Obstetric Anaesthesia Handbook

St Mary's Maternity Unit, Poole Hospital NHS Foundation Trust

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Obstetric Anaesthesia Handbook

Contents:

General Information

Welcome to the Obstetric Anaesthesia Handbook. We hope you find it useful as an introduction to obstetric anaesthesia at Poole Maternity Hospital. Whilst every effort has been made to verify the accuracy of its contents, this cannot be guaranteed. Please inform the obstetric anaesthetic consultants if you find any errors or have any queries.

Anaesthetic
Shifts are 0800, 1700 and 1930 for the day, evening and night shifts respectively. It is your responsibility to check machines and emergency drugs at the start of each shift. On Call Bleep 0399. Consultant Bleep 0632.

A separate anaesthetist is rota'd for the elective Caesarean Section list which happens most mornings Monday to Friday. This should have its own theatre team and be independent of labour ward.

Labour ward
Midwives handover 0730 and 2000. There is always a senior 'shift lead' midwife. Obstetric ward rounds occur after Obstetric handover at 0830, 1300, 1700 and 2100. Anaesthetists should participate in these multidisciplinary ward rounds; it is also useful to have updates on potential theatre and high risk cases as well as checking that the labour epidurals; PCEA, PCA are functioning well.

Preassessment Anaesthetic Clinic
All high risk cases should be seen here for Consultant Obstetric Anaesthetist input. Always check blue notes for a letter detailing the patient plan and there is a copy of the clinic letters located in the anaesthetic office for reference. Referral can be made to clinic by giving details including the reason to antenatal clinic reception.

Novice Anaesthetists
A supernumerary training role which aims to complete the WorkPlace Based Assessments (WPBA) for Novice Obstetric Anaesthesia. It is usual practice for the novice anaesthetists to obtain experience during elective caesarean section lists in the mornings. Check with the labour ward anaesthetic consultant first.

Maternity Policies and Guidelines
These can be located from the Poole Hospital Home Page

http://nww.intranet.poole.nhs.uk/

Once here, left hand column click on	"Policies Procedures Guidelines"
Next page, click on A-Z of	"Clinical Policies, Procedures & Guidelines"
Next page, click on	"M"
Then find	"Maternity Policies & Guidelines"

These Maternity Policies & Guidelines are listed in full on the next page but should be accessed via the Intranet as above. The reason for this is that they are updated regularly.

Maternity Policies and Guidelines (those of particular relevance to anaesthetists are underlined)

Admission to Neonatal Unit
Adverse Incident Reporting (Trust Policy)
Antenatal Downs Syndrome Screening
Antepartum Haemorrhage
Anti D Administration
Aromatherapy Policy
Bladder Care
Booking Appointments & Antenatal Care Pathway
Breastfeeding Policy
Caesarean Section Guideline
Care of Women in Labour
Cell Salvage in Obstetrics
Cord Prolapse Policy
Diabetes in Pregnancy
Discharge Guidelines - Maternity
Eclampsia Guideline
Emergency Dept - Pregnant women admitted to
Epilepsy in Pregnancy Policy
Escalation Policy - Maternity
Examination of the Newborn
Fetal Blood Sampling in Labour
Fetal Monitoring Policy
Handover of Care - Maternity
Haven Birthing Suite Operational Policy
High Dependency Care - Maternity
Immediate Care of the Newborn
Induction of Labour
Information Provision Guideline
Instrumental Vaginal Delivery
Iron Deficiency Anaemia in Pregnancy and Puerperium (Treatment of)
Labour & Birth in Water
Management of Hyperemesis Gravidarum
Management of Neonates and Infants born to HIV infected mothers in the neonatal service
Management of Severe PET
Maternal Antenatal Screening Tests
Maternal Death Policy
Maternity Records and Storage
Maternity Recovery Guideline
Maternity Services Risk Management Strategy
Maternity Services Staffing Levels
Mental Health Policy
MEOWS Policy
Missed Appointments
Multiple Birth and Pregnancy
Neonatal GBS - Prevention of Early Onset
Neonatal Jaundice
Neonatal Life Support
Newborn Feeding Policy
Newborn Security
Obesity Guideline
Obstetric Cholestasis
Oligohydramnios
Oxytocin - Use of
Patient Controlled Epidural Analgesia in Labour
Perinatal Investigation of the Placenta
Perineal Trauma Policy
Postnatal Care
PPH & MOH guideline
Pre Labour SRM
Pre Term Labour
Referral When a Fetal Abnormality is Detected
Remifentanil PCA Policy
Risk Assessments in the Antenatal, Intrapartum and Postnatal Periods
Safeguarding Children in the Maternity Services
Screening and Early Management for Hypoglycaemia in the Newborn
Sepsis - Severe Sepsis and Septic Shock in Obstetric Patients
Shoulder Dystocia
Stillbirth Policy
Stillbirth Form - funeral arrangements
Support for Parents
Training & Development Procedures
Transfer Policy
Urinary Tract Infection Syndromes in Pregnancy
VBAC Guideline
Venous Thromboembolism (VTE)
Weighing Neonates
Women who Refuse Blood Transfusions

Consent

General

Signed consent is not necessary for regional analgesia in labour. However, you should make a record of the risks and benefits you have discussed with the woman since it is not uncommon for women subsequently to deny that they were warned about a possible complication. You should also sign and date the epidural chart section that you have explained the material risks and that the parturient had accepted them. Consent for anaesthesia for caesarean section is implicit in the general consent for caesarean section but the anaesthetist will be required to discuss and explain the benefits, risks and alternatives of the chosen anaesthetic. If required use the information from the Obstetric Anaesthetists Association (OAA) website on anaesthesia for caesarean section[1].

The Epidural Information Card should be used by the midwives when the parturient is considering an epidural and check with the midwife that this has been given and read by the parturient when an epidural request is made. **Use the Epidural Information Card[2] as a guide to your discussion with the parturient.** The original can be found on the Obstetric Anaesthetists' Association website as referenced and is included below for completeness. Under the Clinical Guidelines tab is Regional analgesia and it is found here free to print and with many translations. These should be given early to parturients with limited understanding of English so that they can have time to read and assimilate the information.

Always offer women the opportunity to ask questions, and give honest answers. Any problems regarding consent must be referred to the consultant or senior obstetric anaesthetist and obstetricians.

General Anaesthesia for Caesarean Section[1]

The woman who chooses general anaesthesia (GA) in preference to regional block should be warned about the consequences of her decision upon neonatal sedation, blood loss and postoperative pain (all increased). Awareness, failed intubation and aspiration may be mentioned. However, although it might be appropriate to warn of the overall increased maternal risk of GA for emergency Caesarean Section, it would not be wise to overemphasise as a means of persuading a woman to have a regional anaesthetic. In the event of failed regional block, the anaesthetist will be in a predicament as to reassuring the woman about GA. A suitable form of words might be 'both methods are very safe, but the epidural/spinal more so than general anaesthesia'.

The mother who refuses treatment

This is a complex issue requiring multidisciplinary discussion and management at a senior level.

In general, medical treatment can be undertaken in an emergency acting in a patient's 'best interest'. This is provided the treatment is a necessity and does no more than is reasonably required in the 'best interests' of the mother; meaning that the operation/ treatment will save life or ensure improvement in/ prevent deterioration of physical/ mental health. However, treatment must not be given if the woman has previously refused the treatment when competent. A mentally competent parturient has an absolute right to consent to or refuse medical treatment for any reason, rational or irrational, or for no reason at all.

The Court of Appeal in Re MB has reaffirmed a woman in labour who has capacity to decide may choose not to have medical intervention, even though in the words of the court "the consequence may be the death or serious handicap of the child she bears, or her own death". The Court of Appeal in Re S provides guidelines to apply in cases where the capacity of the patient is in doubt. If a woman refuses consent to caesarean section (or any other intervention) and it is thought she lacks

capacity to make such a decision, a declaration from the High Court will be required to decide whether or not it would be lawful to carry out such treatment.

Capacity

Every person is presumed to have the capacity to consent to (or refuse) medical treatment unless there are circumstances that indicate otherwise. While panic, indecisiveness or irrationality do not themselves amount to incompetence, they might be symptoms of incompetence. A person lacks capacity if some impairment of mental function renders her unable to make a decision. Temporary factors might erode capacity but these are only relevant to the extent that as a result the ability to decide is absent.

One such factor might be panic induced by fear, but while fear of an operation might be a sound reason to refuse consent, fear might also paralyse the will and thus destroy capacity. The Court confirmed it could not consider and weigh in the balance the rights of the unborn child. Doubt over consent should be identified as soon as possible. Capacity to give consent might be assessed by the patients' treating doctor but, in more serious cases, an independent psychiatrist, ideally approved under Section 12(2) MHA 1993, should be consulted. If a doubt still remains, an application to the Court should be considered. The patients' solicitor should be informed or, where the patient is incapable of instructing a solicitor, the Official Solicitor.

In practice

When doctors feel it necessary to seek declarations from the Court, the following practice should be followed. The Court is unlikely to hear an application unless the capacity of the patient is in doubt. If the patient is competent but refuses treatment, a declaration is pointless. Such refusal, however, should be fully documented to show the patient reached an informed decision (i.e. understands the nature and reasons for the treatment and the likely risks and prognosis in refusing it).

For the time being a ruling of the High Court must be sought on issues of competence. Any such potential cases should be identified as soon as possible so that:

- Both patient and Trust have the time to take legal advice
- It is not heard by the Court as an emergency
- The Court can hear oral evidence from as many parties as possible
- Both parties attend the hearing and that the mother should be represented unless she chooses not to be.

Generally, there should be some evidence from a psychiatrist as to competence. Those giving evidence as to capacity should be made aware of Re MB. The Judge should be provided with information about the circumstances and relevant background of the patient. The Judge must know the reasons for the operation or treatment, the risks involved in treating and not treating, any alternative treatment and the reason for the refusal. Early contact should be made with the Trust solicitors (contact details available via switchboard).

EPIDURAL INFORMATION CARD
Epidurals in labour – what you need to know

(This card is a summary. Further information is available from www.oaaformothers.info
Please discuss anything that is not clear with your anaesthetist).

Setting up your epidural

- You will need to have an intravenous cannula and maybe a drip.
- While the epidural is being put in, it is important that you keep still and let the anaesthetist know if you are having a contraction.
- Usually takes 20 minutes to set up and 20 minutes to work.
- Some epidurals do not work fully and need to be adjusted or replaced.

Advantages of an epidural

- Usually provides excellent pain relief.
- Sometimes a **spinal** is given first for a quicker effect.
- The dose or type of local anaesthetic can sometimes be altered to allow you to move around the bed. This is a low-dose (or mobile) epidural.
- In general epidurals do not affect your baby.
- Can be topped up for caesarean section if required.

Possible problems with your epidural

- Repeated top-ups with stronger local anaesthetic may cause temporary leg weakness and increase the risk of forceps or ventouse delivery.
- The epidural may slow down the second stage of labour slightly.
- You may develop low blood pressure, itching or a fever during the epidural.
- The epidural site may be tender but usually only for a few days. Backache is NOT caused by epidurals but is common after any pregnancy.

The other side of this card gives important risks of epidurals

EPIDURAL INFORMATION CARD

Risks of having an epidural or spinal to reduce labour pain

Type of risk	How often does this happen?	How common is it?
Significant drop in blood pressure	One in every 50 women	Occasional
Not working well enough to reduce labour pain so you need to use other ways of lessening the pain	One in every 8 women	Common
Not working well enough for a caesarean section so you need to have a general anaesthetic	One in every 20 women	Sometimes
Severe headache	One in every 100 women (epidural) One in every 500 women (spinal)	Uncommon
Nerve damage (numb patch on a leg or foot, or having a weak leg)	Temporary - one in every 1,000 women	Rare
Effects lasting for more than 6 months	Permanent - one in every 13,000 women	Rare
Epidural abscess (infection)	One in every 50,000 women	Very rare
Meningitis	One in every 100,000 women	Very rare
Epidural haematoma (blood clot)	One in every 170,000 women	Very rare
Accidental unconsciousness	One in every 100,000 women	Very rare
Severe injury, including being paralysed	One in every 250,000 women	Extremely rare

The information available from the published documents does not give accurate figures for all of these risks. The figures shown above are estimates and may be different in different hospitals.

