length of the last 1 cm of the epidural catheter rather than at the tip of the portex catheter. The recommendation is to document as per the portex and ignore the last 1cm.
- threading assist device is loaded on the catheter
- catheter considered more stiff than portex, theoretical risk of more dural puncture.
- catheter connector is different ('snap' connector)
- fixation device not included in kit

Please remember to secure the epidural catheter well to dry skin with a fixation device to avoid dislodgement. Lockit devices are available separately as well as within the Portex kits. Alternatives are available including the epiguard (click here for video on how to use). Utilise tegaderm and hypafix for the window/catheter. Consider tunneling if dislodgement is particularly unacceptable. All filters/yellow catheter clips must be secured tightly and reinforced with tegaderm to deter from disconnection and infection exposure.

Long epidural needles are available (usually within the epidural trolley or via theatre) as our CSE kits from both brands.

The epidural procedure

Room and time management

- The management of a patient in significant pain in an off the floor unfamiliar environment with unfamiliar staff can be stressful.
- We should aim to be as efficient as possible without sacrificing patient safety. Set time expectations early and provide clear instructions to assisting staff. Never rush critical components of the procedure.
- Please ensure ANZCA roles in practice are displayed at all times.
- Have a low threshold to call for extra assistance from the midwife in charge, anaesthetist in charge, JK pain nurse, your co-registrar or theatre staff if available. After-hours, consider your co-registrars on duty, an anaesthetic assistant if theatre staffing permits and in consultation with the theatre nurse in charge.

Preparation and positioning

- Assess patient and obtain consent as per previous section.
- Ensure safe environment and assistance as discussed above.
- Check location and availability of resuscitation equipment
- Obtain epidural drug trolley, drugs required for epidural (local anaesthetics in drug room, schedule 8 drugs in the DD safe inside the drug room)
- Ensure baseline monitoring appropriate, including CTG.
- Ensure adequate IV access (at least 18G) and running line. Fluid loading may occur prior to or whilst insertion of epidural taking place (average 500mL crystalloid but depends on patient condition and any other co-morbidities such as pre-eclampsia). However, fluid loading is not essential in euvolaemic women. Should be considered in patients at risk of non-reassuring FHR, as should careful positioning avoiding aortocaval compression post procedure.
- Position appropriately as per anaesthetist and patient preference
    - Sitting: middle of bed avoiding gaps, pelvis square and level, supported
    - Lateral: edge of bed, back perpendicular
    - Height of bed appropriate
    - Back curled and patient supported
- Full aseptic technique
    - Aseptic hand wash or alcoholic hand-rub
    - Mask, gloves, gown
- Prepare sterile field and lay out equipment

- Skin prep
    - 0.5% Chlorhexidine and alcohol swab stick by assistant, allow to dry completely.

Room management

- The management of a patient in significant pain in an off the floor unfamiliar environment with unfamiliar staff can be stressful
- Please ensure ANZCA roles in practice are displayed at all times.
- Have a low threshold to call for extra assistance from your co-registrar, theatre staff or your consultant at any time to ensure safe provision of epidural analgesia

Performing the epidural & test dose

- Drape while maintaining asepsis
- Identify landmarks
- (Re)Identify the epidural space (some do this prior to scrubbing with a rehearsal of positioning and mark out the relevant surface anatomy including C7/Tuffier's line/the midline/ spinous processes of interest ie L3/L4/L5/S1)
- Confirm and reinforce appropriate patient positioning
- Maintain dialogue with patient and explain upcoming procedure
- Infiltrate with local anaesthetic and use 23G / 25G needle to assist in identifying space and anatomy. Resistance to injection suggests placement in a ligament
- Insert epidural needle and advance into ligament
- Attach saline filled syringe
- Advance needle and syringe in controlled fashion into ligamentum flavum with constant pressure on plunger. Aim to advance into the epidural space when the woman is not having a contraction. Avoid stop/start techniques (if needed to traverse tough ligament, great care and tiny increments are required). Ensure adequate bracing with non-dominant hand along patients back to mitigate against the risk of the needle jumping.
- Identify loss of resistance and release pressure on the plunger and needle.
- Detach syringe and assess that there is no obvious flow of CSF to indicate obvious intrathecal position of needle tip noting this is not always seen with intrathecal placement.
- Note depth epidural needle to space

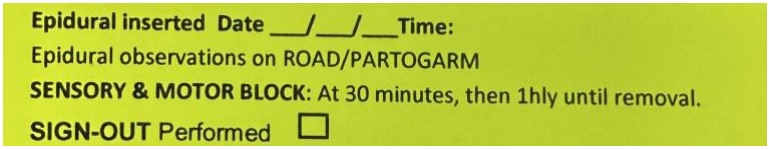
- Consider injecting 5 mL of saline into epidural space, this reduces the risk of vascular cannulation (Mhyre JM et al, Anesth Analg 2009; 108: 1232-42)
- Place catheter (warn patient of possible transient paraesthesia), note depth to epidural space. Avoid threading catheter during a contraction as this can increase the incidence of vascular cannulation.
- Thread catheter to 4-5 cm past depth of Tuohy (leave a minimum of 3cm in, more in obese patients)
- Remove needle carefully while maintaining catheter position
- Ascertain catheter position (raise above patient's head, watch for meniscus drop noting there may not be a drop during contraction, ask patient to cough to see meniscus bounce. Then drop catheter to below insertion point, wait for blood / CSF)
- Aspirate catheter before injection of a bolus dose for CSF and blood. Any aspiratable fluid can be checked to be CSF by dipstick testing for glucose though this is not always reliable. All freely aspirating fluid should be assumed to be CSF and the catheter treated as intrathecal.
- Affix filter
- Inject safe, initial test dose (e.g. 0.2% Ropivacaine 5mL +/- up to 100 ug of fentanyl). Exclude intrathecal / intravascular placement by questioning and examining the patient for signs of intrathecal administration (motor block, **unexpectedly quick analgesia**) or intravascular injection (signs of systemic analgesia, LAST)
- Specifically question for the following symptoms:
  Heavy legs
  Hot feeling in bottom
  A metallic taste in the mouth
  Higher block
  Tingling of the lips, buzzing ears, lightheaded
- Aspiration of the catheter is not in itself a 100% reliable test for CSF or blood
- High block or total spinal may be delayed for up to 20 minutes. Test and document sensory level. If higher than anticipated sensory level, have a high level of suspicion for an intrathecal catheter
- The presence or absence of tachycardia when using adrenaline containing solutions is also not a reliable test of intravascular injection in labour
- Fix catheter securely with LockIt Plus™ dressing and sterile tegaderm on top.
- Place tegaderm over filter and catheter clamp to discourage inadvertent disconnection between filter and catheter clamp

Establishment of block/Epidural loading

- Reconfirm no symptoms or signs of intrathecal or intravascular block.
- Dose with safe increments (5mL of 0.2% Ropivacaine, 5 minutes apart. Aim to give a total of 10 – 15mL of 0.2% Ropivacaine with up to 100 microg fentanyl total (including test dose))
- Confirm monitoring of CTG and maternal BP. **Blood pressure should be measured every 5 minutes for 30 minutes. The anaesthetist should remain on birthsuite until block established and patient stable.** BP should be kept within 10-20% of baseline as placental circulation is not autoregulated.
- Confirm adequacy of analgesia – as part of sign out, test the block with ice for height and evenness after 20-30 minutes. Document this initial sensory level and a Bromage score in the epidural powernote. Remember, we are only aiming for a sensory upper level of T10 for labour analgesia and a Bromage of 0-1. At times, epidurals are initially loaded to a slightly higher upper sensory level of T8 to allow for the time for connection of the PCEA.

Sign out (clinical handover to midwife of epidural prior to leaving patient)

- Any complications or concerns regarding epidural and alterations to management (ie indicators for escalation, how to contact)
- Check sensory and motor level with midwife and ensure documentation on the epidural powernote.
- Confirm timing for PCEA to be started with clear instructions including handover of ongoing mandatory epidural observations to midwifery(see section)
- Ensure sign out box ticked on completed epidural sticker on partogram



Troubleshooting

Can't find the epidural space:

- Sit the patient up, if not already. Recheck and optimise position.

- Consider using ultrasound (and calling for help) if landmarks not palpable
- Identify the spinous process above and below with a 23G needle
- Insert the epidural needle just below the spinous process above, or try the interspace above or below
- If bone is encountered, ask the patient whether they feel it more on the left or on the right and then re-orientate the Tuohy
- Consider a paramedian approach, 1 cm lateral to the midline opposite the spinous process, advance along the spinous process until lamina is encountered. Then walk the needle up in a cephalad and slightly medial direction until it passes into the interlaminar space.
- **If you cannot find the epidural space after 2 attempts, 20 minutes or the patient is distressed, call the consultant anaesthetist.**

Setting up the Patient Controlled Epidural Analgesia (PCEA)

PCEA protocols are used in the labour wards for maintenance of epidural analgesia. PCEA without background infusion reduces local anaesthetic use and is associated with less motor block and the need for anaesthetic intervention when compared with continuous infusion. Intermittent mandatory boluses are an upcoming proposed program change.

Once the block has been established, common settings for the Bodyguard infusion pump are:

100mL pre-mix bag of 0.2% Ropivacaine with 2 mcg/mL fentanyl Bolus dose of 5mL Lockout of 15 minutes 4 hour dose limit of 60mL

This dose should be sufficient for most women. Assess the block and check that the catheter hasn't moved from the depth it was left at if called to give a top up because the woman has reached the 4 hour dose limit.

