Guidelines for Management of Anaesthesia for Caesarean Section

The governing principles outlined within this document are fully supported in every respect by the Clinical Governance Sub-Committee. All members of staff are required to adhere to the principles involved as outlined within this document, together with any related procedures, which are enabled by this guideline.

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Definition of clinical practice guidelines

Clinical practice guidelines are systematically developed statements to assist practitioner and patient decisions about appropriate health care for specific clinical circumstances.
1. Title
Guidelines for Management of Anaesthesia for Caesarean section

2. Adaptation
Updated

3. Major Recommendations

Preoperative Assessment

Fasting, Antacid Prophylaxis and Anti-emetic Therapy

Caesarean Section
- Single Shot Spinal Anaesthetic
- Epidural Anaesthetic
- Combined Spinal Epidural Anaesthetic (CSE)
- General Anaesthetic
- Management of Hypotension associated with regional anaesthesia
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- Challenging cases for Caesarean delivery
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Postoperative Care
- Vital Sign Observations including monitoring of regional block
- Analgesia
- Hydration
- Nausea and Vomiting
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4. Clinical Algorithms

Patient Controlled Analgesia
http://online.lthtr.nhs.uk/app/fileshare/view.asp?noredirect=y&uid=20334&gpuid=33

Post Operative nausea and Vomiting
http://lthtr-documents/current/P51.pdf

Modified early warning score for obstetrics (MOEWS) and detection of severely ill women
http://online.lthtr.nhs.uk/app/fileshare/view.asp?noredirect=y&uid=25878&gpuid=40

5. Disease/condition/target population

Pregnant Women

6. Implementation strategy

Anaesthetic Directorate Meeting

7. Interventions

Preoperative Assessment

All women for Caesarean Section (CS) should be seen preoperatively. For elective cases this is usually the morning of surgery. Women requiring elective CS fill in a health questionnaire in ANC. This is incorporated in the elective Caesarean section pathway.
Those who are suitable will be placed on the enhanced recovery after obstetric surgery (EROS) programme for which there is a separate guideline. Guidance for which is included in the kective Caesarean Integrated Pathway. The programme is designed to reduce the physiological stress response and organ dysfunction due to surgery. This enables patients to recover more quickly. The programme encourages accurate preoperative starvation times including a carbohydrate drink, early food intake after surgery, early mobilisation and also a planned discharge time.

If the mothers are ASA 1or 2 and have had no anaesthetic problems in the past they are only seen on the morning of surgery, unless they have specifically requested to see the anaesthetist.

At the time of decision for elective CS in antenatal clinic women will be advised that the majority of cases are undertaken under a spinal anaesthetic. The Trust Information leaflet on CS under spinal anaesthetic is given at this time. Any woman wishing to have general anaesthetic will be given the Trust Information leaflet for CS under General Anaesthetic.

Some women will have been seen in the antenatal anaesthetic clinic. For criteria for this early review see appendix 1. Documentation from this anaesthetic review will be found in the patients note, there may also be a letter in the filing cabinet in the anaesthetic office in SGU.

These women will still need to be reviewed by the anaesthetist on the day of surgery.

Women will be counselled on the procedure for the chosen anaesthetic. Side effects and complication risks are outlined on the anaesthetic chart for reference. Appendix 2.

Mothers for emergency Caesarean section will need to be preoperatively assessed at the time of decision for surgery.

Categorisation of Caesarean Section:

Category 1 Immediate threat to life of woman or fetus
Category 2 No immediate threat to life of woman or fetus
Category 3 Requires early delivery
Category 4 At a time to suit the woman and maternity services

**Fasting, Antacid Prophylaxis and / Anti-emetic Therapy**

**ANTACID PROPHYLAXIS/ ANTIEMETIC:**
All patients should have antacid prophylaxis within 6 hours of surgery:-
- Ranitidine 150mg oral or 50mg slowly iv/ 50mg im.
- Metoclopramide 10mg oral/iv/im.
- Sodium Citrate in theatre at discretion of anaesthetist.

For elective cases antacid prophylaxis and antiemetic therapy is prescribed at antenatal clinic with instructions.

For emergency cases some mothers will have been given antacid prophylaxis throughout labour. If this is not the case it may be given parenterally at the time of decision for surgery together with the recommended antiemetic therapy.