The other side of this card gives information about epidurals for labour pain

Analgesia for Labour

Labour may be the most painful experience many women ever encounter. The experience is different for each woman, and the different methods chosen to relieve pain depend upon the techniques available locally and the personal choice of the individual. Further information and translations can be obtained from the OAA website[2] including a summary table:

Pain relief in labour: how do the options compare?

Methods with medication	Entonox (gas and air)	Pethidine or diamorphine injection	Patient-controlled intravenous analgesia (PCIA)	Epidural or combined spinal epidural (CSE)
What is it?	A gas mixture of nitrous oxide and oxygen.	Pethidine or diamorphine is injected into the muscle in your arm or leg.	Small dose of fentanyl or remifentanil given from a pump into a drip in your hand.	Local anaesthetic and a painkiller given through a fine tube in your back to numb your nerves. May not be recommended very early or late in labour.
What do you do?	Breathe it through a mask or mouthpiece with a valve.	Have an injection in your arm or leg.	Press the button to give yourself a dose every time you feel a contraction starting.	Sit still in a curled-up position for five to ten minutes while the tube is put in.
How much pain relief?	Moderate help.	Often mild. May reduce anxiety.	The amount of pain relief varies. Women often need to use Entonox as well.	Usually very good. One in 10 times, it may not work well and may need replacing.
How long until it starts to work?	Immediate.	Five minutes to prepare the injection, then 30 minutes before it starts to work. The effects last a few hours.	10 to 15 minutes to set up then works in a few minutes.	Up to 20 minutes to set up. Then 20 minutes for epidural to work (a CSE will be quicker than this as you will also have a spinal injection).
Any extra procedures?	None.	None.	You will be on a drip. You may be connected to a monitor to check your baby's heartbeat. Checks on your oxygen levels. You may need extra oxygen.	You will be on a drip. You may have a urinary catheter. You may be connected to a monitor to check your baby's heartbeat.
Risks to baby?	None.	May be slow to breathe. May be drowsy and find it difficult to feed at first.	May be slow to breathe at first.	You may have low blood pressure and this can affect your baby's heart rate if not treated.
Side effects for mother?	Some nausea. Can feel 'spaced out' Can be tiring and make your mouth dry.	Feeling sleepy or sick. Delay the rate at which food is digested so you get a full stomach. May slow your breathing.	Feeling sleepy or sick. Slow breathing - you will have to stop using it if it makes you too sleepy. Stopping breathing or slowing your heart rate (rare).	Low blood pressure is common. Difficulty passing urine. Bad headache (1 in 100 women). Increase in temperature. Temporary nerve damage (1 in 1000 women). Permanent nerve damage (1 in 13,000 women). Severe complications (1 in 250,000 women).
Effect on labour and delivery?	None.	None.	May increase the need for forceps.	Can make it harder for you to push. May increase the need for forceps.

Non Pharmacological[3]

The advantages here include relative ease of administration and minimal side effects; however, there is little evidence to support the efficacy of many of these techniques, and some may be costly and time consuming.

A selection: Transcutaneous electrical nerve stimulation (TENS), Relaxation/ Breathing techniques, Temperature modulation: Hot or cold packs, water immersion, Hypnosis, Massage, Acupuncture, Aromatherapy.

Transcutaneous electrical nerve stimulation (TENS)

Electrodes placed over the T10 - L1 dermatomes either side of the spinous processes to provide analgesia for the first stage of labour. A second set of electrodes is placed over S2 – 4 dermatomes for second stage pain relief. Women can alter the amount of current supplied to the electrodes providing some degree of control throughout their labour.

Blockade of pain transmission to the brain through stimulation of A-fibre transmission and local release of β -endorphins are suggested theories for TENS analgesia; however, there is no evidence that TENS provides more analgesia than placebo. Despite this, TENS has minimal side-effects and may be appropriate for women who have contraindications to other methods of pain relief or where other methods are not available.

Pharmacological

Inhalational methods

- Nitrous oxide. Entonox (50% nitrous oxide in oxygen) provides analgesia within 20-30 seconds of inhalation, with a maximum effect after about 45 seconds. Advantages include: ease of use, no requirement for physician supervision, minimal accumulation with intermittent use and self-administration provides some control. Disadvantages include drowsiness, disorientation and nausea may occur including brief periods of loss of consciousness. Does not provide complete analgesia.
- Halogenated agents. Several low dose volatile anaesthetic agents have been inhaled intermittently for labour analgesia such as isoflurane and sevoflurane. Their use is limited by technical difficulties in their safe administration and scavenging. They may be of use in theatre to assist in regional anaesthesia for operative delivery during contractions if Entonox alone is ineffective.

Systemic analgesics

- Pethidine (Meperidine). Pethidine is a synthetic phenylpiperidine which is commonly administered intramuscularly (IM) at a dose of 1-2mg/kg. Despite widespread use, its efficacy has been questioned and it gives limited analgesia in labour. Disadvantages include delay to gastric emptying and has been shown to increase gastric volumes in labour. It also causes sedation, dose-dependent respiratory depression, and its active metabolite (norPethidine) has convulsant properties. Pethidine should be avoided in those with a history of epilepsy or pre-eclamptics. Furthermore, Pethidine crosses the placenta, and its effects on the fetus are dependent on dose and timing of administration; the highest fetal plasma concentration occurs 2-3 hours after maternal IM administration. Neonatal effects are compounded by production of norPethidine, which causes further sedation and respiratory depression. Babies of women administered Pethidine in labour have been shown to be sleepier, less attentive and less able to establish breast feeding despite normal Apgar scores.

Despite these disadvantages, Pethidine remains popular in many obstetric units, is easy to administer and may be a useful analgesic modality where other methods are not available or are contraindicated.

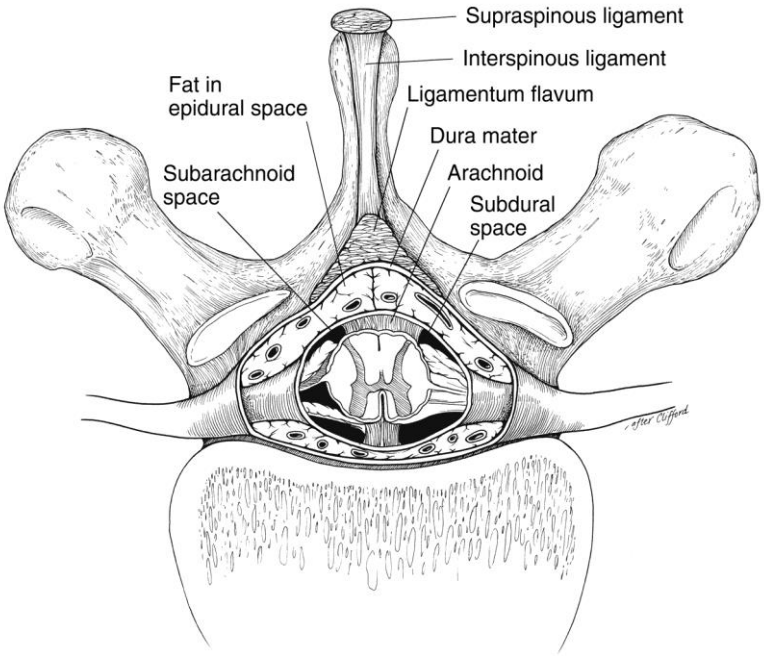
- Morphine. Shares many of the side-effects of Pethidine and rapidly crosses the placenta; however, its metabolites do not have convulsant effects. The dose used for maternal analgesia is 0.1-0.15mg/kg but has not been shown to have any significant analgesic effects.
- Diamorphine, is a slightly more efficacious analgesic than Pethidine, is increasingly used for labour analgesia in the UK. It is administered IM at a dose of 7.5mg. Diamorphine prolongs labour by an average of 82 minutes and may decrease maternal oxygen saturation during the first hour of administration.
- Fentanyl, a highly potent phenylpiperidine derivative, has a rapid onset of action. It has a longer terminal half-life than both Pethidine and morphine, and repeated dosing may result in drug accumulation in both the fetus and the mother. Advantages include absence of active metabolites and rapid onset of action, making it useful for patient-controlled analgesia.

Patient-controlled analgesia (PCA)

- If regional analgesia is unavailable or contraindicated, then PCA is a useful method of pain control as long as the equipment and staffing are available. Many opioids have been used in PCA devices; drugs currently used include fentanyl and, more recently, Remifentanil.
- Fentanyl PCA
- A suggested regimen for fentanyl PCA is a 20 µg bolus with 5 minute lockout; however, the ideal loading dose, bolus dose, lockout time and maximum hourly dose remain unclear. Both parturient and neonate should be carefully monitored during labour, post-partum and PCA settings altered accordingly. Fentanyl PCA is used less nowadays with the introduction of remifentanil PCA.

  Remifentanil PCA
- Remifentanil, an ultra short-acting opioid, is rapidly hydrolysed by blood and tissue esterases and does not accumulate, even after prolonged infusions. There are increasing reports of its use in PCA, although, like fentanyl, the ideal regimen remains unclear. A bolus dose of 0.25-0.5 µg/kg with a 2 minute lockout has been used successfully. However, close monitoring is essential and supplementary oxygen may be required. Please refer to Remifentanil Guidelines on the intranet.
- There is a Remifentanil Box containing the dedicated PCA pumps, guidelines, patient information sheet and audit forms are located in the clinical room in delivery suite ward.

Epidural



Cross-sectional anatomy of the lumbar spine, detailing the epidural space[4]

Epidural and common scenarios

- Absolute and relative contraindications

  Absolute
  - Patient refusal
  - Skin infection near insertion site
  - Coagulopathy
  - Raised ICP
  - Inability to understand the benefits and risks and therefore provide informed consent

  Relative
  - Some forms of anticoagulant therapy
  - Hypovolaemia
  - Disease of the nervous system
  - Gross spinal deformity
  - Haemorrhage and hypovolaemia
  - Systemic sepsis (under antibiotic treatment)
  - Severe foetal distress
  - Fixed cardiac output states
  - Uncooperative parturient (suggest a CSE in some cases)
- Thrombocytopaenia aetiology includes PET/Eclampsia, HELLP syndrome, auto-immune, idiopathic thrombocytopaenia of pregnancy (ITP), AIDS, Anti phospholipid syndrome (APS)
- Epidural analgesia and thrombocytopaenia
  - >100,000 Epidural as indicated. Clotting screen need not be performed
  - 80 – 100,000 or a fall of platelet count by 50% within 24hrs. Perform a clotting screen. If normal epidural as indicated. If abnormal epidural contraindicated.

    - <80,000 Do not site an epidural until the clinical situation has been discussed with one of the obstetric consultant anaesthetists. If they can't be contacted then speak to the on call consultant anaesthetist or haematologist.
    - Patients with platelets < 80000 in whom an epidural has been sited must be carefully monitored postpartum for evidence of a neurological deficit. Management must be carefully documented in the parturient's notes.
- Clotting
    - A clotting screen must be checked and INR/ APTTr 1.2 or below prior to regional anaesthesia if:
        - There is any clinical suspicion of a bleeding tendency
        - There is any reason to suspect liver dysfunction (eg. cholestasis with abnormal ALT and no recent clotting result)
        - Consider in abruption, fetal death and amniotic fluid embolism.
    - In severe PET a platelet count should always have been checked within 6 hours of a block or more recently in rapidly progressive disease.
    - Parturients on aspirin; the risk of a spinal or epidural haematoma does not appear to be increased.
    - Patients on clopidogrel; Stop for 7 days prior.
- Heparin
    - Treatment dose
        - Unfractionated. Must be discontinued and a normal APTTr result achieved before regional anaesthesia.
        - LMWH 24 hours should elapse before siting (or removing) an epidural or spinal. Consult Haematogist.
    - Prophylactic dose
        - Beware possible thrombocytopaenia that can occur with short or long term use. HIT is in fact classically associated with recent initiation of LMWH.
        - Unfractionated. Wait 6 hours after last dose before performing block or removing catheter. Subsequent or first dose at least 6 hours after block insertion or removal.
        - LMWH. Wait 12 hours after last dose before performing block or removing catheter. Subsequent or first dose at least 6 hours after block insertion or removal.
    - N.B. If in doubt about anticoagulation and regional analgesia contact the consultant obstetric anaesthetist and/or haematologist
- **Maternal Pyrexia**. Many parturients may have pyrexia during labour often secondary to prolonged rupture of membranes (PROM). Others may have chorioamnionitis. Current opinion is that epidural analgesia is safe for these patients who are at high risk of operative delivery.
- If these parturients are not already on antibiotics, administer parenteral antibiotics, after discussion with the obstetric team, before siting the epidural. Be aware that siting an epidural is associated with a rise in maternal temperature in the apyrexial population. A further rise in maternal temperature (and hence fetal temperature) should be expected in the already pyrexial mother.
- **Haematological Disorders.** Most common presenting for regional blockade are Haemophilia Carriers and Von Willebrand's disease. In the majority of patients Factor VIII levels increase with pregnancy and at term many of these patients will have normal Factor VIII levels. These patients can safely have a regional block but check with the haematologist. Check that a recent Factor VIII level has been performed. If a normal level has existed at some point during the latter part of pregnancy it is unlikely that it will fall. Therefore it is unnecessary to recheck the level in such patients immediately before an epidural. Please check that the management plan of such parturients is in the hospital notes. If you are unsure please refer to one of the obstetric consultants. These parturients will usually be under the care of the haematologists/ haemophilia team and will usually have a plan in the notes. You can call the on call haematologist for additional advice.