Management of immediate complications

Hypotension

BP should be maintained more aggressively than in general surgical patients. Maternal BP has a direct effect on placental circulation (which is not autoregulated) and foetal wellbeing. The BP should remain within 20% of baseline and ideally 10%. Patients with severe pre-eclampsia often need a slightly higher BP than normal to maintain placental perfusion. **Anaesthetists must remain available after epidural placement to treat this.**

Causes:

- Sympathetic block (can be dose related or secondary to subdural/intrathecal placement)
- Aorto-caval compression
- Dehydration
- Blood loss (may be concealed ie abruption)
- Vasodilatation i.e. MgSO4
- Rare; embolus, anaphylaxis

Management

- O_2 via mask
- IV fluids
- Left lateral position
- Metaraminol 0.5mg (preferable) or Ephedrine 6 mg every 2 min to 30 mg
- Check block height and other causes
- Monitor foetus
- Call for assistance if not resolving

Bloody tap

If blood comes down the Tuohy, resite at a different interspace.
If blood in catheter, flush catheter with saline and aspirate as catheter is withdrawn until no blood can be aspirated. If 3 cm of catheter is still in the space then proceed cautiously with a test dose. Any less will require re-siting.
A 5 mL bolus of normal saline down the Tuohy needle before insertion of the catheter will decrease the risk of cannulation of epidural veins.

High block & total Spinal

It is mandatory to call the consultant in charge or on call at JKWC if the block is unexpectedly high (T4 and higher)

The ideal height of an epidural in labour 10-20 min after loading with up to 15 ml of 0.2% Ropivacaine (including test dose) is about T10 bilaterally. The cause of an unexpectedly high block may be:

- Inadvertent subarachnoid or subdural placement of catheter
- Patient factors e.g. short stature, obesity, multiple pregnancy, spinal deformity
- Wrong drug e.g. more concentrated ropivacaine or bupivacaine
- Pump programming error
- A subdural catheter can be difficult to diagnose. One should suspect a subdural catheter if the block is unexpectedly high for the amount of local anaesthetic given, with relative sparing of motor and sympathetic nerves. Onset can be slow (15 – 30 minutes) and it is often patchy. Discuss with a consultant anaesthetist.

Management of High Block:

- Cease infusion, sit patient upright if tolerated
- Initiate ALS if indicated
- Atropine for bradycardia
- Vasopressors for hypotension
- Reassure the patient and explain what has happened
- Administer O_2
- The block may continue to rise so ensure resuscitation equipment is available
- Monitor foetus
- Aspirate catheter to check for subarachnoid placement.
- Remain with the patient until block is decreasing, notify anaesthetist in charge.
- Subsequent infusions should be ceased until the block has dropped below T8 and then any subsequent infusion or bolus given cautiously. Consider a 3mL dose to 2% lignocaine to ascertain location of catheter (avoid if suspect intrathecal).

Clinical manifestations of a total spinal:

- CVS- hypotension, bradycardia, apnoea, desaturation
- Neurological- nausea/anxiety, arm/hand dysaesthesia or paralysis, loss of consciousness
- In the event of ***total spinal***, decreased GCS or respiratory distress
  - Call anaesthetist in charge and maternal code blue
  - O_2
  - RSI and intubation
  - Fluids +/- vasopressors to maintain BP
  - Lateral tilt
  - Foetal monitoring
  - Amnestic i.e. midazolam
  - The patient will usually require ventilation for about 2 hours. CS is usually not required unless foetal distress occurs.

Unilateral or patchy blocks

Incidence is about 10%. Assess the block. Check the catheter to see if it has moved.

For unilateral blocks:

- Under aseptic conditions, pull the catheter back leaving a minimum of 3cm in the epidural space.
- Bolus the catheter. Ensure the maximum dose over 4 hours is ropivacaine <3 mg/kg. Start with 5-10 mL of the premix bag. Occasionally a more concentrated local anaesthetic may be used

such as lignocaine 1 or 2%; remember this will not compensate for a poorly working epidural.
- Consider bolusing the catheter with the unblocked side down; this can be difficult if the woman has severe pain or is distressed and not always effective.

For patchy blocks or perineal pain:
- This can be difficult to treat.
- Additional opioid, i.e. 50-100 µg fentanyl made to 5 mL with saline. Cumulative opioid dose limit is 1 µg/kg fentanyl per hour.
- Bolus sitting up with 10mL of the premix bag.
- If the above does not result in satisfactory analgesia, resite catheter
- Consider CSE.
- Supplement analgesia as described in alternatives. If PCA fentanyl is used, fentanyl should be removed from the epidural solution and changed to a plain local anaesthesia solution.

Failed epidural analgesia

Defined as no block after apparently satisfactory attempt or inadequate analgesia despite manipulation.
- Test with 5mL of 2% lignocaine.
- Assess the presence of motor block.
- If no block, resite epidural and consider CSE at this time

Local Anaesthetic Toxicity (LAST)

Management depends on whether the patient has mild or severe symptoms and signs of local anaesthetic toxicity. Mild local anaesthetic toxicity may present with:
- A metallic taste in the mouth
- Tingling of the lips
- Buzzing in the ears
- Light-headed feeling

Patients presenting with mild local anaesthetic toxicity should have their vital signs and the foetus monitored. Usually this is due to intravascular local anaesthetic injection but occasionally is due to total dose given. The total doses of local anaesthetic administered as well as the location of the catheter should be ascertained. No further local anaesthetic should be given until symptoms resolve. Inform the consultant anaesthetist and consider re-siting the epidural catheter.

Severe local anaesthetic toxicity may present with seizures or cardiovascular collapse. This is an emergency; call for assistance, manage the woman as per ALS guidelines and expedite delivery of the foetus. See ANZCA endorsed guideline re management of LA toxicity and intralipid therapy and Appendix 2:

http://www.aagbi.org/sites/default/files/la_toxicity_2010_0.pdf

Dural puncture

All patients with known or suspected dural punctures should be reported to the Anaesthetist in Charge and details emailed to Priya Rao and Davina Taylor.

Option 1: insert intrathecal anaesthesia and administration of intermittent local anaesthetic for analgesia

- Ensure appropriate monitoring and instructions for care:
    - Haemodynamic maternal & foetal monitoring commensurate with subarachnoid block.
- No medications to be administered via the catheter by non-anaesthetic staff. **Do not initiate infusion or PCEA**.
- Surveillance for development of PDPH by midwifes & APMS.
- Clear documentation and labelling of the catheter as intrathecal.
- The Anaesthetist doing the procedure is responsible for administration and documentation of intrathecal catheter medication and handover.
- Remain available for top-up of intrathecal catheter as required & documentation of same.
- Duration of Intrathecal catheter: catheter to be removed after completion of 3rd stage, or after perineal repair or after completion of ceasarean delivery, whichever is the later.
- Intrathecal catheters are not to be left in situ for longer than 24 hours for the purpose of reducing the risk of PDPH as evidence for this is conflicting and the risks of leaving the catheter in situ outweigh the benefits.

Option 2: administer analgesic dose of local anaesthetic intrathecal and re-site at new level

- Discuss proceeding to new level epidural with the woman and/or support person(s).
- Ensure appropriate monitoring and instructions for care

- Establish analgesia with intrathecal dose of analgesia (2.5mL 0.2% Ropivacaine OR *0*.25% Bupivacaine 1 mL made up to 2mL with saline)
- For a repeat attempt after recognised dural puncture, always use **LOR to saline** as air will lead to painful pneumocephalus.

Options 3: **re-site epidural at new level**

Option 4: alternative non-neuraxial analgesia

- Discuss options with the woman and/or support person(s).
- Ensure appropriate monitoring and instructions for care.
- Document any subsequent epidural catheter insertion and epidural PCEA.

The patient needs to be warned of the increased risk of PDPH and followed up daily. **Hand over directly to APMS.**

Mandatory observations for midwifery staff after placement of epidural

Time for documenting		Type of Observation									
		CTG*	FHR	MHR*	SpO_2*	BP	SS^	RR^	SB^	MB^	LAST
← Time from epidural drug administration	At time of epidural drug administration Then	Continuous.	X	X	X	X					Observe for at all times (see *Section 8.5.8*)
	Every 5 minutes for 30 minutes Then		X	X	X	X					
	At 30 minutes Then		X	X	X	X	X	X	X	X	
	Every 30 minutes OR **Every 1 hour** Until birth		X	X	X	X	X	X	X	X	

Refer to PPG Obstetric Epidural Analgesia (OP-GC6)

- Please remind your midwifery colleagues of the mandatory observations following epidural sign out. These are essential as they allow early intervention in the case of complications.
    - Continuous CTG
    - 30 minutely fetal heart rate, maternal heart rate, SpO2 and BP
    - Hourly sedation scores, respiratory rates, sensory block/level, motor block/level * *these are often omitted*

Reportable observations requiring prompt review by Anaesthesia

- BP < 100 systolic
- HR < 60
- Respiratory difficulty
- Excessive sedation
- Numbness, tingling or weakness of hands
- Sensory level above T4
- Bromage >3

For above stop PCEA immediately

- Inadequate analgesia

Epidural documentation and prescription on EMR

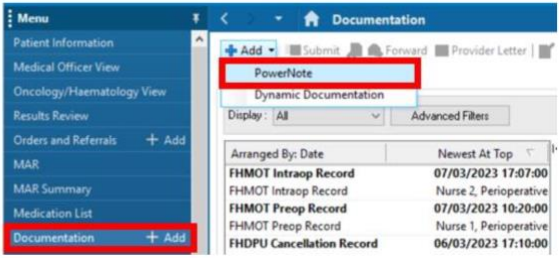
Please refer to the most up to date Quick Reference Guide on labour epidural documentation when you arrive. As of early 2024, there are three obligatory steps on EMR for every epidural:

1) Documentation of the epidural assessment, procedure, times, post procedure monitoring and instructions on an epidural powernote
2) Prescription of epidural medication using the epidural orderset
3) Signing off medication administered during the procedure at the time administered in the medication administration record (MAR)

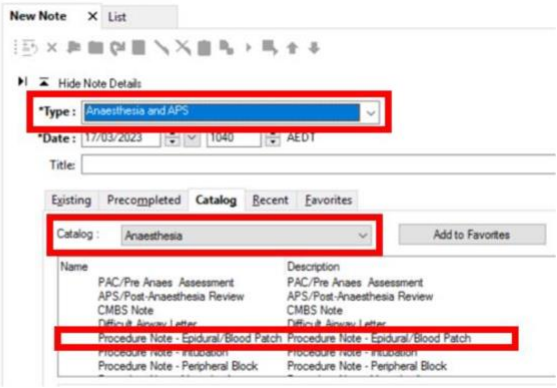
A summary is provided of our current process at WH below:

1. **Epidural powernote**

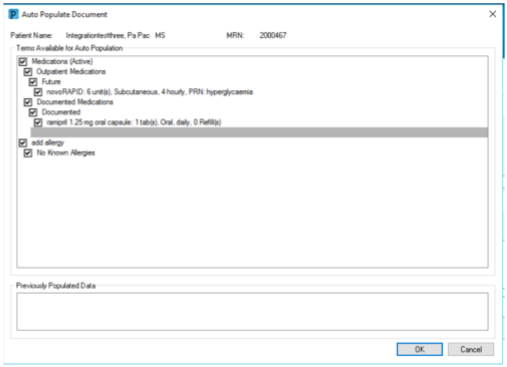
1. Under Documentation, click +Add and select PowerNote



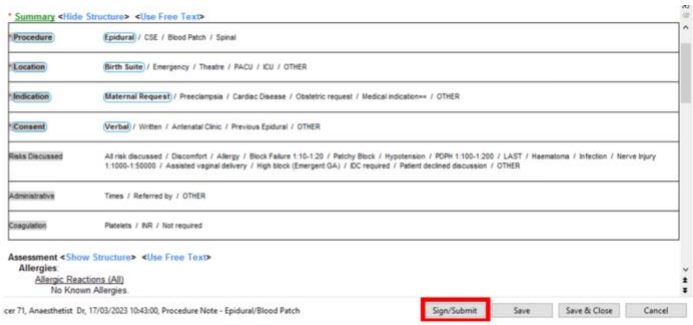
2. Select “Anaesthesia and APS” type, Catalog “Anaesthesia”, Name “Procedure Note – Epidural/Blood Patch”



3. Select the terms you wish to populate. Click “OK” to allow Autopopulation.



4. Complete all necessary fields by clicking and adding any details relevant. Click "Sign/Submit" when complete.



- Please ensure **as much detail as possible** is entered on the powernote. This includes a comprehensive assessment, specific consent discussions, a note on time of arrival and any detail on specific technical issues encountered during the attempt or reason for multiple attempts. Ticking 'all risks discussed' is insufficient as consent as it is too vague. As previously described, **a sensory and motor block assessment must be done and documented on this powernote** prior to leaving the patient as part of sign out.
- The loading dose volume is distinct from the test dose volume. It should clearly include a comment on the interval of time between doses of local anaesthetic through the epidural (which should match up with administration times in the next step)

Enter Username and Password and click OK

2. Epidural medication order set

1. select "+" next to "Orders and Referrals", Type "Anaes" into search box and click "ANAES Epidural Analgesia (Obstetric)"

2. Ensure all "Communications Orders" are checked as well as other appropriate drug orders and click "Orders for Signature"

3. Prescribe local anaesthesia and opioids for your epidural test and loading doses as well as the PCEA order.

4. Enter Username and Password and click ok

3. Medication administration on the MAR

1. in the MAR, click the opioids and local anaesthetic given ensuring the times correspond to the administration time of your test and loading doses. It must be clear what the interval of time between doses of local anaesthesia is. Please ensure local anaesthesia is written up as ml.

Transfer of patients to operating theater with epidural in situ

- The epidural should be disconnected before leaving the Birth Suite as follows:
  - Using an aseptic technique, it is the responsibility of the midwife to disconnect the yellow bodyguard line from the epidural filter. Place a sterile red cap on the epidural filter and ensure the epidural line is secure. Ensure the epidural filter and catheter clamp are not disconnected from each other (a Tegaderm should be placed over this connection during insertion to help prevent this)

  - It is the responsibility of the midwife to dispose of the epidural infusion bag and the bodyguard line in accordance with Western Health procedure.
  - *In a critical obstetric emergency, the pump may be transferred to theatre with the epidural line attached, in the interest of saving time*

Epidural catheter manipulation and removal

  - For non-caesarean deliveries, the catheter is typically removed soon after delivery unless there is concern about coagulopathy (e.g. thrombocytopaenia in severe pre-eclampsia). Ensure this is handed over to the midwives if this may be a concern.
  - For CS, the catheter is removed at the end of the case unless there is concern about coagulopathy. Please ensure the removal documentation is completed on the anaesthesia chart as an action.

The platelet count and coagulation status required for safe catheter removal is the same as for catheter insertion;

  - Platelet count > 70 000
  - APTT < 8 seconds prolonged
  - PT/INR < 1.4 x control
  - 12 hours after the last dose of prophylactic LMWH

- 24 hours after the last dose of therapeutic LMWH
- 6 hours after the last dose of UFH prophylaxis

Management of delayed complications

Post dural puncture headache (PDPH)

Refer to Management of Obstetric PDPH Guideline on PROMPT. All patients with PDPH should have details emailed to Davina Taylor and Priya Rao

Differential diagnosis

- Migraine
- HT
- Brain tumour
- Meningitis
- Subdural haemorrhage
- Subarachnoid haemorrhage
- Cortical vein thrombosis
- Sinusitis
- Pneumocephalus
- Caffeine withdrawal

Signs & symptoms

Postural

- Fronto-occipital in location but can be quite variable
- May involve cranial nerve palsy. CN VI most common, IV, III, VIII can also be involved. This is an indication for an early blood patch.

Clinical assessment:

- Past Hx headache, type
- Hx of epidural
- Blood pressure, proteinuria
- Temperature
- Tenderness over sinuses, photophobia, neck stiffness
- Full neurological assessment

Management of PDPH:

Add patient to APMS list. Ensure handover to incoming anaesthetic staff. Refer to PDPH PPG on PROMPT.

Consider an early blood patch (but not <24/24) if;

- Patient request
- Tuohy needle as cause (as PDPH caused by small spinal needles are more likely to resolve)
- Severe symptoms suggest large tear. Delay in blood patch with large tears may have a risk of seizures of about 1%.

- Cranial nerve involvement
- If symptoms warrant after 24/24 then the patient should be considered for blood patch. **Prophylactic EBP or EBP <24 hours have been shown to be lacking in efficacy**
- If neurological symptoms or signs other than dural puncture headache, nausea and vomiting, then refer for radiological imaging to rule out more serious conditions (subdural haematoma/intracranial bleed, venous sinus thrombosis)
- Sphenopalatine block may be considered where epidural blood patch contraindicated.

Conservative management include;

- Simple analgesics
- Bed rest
- Hydration
- Caffeine

Studies demonstrate that most forms of conservative management are lacking in efficacy. They probably enable patients to tolerate symptoms better so they can consider treatment options as well as to await improvement for PDPH which would have resolved anyway (mainly those with pencil point spinal needles).

Epidural blood patch (EBP)

Risks and Complications

- The usual complications associated with epidurals
- Failure: 70-80% will be effective initially, but 10-20% will redevelop symptoms requiring a repeat EBP
- Severe prolonged lumbosacral pain
- Radicular pain (NSAID may be helpful – most are mild and self-limiting)
- Neck ache
- Fever or infection

Contraindications

- Patient refusal
- Sepsis
- Coagulopathy

The Procedure

- Informed consent
- Done in PACU or in an anaesthetic room
- 2 operators. **An experienced anaesthetist must be present**
- Use the same space or one below

- 2nd operator takes blood under strict aseptic conditions once LORS identified
- Blood is injected slowly until limited by back or neck pain
- The optimal volume of blood is unclear, but one should attempt to administer up to 20mL of blood unless the patient complains of back pain. (Paech et al Anesth Analg Volume 113(1), July 2011, 126)
- Patient should lie flat for 1 hour
- Follow up a few hours and 24/24 after, and the results documented
- Failed patches may be repeated
- If repeated patches fail - review diagnosis, consider neurology review

Neurological deficit post epidural

Causes

- Obstetric / surgical
- Epidural related
- Unrelated (eg. Degenerative conditions, undiagnosed medical conditions)

Clinical presentations of nerve lesions

- Most lesions are unilateral sensory in nature, with motor and bilateral lesions being much less common. Some of the common presentations include:
- Unilateral area of paraesthesia in buttock or lower limb
- Unilateral foot drop
- L2/3 sensory lesion ("paraesthesia meralgica")
- Femoral and obturator neuropathies
- Radicular pain

History

- Previous neurological problems including MS
- Back disease including disc prolapse
- Neurological deficit during pregnancy
- Significant features of delivery, forceps, stirrups
- Significant features of any surgery
- Features of epidural insertion, paraesthesia, multiple attempts, level
- Extent of neurological disability, incontinence, sensation to bladder and bowel

Examination

- Inspect epidural site for bleeding, erythema, swelling
- Palpate epidural site for tenderness

- Check for fever
- Full neurological examination of lower limbs, PR

Assessment

- Pattern of deficit
- Check blood results, WCC and other inflammatory markers

Management

- Document thoroughly and **discuss with a consultant anaesthetist.**
- Inform the anaesthetist who initially performed the block.
- Epidural haematoma presents classically of radicular back pain and lower limb sensory loss, followed by leg weakness, bladder and bowel dysfunction progressing to paraplegia.
- Fever, back pain, and focal neurological deficits is diagnostic of an epidural abscess, however not all may be present. Sensory and bladder problems may be the only presentation.
- A diagnosis of epidural abscess or haematoma requires **immediate neurosurgical assessment**, with MRI available at Sunshine and Footscray. A consultant referral is required and urgent liaison with the MRI radiologist is required. **A CT is not a suitable substitute for an MRI.**
- Focal neurology that is identifiable to a peripheral nerve is more reassuring as this is typically due to an obstetric cause.
- Patients with obstetric or surgical causes should be referred back to the parent unit.
- Patients with significant sensory deficit or if medico-legal issues are suspected, should be referred to the Neurologist at Footscray for nerve conduction studies etc.
- Patients with mild or resolving sensory deficit should be followed up by the APMS.