**PERI-OPERATIVE STARVATION:**
For safety reasons patients should not eat or drink immediately prior to surgery.
The Association of Anaesthetists in Great Britain and Ireland recommends the minimum fasting periods based on the American Society of Anaesthesiologists Guidelines.

- 6 hours for solid food.
- 2 hours for clear non particulate (water, black tea or black coffee) and non carbonated fluids.

It is important that pregnant patients should not be left for long periods of time without hydration. They may require intravenous fluids. Those on the enhanced recovery programme will be given a carbohydrate drink to have up to 2 hours prior to surgery.

The chewing of gum is controversial but sensible to treat it as if it were an oral fluid and prohibit for 2 hours preoperatively.

**Caesarean Section**

For women with a BMI > 40 it is nationally recommended that this should be undertaken under direct consultant supervision. Whilst this is feasible in the elective setting, it may be that in an emergency situation discussion with the consultant will suffice, particularly if there is a good working epidural or the trainee is ST6 or above.

Meticulous anaesthetic records are vital.

Induction of Anaesthesia is undertaken in the operating theatre. Once the mother is laid down precautions should be taken to reduce aorto-caval compression.

ECG, blood pressure and saturation monitoring is commenced. This monitoring is maintained until discharge from the recovery area.

Intravenous access is obtained. 17G intravenous cannula is minimal to be used as obstetric haemorrhage is rapid and massive if it occurs. Intravenous fluid is commenced.

For emergency Caesarean section, fetal heart rate monitoring should be undertaken during induction of anaesthesia for as long as feasibly possible. http://online.lthtr.nhs.uk/app/fileshare/view.asp?uid=24629&gpuid=40

Women should be offered a single dose of prophylactic antibiotics: 1.5g cefuroxime and 500mg metronidazole (if allergic to penicillin give 600mg of clindamycin instead of cefuroxime), within 60 minutes prior to skin incision, to reduce the risk of postoperative infections.

At delivery 5 units of syntocinon (5u in 5 mls) are given slowly to stimulate uterine contraction. Sometimes further syntocinon is required. The obstetricians will let you know if this is needed. Syntocinon 40 units is added to a 500mls of normal saline and given at 125mls/hr via a volumetric pump.

**Single Shot Spinal Anaesthetic:**

The patient is positioned (sitting or lateral). The subarachnoid block is performed with an aseptic technique as Association of Anaesthetist great Britain and Ireland guidelines (AAGBI). http://www.aagbi.org/sites/default/files/infection_control_08.pdf https://www.aagbi.org/sites/default/files/skin%20antisepsis%20for%20central%20neuraxial%20blockade_0.pdf

We have a selection of spinal needles but the preferred is a 24 G or 25G pencil point. Regular and longer lengths are available. These needles are all available with non luer connectors as per the NPSA alert 2012.
0.5% bupivacaine heavy alone or mixed with an opiate can be used. Intrathecal diamorphine (0.3 mg) is the intrathecal opioid of choice at Preston. Pre-prepared syringes should be available containing 0.5mg. Withdraw the appropriate amount (0.3ml) using a 1ml syringe. Intrathecal diamorphine is favoured because it provides postoperative analgesia.

Intrathecal Fentanyl can be used (15 mcg) but a PCA must be commenced at the end of surgery to provide post operative analgesia.

As soon as the intrathecal block is complete the patient is positioned lying down with either a wedge under the buttock or the table tilted to the left at about 15 degrees. This is to prevent aorto-caval compression.

The head and shoulders are elevated using two pillows with one placed partially under the head and one partially under the shoulders.

Monitoring is continuous. Ephedrine/phenylephrine are used for hypotension.

Nausea and vomiting is corrected by correction of hypotension. However, if there is no hypotension it is often worth giving atropine (providing the HR is < 100) to help the nausea and vomiting. A pregnant woman's heart rate is normally 80 bpm or above.

The level of block is tested for surgical adequacy. Anaesthesia (inability to appreciate light touch) should extend from S5 to T4 at the time of delivery. We recommend that a block to cold (ethyl chloride) to T4 should be confirmed before granting permission to start surgery. This is absolutely necessary. We prefer to use this rather than light touch as it is more easily differentiated by the mother. In addition, a block to T6 of light touch is highly desirable before starting surgery. It should be borne in mind that the zone of differential sensitivity to touch and cold may be two to four dermatomes wide.