- HIV. This is not a contraindication to regional block.
- Thromboelastography (TEG)/ROTEM: These near patient tests may be useful in guiding the safety of regional analgesia/ anaesthesia and the appropriate use of blood products peripartum.

Epidural Troubleshooting[5]

Your solution here will derive from the pattern of failure. Remember that a full bladder may cause breakthrough pain. Ask the midwife if a full bladder is likely. Carefully assess the spread of the block. The pressure from engagement of the fetal head particularly in the occipito-posterior position may also cause pain resistant to epidural analgesia. It is important to be confident that the epidural could be topped up for a caesarean section if required. Check the efficacy of the labour epidural regularly. If in doubt, resite the epidural.

When it comes to using a top-up local anaesthetic for Epidural Troubleshooting a typical dose would be 5ml of 0.25% LevoBupivacaine and sometimes with a small dose of fentanyl e.g. 25-50mcg.

Pattern of Failure	**Remedy**
Global No detectable block despite at least 10ml 0.25% Bupivacaine (or equivalent)	Resite Epidural
Partial	
Unilateral block: feel both feel to assess whether they are symmetrically warm and dry. See if the pattern matches the distribution of pain.	Top-up epidural with painful side in a dependent position (Use local anaesthetic and 50mcg Fentanyl) Withdraw catheter 1-3cm and give further Top-up Resite Epidural
Missed segment: true missed segments are rare. Commonly a 'missed segment' felt in the groin is a partial unilateral block.	Top-up with opioid (ie. 50mcg Fentanyl). The intrathecal mode of action will minimise segmental effects. Continue as per 'unilateral block'
Back pain: severe back pain is associated with an occipito-posterior position of the fetus and may require a dense block to establish analgesia	Top-up with more local anaesthetic and opioid
Perineal pain	Check sacral block and that the bladder is empty Top-up with more local anaesthetic in sitting position with 50mcg fentanyl Continue as per Unilateral block

Regional Anaesthesia for Caesarean Section

Ensure that you have a running drip and monitoring of the mother and fetus.

Epidural Top-up

Think: If there are doubts about the epidural working for example a one-sided block or total failure then have a low threshold to avoid the epidural top-up. Provided there are no contraindications then remove the epidural catheter and administer spinal anaesthesia.

If you have a good working epidural then make up in a 20ml syringe **either**

20ml 0.5% LevoBupivacaine (For Cat 2-3 CS)

or

Rapid Onset Top-up (Cat 1 & 2 CS) – The formula and drugs are available on top of the anaesthetic machine in a red container in both obstetric theatres.

17ml	2%	Lignocaine
2ml	8.4%	Bicarbonate
1ml	1 in 10,000	Adrenaline

Having made up your top-up solution you will start the top-up only when you feel safe the mother is in a position for you to manage the rare complication of high spinal. For some anaesthetists this is in the labour room, for others this is the theatre. For Cat 1 CS, you should give a test dose (3mls of rapid top up solution) in the labour room and stay with the parturient monitoring the effect constantly and following her to theatre (The Confidential Enquity in CESDI 2001). This will also expedite the transfer of Cat 1 CS women into theatre.

Thereafter, administer top-up solution in boluses initially of 5ml and check block height as you go. Most patients will need between 10 and 20ml in total.

After uterotomy or surgical incision of the uterus; administer 2.5mg Diamorphine made up in 2.5ml N.Saline via the epidural catheter with a 1ml saline flush for long acting analgesia. Studies have shown that minimal opioid is transferred to the fetus after uterotomy and this early addition of epidural diamorphine can improve epidural anaesthesia for the parturient.

Spinal

Most Anaesthetists will vary in their chosen doses. However a typical spinal would consist of

2.3 to 2.5ml 0.5% Heavy Bupivacaine (Marcaine) depending on maternal height.
0.4ml 0.4mg Diamorphine made up in N.Saline

N.B. Unlike CSE, there is no way of supplementing single shot spinal mid-surgery and if in doubt, administer the higher dose to ensure adequate block for CS. Maternal hypotension can be corrected with phenyephrine infusion (see below) and other vasopressors.

Assessment of adequate block for CS

Minimum of T4 for cold sensation, T5 for touch and S5 for both before starting the CS. Adequate S5 block is when the parturient does not feel discomfort during urethral catheterisation. S3 is testing the lateral border of the parturients foot with cold spray.

Post-op Analgesia

Diclofenac 100mg pr by the midwife/obstetrician if not contraindicated.

1g	QDS	PO	Paracetamol	
400mg	QDS	PO	Ibuprofen	
20mg	BD	PO	Omeprazole	
4-8mg	TDS	PO/IV	Ondansetron	PRN
4-8mg	TDS	IV	Piriton	PRN
10-30mg	4hrly	PO	Oramorph	PRN

General Anaesthesia for Caesarean Section

Indications

Where regional anaesthesia is contraindicated and for category 1 Caesarean Section unless a working epidural for labour is present (use rapid block solution of Lig 2%+ HCO3 8.4% 2mls + 1ml 1:10000 Adrenaline) or for experienced anaesthetists the Rapid Sequence Spinal as per Bristol technique.

Pre-op

Verbal Consent
Fetal Resuscitation – 1. Full left latéral tilt 2. High flow oxygen 3. 1L Hartmann's unless normovolaemic 4. Fetal monitoring 5. Turn off syntocinon infusion

Rapid Sequence Induction

Preoxygenation 3 mins with tight mask
Suction on
Cricoid Pressure (identify cricoid cartilage with ODP in parturients with difficult anatomy)
For those with high BMI use the Oxford HELP

5-7mg/kg Thiopentone (some women may require more so always use a sleep dose)
1.5mg/kg Suxamethonium or if Sux contraindicated Rocuronium 1.2mg/kg (check)
(Suggamadex available for rapid reversal in drug cupboard)

Intra-op

Antibiotics – Cefuroxime 1.5gm and Metronidazole 500mg (give pre-incision)
Syntocinon 5IU once baby delivered plus syntocinon infusion (40iu in 500mls, 125mls/hr) for all Cat 1 & 2 parturients and some Cat 3 & 4). Confirm with surgeon.
Further Uterotonics as requested by surgeon

Analgesia

IV Fentanyl (given at induction)
IV Morphine (for intra and post-operative analgesia). Set up a morphine PCA for post-op pain control.
Transversus Abdominis Plane (TAP) Block. There is an US machine to aid if you use this identification technique.

Post-op

Diclofenac 100mg pr given by the obstetrician or midwife at end of surgery if not contraindicated.

1g	QDS	PO	Paracetamol	
400mg	QDS	PO	Ibuprofen	
20mg	BD	PO	Omeprazole	
4-8mg	TDS	PO/IV	Ondansetron	PRN
4-8mg	TDS	IV	Piriton	PRN
10-30mg	4hrly	PO	Oramorph	PRN

Patient Info for GA for unplanned CS[1]:

Post Dural Puncture Headache[5]

Following a dural puncture with a 16G Tuohy Needle, the incidence of post dural puncture headache is approximately 70%. Headaches in the postnatal period are common. The key differentiating factor between a 'normal' headache and a post dural puncture headache is the postural nature of the latter. All assessment and treatment of Post Dural Puncture Headache (PDPH) should involve a senior obstetric anaesthetist.

Go and see the patient, take and history and examine

- Typically onset is 24-48hr post dural puncture. Untreated they may last 7-10days and in some cases longer.
- Characteristically worse on standing (postural). Headache is often absent after overnight bedrest but then returns after mobilising.
- Usually in the fronto-occipital regions and may be associated with neck stiffness.
- Photophobia and difficulty in accommodation are common. Hearing loss, tinnitus and VIth nerve palsy with diplopia are possible.
- Nausea occurs in up to 60% of cases.
- On examination look at the observations and examine the back for signs of infection. Abdominal compression and release can be used to elicit temporary improvement and worsening of symptoms respectively. This would support the likelihood of post dural puncture headache.
- **The anaesthetic notes are vital parts of the history and not to be forgotten. Look at these and complete a post dural puncture headache follow up form and give the mother a copy of the Headaches following epidural or spinal anaesthetics leaflet.**

  It is important to document your assessment and discussion with the parturient in the maternal notes including options for conservative treatment and epidural blood patch.

Prophylactic Treatment

Blood patching is not without sequelae full informed consent should be obtained. Bed rest alleviates symptoms, but the incidence of post dural puncture headache after 48hr is the same for those cases that mobilised throughout. Because of the risk of thromboembolism, bed rest should not be routinely encouraged in asymptomatic women.

Symptomatic Treatment

- Regular simple analgesics (paracetamol, NSAIDs) should always be prescribed unless contraindicated.
- Prescribe laxatives and stool softeners to avoid straining which exascerbates PDPH
- Encourage adequate fluid intake.
- Caffeine rich drinks.
- Epidural blood patch.

Epidural Blood Patch (EBP)

Check that there are no signs of infection locally or systematically before performing an EBP. If in doubt consult the anaesthetic consultant and do a FB

Epidural blood patch performed around 24-48hr post partum depending on severity of the PDPH an has an 80% symptomatic cure rate at the first attempt. Success is far more likely if 12ml or greater volume of blood is injected and inject 20mls provided there is no pain on injection. Use a smaller volume if the patient complains of severe pain during injection. Pain and complications can be minimised by slow injection.

The proposed mechanism of action is:-

- Blood injected into the epidural space compresses the dural sac by mass effect and raises the intracranial pressure. This produces an almost instantaneous improvement in pain.
- The injected blood forms a clot over the site of the dural tear and this seals the CSF leak.

Blood injected into the epidural space predominantly spreads cephalad, so blood patches should be performed at the same or lower interspace as the dural puncture. After the procedure, to allow the clot to form, maintain bed rest for at least 2 hours and then allow slow mobilisation. As far as possible, the patient should avoid straining, lifting or excessive bending for 48 hours. Prescribe laxatives and stool softeners. Document your EBP procedure in the parturient's notes. Follow-up is still required and every woman should have clear instructions to contact the anaesthetists again if symptoms recur even after discharge home. The PDPH form should have the contact details of the parturient who can be followed up on a daily basis until headache free.

VTE Prophylaxis[6]

Incidence of deep vein thrombosis (DVT) in pregnant women is 0.05 – 0.1% which is at least 5 - fold greater than women who are not pregnant or taking the oral contraceptive pill. 5 - 10% of pregnant women with an iliofemoral DVT develop a pulmonary embolism (PE). DVT is more common in the left leg; (85%) of events. In 72% of women the DVT affects the iliofemoral veins, which is possibly related to the fact that the right iliac artery crosses the left iliofemoral vein.