Discharge epidural checklist

- All patients who have had an epidural will receive Day 1 reviews (and further reviews as necessary) by the JK Pain registrar and APMS nurses, when available.
- A patient can be discharged from the Epidural Task Manager on EMR only if they have met the following criteria
    - Postural headache ABSENT
        - If not, follow up for PDPH and follow protocols as discussed above and within the relevant intranet guideline
    - New back pain ABSENT
    - NORMAL sensory function

    - NORMAL motor function
    - NORMAL urinary continence
    - NORMAL bowel continence
    - Insertion site healthy
    - Afebrile
    - Education provided
    - Alert card/written information given
- This checklist can be found on EMR in the Interactive View and Fluid Management tab→ Pain Management → Epidurals

Severe Pre-Eclampsia

Pre-eclampsia is a multisystem disease present only in pregnancy and in the immediate post-partum period. Historically it was diagnosed when hypertension and proteinuria was present beyond 20 weeks gestation; however it is now recognised pre-eclampsia affects virtually every organ system. Deaths are usually due to intracranial haemorrhage and cerebral infarction, acute pulmonary oedema, respiratory failure and hepatic failure or rupture. **A consultant anaesthetist must be involved in the management of any parturient with severe pre-eclampsia.**

Pre-eclampsia is defined as hypertension plus one or more of co existing conditions.

Systolic BP >140mmHg and/or
Diastolic BP > 90mmHg

Diagnosis

Diagnosis can be made when hypertension arises after 20weeks gestation, and is confirmed on 2 or more occasions. It is also accompanied by one or more of the following:

- Significant proteinuria:
  - Protein creatinine ratio > 30mg/mmols;
  - 24 hour urine excretion not usually required.
- Renal involvement:
  - Serum or plasma creatinine ≥ 90micromol/l or oliguria.
- Haematological involvement:
  - Thrombocytopenia, haemolysis, DIC.
- Liver involvement:
  - Raised transaminases, severe epigastric or right upper quadrant pain.
- Neurological involvement:
  - Severe headache, persistent visual disturbances;
  - Hyperreflexia with sustained clonus;
  - Convulsions (eclampsia);
  - Stroke
- Pulmonary oedema.
- IUGR, placental abruption.
- HELLP (haemolysis, elevated liver enzymes, low platelets) is considered a variant of severe pre-eclampsia.

Principles of management

Please refer to intranet guideline on PROMPT for more details

In summary, the principles are:

- Consultation and multidisciplinary team approach
- High dependency nursing
- Eclampsia prophylaxis
- Blood pressure control
- Maintain strict fluid balance chart
- Epidural analgesia
- Regular investigations, maternal monitoring and foetal monitoring
- Delivery

Consultation

Management of pre-eclampsia requires early multidisciplinary input. Good communication between obstetricians, midwives and anaesthetists is essential. Anaesthetic expertise includes resuscitation, fluid management, insertion of invasive monitoring if required and analgesia/anaesthesia for labour and delivery. Anaesthetic registrars need to be proactive in ensuring they are aware of any potential complicated patients on labour ward.

High dependency nursing

Patients with severe pre-eclampsia are nursed in the labour ward in the high dependency beds. They may be brought to recovery or transferred to intensive care for stabilisation prior to delivery if clinical conditions dictate (eg requiring arterial line).

Eclampsia prophylaxis

Careful assessment of fluid staus is recommended. Magnesium sulfate comes in a pre-prepared syringe contained in a pre-eclampsia box located in theatre. A 4g bolus (8mL) is given over 15 min (32 mL/hr) and continued at 1g/hr (2 mL/hr) until at least 24/24 postpartum or the last eclamptic seizure. The patient is warned that she may feel transient hot flushing on commencement.

Magnesium therapy should be monitored every 6/24. Respiratory rate, heart rate, blood pressure, urine output and patellar reflexes should be

checked. Check serum magnesium if toxicity is suspected on clinical grounds. The patient should have normal reflexes and serum levels of 1.7-3.5 mmol/l. Toxicity may occur in the event of accidental overdosage or with decreased renal function as magnesium is renally excreted unchanged. Toxicity is indicated by:

- Abolished reflexes
- Drowsiness
- Respiratory rate less than 10
- Heart block

In the event of toxicity, the management is supportive. Do an ECG to monitor for cardiac effects. Stop the infusion for a limited time and start at a lower rate. In rare instances of severe overdose Calcium gluconate (10ml of 10%) may be given as an antidote. **This may reverse all the effects of magnesium and eclampsia may occur.** Magnesium levels may sometimes be slightly above 3.5 and but the patient remains hyper-reflexic with no signs of toxicity; clinical assessment should take precedence over investigations.

Magnesium is a tocolytic and increased doses of uterotonics may be required to counter this effect. Intra-partum CTG tracings may show reduced variability so scalp pH may be required to differentiate this effect from hypoxia. Beware of using $MgSO_4$ in the presence of hyperkalaemia as it may exacerbate arrhythmias.

Fluid management

A urinary catheter should be placed in all patients and hourly urine output measured. Maintenance fluids of Hartmann's solution should be commenced at 80ml/hr. Monitor for oliguria. Persistent oliguria can be treated with a bolus of crystalloid. Diastolic dysfunction may be present in severe pre-eclampsia, consider goal directed therapy.

Sudden fluid shifts and rises in CVP often occur after delivery due initially to the autotransfusion of the contracted uterus and then the movement of interstitial fluid into the central compartment over the next few days. Patients remain at risk of APO in the early postpartum period.

Renal failure requiring dialysis is very rare in pre-eclampsia and pulmonary oedema occurs relatively frequently. Renal impairment can occur despite adequate filling due to endothelial dysfunction. Apart from adequate filling, perfusion pressure across the kidney, O_2 and Hb, secondary measures are of unproven benefit in renal preservation.

Epidural analgesia

Epidural analgesia is strongly recommended in severe pre-eclampsia for the following reasons;

- Decreased sympathetic activity and improved blood pressure control
- Improved renal and placental blood flow
- Increased need for instrumental delivery and CS in this group.
- It is preferable that epidurals are placed early before the onset of coagulopathy.
- Concerns with general anaesthesia include;
  - Pressor response to intubation leading to cerebral haemorrhage
  - Increased risk of failed intubation due to oedema.

Patients with pre-eclampsia should have a platelet count done in the previous **6 hours**, and more frequently if falling rapidly. If this is greater than 150,000 then the likelihood of any other coagulation disorder is rare. If platelet count is borderline coagulation studies should be checked. The use of low dose aspirin is not a contra-indication to the insertion of an epidural.

Treatment of acute severe hypertension

Large drops in blood pressure and perfusion pressure are not well tolerated by the mother or foetus. Target blood pressure should be 140-150/90-100. Aim to lower BP 10-20mmHg every 10-20 minutes. Treatment is often initiated with oral nifedipine, hydralazine or labetalol; the addition of magnesium infusion and epidural analgesia is often adequate.

Commence treatment if:

- SBP is ≥ to 160mmHg; and/or
- DBP is ≥ to 110mmHg.

Note: concurrent administration of longer acting oral agents will achieve a more sustained BP lowering effect.

Drug	Dose	Route	Onset of action
Nifedipine	10-20mg Tablet	Oral	**Immediate release:** 30-45 minutes Repeat after 45 minutes. **Caution:** 20mg also available as SR/slow release, so check before administration.

Hydralazine (refer to page 8)	5-10mg	IV bolus	20 minutes Repeat after 20 minutes.
Labetalol	20-80mgs	IV bolus over 2 minutes	5 minutes Repeat after 10 minutes.

Monitoring and investigations

Maternal monitoring – Clinical:

- Symptoms i.e. conscious state, headache, visual disturbance, abdominal pain
- Signs i.e. tendon reflexes
- BP 5 min for 20 min after any intervention and then hourly.
- Hourly urine output.

Invasive monitoring:

Intra-arterial pressure monitoring should be considered in patients who require immediate delivery but remain hypertensive (>160/110) or are sufficiently unstable to require stabilisation in ICU/PACU with the direct involvement of anaesthetic staff.

Indications for insertion of a CVC:

- Renal impairment or persistent oliguria; or
- Pulmonary oedema

Baseline investigations

- Serum electrolytes, including Ca^{++} and Mg^{++}
- Renal function (urea, uric acid, creatinine, protein/creatinine ration), LDH
- FBE and clotting
- Liver function tests, total protein and albumin
- Group and hold
- Catheter urine for microscopy and culture

Ongoing investigations

Mg^{++} should be checked if toxicity is suspected and in the presence of renal impairment. FBC should be monitored.

Foetal monitoring

Sometimes the request for urgent caesarean section is made because of foetal distress where the patient has severe pre-eclampsia and is inadequately resuscitated. Preferably stabilisation should occur pre CS and often this may resolve the foetal distress. Circumstances may dictate immediate delivery despite an unstable parturient.

Other therapy

Steroids may be of use in severe pre-eclampsia complicated by liver dysfunction and coagulopathy. Platelet count may rise after steroids but it is unclear whether using dexamethasone to generate a number at which one could safely undertake regional anaesthesia is beneficial or harmful.

Where there is bleeding or plans to deliver: Platelet transfusion (1 pool) is indicated if the platelet count is < 50,000, FFP is required if APTT or INR are greater than X 1.5 control. Cryoprecipitate or fibrinogen concentrate is required if fibrinogen is <1.5g/ **Haematology involvement is advisable.**

Delivery

This should be achieved as rapidly as is appropriate after the patient's condition is stabilised and by the route that the obstetrician deems most appropriate.

If CS is required, patients generally do not become hypotensive after spinal anaesthesia as endothelial dysfunction persists despite sympathetic blockade. If GA is indicated, the pressor response must be blunted. Alfentanil 2mg, Remifentanil or Esmolol are suitable. Inform the neonatal team if opioids have been given.

Major Postpartum Haemorrhage (PPH)

Refer to Western Health Guideline for PPH on PROMPT management for more details.

Postpartum haemorrhage (PPH) affects approximately 28% of women birthing at Western Health. Major postpartum haemorrhage (over 1000mL) affects over 7%.

PPH is a major cause of mortality, morbidity and long-term disability related to pregnancy and birth. The burden of this life-threatening condition can be greatly reduced through effective interventions to prevent and treat PPH.

This is not intended to be a comprehensive guide to the management of major obstetric haemorrhage. A brief overview of the topic is offered to aid further reading. Trainees need be aware of what resources are available and how to mobilise these should an unexpected obstetric haemorrhage occur after hours.