Surgery may begin once the block is adequate and the patient has been catheterised. The mother should be warned that she will feel pushing but should not feel pain.

If there is pain she should be offered analgesia or GA. This must be documented. During suturing of the peritoneum, if bupivacaine alone has been used there may be some discomfort and nausea. This can be treated withalfentanil, fentanyl, remifentanil and/or entonox. Reassurance must be given as these symptoms usually go once that surgical layer is complete.

Immediate post operative analgesia is completed with a NSAID (100mg diclofenac suppository with consent) and paracetamol unless contraindicated.

- Epidural Anaesthetic:
  At present this is most likely to occur in a patient who has an epidural in for labour. However, occasionally if the clinical situation dictates the epidural is sited purely for Caesarean section.

If the epidural is commenced de novo for the Caesarean Section then the patient is positioned sitting or lateral as for spinal anaesthetic. The epidural block is performed with an aseptic technique as for Single Shot Spinal Anaesthetic.

If the epidural is already in place it simply needs to be topped up for CS. Various different local anaesthetics can be used:
- 0.5% Bupivacaine/chirochaine 15 - 20 mls +/- 50 - 100 mcg fentanyl.
- 7.5mg/ml Ropivacaine 10 - 20 mls +/- 50 - 100 mcg fentanyl,
- 2% Lignocaine 10 mls (+/- adrenaline 15 mcg)
- 5 mls 2% Lignocaine + 10 mls 0.5% Bupivacaine, (+/- adrenaline) all 15 mls needed.
All need to be given in titrated doses. 1.5 – 2 mls per unblocked segment.

The lignocaine and lignocaine/bupivacaine mixture is used to produce a block with quicker onset.

The patient may need to be rotated from side to side to ensure adequate block. It may take 40 minutes or so to obtain adequate block.

Procedure then follows that of a subarachnoid block.

Epidural diamorphine 3mg may be given after the baby is delivered and for the purpose of post operative analgesia. A solution of 1mg/ml of diamorphine is made in saline. 3mls (3mg) is given via the epidural and then flushed down the epidural catheter with saline.

The risk of an accidental drug error such as incorrect administration of a drug intended to be used intravenously but given via the epidural route and vice versa can be reduced by a double person check of the drug and port of injection.

This is supplemented with a NSAID (100mg diclofenac suppository with consent) and paracetamol unless contraindicated.

**Combined Spinal Epidural Anaesthetic (CSE):**

This technique is used on occasions. In particular, for some clinical situations where there is potential for prolonged surgery or cardiovascular compromise.

The principle is spinal anaesthesia with an epidural catheter inserted for top up to extend the level of the block should it be required. Drug dosing may need manipulation depending upon the clinical situation.

There are a number of different ways to perform a CSE depending on the situation and on clinician experience. The main options are:-

1) Needle through needle technique - 2 options
   - CSE ‘kit’ – 16G Touhy and 27G spinal needle – be aware though that at present this kit has a luer connection so extra care must be taken when preparing injection mixture.
   - 16G Touhy needle using a 120mm spinal needle (non luer)

2) Epidural and spinal at separate sites.

Needle through needle is often favoured but this did demonstrate more complications than separate sites in the NAP3 study. Unless there is a clinical indication for reduction, the usual dose for spinal anaesthesia should be used as described above.

A suggested technique would be as follows

- Prepare the patient as for a single shot spinal injection.
- Locate the epidural space with 16g Tuohy needle using LORS. Preferred level is L3/4.
- Pass a 24 or 25G 120mm non luer pencil point needle through the Tuohy needle to give the spinal injection.
- Withdraw the spinal needle.
- Insert the epidural catheter and withdraw the Tuohy needle.
- While maintaining sterility ask the patient to lie in the lateral position and commence the phenylephrine infusion prior to checking and securing the catheter.
- Start the theatre clock (so you can keep an eye on how long the block has been in for)
- Turn the patient on their back with left lateral tilt.
- Check the block as described earlier.
- Reassess to situation at about 50-60mins of block time. Unless the surgeons are on the skin layer give an initial test dose into the epidural of 3ml of 0.5% bupivacaine. If there are no problems from
the test dose after 10-15 mins and surgery is still continuing consider giving the remaining 7ml of 0.5% bupivacaine.