Venous thromboembolism (VTE) often has no symptoms – in over half of deep vein thromboses, there are no symptoms at all. However, a serious complication of deep vein thrombosis (DVT) is pulmonary embolism (PE), where the blood clot from a deep vein breaks away, travels within the bloodstream, and blocks the blood supply to the lungs.

Signs and Symptoms of Venous Thromboembolism (VTE)

Deep Vein Thrombosis (DVT)	**Pulmonary Embolism (PE)**
Swelling of the calf, ankle or foot	Sharp chest pain (worse during deep breathing)
Tenderness or pain in the calf or upper leg	Shortness of breath (dyspnoea) and/or hyperventilation
Purple or blue discoloration of the skin on the leg	Coughing up of blood (haemoptysis)
Increased warmth of the leg	Rapid heart beat (tachycardia)
Redness of the skin (erythema)	Feeling faint/faint

Factors associated with the increased incidence of VTW in pregnant women

- Extrinsic compression of the uterus on Ilio-femoral veins leading to lower limb venous stasis
- Venous atonia related to hormonal changes affecting venous return;
- Raised clotting factor levels especially factors I, VII, VIII and VWF;
- Reduced naturally occurring anticoagulants such as Protein S;
- Decreased fibrinolysis related to raised levels of plasminogen activator inhibitor 1 and 2.

Risk factors venous thromboembolism in pregnancy and puerperium	
Preexisting	New onset or transient
Previous VTE **Family History of VTE** **Current smoker** **Thrombophilia** **Congenital** **Antithrombin deficiency** **Protein C deficiency** **Protein S deficiency** **Factor V Leiden** **Prothrombin gene variant** **Acquired (antiphospholipid syndrome)** **Lupus anticoagulant** **Anticardiolipin antibodies** **Age over 35 years** **Obesity (BMI>30)** **Parity≥3** **Gross varicose veins** **Paraplegia** **Sickle cell disease** **Inflammatory disorders e.g., Inflammatory bowel disease** **Some medical disorders, e.g., nephrotic syndrome, certain cardiac diseases** **Myeloproliferative disorders e.g., essential thrombocythaemia, polycythaemia vera**	**Surgical procedure in pregnancy or eg.,evacuation of RPOC, postpartum sterilization** **Hyperemesis** **Dehydration** **Ovarian Hyperstimulation syndrome** **Severe infection, pyelonephritis** **Immobility (>4 days bed rest)** **Pre-eclampsia** **Excessive blood loss** **Long-haul travel** **Prolonged labour** **Midcavity instrumental delivery** **Immobility after delivery**

Antenatal Thrombosis Risk Assessment

All women should undergo an assessment of risk factors for VTE in early pregnancy, repeated at 28 and 34 weeks, and whenever a woman is admitted to hospital or develops other intercurrent problems. High risk women who may need prolonged thromboprophylaxis should be referred to the Consultant Haematologist. Thromboprophylaxis may be initiated by the Consultant Obstetrician if clinically indicated.

Thrombophilia

This can be an inherited or acquired increased tendency towards thrombotic disease, usually venous > arterial. Pregnant women with a personal history of VTE or a family history of VTE may be offered screening for thrombophilia.

Indications include: VTE aged < 50, Recurrent VTE, VTE in unusual site such as axillary, cerebral or mesenteric vein, Strong family history of VTE, especially first degree relatives, Family history of known thrombophilia defect, Unexplained recurrent miscarriages, Previous warfarin induced skin necrosis – seen in Protein C / S deficient patients.

Generally it is best to perform thrombophilia screens when women are not pregnant because of the fact that pregnancy is associated with high factor VIII levels leading to acquired Protein C resistance and reduced Protein S levels but sometimes this is unavoidable. In selected cases a limited thrombophilia screen for the Factor V Leiden and Prothrombin gene mutations/ antithrombin level/ anticardiolipin antibodies plus a lupus anticoagulant may be useful. It is best to perform the screens when patients are not receiving heparin that lowers antithrombin or warfarin that lowers Protein C / S levels.

Thromboprophylaxis in Pregnant Women

Note that booking weight should be used for prophylactic doses.

It is recommended that LMWH are the agents of choice for antenatal thromboprophylaxis as they are as effective as and safer than unfractionated heparin. Warfarin should be avoided if possible during pregnancy and at least between 6 and 12 weeks, plus after 36 weeks gestation. Antenatally and postnatally all women at high risk for VTE should be encouraged to wear Class-II GEC below knee stockings. Class-I GECS however are appropriate for hospital inpatients at increased risk for VTE and for pregnant women travelling by air.

Investigations for the diagnosis of DVT

Doppler ultrasound leg studies (requested through the ultrasound scan department or refer to DVT clinic during working hours), Confirm normal renal and hepatic function by FBC, coagulation screen, urea and electrolytes (U and E) and liver function tests (LFT) prior to anticoagulant therapy, If all investigations are negative anticoagulant treatment should be discontinued. A thrombophilia screen is not routinely recommended.

Acute Management for Women with Suspected/Diagnosed DVT

- Assess ABC
- Arrange appropriate investigations urgently
- Treat with Therapeutic Dose low-molecular-weight heparin until the diagnosis of DVT is excluded, unless such treatment is strongly contraindicated
- Most recent weight should be used for treatment doses of LMWH
- On diagnosis: treat with anticoagulants throughout pregnancy and for at least 6 weeks postnatally, but at least until 3 months treatment has been received
- Elevate the leg
- Apply graduated elastic stockings
- Encourage mobilisation / maintain hydration

Investigations for diagnosis of PE

- Recommend and offer portable **Chest x-ray** (CXR) to exclude pneumothorax or pneumonia; X-ray findings may show collapse, raised hemi diaphragm, pleural effusion, consolidation, wedge infarction or may be normal. (Regarding radiological investigations in pregnancy, the radiation dose thought to be dangerous to the fetus is 0.5 rad. A CXR is associated with < 0.001, venogram < 0.05, VQ scan < 0.05 and CT pulmonary angiogram < 0.05 rad exposure);
- Consider duplex Doppler of lower limbs- if CXR and Doppler normal but still high index of suspicion perform VQ scan or CTPA;
- **D-dimers;** D-dimers are not diagnostic of an acute thromboembolism event as the physiological changes in the coagulation system mean they are raised towards term and in the postnatal period. They can also be raised with other conditions such as pre-eclampsia. However a low level of D-dimer in pregnancy is likely to suggest that there is no venous thromboembolism. D-dimers are available out of hours, (use light blue sodium citrate bottle);
- FBC, coagulation screen, U&E, LFT and arterial blood gases prior to commencing anticoagulant therapy if possible. A thrombophilia screen is not routinely recommended;
- ECG: may show right bundle branch block, sinus tachycardia, S1Q3T3;
- VQ scan (ventilation perfusion scan): discuss with the on call radiologist, the ventilation part is often omitted in pregnancy and the radiation dose is lower than CTPA. It has a high negative predictive value;

- CTPA may be necessary- fetal thyroid function should be checked in the neonate if CTPA has been performed in pregnancy – a neonatal alert proforma;
- Liaise with chest physicians or on call medical registrar.

Acute Management for Women with Suspected/Diagnosed PE

- Assess ABC;
- Collapsed, shocked women need urgent assessment by a multi-disciplinary team to consider pulmonary artery catheter break up of clot, embolectomy or thrombolysis if situation is life threatening. Immediate thrombolysis should be considered if a massive PE is confirmed or, in extreme circumstances, prior to confirmation;
- Assess and manage in HDU;
- Arrange appropriate investigations urgently;
- Monitor BP, pulse, oxygen saturation, urine output and cardiac rhythm;
- If hypotensive – give 500ml crystalloid, consider inotropes if remains low;
- Consider arterial line and central line.

Massive P.E Management

- IV unfractionated heparin or thrombolytic therapy or thoracotomy or surgical embolectomy;
- In massive PE, IV unfractionated heparin should be administered after consulting the physicians / cardiologists;
- An urgent portable ECHOCARDIOGRAM or CTPA within 1 hr of presentation.

IV Heparin Treatment

Most recent weight should be used for treatment doses with unfractionated heparin and LMWH.

Loading: 75 units/kg (to nearest 100 units) by IV bolus injection. **Maximum 5000 units**.
Omit loading dose if patient received thrombolysis

Maintenance: Continuous infusion 18 units/kg/hr (to nearest 100 units)
To make the infusion use 20,000units/20ml vial and draw up into a 50ml syringe. **Do not dilute.**

Adjust dose according to APTT – Aim for 1.5-2.5 x lab APTT value
Measure APPT : 6 hours after loading dose
6 hours after any dose change
At least daily when in therapeutic range

Infusion rates according to activated partial thromboplastin time (APTT):

APTTR	Adjustment to heparin rate (1000units / mL)	Monitor APTT Ratio
> 5	Stop for 1 hour then reduce by 0.6mL / hr Inform Dr	After 2 hours
4.1 to 5.0	Reduce by 0.4mL / hr	After 6 hours
3.1 to 4.0	Reduce by 0.2mL / hr	After 6 hours
2.6 to 3.0	Reduce by 0.1mL / hr	After 10 hours
1.5 to 2.5	NO CHANGE	After 10 hours
1.2 to 1.4	Increase by 0.2mL/hr	After 6 hours
< 1.2	Increase by 0.4mL / hr Discuss with Dr to consider a bolus.	After 4 hours

Post-Partum Haemorrhage

Minor: 500–1000 ml
Moderate: 1000-2000 ml – women go to HDU if blood loss > 1.5 litres
Severe: 2000 ml or 1500ml with ongoing haemorrhage – this is **Major Obstetric Haemorrhage:** call Switch on 2222 and call Major Obstetric Haemorrhage (MOH). They contact obs/anaes/haematol/porter/lab.

Management

- Assess Airway, Breathing, Circulation
- Give Oxygen, high flow (15 l/min), by face mask
- Bring major haemorrhage box and resuscitation trolley
- Intravenous (IV) access with 14 gauge cannula x 2
- Infuse:
    - Crystalloid - Hartmanns, up to 2 L rapidly then
    - Blood Products:
        - O –ve blood (2 units on Del Suite- MUST tell lab if used)
        - Type specific blood 10 mins (or full X-M if previous sample & no antibodies)
        - Emergency X-match 20 mins
        - Full X-match 40 mins
- Take & send FBC (purple)/ coagulation (pale blue)/ G&S (pink) samples
- Phone transfusion to inform re major haemorrhage, give patient details and request 4 units of RBCs with or without 3 units FFP
- Call Major Haemorrhage alert via switchboard
- Therapeutic goals
    - Hb > 100g/L (can use Haemacue as a guide to trends, take FBC as soon as practical)
    - Platelets >50 x 10^9/l. Target 75 x 10^9/l 50
    - PT/APPT ≤ 1.5 x mean control
    - Fibrinogen > 1.5 g/dl – increase with Cryoprecipitate or fibrinogen concentrate
- Keep patient warm – Bair Hugger, Ranger fluid warmer or Level 1 Rapid Infusor – and monitor temperature
- Use pressure bags to increase speed of IVI or Level 1 Rapid Infusor for major haemorrhage
- Use Cell Salvage – initiate with collecting system for fresh lost blood

Also:
- Urinary catheter and input /output chart
- ABG with lactate. Use NICU machine (Del Suite machine does gases and pH only)

Arrest the Bleeding

Institute the following conservative measures to stop bleeding but consider EUA in theatre to exclude retained products or genital tract trauma. Also consider possible need for interventional radiology at an early stage.