Risk Factors

Antenatal

Anaemia (Hb <9g/dL)
APH (>20 weeks gestation)
Coagulation disorders
Fibroids (>5cm)
Grand multiparity (five or more previous births)
Hypertensive disorders
Macrosomia (EFW >95th centile or AC >95th centile)
Maternal Age (>40 years of age)
Multiple pregnancy
Obesity (BMI >35)
Placenta praevia (≤2cm clear of os)
Placental adhesive disorders (accreta/increta/percreta)
Previous PPH (>1000mL)
Polyhydramnios (AFI >30cm)
Previous caesarean section/uterine surgery
Previous retained placenta
Therapeutic anticoagulation
Thrombocytopaenia

Intrapartum

	Clinical Risk Factors
	Amniotic fluid embolus
	Augmented labour
	Bipartite placenta
	Chorioamnionitis / sepsis
	Fever
	General anaesthesia
	Magnesium sulphate
	Operative delivery
	Physiological management of third stage
	Placenta and/or membranes incomplete at delivery
	Placental abruption
	PPROM
	Precipitate labour
	Prolonged labour (any stage)
	Recent anticoagulant use
	Succenturiate lobe
	Thrombocytopaenia
	Tocolytics: nifedipine, salbutamol and/or glyceryl trinitrate

Presentation

As the list of aetiology suggests, many major cases of obstetric haemorrhage can be predicted. However, where it is unexpected, recognition may happen late as pregnant women compensate very well for hypovolaemia. Hypotension does not occur until late, at 1500mL blood loss or more. Obstetric haemorrhage is often concealed and can occur extremely rapidly. Treatment should begin as soon as haemorrhage is obvious, assumed, or predicted.

Management

The management priorities are:

- Call for help, activate massive transfusion protocol
- Resuscitate patient
- Assess and treat cause of bleeding

1. Call for help

(Ensure the consultant anaesthetist is present or coming in ASAP).

Ask for the PPH trolley. On the trolley will be required resuscitation equipment and the MOTHER cognitive aids.

At Western Health, the MOTHER Package (Midwifery Obstetrics Theatre anaestHesia haemorrHage Response) has been developed with the goal of reducing rates of avoidable postpartum haemorrhage. The MOTHER Package aims to articulate an evidenced-based overarching approach to management of PPH that incorporates elements of Crisis Resource Management and team training, and that aligns with and supports existing applicable Western Health procedures and guidelines. A key component of the MOTHER project is the cognitive aid package that support the framework. Each team member is given a card. On each card is a list of prompts for required tasks, organized into severity. Also included are key contacts and phone numbers (theatre, IC anaesthetist, blood bank).

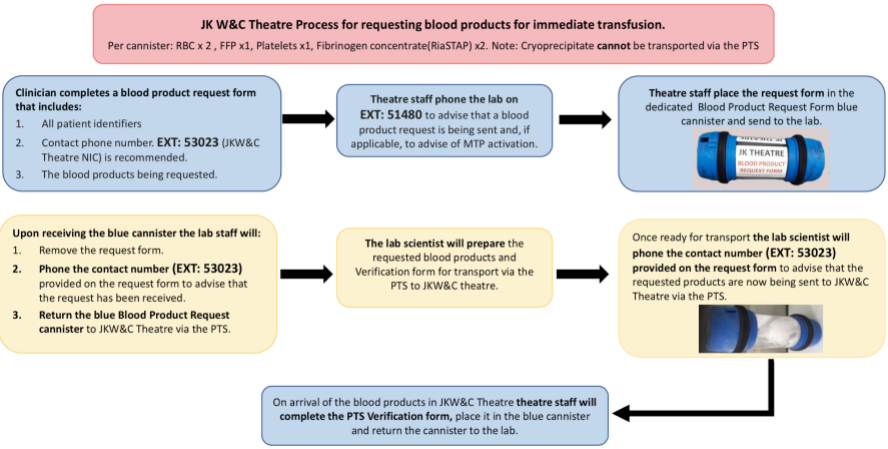
2. Activate the massive transfusion protocol

Call blood bank at Sunshine on 51480 and "activate massive transfusion protocol".

See WH Massive Transfusion Protocol on PROMPT

This will notify haematology consultant on-call, recruits blood bank services, enabling them to continue to release products to the patient without further paperwork. There is no 'MTP pack' at JKWC, blood products will need to be requested.

Procedure for request and collection of blood at Joan Kirner



Please note if blood is not used within 30 minutes of dispatch from Blood Bank, it will be discarded if returned. If you are unsure immediate transfusion is required but want blood available, ensure it is transported and remains in the multi-unit transporter which extends the timeframe out of refrigeration to 3 hours. This requires a dedicated staff member to pick up the blood form Sunshine rather than utilizing the pneumatic tube system. It is an important consideration to avoid unnecessary wastage of this precious resource.

3. Resuscitate the patient and set up additional equipment

Immediate Resuscitation

- Give oxygen in high concentration, consider intubation
- Obtain large bore IV access (minimum 2 x 16G, 14G or RIC)
- Maintain patient temperature – warmed fluids, forced air warmers
- Give blood early. Consider calling massive transfusion protocol as described above. Cross-matched if possible, O-ve if necessary
- Attempt to prevent or treat coagulopathy with early use of products
- Set up level 1 infuser and cell saver if needed
- Invasive monitoring (arterial line, CVC) are useful but must not cause delay
- If bleeding is torrential, trans-abdominal aortic compression may be life saving

Assess and control bleeding

The cause of the bleeding must be identified and treated. Point of care testing should be performed. Avoid hypothermia, hypocalcaemia, acidosis and dilutional coagulopathy. At Western Health ROTEM is used. Formal bloods should be sent to the lab as frequently as necessary dictated by the clinical situation.

Aetiology (4 Ts)

TONE	*Abnormalities of Uterine Contraction*	*70%*
TRAUMA	*Genital Tract Trauma*	*20%*
TISSUE	*Retained Products of Conception*	*10%*
THROMBIN	*Abnormalities of Coagulation*	*1%*

Management of uterine atony

- Uterine massage
- Oxytocics
    - Oxytocin infusion 40 units in 36 mL N Saline over 4 hours (not within 1 hour of administration of carbetocin)
    - Ergometrine (250microg IV and 250microg IM), avoid in patients with hypertensive disorders in pregnancy and pre-medicate with anti-emetic
    - Carboprost® (Prostoglandin F2 alpha analogue). Used in refractory atonic PPH (accepted off-label use). 250micrograms repeated 15 minutely to a maximum of 8 doses. Given by deep **intramuscular** (**NEVER intravenous:** may result in bronchospasm, hypertension, vomiting, or anaphylaxis). Avoid in known hypersensitivity, active cardiac/pulmonary/renal or hepatic disease. May cause nausea, vomiting and diarrhoea. Ensure anti-diarrheal prophylaxis charted for administration in recovery

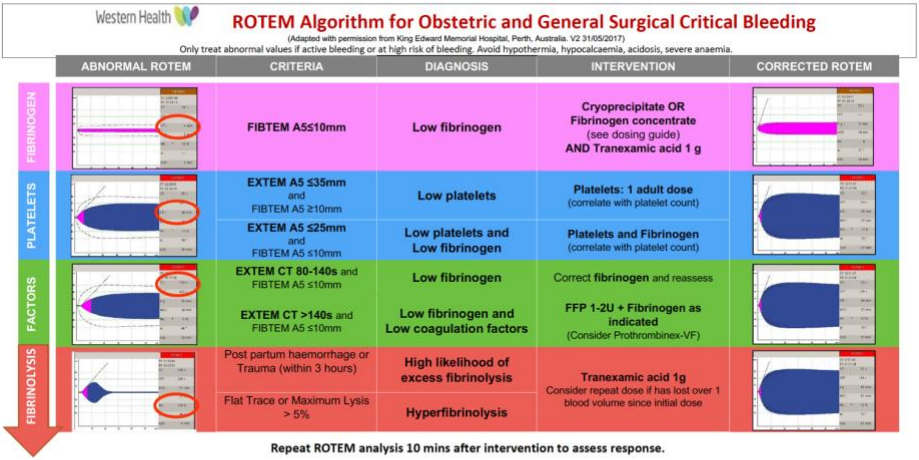
Ongoing bleeding despite maximal uterotonic therapy would likely require surgical management. Treatment options may include:

- Internal uterine tamponade (e.g. a Bakri balloon catheter, inserted PV)
- External uterine tamponade performed at laparotomy (B-Lynch suture)
- Hysterectomy

ROTEM, TxA and Fibrinogen Concentrate

ROTEM is available at JKWC as a useful point of care test to guide transfusion requirements in obstetric bleeding. Hypofibrinogenemia and fibrinolysis is usually the earliest clotting abnormality. Early TxA (1g over 10 minutes +/- infusion of 1g over 8 hours) is advisable in all massive obstetric bleeding unless contraindicated. It is usually requested by the obstetric team. Fibrinogen concentrate is available at WH and may be given when FIBTEM A5 $\leq$ 10mm and cryoprecipitate is not immediately available as per the dosing guideline in PROMPT. It can only be used with consultant anaesthetist approval and usually after discussion with haematology. When fibrinogen concentrate is used, cryoprecipitate should be ordered in preparation for subsequent dosing.

Please refer to the *Rotational Thromboelastometry (ROTEM) Usage Guidelines* and *Fibrinogen Concentrate for Major Obstetric/Non- Obstetric Bleeding Procedure* on PROMPT for more detail.



Fibrinogen Dosing Guide

FIBTEM A5 Target: ≥12mm

FIBTEM A5	Increase required	Cryoprecipitate (WB=whole blood, A= apheresis)	Fibrinogen Concentrate
9-10mm	2-3 mm	10 – 20 WB units or 5-10 A units	N/A
7-8mm	4-5 mm	10 – 20 WB units or 5-10 A units	N/A
4-6mm	6-8 mm	20 WB units or 10 A units	4g
<4mm	≥9mm	20 WB units or 10 A units	5g

Fibrinogen Concentrate

Guidelines for Use

- Activation of the MTP
- Consultant anaesthetist approval required.
- Patients must be experiencing life threatening haemorrhage.
- Fibrinogen concentrate may be indicated instead of, or in addition to, cryoprecipitate if the FIBTEM A5 is 6mm or below, OR there is a high suspicion of coagulopathy in a life-threatening haemorrhage.
- Use at higher FIBTEM values may be appropriate in patients refusing cryoprecipitate.