- If at any other point the block appears inadequate a top up can be given.
- At the end of the procedure the catheter should be removed (unless it is needed for postoperative care). This should be documented in the notes with a time and that the blue tip was intact.

On occasions the epidural may be used for postoperative analgesia. This requires multidisciplinary team discussion and early decision making as to the appropriate site for postoperative care.

**General Anaesthetic:**

Use a rapid sequence induction.

Patient lies on the operating table with 15° tilt or wedge under the buttock to prevent aorto-caval compression. Catheterisation occurs prior to induction of anaesthesia. Surgical equipment is prepared and if the clinical situation dictates the patient should be prepped and draped prior to induction of anaesthesia.

Patients should be preoxygenated for at least 3 minutes. Nasal cannulae giving supplemental oxygen under the face mask has been shown to prolong oxygenation. This should start at low flow ( < 5 l/min) as it is uncomfortable for the patient but once asleep can be increased to 10 l/min. The capnograph should be attached to the anaesthetic circuit at this time. Intravenous induction is used. Ideal drug at present is thiopentone and a sleep dose should be given. 4 -5 mg/kg. Cricoid pressure applied and suxamethonium 1 -1.5 mg/kg given. Consideration can be given to gentle face mask ventilation ( Pmax< 20cmH₂O) whilst the suxamethonium is having effect.

Wait for the suxamethonium to work before even attempting laryngoscopy and intubation. This ensures complete relaxation. Try with a size 7.5mm ETT to start if this is too big drop to a 7.0mm. Connect up with a catheter mount with capnograph in place.

If difficult or failed intubation is encountered follow the difficult/failed intubation algorithm. Appendix 3.

Anaesthesia is maintained with 50% oxygen in nitrous oxide and sevoflurane (or other volatile) to an appropriate Minimum Alveolar Concentration (MAC) value on the monitor. Adjust with clinical signs.

A non depolarising muscle relaxant can be given as soon as the suxamethonium wears off. Half to two thirds the normal dose is required because of the resulting abdominal decompression following delivery of the baby.

Following administration of syntocinon at delivery, analgesia should be given. Suggest fentanyl 1mcg/kg for immediate analgesia followed by morphine 10 mg. More can be given in recovery if needed.

At the end of surgery the mother is reversed. She is woken in either the left lateral head down position or supine or head up position. She is not extubated until the airway reflexes are present.

Post operative analgesia is completed with a NSAID (100mg diclofenac suppository with consent), paracetamol and morphine PCA. In addition, a local anaesthetic block can be used such as TAP block or ilioinguinal, rectus sheath plus genitofemoral.

Post operative fluids are prescribed by the anaesthetist.

PLEASE BE AWARE:

Cefuroxime and thiopentone are similar in colour when reconstituted. Accidental drug errors have been known to occur due to confusion. Please ensure that drug labels are used and that these two medications are kept separate at all times. In an endeavour to reduce drug errors pharmacy do provide...
us with pre-prepared syringes of thiopentone which are in a 30 ml syringe and clearly labelled. These are kept in the fridge. The risk should also be minimised by a double drug check.

Management of Hypotension associated with regional anaesthesia:

Preloading with intravenous fluid is not necessary unless the patient is known to be hypovolaemic

Ensure that there is use of left lateral tilt 15 degrees of the operating table to avoid aorto-caval compression.

Most pregnant patients have a heart rate above 80bpm.

Phenylephrine infusion. 10mg into 100ml bag saline making a mixture of 100mcg/ml. Alternatively, if available ampoules of 100mcg/ml should be used. Draw up 25 mls and commence at 40mls/hr once the spinal is sited. Titrate the infusion with the mothers BP. Usually it can be stopped once the baby is born.

Ephedrine. This can be given as bolus doses of 3mg to 6 mg. However, it has been shown that there is less hypotension if an ephedrine infusion is used. This can be done by simple adding 30mg of ephedrine to the litre of crystalloid being used and titrating the infusion rate. You may still need to give boluses of ephedrine.

Phenylephrine boluses. The use of small boluses of phenylephrine are recommended (25 -50 mcg you will need to double dilute) if the mothers heart rate goes above 130bpm or there is little response to ephedrine. It has been shown not to cause an adverse outcome on the fetus. However, beware it can cause a marked bradycardia so cautious small doses are a MUST.