- Rub up a contraction by massaging fundus or bi-manual uterine compression
- Syntocinon 5 units by slow IV injection. Can be repeated.
- Ergometrine 0.5mg IM. Caution in women with pre eclampsia, heart disease, high BP, any infection and multiple pregnancy.
- Syntocinon infusion (40 units in 500 mIs. Hartmanns at 125 ml/hr).
- Misoprostol 1000 mcg PR. Side effects include shivering, pyrexia & diarrhoea. Can also be given into the uterine cavity during caesarean section.
- Carboprost (Haemabate) 0.25 mg intramuscular (IM) -repeat at intervals of not less than 15 mins to a maximum of 8 doses (2 mg). Can give intra-uterine too. *Avoid in asthmatics*
- Antifibrinolytics 1g Tranexamic Acid (Cyclokapron) IV 6-8 hourly

- NB Consider these *early* in women who refuse blood transfusions.
- Complete Major Obstetric Haemorrhage (MOH) Debrief form (see below)

Medical therapy the haematologist may advise:

Antifibrinolytics e.g. Tranexamic Acid (Cyclokapron)
Tranexamic acid is an effective antifibrinolytic that blocks the binding of TPA and plasminogen to fibrin. Contraindication macroscopic haematuria: risk of precipitating a blood clot within the bladder or ureters that could trigger an obstructive uropathy

DDAVP(Desmopressin) Synthetic analogue of vasopressin. Given IV, raises Factor VIII and Von Willebrand Factor levels x2 to 4 within 30 minutes. Useful in patients with mild Haemophilia A and most subtypes of Von Willebrand's disease (VWD). Can also improve haemostasis in patients with inherited plus acquired platelet function disorders. The latter would include bleeding related to the effects of renal failure. Dose: 0.3 mcg / kg body weight infused in 50 mls 0.9% Saline over 30 minutes. It can be repeated 12-hourly if required. It can cause hyponatraemia hence it is important to monitor sodium levels daily. Contraindicated if sodium <120 umol/l and patients with arterial disease such as previous thrombotic strokes, angina etc.

Recombinant activated Factor VII (Novoseven)
It is important to note that Novoseven is unlikely to work if the platelet count is $<50 \times 10^9$/l, fibrinogen is <0.5 g/l and the pH is <7.2. Initial dose 90 mcg/kg. Novoseven is available in 1, 2 and 5 mg vial size doses-round up to the nearest whole vial dose. If bleeding continues it is essential to make sure that every possible effort has been made to raise the platelet count to $> 50 \times 10^9$/l and the fibrinogen concentration to at least 0.5g/l but ideally 1g/l before giving further Novoseven. If 1- 2 hours after the initial dose bleeding continues despite all other modes of treatment consider a further dose at 120 mcg/kg. Due to the recognised risks of thrombosis this should only be used on the advice of a consultant haematologist.

Surgical treatment

Balloon Tamponade
The 500ml intrauterine balloon catheter (Bakri balloon) may be useful when the PPH continues due to abnormal placentation, abnormal clotting or a large placental bed. It is important to continue a Syntocinon infusion to keep the uterus contracted around the balloon. The balloon should remain in-situ for at least 24 hours before decompressing.

Surgical measures
- B-Lynch brace suture for atonic uterus
- Parallel vertical compression sutures for bleeding placenta praevia/ accreta
- Bilateral ligation of uterine/internal iliac arteries
- Hysterectomy.

Interventional radiology (IR) In certain cases (eg. potential uterine rupture or morbidly adherent placenta e.g. placenta accreta) the interventional radiology (IR) team can be informed, and prophylactic internal iliac balloon catheters may be placed electively before CS. IR involves inflating the intraarterial balloons for control of bleeding and embolisation of the uterine/internal iliac arteries with a suitable embolic material under image guidance (C-arm).

Other peripartum events that may lead to the need for IR/ advanced surgical expertise include:

- uterine atony despite medical treatment, particularly after vaginal delivery
- atonic uterus despite B-Lynch suture/ intrauterine balloon
- surgical complications or uterine tears at the time of caesarean section

- bleeding while in recovery or postnatal ward following normal delivery or caesarean section
- vaginal thrombus or cervical tear after failed surgical repair
- persistent bleeding following arterial ligation/ hysterectomy.
-

Women Who Refuse Blood Transfusion During Haemorrhage

It must be documented in the notes at the time of booking of all women who decline blood products. These should normally be referred to the high risk anaesthetic assessment clinic preoperatively. The principle of management of haemorrhage in these cases is to avoid delay. Rapid decision making may be necessary, particularly with regard to surgical intervention. If unusual bleeding occurs at any time during pregnancy, labour or the puerperium, the consultant obstetrician should be informed and the standard management should be commenced promptly. The threshold for intervention should be lower than in other patients. Extra vigilance should be exercised to quantify bleeding and to detect complications, such as clotting abnormalities, as promptly as possible. Consultants in other specialties, particularly anaesthetics and haematology should be informed as soon as possible after bleeding has been detected. Cell salvage (see OBS 3.7.2 Cell salvage in Obstetrics) should be made available on site and the accompanying team mobilized. It is important to note that there may not always be staff trained to use this equipment out of hours or at the weekend. Advanced planning should include locating these personnel.

Intravenous crystalloid should be used. In cases of severe bleeding, Vitamin K should be given to the woman intravenously. Other drugs which have been recommended include Desmopressin, Methylprednisolone, and Fibrinolytic inhibitors such as Aprotinin (Trasylol) and Tranexamic Acid. The advice of the haematologists should be sought before considering the use of Heparin to combat disseminated intravascular coagulation. Hyperbaric oxygen can make a crucial difference in the situation of very low haemoglobin.

The woman should be kept fully informed about what is happening. Information must be given in a professional way, ideally by someone she knows and trusts. If standard treatment is not controlling the bleeding, she should be advised that blood transfusion is strongly recommended. Any patient is entitled to change her mind about a previously agreed treatment plan. The doctor must be satisfied that the woman is not being subjected to pressure from others. It is reasonable to ask the accompanying persons to leave the room for a while so that the doctor (with a midwife or other colleague) can ask her whether she is making her decision of her own free will. If she maintains her refusal to accept blood or blood products, her wishes should be respected. The legal position is that any adult patient (ie. 18 years old or over) who has the necessary mental capacity to do so is entitled to refuse treatment, even if it is likely that refusal will result in the patient's death. No other person is legally able to consent to treatment for that adult or to refuse treatment on that person's behalf.

Hysterectomy is normally the last resort in the treatment of obstetric haemorrhage, but with such women delay may increase the risk. Early interventional radiology may stop the bleeding, reduce the use of blood and blood products and may save the uterus. The woman's life may be saved by timely hysterectomy, though even this does not guarantee success. When hysterectomy is performed the uterine arteries should be clamped as early as possible in the procedure. Subtotal hysterectomy can be just as effective as total hysterectomy, as well as being quicker and safer. In some cases there may be a place for internal iliac artery ligation.

Antepartum Haemorrhage

Causes of APH

Placenta previa
- Bleeding from placenta inserted wholly or partly into lower segment of uterus
- MAJOR = placenta covers internal os
- MINOR = placenta in lower segment but not covering cervical os
- Blood loss typically revealed and painless

Placental abruption
- Premature detatchment of normally situated uterus
- 0.5-1.8% pregnanices
- Significant cause of maternal mortality
- Predisposing factors
    - Hypertensive disease in pregnancy
    - Smoking and substance misuse
    - Trauma
    - Overdistension of uterus
    - Placental insufficiency
    - Maternal thrombophilia
- Clinical features
    - Bleeding (revealed in 80% but may be concealed)
    - Pain and uterine tenderness +/- contractions
    - Shock
    - Woody, hard uterus
    - Blood stained liquor

Other (vasa previa, cervical polyps, cervical cancer, ectropion, trauma)

Management

Assess fetal and maternal condition
- Maternal resuscitation
- If massive haemorrhage follow **Major Obstetric Haemorrhage** protocol
- Continuous fetal monitoring
- Consider steroids for lung maturity
- **Placenta previa**
    - Delivery by LSCS (senior obstetricians and anaesthetists)
- **Placental abruption (intrauterine death)**
    - Aim vaginal delivery
    - Augment if indicated
    - Anticipate PPH, PET
- **Placental abruption (live fetus)**
    - If signs of fetal compromise then Cat 1 CS

Major Obstetric Haemorrhage (MOH) Debrief

To be completed for **all** MOH cases phoned through switchboard

- Patient Hospital Number: DOB:
- Patient Surname:
- Patient Forename:
  (Please attach addressograph label)
- Date: Time:

OBSTETRIC ANAESTHETIST – please complete below with input from the rest of the theatre team

STAFF NAME: Bleep/Ext:

- Was Cell Salvage set up? YES / NO
- If yes, Volume collected:
- If yes, Volume infused:
- **Please supply debrief comments below**:

Brief Summary: Including estimated blood loss volume and cause of

What went well?

What could have been improved?

This form will be used as a learning tool to help to continue to improve the service provided in MOH cases. The laboratory staff involved in the case will also be asked to complete a similar form and there will be a review of these forms after the event. **Please complete and return a copy via the internal mail to the Transfusion Practitioners, Vikki Chandler-Vizard /Clare Thompson ASAP. Thanks for your time.**

Pre-eclampsia and Eclampsia

Consider in any woman (other than known epilepsy) who has a convulsion in pregnancy. Eclampsia can occur before hypertension or proteinuria develops. Antenatal eclampsia usually occurs after 20 weeks.

Pre-eclampsia symptoms include headache, visual disturbance, epigastric pain.
Signs include clonus, biochemical evidence of HELLP (Plt < 100 x 10^9), Creatinine >100 or Creatinine clearance <80. Hyper-reflexia is unreliable: sustained clonus is more significant. NB symptoms may be mimicked by the S/Es of vasodilators eg hydralazine or nifedipine. Magnesium Sulphate (MgSO4) is the drug of choice for preventing and treating eclampsia. There is an Eclampsia box in the emergency trolley with drugs and protocol.

Criteria for commencement of MgSO4
Any woman with severe proteinuric hypertension where the decision to deliver has been made and where there is **one other of the following criteria**:

- Hypertension: diast BP ≥ 110 mmHg or syst BP ≥ 170mmHg *twice* & proteinuria ≥ 3+
- Hypertension: diast BP ≥ 100mm Hg or syst BP ≥ 150 mm Hg *twice* & proteinuria ≥ 2+ (0.3 g/day) and at least two of the following:
    - Headache, visual disturbance, epigastric pain
    - Clonus (> 3 beats)
    - Biochemical evidence of developing HELLP syndrome (I.e. platelet count < 100 x 10^9, ALT (alanine aminotransferase) ≥ 50 iu/l)
    - Creatinine > 100 or creatinine clearance <80
- Eclampsia

Eclampsia Management
Call for help: The on call Obs Registrar, Anaes Registrar, Paed & labour ward coordinator.
A: **Left lateral** / **Clear airway** / **Insert airway (if required)**
B: **Check breathing** / **100% oxygen via face mask**
C: **Check maternal heart rate/ Insert cannula and take bloods (FBC, U+E, LFT, Coag, G&S)**
Displace uterus

Control Hypertension
- Treat hypertension if systolic BP > 150mmHg or diastolic BP > 110 mmHg.
- Beware maternal hypotension and fetal heart rate abnormalities.
- **NIFEDIPINE MR** 10 mg OR **LABETALOL 200mg** orally (use the drug that they are not being treated with. Can be repeated once after 45 minutes if necessary.
- **LABETOLOL** 100mg in 100ml normal saline at 20mg / hour, increasing at ½ hourly intervals as required to a maximum of 160mg/hour.
- **HYDRALAZINE** 50mg (powder) in 50mls normal saline. Load; Give 5mg over 15mins and repeat if diastolic still >100mmHg. Maintenance; Target diastolic 90-100mmHg and systolic 140-150mmHg. Give 5mg/hr and titrate down to 2-3mg/hr. Max dose 18mg/hr.

Control/ Prevent Seizures
Loading dose MgSO4: 4g MgSO4 in 20% solution over 20 minutes
- 2 x 10ml 5g ampoules MgSO4 + 30ml 0.9% saline in 50 ml syringe (=10g in 50ml)
- Give 20ml IV over 20 minutes using a syringe driver at rate of 60mls/hour
- Standard maintenance dose MgSO4: 1g (5ml) per hour infusion, ie 5ml/hr.

Recurrent seizures whilst on MgSO4
- Give further bolus of 2g (10mls of 20% solution) IV over 5 minutes
- Senior anaesthetic help including intensivist should be sought

Monitor: On MEOWS chart hourly urine output, respiratory rate, oxygen saturation, BP, HR, AVPU. Patellar/brachial reflexes: every 10 minutes for the first 2 hours and then every 30 minutes. Check Mg level regularly or sooner if Mg toxicity is suspected on clinical grounds.