Administration

- Reconstitute 1g in 50ml warm sterile water (use prepared kit in fluid warmer).
- Swirl gently and do not shake (to avoid foaming). After reconstitution, the RiaSTAP solution should be colourless and clear to slightly opalescent.
- Administer each 1g via syringe driver over 2-4 mins if life-threatening haemorrhage or over 10mins if not.

Additional equipment: Cell saver

Cell saver is also available but should be pre-arranged . The technicians are responsible for setting up the collection disposables, the nurse in charge organises an outside perfusionist to process the collected blood. Anaesthetists need to be able to assist in set up.

The following is the procedure for setting up the blood collection reservoir. Collect the following equipment:

- Cell saver machine
- One bag of normal saline, add 30000 units of heparin
- One Aspiration and Anticoagulation Line
- One Blood Collection Reservoir
- One Regulated Suction Source (Located on the cell saver machine)

Set up as follows:

- Hang bag of saline with 30000 units heparin on Cell Saver IV pole.
- Using aseptic technique, open and pass to the sterile field the Aspiration and Anticoagulation line.
- Remove the Blood Collection Reservoir from the container.
- Completely clamp ends with the straight adapter and affix to bottom of the Reservoir. Place Reservoir in the holding ring on the cell saver machine.
- Attach regular suction tubing from the regulated vacuum source (set not to exceed 150MM / HG) to the **yellow-capped** port located on the top of the reservoir.
- Receive double lumen end of Aspiration and Anticoagulation Line from the sterile field. Remove a **blue cap** from any one of the horizontal ports on the Reservoir top and attach the Aspiration line to this port (see illustration on emergency setup sheet located on the cell saver machine). Spike the bag of heparin saline solution with the other lumen and prime Reservoir with approximately 100ml of anticoagulant. After priming, adjust drip rate to approximately one drop per second.

Caesarian Section

Spinal anaesthesia for caesarean section

- Where no anticipated issue exists in an otherwise uncomplicated C section with neuraxial anaesthesia, the support person/partner is can be invited into the room during the spinal procedure.
- Use a 25 or 27G pencil point spinal needle with a 20G introducer. For obese patients longer needles are available. Consider also the long spinal needle through an epidural needle or a CSE kit.
- Co-load with 1L hartmanns (insert IV, start fluid then perform aseptic handwash).
- Commonly used: 0.5% heavy Bupivacaine 2.2 mL + Fentanyl 15µg + preservative-free Morphine 100mcg
- Consider a CSE in CS for anticipated difficult or prolongedCS, triplets or higher order pregnancy.
- Most anaesthetists aspirate CSF at the beginning and end of the injection (can be difficult through a 27G).
- The level of the block should be tested with ice and motor block of legs should be assessed.
- Place wedge under the right hip as soon as patient is supine after spinal to mitigate aortocaval compression.
- Have metaraminol drawn up and available as hypotension is common with spinal anaesthesia for CS.
- Studies now suggest that BP management should be proactive. Some anaesthetists give a dose of vasopressor as soon as the block has been placed or run a vasopressor infusion during the case. This may also reduce the incidence of vomiting. Minutely BP with a metaraminol infusion ready to start at 5-10mg/hr after spinal is a common practice. Caution in hypertensive disorders of pregnancy.
- Some women have a profoundly vagal response to spinal anaesthetic. Consider prophylactic atropine 300-600ug or ephedrine 3-6mg in patients with falling HR.
- Give IV antibiotics pre incision (usually 2g cephazolin)
- Immediately after delivery give 100mcg carbetocin IV over 1 minute, if contraindicated, please discuss uterotonic plan with obstetrician and anaesthetist
- Post-operatively, patients should remain in recovery for 30 min while the usual BP, pulse and block height is checked. It is the anaesthetist's responsibility to write up fluids for the next 24 hours, analgesia and anti-emetics. Refer to the section on the Western Health APMS guidelines for analgesia post CS

Emergency caesarean section

An emergency caesarean section should be performed under neuraxial anaesthesia wherever possible. If an epidural is already in place and working well for analgesia during labour then it should be topped up for CS. Always check the epidural site and perform a sensory/motor assessment prior to loading the epidural. Discuss with a consultant anaesthetist if spinal anaesthesia is being considered where the epidural is thought not to be reliable. The addition of fresh adrenaline and $NaHCO_3$ significantly speeds the onset of surgical anaesthesia:

The solution usually used is made up as follows:

- 17ml of 2% Lignocaine
- 1mL 1:10,000 adrenaline (100 µg)
- 2mL Sodium Bicarbonate 8.4%
- Fentanyl 100µg (may be given separately if preferred)

Give in 5 ml aliquots and assess block. When caesarean is time critical, give 10ml irrespective of the block height to ice, unless a concentrated local anaesthetic has been given as a bolus in the last 1/2 hour.

Pain during caesarean section

- NB: if not managed well, results in maternal distress and also is a common cause of complaints and litigation

Consent:

- Assure your patient you will not allow the surgeons to start until you are satisfied with the block
- Prepare them to expect sensations of stretch and pressure, but not pain
- Advise them that additional analgesia or general anaesthesia is always an option if they experience pain during surgery

Do not allow surgery to commence until an adequate neuraxial block is present:

- Block to ice to T4 (soft touch to T6), Bromage 2 or 3
- No pain on surgical Bonney's forcep test

⇨ If the block is insufficient, ask the surgeons to wait while you perform interventions eg. Trendelenberg position, further epidural boluses if epidural in situ

⇨ If still inadequate, discuss with your consultant, the patient and the surgeons regarding a plan eg. repeat neuraxial or general anaesthesia. In cases of foetal distress, the surgeons may advise there is no time for a repeat neuraxial procedure

If your patient complains of pain, believe them!

- Ask the surgeons to temporarily halt surgery if safe to do so
- Offer the patient pain relief or a general anaesthetic, ensuring that your language is reassuring and that the patient and their partner feel included in the decision making process. Options include:
    - Rapid onset IV opioid (for example alfentanil), notify paediatrician if prior to delivery
    - N_2O
    - Epidural bolus if epidural in situ: 5ml of 2% lignocaine with adrenaline 1:200,000
- If the woman still has pain after you have instituted management, offer a general anaesthetic. Notify your consultant.
- If pain occurs early in the caesarean (eg. prior to or shortly after delivery), it is likely that a general anaesthetic will be required
- If pain occurs towards the end of the surgery, you can ask the surgeon to inject subcutaneous local anaesthetic
- Document the events

References of interest

- https://associationofanaesthetists-publications.onlinelibrary.wiley.com/doi/10.1111/anae.15717
- https://obgyn.onlinelibrary.wiley.com/doi/full/10.1111/1471-0528.13845
- https://anesthesiaexperts.com/uncategorized/pain-control-cesarean-delivery/
- https://www.oaa-anaes.ac.uk/assets/_managed/cms/files/Clinical%20Guidelines/NewFolder/Bolton%202018%20-%20%20Conduct%20of%20Anaesthesia%20for%20CS%20paragraph%2073%20addition%20050917.pdf

Code green

The code green is a system activated when a woman requires immediate caesarean section. The code will be overhead paged and anaesthetics will receive a page and message on the in-charge phone.

The birth suite staff will bring the patient directly to theater. The neonatal team will also be paged to theatre. On activation of the code green the anaesthetic team go directly to the allocated OR (usually theatre 3 or 4) and make preparations (including drawing up drugs for GA and making an epidural top-up solution if one is in situ).

It is faster and safer to top up a working epidural (compared to GA) so this should occur at the same time as making a brief but directed assessment when the woman first arrives in the OR. Obtain the most important information first;

- Indication for Code Green CS
- Working epidural?
- Any past history or family history of significant GA problems
- Any other major medical problems
- Allergies
- Airway assessment

Some trainees find it useful to use the AMPLE acronym as a prompt

- A = allergies
- M = medications (regular and those recently given including emergency obstetric medications and blood thinners)
- P = relevant past medical history (CVS/resp) and antennal hx
- L = last ate
- E = events leading to this situation

The following cognitive aid can be used to gain efficient information and establish a shared mental model with those involved in the code green. They are on the walls of all obstetric theatres at JKWC

OBSTETRIC EMERGENCY SAFE HANDOVER CHECK

IDENTIFY

PATIENT 3-point Identification Check ✓NAME ✓DOB ✓URN

TEAMS O+G ANAES MW PAEDS

SITUATION

INDICATION

Maternal Fetal

BACKGROUND

ANTENATAL Pre-eclampsia or other *HYPER*tensive disorder

Bleeding risk Platelet count / Anticoagulants

Group + Hold Checked? ☐

Labour Epidural ?working well

MEDICAL Cardiac or Respiratory disease

ALLERGIES

BMI >35

ACTION

MODE OF DELIVERY

LUSCS INSTRUMENTAL OTHER

RESPONSE

MODE OF ANAESTHESIA

GA EPIDURAL TOPUP SPINAL

PROCEED? **REASSESS?**

As for the indication for the alert, these can include;

- Cord prolapse
- Antepartum haemorrhage (APH)/ abruption
- Prolonged foetal bradycardia
- Elevated lactate

Cord prolapse and significant APH are generally indications for a general anaesthetic. Much of the bleeding in placental abruption can be concealed.

For prolonged foetal bradycardia, the FHR should always be checked on arrival in OR, as it often recovers thus allowing time for a regional technique. Discuss with the obstetrician if they have any preference of anaesthetic technique, particularly with regards to the foetal status; but ultimately the decision is up to the anaesthetist.