High Spinal:

This is a complication of a spinal anaesthetic. http://online.lthtr.nhs.uk/app/fileshare/view.asp?noredirect=y&uid=24786&gpuid=40

It is defined as local anaesthetic block extending above the level of T4. It may be due to excessive spread of a spinal injection of local anaesthetic or unintentional injection of local anaesthetic into the spinal space rather than epidural space because of a wrongly placed or unrecognised migration of an epidural catheter.

Management should be by ABCDE of resuscitation and may require the induction of a general anaesthetic.

All patients should be followed up carefully and sympathetically in the subsequent days. A consultant obstetric anaesthetist should be involved with this if at all possible. A follow up appointment should be made in the anaesthetic clinic so that it can be discussed again.

Contraindications to regional anaesthetic;

Most are relative but may need discussion with a consultant

- Patients refusal
- Bleeding diathesis
- Hypovolaemia
- Sepsis near to site of insertion of needle for regional block
- Stenotic valvular heart disease
- Platelet count less than 100 x 109/l. (Will need discussion with consultant as may be possible with a lower platelet count).
- Generalised sepsis
Challenging cases for Caesarean delivery:

Pre-eclampsia or Eclampsia

These mothers may present for emergency CS. There will all ready have been multidisciplinary in put to the care of these mothers with which you will have been involved. The mother should be optimised prior to Caesarean so that the procedure is performed at the safest time for mother and baby.

Anaesthesia providing there is no contraindication can be performed under single shot spinal anaesthesia.

http://online.lthtr.nhs.uk/app/fileshare/view.asp?noredirect=y&uid=30670&gpuid=40

Obstetric Haemorrhage

Obstetric haemorrhage can be primary or secondary (associated with coagulation failure). Placental abruption can fall into both categories.

<table>
<thead>
<tr>
<th>Primary</th>
<th>Secondary</th>
</tr>
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<tbody>
<tr>
<td>Uterine atony</td>
<td>Pre-eclampsia/HELLP</td>
</tr>
<tr>
<td>Placenta praevia</td>
<td>Intrauterine sepsis/septicaemia</td>
</tr>
<tr>
<td>Retained placenta/products of conception</td>
<td>Amniotic fluid embolism</td>
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<tr>
<td>Genital tract trauma</td>
<td>Pre-existing coagulaopthy</td>
</tr>
<tr>
<td>Uterine rupture</td>
<td>Incompatible blood transfusion</td>
</tr>
<tr>
<td>Uterine inversion</td>
<td>Retained dead fetus</td>
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</tbody>
</table>

Any woman who is pale, tachycardic and hypotensive must be considered to have lost a substantial amount of blood until proven otherwise and a general anaesthetic used.

Antepartum haemorrhage:  
http://online.lthtr.nhs.uk/app/fileshare/view.asp?noredirect=y&uid=30267&gpuid=40

Post Partum haemorrhage  
http://online.lthtr.nhs.uk/app/fileshare/view.asp?noredirect=y&uid=27793&gpuid=40

Massive Obstetric Haemorrhage  
http://online.lthtr.nhs.uk/app/fileshare/view.asp?noredirect=y&uid=31164&gpuid=368

Cell Salvage:

For cases where there is anticipated excessive blood loss or another indication for use of cell salvage please see Appendix 4

Interventional Radiology:

An interventional radiology service operates in the hospital 08:30 - 17:30, Monday to Friday (excluding bank holidays).

A mobile image intensifier with a vascular package is available in the Obstetric & Gynaecology theatre.

Postoperative Care

All women who have a general anaesthetic or an emergency Caesarean section, once immediate theatre recovery is complete, should be cared for on delivery suite on a one to one basis for at least an hour.

Please see recovery guideline: due for update ???
Vital Sign Observations:

Immediately after CS
Women should be observed on a one-to-one basis by a properly trained member of staff until they have regained airway control and cardiorespiratory stability and are able to communicate. In this immediate recover phase observations of
- respiratory rate,
- heart rate,
- blood pressure,
- pain
- sedation
should be monitored every 5 minutes unless the clinical situation dictates more frequent.