Stop infusion and check MgSO4 levels and review management with consultant if:

- Urine output <10 ml in 1 hour OR
- Patella or brachial reflexes are absent OR
- Respiratory rate <14 / minute OR
- Oxygen saturation less than 90% OR
- Creatinine >120 OR
- Magnesium level >3.5

There is always suppression of reflexes before respiratory depression. A simple clinical test is to check the DEEP TENDON REFLEXES: KNEE/ FOREARM JERKS: If they are absent no more magnesium should be given until you have accurate knowledge of what the plasma concentrations are. The drug must be given SLOWLY - the woman will first feel warm, can cause nausea & vomiting if too rapid.

Antidote 10% calcium gluconate 10ml IV over 10 minutes.

Deliver

There is no place for the continuation of pregnancy if eclampsia occurs

- Stabilise the mother before delivery
- **Ergometrine should not be used** in severe pre-eclampsia and eclampsia
- **Avoid pethidine as norpethidine is a convulsant**
- Consider prophylaxis of thromboembolism
- Maintain vigilance as the majority of eclamptic seizures occur after delivery.

Need close Consultant involvement & bedside review within 4 hrs of starting MgSO4

Monitoring dosage of magnesium sulphate

- ensure that reflexes are present every ½ hour
- ensure respirations >14/min
- check blood Mg level at + 1 hour, at + 4 hours then 6 hourly while infusion in progress
- therapeutic levels are 2 - 3.5 mmol/l

Responses to magnesium blood measurements

High - **3.55-5.0 mmol**

- stop infusion for 15 minutes
- restart at half the previous rate if urinary output 20mls/hr or more
- recheck blood levels one hour after the infusion was temporarily stopped
- if urine output <20 mls/hr ask fo*r* consultant advice

Very high - **>5.0 mmol**

- stop infusion
- Consultant advice urgently. Give 10ml 10% Calcium Gluconate via slow i.v. over 10 mins.

Low - **<2mmol**

- increase rate of infusion to 2 g/hour (10 ml/hr) for *2* hours only
- recheck levels in 2 hours

If further fits

Consider if there is **inadequate treatment** and **check plasma magnesium** levels prior to giving a further bolus of 2g (10ml of 20% solution) MgSO4 IV over 10 minutes.

Seek senior Anaesthetic advice and consider other causes as persistent convulsions may be the sign of serious intracranial lesions and an **indication for CT/MRI Head**

Alternative treatments to consider:

IV Diazepam (5 -10 mg) x1 dose only/ Thiopentone 50mg x1/ intubate & paralyse; thiopentone infusion for sleep. Contact ITU consultant for transfer to ITU.

Procedure for Magnesium Sulphate Administration

CHECK REFLEXES: before treatment can begin, check that knee jerks are present. If epidural in situ, check forearm jerks are present. Check every 10 minutes for the first 2 hours and then every 30 minutes.

CHECK URINE OUTPUT: if the woman is ANURIC, only the loading dose may be given.

Therapeutic Range: 2 – 3.5 mmol/L

MAGNESIUM SULPHATE PREPARATION:

• Take two 10 ml ampoules of MgSO4 each containing 5 g of MgSO4

• **Dilute** in 30 ml of Normal Saline.

• This makes up a solution of 50 ml of 20% MgSO4 **i.e. 5 ml contains 1g MgSO4**.

• Give by a syringe pump (50 ml syringe)

NEVER make up a stock that contains more than l0g MgSO4 at any one time (to reduce the risk of accidental overdose)

• **LOADING DOSE**:

4 g of the 20% MgSO4 solution IV **over 20 minutes** (20 ml)

Set syringe pump at 60 ml / hour (for 20 minutes)

• **MAINTENANCE OF DOSE:**

1 g of the 20% MgSO4 per hour (5 ml per hour) for 24 hours

In some circumstance the dose may need to alter (See section ……..).

The ANTIDOTE for magnesium sulphate is

CALCIUM GLUCONATE 1g IV

Pack contains a 10ml ampoule of 10% calcium gluconate that should be given over 10 minutes. This should only be given under consultant supervision.

INVESTIGATIONS FOR FIRST 24 HOURS AFTER ECLAMPTIC FIT OR FOLLOWING START OF IVI MAGNESIUM SULPHATE

Request forms & bottles in each of the **6** packs. Investigations may need extending in some cases.

	PACK 1	PACK 2	PACK 3	PACK 4	PACK 5	PACK 6
Haematology	Before MgSO4	1 hour	4 hours	10 hours	16 hours	24 hours
	1 pink G&S					
	1 purple FBC		1 purple FBC	1 purple FBC	1 purple FBC	1 purple FBC
	1 blue Clotting screen		1 blue Clotting screen #	1 blue Clotting screen #	1 blue Clotting screen	1 blue Clotting screen
Biochemistry	1 yellow Na, K, Creat, Alb, ALT, Bili, Alk.Phos, GGT, LDH Uric acid Magnesium level	1 yellow Mg level	1 yellow Na, K, Creat, Alb, ALT, Magnesium level	1 yellow Na, K, Creat, Alb, *ALT, Magnesium level	1 yellow Na, K, Creat, Alb, *ALT, Magnesium level	1 yellow Na, K, Creat, Alb, ALT, Bili, Alk. Phos, GGT, LDH Uric acid Magnesium level
	1 Grey glucose					1 Grey glucose
	1 MSU for protein/creat ratio					1 MSU for protein/creat ratio
	biochem/ haem request form	biochem/ haem request form	biochem/ haem request form	biochem/ haem request form	biochem/ haem request form	biochem/ haem request form
	microbiology request form					microbiology request form

= omit clotting screen if platelets > 100,000
* = omit ALT /albumin if last ALT <60

Cardiac Arrest in Pregnancy

This is guided by the Advanced Life Support (ALS) Algorithm. A few points are specific to the Cardiac Arrest in Pregnancy.

- Call for help. Dial 2222 and request “Obstetric Medical Emergency Team”
- Obstetrician to deliver baby **within** 5 minutes to save mother’s life. Incision at 4 minutes.
- IEarly intubation to secure airway.
- Avoid IVC Compression. Best to have a dedicated person to physically retract the gravid uterus towards the right while CPR is continued in the supine position. Wedges can be used but may make CPR less effective.

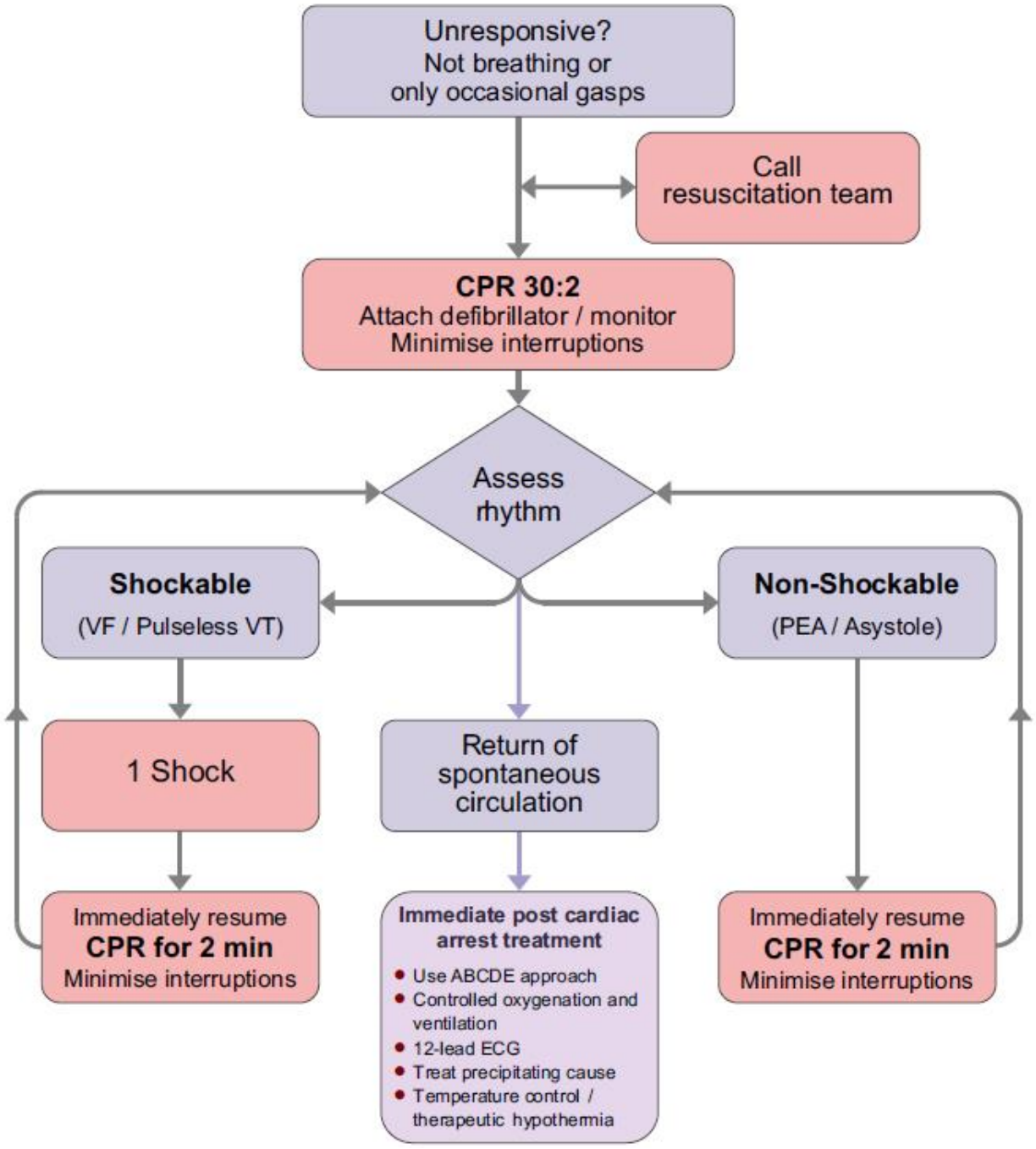
There are a couple of relevant questions and answers on the ALS website[7]. Abridged answers are included in this guide below.

Question

Regarding resuscitation of the pregnant patient, at what gestation can compression of the inferior vena cava (IVC) occur and when should techniques for displacing the uterus off the IVC be employed ?

Answer

There needs to be a pragmatic and simple approach when giving advice concerning the necessity of avoiding IVC compression during attempts at CPR in the pregnant patient. If the woman is known to be 20 weeks pregnant or more, then IVC compression may occur and it should be relieved either by manually displacing the uterus to the left with 1 or 2 hands (keeping the chest supine which is preferable for CPR).



Advanced Life Support (ALS) Algorithm 2010[7]

Failed Intubation

The incidence of failed tracheal intubation in the general surgical population is approximately 1: 2200 but the incidence in the obstetric population may be as high as 1:250. Pharyngeal and laryngeal oedema probably explains some of this difference and it has been shown that Mallampati scores worsen throughout pregnancy. Failed intubation may also be due to poorly applied cricoid pressure.

In order to prevent or pre-empt difficult or failed intubation, a pre-operative assessment is vital. If difficulties are anticipated, it is strongly recommended to avoid General Anaesthetic (GA) if possible.

Do not delay making the decision that you cannot intubate. (see PHFT Failed intubation algorithm below). Also check DAS/OAA draft Failed Intubation Guidelines on their websites.
Oxygenation of the mother is the first priory.
Call for Senior Anaesthetic Assistance in all cases of failed intubation.
Proceed to Rescue Techniques if you cannot oxygenate.

Give 100% oxygen and maintain cricoid pressure. You will need to oxygenate by manual ventilation until suxamethonium wears off. Use all the aids available as detailed in the failed intubation drill.

If maintenance of an airway is difficult despite bi-manual airway manoeuvre and an oral airway, insert a Laryngeal Mask Airway (only if the patient is still anaesthetised) or ProSeal. Maintain cricoid pressure.

Decide Urgency of Delivery – Category 1- 4 CS

Whether to continue with general anaesthesia (see decision DAS/OAA algorithm below)

This will depend on

- Your level of experience.
- The patient's condition.
- The baby's condition.