If it is felt unsafe to administer a general anaesthetic without consultant anaesthetist presence (for instance, difficult airway or morbidly obese) inform the obstetricians of this, proceed with a regional technique, and have the in-charge nurse call the consultant anaesthetist and inform them of the situation and that their presence is urgently required. Keep the consultant anaesthetist updated. **The woman's safety is the always the first priority; do not proceed with GA if it is felt the consultant anaesthetist should be present for this.**

You will receive EMR training on how to set up the anaesthetic record on the Surginet Anaesthesia Application (SAA) using the obstetric macro. The QRG Anaesthesia – Creating a Blank Record for Emergency Cases is particularly useful for use in an emergency or code green C -section.

General anaesthesia for caesarean section

The supervising consultant anaesthetist should always be called when a general anaesthetic is anticipated.

Caesarean section is a major operation. Patients should be fully assessed whenever possible at a preoperative visit. Consent should include an explanation of RSI, and FBE and G&H taken.

Arrival and Induction

- Confirm that antacid prophylaxis has been given if time permits (Na citrate is available in JK theatre drug trolleys)
- Establish a free running IV.
- Position the mother supine on the table in optimum airway position (consider an oxford pillow for obese patients) with a wedge under the right hip (15°-30° tilt)
- Prepare for a difficult intubation. Have video laryngoscope on and available. Utilise CODE GREEN GA LUCS checklist as above.
- While the patient is prepped and draped by the surgical team, Pre-oxygenate the patient with a tight-fitting mask using 100% oxygen. Pre-oxygenate for 3 minutes aiming for an EtO_2 of greater than 80%. The anaesthetic nurse attaches standard monitors and BIS at this time. Ensure capnography is working.
- When the patient is prepped and draped, instruct the anaesthetic nurse to position her fingers over the cricoid cartilage. **Check this is correctly placed.**
- Administer a rapid bolus of 2.5-3mg/kg of propofol (or thiopentone) followed by 1.5 mg/kg of suxamethonium (max 150mg) once the eyelids start to droop. Apply cricoid pressure.
- Do not intubate until fasciculation ceases. Confirm ETT placement with auscultation and $ETCO_2$. Remove cricoid pressure once confirmed.
- **Inform the obstetricians they can proceed.**
- Ensure blood pressure does not fall below 10% of baseline using fluid and vasopressors.
- For maintenance of anaesthesia use O2+/- N2O and sevoflurane with high flows to start with (Alternative propofol TIVA if time).
- Further muscle relaxation may be required. Give NDMR (approx. 20mg of atracurium or 4 mg vecuronium) if requested.
- Immediately after delivery give 100mcg carbetocin IV over 1 minute
- After the baby has been delivered and the cord has been clamped, give IV opioid. Morphine up to 30mg may be required, usually start with 20mg and titrate to a respiratory rate of 8-10 (or alternatively fentanyl up to 500mcg). Aim to reduce volatile anaesthesia to

assist with uterine contraction, whilst still minimising risk of awareness. Add N_2O, aiming for 50:50 N_2O and O_2. Or alternatively, use a propofol infusion if you are familiar with this technique.
- Give prophylactic antiemetics and non-opioid analgesia.
- These patients should be extubated awake.
- Consider TAP blocks and prescribe a PCA, refer to APMS.

Neuraxial morphine & Western Health APMS Guidelines for analgesia post C-section

Spinal C-Section

See also 'Neuraxial Morphine for Caesarean Section' Procedure on PROMPT.

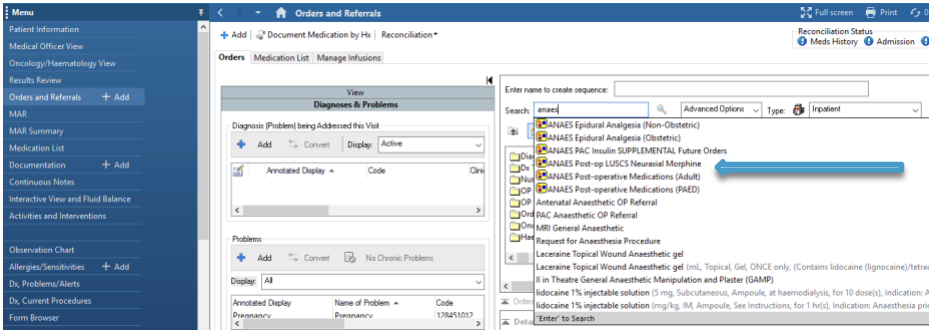
All patients can receive intrathecal morphine unless specific contraindications exist. Patients on suboxone or methadone should be discussed with an APMS consultant prior.

Intra-operative analgesia is included in the obstetric macro (*Caesarian-neuraxial*) on the Surginet Anaesthesia Application (SAA) and is automatically transferred to the MAR. Of note, this includes:

- Ondansetron 4mg IV for nausea/pruritis prophylaxis (give prior to IT morphine)
- Intrathecal (preservative-free) morphine 100mcg in spinal mixture
- Paracetamol 1g IV (unless low stock, please give oral in recovery when possible)
- Parecoxib 40mg IV
- Dexamethasone 8mg IV after delivery

Post operative analgesia and post intrathecal morphine observations must be charted using the *'ANAES Post-op LUSCS Neuraxial Morphine'* orderset

- Under Orders and Referrals→ Search and click on 'ANAES Post-op LUSCS Neuraxial Morphine'



Of note, this orderset includes:

Observations

- Post neuraxial morphine observations – as per WH policy. Includes SS, SpO2, RR every hour for 12 hours then, if stable, 2 hourly for 12 hours
- Never untick this!

Recovery room

- No parenteral opioid

Ward

- **VTE prophylaxis:** automatically scheduled for + 6 hours to ensure safe interval from spinal procedure. Dosing of clexane should consider weight and renal function as per *Adult Venous Thromboembolism (VTE) Prevention* guideline on PROMPT
- **Fluids**
- **Analgesia**
    - NSAIDs (choose one only) (assuming parecoxib given)
        - Ibuprofen 400mg TDS with or after food 3 days +12 hrs
        - Diclofenac 50mg TDS with or after food for 3 days +12 hrs
    - Paracetamol 1g QID PO/IV
    - Oxycodone 5mg po q3hrly prn for first 24 hours then 5-10mg q2hrly prn at +24 hours (the EMR orderset contains these 2 oxycodone orders to ensure conservative doses while neuraxial morphine in effect, and then more generous doses from day 2 of delivery- ensure both are ordered)
    - Tramadol IR 50-100mg po/IV q4hrly prn
- **Laxatives**
- **Antiemetics**
- **Anti-pruritics (naloxone)**
- **Anti-diarrhoeals (required if carboprost used)**

Epidural Top-Up Caesarean

If the epidural has been reliably used for the caesarian, **1.5mg epidural morphine pre-packaged in Baxter syringe should be administered towards the end of the case unless there are any contraindications, followed by 5ml 0.9% NaCl flush**. This is available to chart when the dedicated macro on SAA is used (*Caesarian – epi top up*). The syringes contain 2mg, so you will discard 0.5mg in the P22 sharps container and document this discard as usual for all S8 medication. This is available to chart on a dedicated macro on SAA (*Caesarian – epi top up*).

Use the exact same post op orderset as for Spinal Caesarean with intrathecal morphine (‘***ANAES Post-op LUSCS Neuraxial Morphine’)***

General Anaesthesia C-Section

Intra-operative analgesia (via SAA)

- Opioid as per anaesthetist choice
- Parecoxib 40mg IV (delay subsequent NSAID >12 hrs)
- Paracetamol 1g IV
- TAP Blocks by surgeon or anaesthetist
- IV opioid 20mg morphine usually
- No rectal medication

Via orderset *‘ANAES Post-operative Medications (Adult)’ and ‘Intravenous Analgesia – PCA and Continuous ADULT’*

Recovery Room

- Opioid “ As Per Protocol”
    - Morphine: 1-4 mg,IV, 5/60 PRN
    - Fentanyl: 10-40mcg, 5/60 PRN

Ward

- PCA Opioid: usually until day 1
    - Morphine: 2mg bolus, 5 min lockout, no background, no maximum
    - Fentanyl: 20-40mcg bolus, 5 min lock out, no background, no maximum
- Paracetamol 1g QID
- Strict NSAID (choose one only)
    - Diclofenac: 50mg TDS (BD if <50kg) + 12 hours for 2 days
    - Ibuprofen:10mg/kg (up to 800mg/dose)TDS + 12 hours for 2 days
- Laxatives regular and PRN
- Anti-emetics X 2 PRN

Note:
In some scenarios the need for GA is because of insufficient spinal anaesthesia effect. If neuraxial morphine has been effectively delivered to the patient, utilise the '***ANAES Post-op LUSCS Neuraxial Morphine'*** **orderset** as per spinal C-section EMR orders above.

Opioid Tolerant Patients and CS

As for GA, need higher opioid doses. Consultation with APMS is advisable in complex cases.
Methadone: usual dose at usual time on day of delivery in addition to PCA
Buprenorphine/Suboxone: seek advise from APMS consultant

Other Obstetric Anaesthesia Issues

Retained Placenta

Surgical anaesthesia is not given in the labour ward, thus manual removal of placental (MROP) is a procedure that occurs in the OR.

Careful assessment of the volume status and what resuscitation has occurred prior to the patient's arrival is vital. The volume of blood lost is often greatly underestimated in labour ward. General anaesthetic should be considered if blood loss is uncertain.

A woman with a working epidural should have a top up with the mix described earlier in "Code Green Caesarean" Up to 20mL may be required to produce a block to T6. Alternatively a spinal anaesthetic can be used.

If bleeding is ongoing, expected to be problematic or the patient is not able to adequately resuscitated, GA is indicated. Ensure large bore IV access and the availability of blood products. It is not unreasonable to offer a woman a GA if she so desires and there are no indicators of difficult airway. A woman should be considered to have a full stomach until at least 24 hours post-delivery.

Repair of Third / Fourth Degree Perineal Tears

Repair of third- and fourth- degree tears occurs in the OR to enable optimal visualisation and repair. A working epidural can be topped up with up to 10mL of the mix used for CS. Alternatively spinal anaesthesia with 1.5mL of 0.5% heavy bupivacaine, allowing the woman to sit for a few minutes after block placement will produce a dense saddle block.