After recovery and on return to the ward
- respiratory rate,
- heart rate,
- blood pressure,
- pain
- sedation
should be monitored every
- 15mins for first hour
- half hour for the next 1 hour,
- hourly (until 12 hours postoperatively) thereafter provided that the observations are stable or satisfactory.

A MOEWS should be calculated with each set of observations.

All patients who have received spinal/epidural diamorphine should have hourly observations for the first 12 hours post-op.

If these observations are not stable, more frequent observations and medical review are recommended.

Please ensure the following information is recorded on the obstetric vital signs chart:
- level of consciousness
- haemoglobin saturation and oxygen administration
- blood pressure
- respiratory frequency
- heart rate and rhythm
- pain intensity e.g. verbal rating scale
- intravenous infusions
- drugs administered

Monitoring of the regional block (if relevant):
The leg strength and sensory level should be measured at 6 hours after the completion of surgery. At this stage the mother should have a modified Bromage score of at least 2 and the sensory level should have regressed almost completely. Appendix 5. If this is not the case please contact the anaesthetist on bleep 4154 to review the patient.

Patients may only mobilise if they have achieved a Modified Bromage score of 1 and have full sensation.

Further follow up of neurology occurs at the anaesthetist’s routine follow up – see below.
If patient complains of severe back pain with or without any neurological deficit to lower limbs an epidural abscess or haematoma must be considered. These are neurosurgical emergencies and any symptoms that would lead you to suspect them require immediate investigation. The patient must be assessed by the maternity anaesthetist and if appropriate have an immediate neurosurgical referral.

Post –Operative Analgesia:
Most patients who have had spinal or epidural diamorphine will have 18 – 24 hours good pain relief especially if regular paracetamol and voltarol are given.

These patients must not be given intramuscular opiates. If opiates are required in the first 18 hours post op they must be given via a PCA.

If a PCA is then required, please refer to the acute pain intranet site to be found within anaesthetic directorate protocols and guidelines. http://online.lthtr.nhs.uk/app/fileshare/view.asp?noredirect=y&uid=20334&gpuid=33

Oral analgesia is provided in the form of regular paracetamol, ibuprofen plus DF118 with oromorph for breakthrough.

Regularly:
Ibuprofen 400mg qds (to start 18 hours after the initial dose of diclofenac). Please be aware this is a conservative dose, the maximum dose of ibuprofen is 2.4G in 24 hours.

Paracetamol 1G qds ( please sign for the initial dose given in theatre complex).

DF118 (Dihydrocodeine) 30mg qds ( stating can be refused) to start 18 - 24 hours after the surgery.

As Required
DF118 (Dihydrocodeine) 30mg 4 – 6 hourly.
Noting that a maximum of 8 x 30mg DF118 can be taken in a 24 hour period.

Oromorph 10 mg 4 hourly can be prescribed for breakthrough pain. (Maximum 60mg in 24 hours)

All mothers should be advised that dihydrocodeine is not codeine but as it is an opioid should be taken in as small a dose as possible for as short a period as possible. This helps avoid breast feeding issues and constipation.
If they are breast feeding she should cease the drug and seek medical advice, if she notices side effects in her baby such as:
• Breathing Problems
• Lethargy
• Poor Feeding
• Drowsiness
• Bradycardia – slow heart rate

Dihydrocodeine (DF118) is metabolised by CYP2D6 to the metabolite dihydromorphine (DHM). The analgesic effect is mainly due to the parent drug not the DHM. Therefore, any genetic polymorphism is unlikely to have an effect on analgesia unlike codeine. In addition, as DF118 is not codeine there is no breakdown to morphine unpredictable or otherwise. Hence, this is why we have chosen Dihydrocodeine at LTHTR.

Nausea and Vomiting:
Please refer to the acute pain intranet site to be found within anaesthetic directorate protocols and guidelines.
Hydration:
Intravenous fluids are prescribed at the end of the surgery and should be kept in place until eating and drinking adequately.

Feeding:
Irrespective of elective or emergency Caesarean section.
On return to ward sips of water are given, increasing the amount if tolerated. Then light diet may be commenced as soon as the mother feels able.
No need to listen for bowel sounds, if mother hungry ileus is unlikely.