There are no absolutes. **If you have to choose, the mothers' safety takes precedence over the baby**. If you are inexperienced it is probably better to wake the mother up in all circumstances except when her life is in immediate danger (e.g. massive haemorrhage). You should already have called for senior help in such circumstances.

Severe fetal distress may persuade the more experienced anaesthetist to continue the anaesthetic without protecting the airway.

Otherwise, wake patient up in the left lateral, head down position and await senior assistance. Consider regional techniques e.g. spinal or epidural. Alternatively consider an awake fibre-optic intubation.

If you feel you have to continue the Anaesthetic

Continue anaesthesia via a facemask and airway or Proseal LMA/ standard LMA with a volatile agent. Cricoid pressure should be released to allow correct insertion of the LMA. Manually ventilate until the resumption of spontaneous breathing, then maintain anaesthesia with 50% nitrous oxide in oxygen and a volatile agent (keep the patient deep). Keep the patient in the left lateral supine position and **Maintain Cricoid Pressure**.

<u>Difficult or Impossible Ventilation:</u> Can't Intubate. Can't Ventilate.

Whilst the patient is unable to breath for herself you must continue efforts to oxygenate with 100% oxygen. Remember that suxamethonium lasts longer in pregnancy. After two attempts to intubate and attempts to ventilate, including laryngeal mask insertion, the patient will be profoundly hypoxaemic. If there are no signs of a resumption of spontaneous ventilation or manual ventilation is impossible you must perform **cricothyroid puncture. You must have thought through a technique and the equipment you would use before this situation arises.** Better still you should have practiced this in simulation practice.

If ventilation is still impossible, a transtracheal airway must be inserted.

Cricothyrodotomy is performed using the specific cricothyrodotomy kit which can be connected to the anaesthetic breathing system. Alternatively, we have a jet ventilator (Manujet) with Ravussin needles set up in obstetric theatre for needle cricothyrodotomy. Alternatively, an ENT surgeon can be called for a tracheostomy.

Once oxygenation is established you can turn the patient onto her left side, head down and wait for her to wake up. Take care not to dislodge the cricothyroidotomy cannula whilst turning. The choice must then be made as to whether a spinal, epidural or awake fibre-optic intubation is most appropriate.

Additional notes:-

- Enlist the help of midwives and obstetrician as necessary for turning the patient or manual ventilation of the reservoir bag.

- Local infiltration with 0.5% Lignocaine by the obstetrician - (the infiltrate and cut technique) - may be used in urgent cases if the obstetrician is familiar with the technique.

- Remember to see the patient post-operatively to explain the difficulties and issue a difficult intubation hazard warning at the front of her notes.

Obstetric Failed Intubation Drill

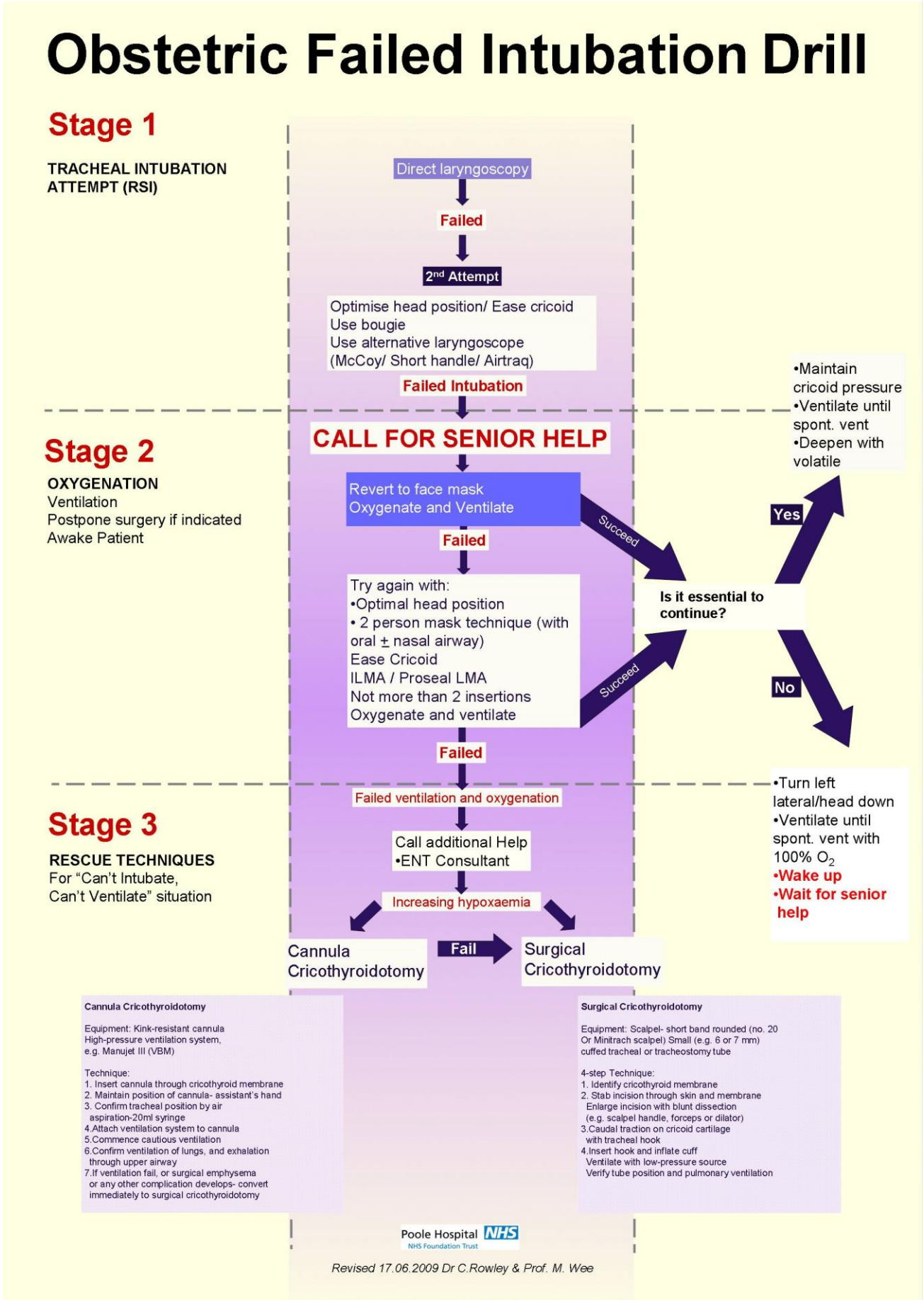


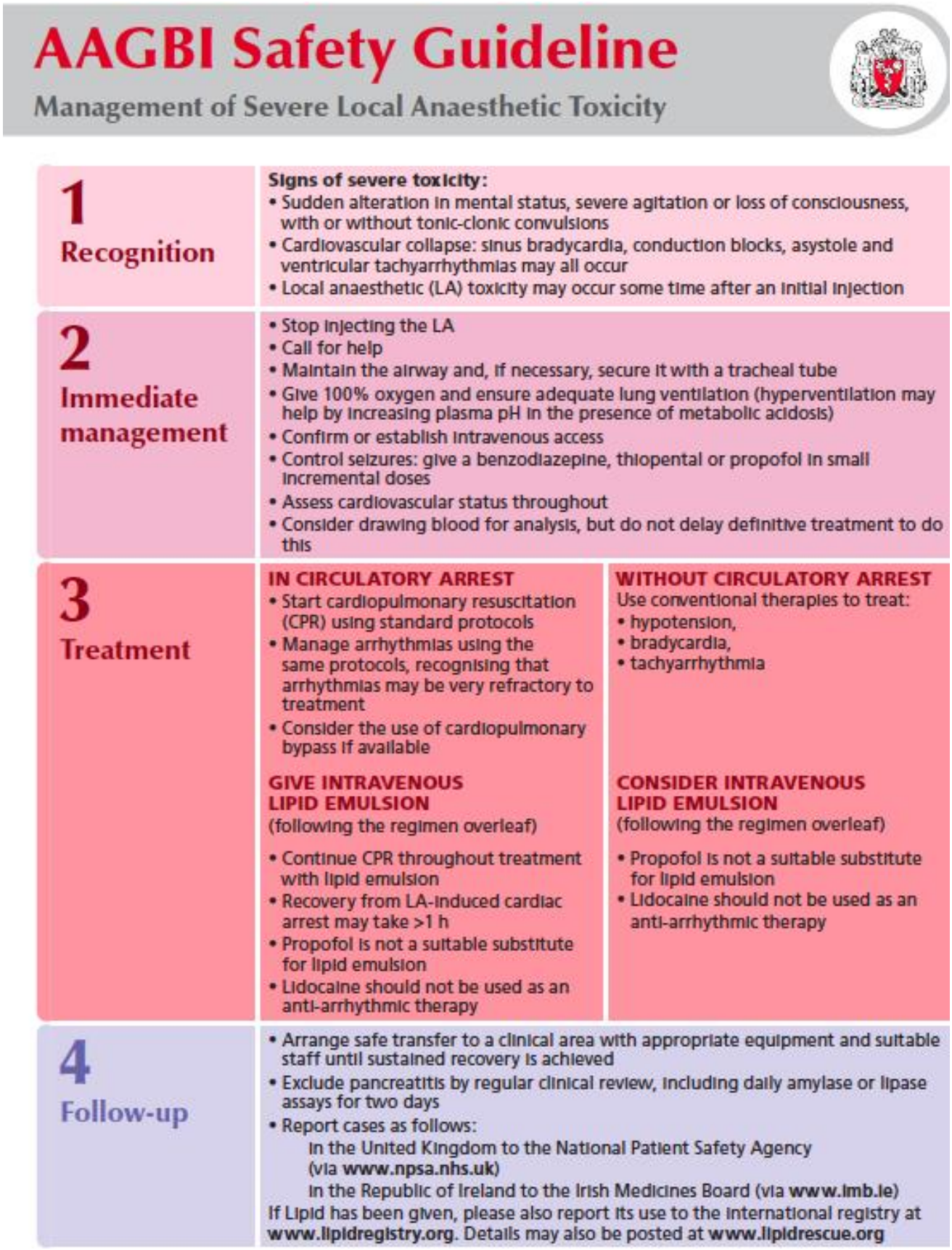
Table 1 – Criteria to be used in the decision to wake or proceed following failed tracheal intubation at caesarean section

	Wake			Proceed to CS
Maternal condition	No compromise	Mild acute compromise	Haemorrhage responsive to resuscitation	Hypovolaemia requiring corrective surgery, critical cardiac or respiratory compromise, cardiac arrest
Fetal condition	No compromise	Compromise corrected with IUFR, pH <7.2 but >7.15	Continuing fetal heart rate abnormality in spite of IUFR, pH < 7.15	Sustained bradycardia, fetal haemorrhage, suspected uterine rupture
Anaesthetist	Novice	Junior trainee	Senior trainee	Consultant / specialist
BMI	Supermorbid	Morbid	Obese	Normal
Surgical factors	Complex surgery or major haemorrhage anticipated	Multiple uterine scars, difficulties expected	Single uterine scar	No risk factors
Aspiration risk	Recent food	No recent food, in labour, opioids given, no antacids	No recent food, in labour, no opioids, antacids given	Fasted, not in labour, antacids given
Airway device	Difficult face mask ventilation	Adequate face mask ventilation	First generation SAD	Second generation SAD
Airway pathology	Airway oedema, stridor	Suboptimal airway, airway bleeding	Facial oedema, potential deterioration	None evident

Obstetric Anaesthetists' Association / Difficult Airway Society: Criteria to be used in the decision to wake or proceed following failed tracheal intubation at caesarean section DRAFT (2014)

Local Anaesthetic Toxicity

This is based on the AAGBI guideline[8]