Again, the volume status of the woman should be assessed prior to anaesthesia and on an ongoing basis. **Blood loss is hard to estimate but it can be significant until the suturing is nearly completed.** Ongoing communication with the obstetric team is essential. Occasionally the surgeons or the woman may request a GA, especially for complex fourth degree tears.

Trial of forceps

Trial of instrumental delivery often progresses to CS. If the parturient has a working epidural, top up with at least 10mL of the solution described in

“Code Green Caesarean” and aim for a block up to T10. Further doses can be given if the case proceeds to CS. For spinal anaesthesia give the usual CS dose.

APPENDIX

Appendix 1: Guide to assessment of labour neuraxial analgesia competency

Pre procedure	
1	Assesses the patient
2	Chooses the anaesthetic technique appropriately
3	Explains the procedure and obtains informed consent
4	Ensures adequate assistance, monitoring, equipment and IV access
Procedure	
5	Demonstrates satisfactory aseptic technique including safety with prep
6	Positions the patient correctly for the block
7	Identifies landmarks
8	Inserts epidural catheter satisfactorily using appropriate technique
9	Performs aspiration test and responds appropriately to the result
10	Administers appropriate test dose
Post Procedure	
11	Performs safe incremental dosing
12	Assesses analgesia and ensures further care of patient as appropriate
13	Demonstrates good record keeping

14	Demonstrates good behaviour, communication skills and attitudes

Overall ability to perform procedure

NC - Not yet competent

CS - Able to perform procedure competently with supervision

C - Able to perform procedure independently

Appendix 2: Management of Local Anaesthetic Systemic Toxicity

AAGBI Safety Guideline

Management of Severe Local Anaesthetic Toxicity

1 Recognition

Signs of severe toxicity:
- Sudden alteration in mental status, severe agitation or loss of consciousness, with or without tonic-clonic convulsions
- Cardiovascular collapse: sinus bradycardia, conduction blocks, asystole and ventricular tachyarrhythmias may all occur
- Local anaesthetic (LA) toxicity may occur some time after an initial injection

2 Immediate management

- Stop injecting the LA
- Call for help
- Maintain the airway and, if necessary, secure it with a tracheal tube
- Give 100% oxygen and ensure adequate lung ventilation (hyperventilation may help by increasing plasma pH in the presence of metabolic acidosis)
- Confirm or establish intravenous access
- Control seizures: give a benzodiazepine, thiopental or propofol in small incremental doses
- Assess cardiovascular status throughout
- Consider drawing blood for analysis, but do not delay definitive treatment to do this

3 Treatment

IN CIRCULATORY ARREST
- Start cardiopulmonary resuscitation (CPR) using standard protocols
- Manage arrhythmias using the same protocols, recognising that arrhythmias may be very refractory to treatment
- Consider the use of cardiopulmonary bypass if available

GIVE INTRAVENOUS LIPID EMULSION
(following the regimen overleaf)
- Continue CPR throughout treatment with lipid emulsion
- Recovery from LA-induced cardiac arrest may take >1 h
- Propofol is not a suitable substitute for lipid emulsion
- Lidocaine should not be used as an anti-arrhythmic therapy

WITHOUT CIRCULATORY ARREST
Use conventional therapies to treat:
- hypotension,
- bradycardia,
- tachyarrhythmia

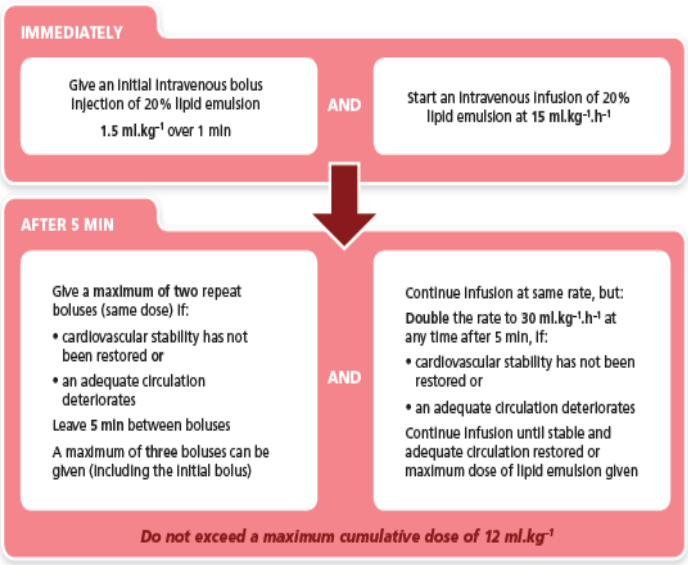
CONSIDER INTRAVENOUS LIPID EMULSION
(following the regimen overleaf)
- Propofol is not a suitable substitute for lipid emulsion
- Lidocaine should not be used as an anti-arrhythmic therapy

4 Follow-up

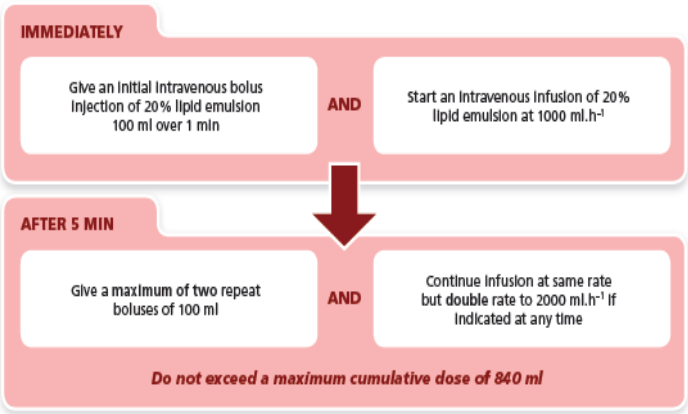
- Arrange safe transfer to a clinical area with appropriate equipment and suitable staff until sustained recovery is achieved
- Exclude pancreatitis by regular clinical review, including daily amylase or lipase assays for two days
- Report cases as follows:
  - In the United Kingdom to the National Patient Safety Agency (via **www.npsa.nhs.uk**)
  - In the Republic of Ireland to the Irish Medicines Board (via **www.imb.ie**)

If Lipid has been given, please also report its use to the International registry at **www.lipidregistry.org**. Details may also be posted at **www.lipidrescue.org**

Your nearest bag of Lipid Emulsion is kept.....



An approximate dose regimen for a 70-kg patient would be as follows:



This AAGBI Safety Guideline was produced by a Working Party that comprised:
Grant Cave, Will Harrop-Griffiths (Chair), Martyn Harvey, Tim Meek, John Picard, Tim Short and Guy Weinberg.

This Safety Guideline is endorsed by the Australian and New Zealand College of Anaesthetists (ANZCA).

Appendix 3: Other useful resources

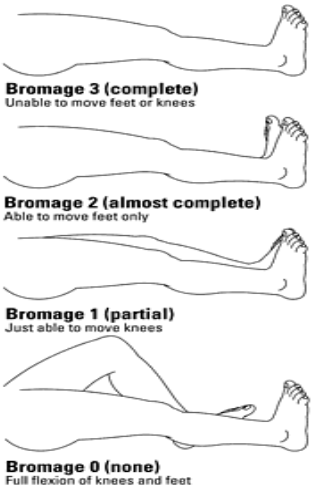
- Oxford Specialist Handbooks in Anaesthesia: Obstetric Anaesthesia. Clyburn et al., Oxford University Press, latest version
- Chestnut's Obstetric Anesthesia: Principles and Practice, 5th Edition. Chestnut et al., Mosby, latest version
- Shnider and Levinson's Anesthesia for Obstetrics. Hughes, Levinson, Rozsen, Lippincott Williams and Wilkins, latest version
- Oxford Specialist Handbooks in Anaesthesia: Paediatric Anaesthesia. Doyle, Oxford University Press, 2007
- A Practical Approach to Pediatric Anesthesia. Jolzman, Mancuso, Polaner (eds)., Lippincott Williams and Wilkins, latest version
- Paediatric Anaesthesia (Problems in Anaesthesia). Stoddart, Lauder (eds)., Informa Healthcare, latest version

Appendix 4: Relevant PROMPT procedures/guidelines

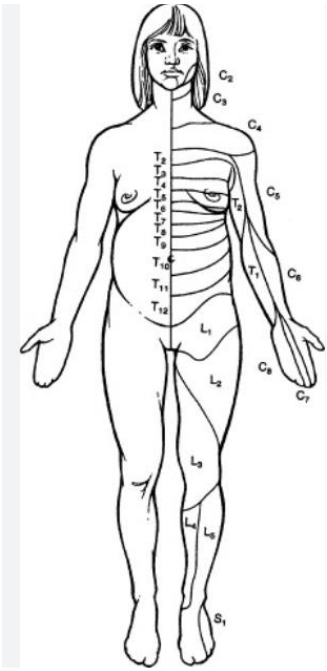
Accessed via the intranet: inside.wh,org,au/Pages/Welcome.aspx → Policies, Procedures & Forms → PROMPT

- Obstetric Epidural Analgesia
- Management of Obstetric Post Dural Puncture Headache
- Equipment Stocking- Anaesthesia Trolleys
- Neuraxial Morphine for Caesarean Section
- Rotational Thromboelastometry (ROTEM) Usage Guidelines
- Fibrinogen Concentrate for Major Obstetric/Non- Obstetric Bleeding Procedure
- Critical Bleeding and Massive Transfusion
- Care of Women with Obesity in Pregnancy
- Intrapartum Pain Management
- Care during Active Labour, Birth and the Immediate Postpartum Period
- Management of Hypertension in Pregnancy – Preeclampsia and Eclampsia
- Oral intake in labor
- Detection and Management of Obstetric Sepsis
- Birth after Previous Caesarean Section
- Management of Post Partum Haemorrhage
- Patient Controlled Analgesia (PCA) and Continuous Intravenous Opioid Infusion for Adults and Paediatric Patients over 50kg
- Adult Venous Thromboembolism (VTE) Prevention

Appendix 5: Sensory and Motor Assessment Scores



Modified Bromage Score 0-3



Sensory Level Assessment: Note A level of T10 is all that should be required for labour analgesia. A dense block to T4 is required for C section