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

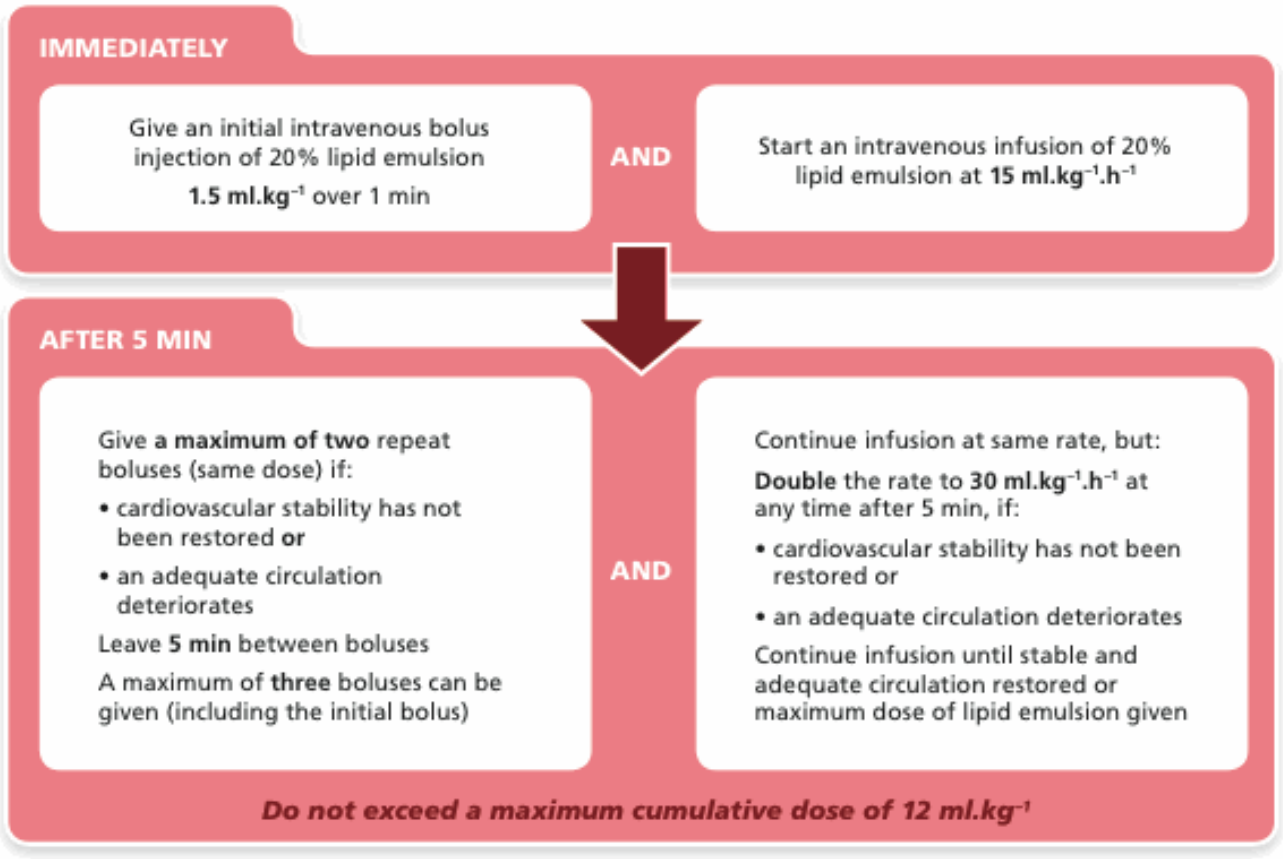
CONSIDER INTRAVENOUS LIPID EMULSION
(following the regimen overleaf)

- Propofol is not a suitable substitute for lipid emulsion
- Lidocaine should not be used as an anti-arrhythmic therapy

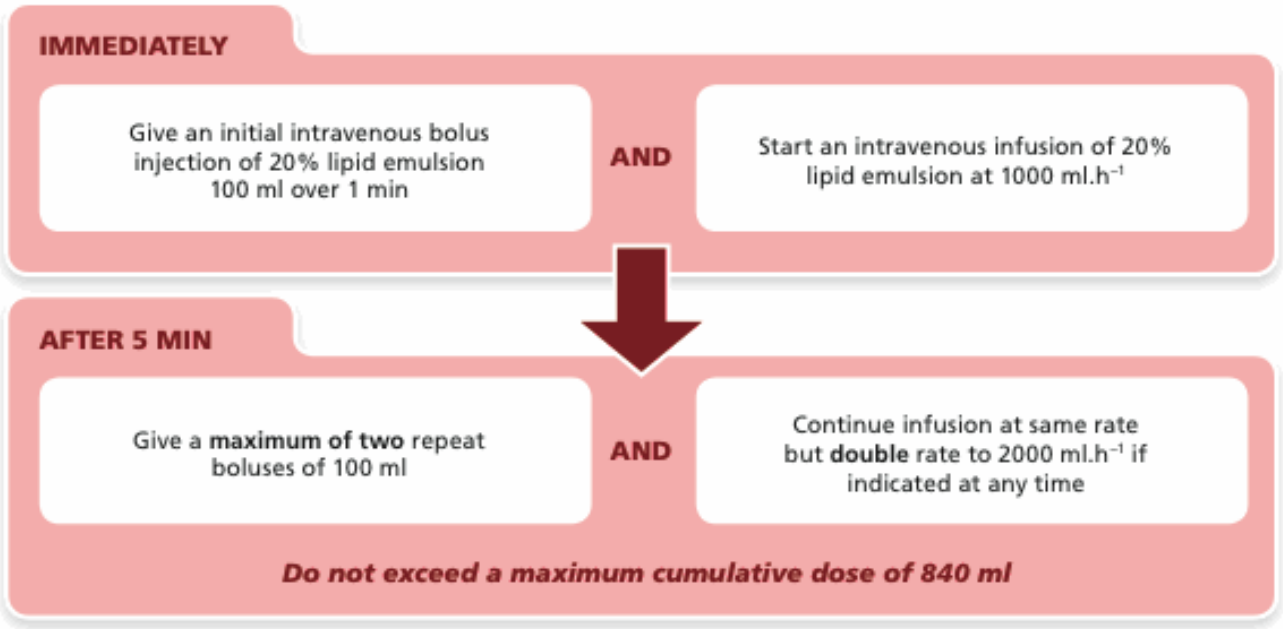
4 Follow-up

- 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**



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



Drugs common to obstetrics

This is a summary only of drugs and key pointers for their use in obstetrics.

Uterotonics

Ergometrine 500mcg IM. Alpha1 Agonist. Avoid in Hypertensive patients. SideFX Nausea. Give concurrent IV antiemetic to counter the SideFX.

Haemabate (Carboprost) 250mcg IM 15mins. Prostaglandin PGF2Alpha. Can give up to 8 doses. Can be given intrauterine. Avoid in asthma.

Misoprostol 1000mcg (200mcg x 5) PR. Avoid in sepsis as can increase temperature.

Syntocinon (Oxytocin) 5IU IV slow push. In theatre upon delivery of a baby. The Obstetrician may request a further bolus of 5IU and Syntocinon infusion of 40IU in 500mls Hartmanns. This is made up in 500ml of Hartmanns and delivered at 125ml/hr (thus delivered over 4hours). If a mother is fluid restricted for any reason it can be made up in syringe 50ml of Hartmanns and delivered at 12.5ml/hr (thus delivered over 4hours). Caution using syntocinon in patients with cardiac disease.

Carbetocin is a long acting analogue of oxytocin, T1/2 40 minutes. Permitted for use in **Enhanced Recovery** patients only. **Instead** of 5U oxytocin/ 40U infusion. Dose 100mcg IV after delivery (dilute 100mcg in 10ml 0.9% Saline). Give over 1 minute.

Vasoconstrictors

Phenylephrine 100mcg/ml. Use as an infusion during spinal anaesthesia to provide cardiovascular stability. Draw up 20mls for an infusion pump and start at 5mls per hour. Step up or down depending on response.

Ephedrine 3mg/ml, 6mg bolus may also be used particularly if the patient is bradycardic.

In the absence or shortage of Pheynylephrine, Metaraminol 50mcg/ml bolus may be used although this vasoconstrictor has not been widely used in obstetrics.

Useful guidelines

Further Reading

We would recommend locating the following guidelines on the Maternity Policies and Guidelines section of the Poole Hospital Intranet. The instructions for finding these guidelines are immediately below. They are not included in this booklet partly in an effort to keep the booklet succinct and partly because the guidelines will be updated online.

a. Antibiotic prophylaxis
b. Caesarean Section
c. Cell Salvage
d. Cord Prolapse
e. Diabetes in pregnancy
f. Instrumental delivery
g. Recovery
h. Obesity in pregnancy
i. PCEA
j. Remifentanil PCA
k. Sepsis in obstetrics
l. Shoulder dystocia
m. VTE prophylaxis
n. Post-Partum Haemorrhage (PPH)
o. Blood and Blood Products Policy

Maternity Policies and Guidelines

These can be located from the Poole Hospital Home Page

http://nww.intranet.poole.nhs.uk/

Once here, left hand column click on	"Policies Procedures Guidelines"
Next page, click on A-Z of	"Clinical Policies, Procedures & Guidelines"
Next page, click on	"M"
Then find	"Maternity Policies & Guidelines"

Work Place Based Assessment (WPBA) for Novice Obstetric Anaesthesia

Obstetrics[9]

Learning outcome:

- To gain knowledge, skills and experience of the treatment of the healthy pregnant woman

Minimum clinical learning outcomes:

- To pass the formal practical initial assessment of competence in obstetric anaesthesia and, having achieved this, be able to provide analgesia and anaesthesia as required for the majority of the women in the delivery suite
- To understand the management of common obstetric emergencies and be capable of performing immediate resuscitation and care of acute obstetric emergencies [e.g. eclampsia; pre-eclampsia; haemorrhage], under distant supervision but recognising when additional help is required

The RCOA has produced a specific list of WPBA which are needed for the initial assessment of competence in obstetric anaesthesia.

All of the following thirteen needs to be completed before the Obstetric Initial assessment of competence certificate can be signed off.

A-CEX
(Basic Competencies for Obstetric Anaesthesia)

Conduct epidural analgesia for labour (OB_BTC_A01) ☐

Conduct regional anaesthesia for caesarean section (OB_BTC_A02) ☐

Conduct general anaesthesia for caesarean section (OB_BTC_A03) ☐

DOPS
(Basic Competencies for Obstetric Anaesthesia)

Top up epidural for labour analgesia (OB_BTC_D01) ☐

Top up epidural for caesarean section (OB_BTC_D02) ☐

Perform spinal anaesthesia (OB_BTC_D03) ☐

CBD

Discuss how changes in the anatomy and physiology due to pregnancy influenced the conduct of anaesthesia (OB_BTC_C01) ☐

Discuss whether pregnancy influenced the choice of drugs used during anaesthesia (OB_BTC_C02) ☐

Discuss how the conduct of general anaesthesia is affected by late pregnancy (OB_BTC_C03) ☐

Examine the case records of a patient that the trainee has anaesthetised for operative delivery in a situation where major haemorrhage might be expected. Discuss the factors that influence the likelihood of major obstetric haemorrhage, the precautions that should be taken to deal with it and the principles of its management. (OB_BTC_C04) ☐

Examine the case records of a patient with pregnancy associated hypertension that the trainee has treated. Discuss how this influences anaesthetic management. (OB_BTC_C05) ☐

Examine the case records of a patient for whom the trainee provided extradural analgesia for normal labour. Discuss the methods of pain relief available for normal delivery. (OB_BTC_C06) ☐

References

1. www.labourpains.com

Contains good information summary for labour analgesia. There is also a good summary covering unplanned general anaesthetic.

2. http://www.oaa-anaes.ac.uk/

This is a fantastic resource. The Clinical Guidelines tab contains a wealth of information and also the source of the Epidural Information Card available to print in many languages.

3. http://www.anaesthesiauk.com/

Another fantastic resource. The 'Anaesthesia UK: Analgesia for labour' article is succinct and well categorised.

4. Cross-sectional anatomy of the lumbar spine, detailing the epidural space. *Atlas of Regional Anaesthesia.* Philadelphia, PA: WB Saunders, 1992, p286

5. Oxford Handbook of Anaesthesia. This has a great section covering Obstetric Anaesthesia.

6. Coagulation and Regional Anaesthesia. Southampton General Hospital guideline.

Guidelines from our region's tertiary hospital.

7. Advanced Life Support (ALS) Guidelines. www.resus.org.uk

8. Association of Anaesthetists Great Britain and Ireland (AAGBI) Guidelines. www.aagbi.org

9. Royal College of Anaesthetists. www.rcoa.ac.uk