Thromboprophylaxis:
This is provided with Intermittent pneumatic calf compression devices during the CS and until mobile.
Anti-embolic Stockings are used once the patient is mobile.
The decision for Low Molecular Weight Heparin (LMWH) is made by a scoring system.

Mobilisation:
Early mobilisation is encouraged. However, prior to mobilisation the mothers postoperative observations must be stable and full power and sensation must have returned. Appendix 5

Follow Up:
All patients must be followed up post operatively for two days. Please ensure that patients have the Maternity Discharge Advice – Spinal Anaesthesia and Epidural Analgesia.

For those that go home on day 1 as part of the EROS programme a telephone follow up should be completed.

Follow up sheets are attached to the anaesthetic sheets. These are a tear off sheet but must be filed in the case notes. Documentation for anaesthesia follow up will be available on K2 in the near future.

Accidental awareness under General Anaesthetic:
Awareness is generally considered to have occurred when, after completion of anaesthesia, an individual has explicit recall of intraoperative events with or without pain.

Awareness results when too little anaesthetic is delivered to the brain. Failure of anaesthetic delivery may occur either by ‘accident’ (often in combination with reduced practitioner vigilance) or when the anaesthetist either unintentionally or intentionally administers less anaesthetic than is necessary to maintain unconsciousness.

The risk of awareness under general anaesthetic for Caesarean section are minimal if modern techniques are used. However, the risk with emergency Caesarean remains high at approximately 1 in 1,200 (0.8%) as compared to the general population of 1 in 15,000.

Only 50% of affected patients report awareness immediately after operation.

Most cases of awareness leading to serious psychological upset. Early postoperative consequences of awareness include sleep disturbance, nightmares, daytime anxiety, and fear of future anaesthetics. Long-term psychological harm occurs in up to one-third of cases, with pain the most associated risk factor.
Complaints of unintended awareness should always be taken seriously. A senior anaesthetist should be involved, a critical incident form should be completed and the clinical governance team asked to help manage.

A full explanation and sympathy should be offered, and counselling provided.

### 8. Major Outcomes

Safe Delivery of Anaesthesia for Caesarean Section

### 9. Reference(s)


### 10. Guideline Availability

Anaesthetics and Women Health

### 11. Companion Documents

As intranet links indicate through the guideline

### 12. Patient Resources

- Information About Your Medicines – Womens Health Directorate

- Caesarean Section under Spinal Anaesthetic

- Caesarean Section under General Anaesthetic

Maternity Discharge advice - Spinal Anaesthesia and Epidural Analgesia
APPENDIX 1 Criteria for Anaesthetic referral:

ANAESTHETIC OBSTETRIC CLINIC

High risk patients are seen in the anaesthetic clinic which is run once a week by a consultant anaesthetist.

A) Significant medical problems:-

- Cardiac
  - Congenital heart disease, corrected or uncorrected
  - Acquired heart disease: valvular lesions, ischaemic heart disease, cardiomyopathy
  - Arrhythmias: congenital or acquired (e.g. complete AV-block)
  - Diseases of the aorta (e.g. Marfan’s Syndrome)
  - Essential hypertension requiring treatment
  - Please ensure appropriate referral has been also made to cardiology.

- Respiratory (mild, well controlled asthmatics do not need referral)
  - Severe obstructive/ restrictive lung disease (e.g. asthma, pulmonary fibrosis) which require special care during pregnancy and childbirth

- Endocrine disorders

- Renal or liver disease
  - Impaired renal function/ regular dialysis
  - Renal Transplant

- Neurological Disorders
  - Neuromuscular disease which may affect breathing (Myasthenia gravis, Muscular dystrophy)
  - Other intracranial pathologies (e.g. AV-malformations, BIH, Neoplasm)
  - Previous history of stroke or intracranial bleeding

- Haematological Disease
  - Congenital Coagulopathies (e.g. vonWillebrand disease, haemophilia)
  - Platelet deficiencies (thrombocytopenia with count less than 100) or platelet dysfunction.
  - Therapeutic anticoagulation (not thromboprophylaxis).
  - Sickle cell anaemia.

Those women prescribed LMWH please give the information leaflet “Low Molecular Weight Heparins

Women with thalassaemic haemoglobinopathies or hypercoagulability with prophylactic anticoagulation therapy during pregnancy (e.g. Protein S/C/ATIII deficiency) do not need referral unless complicated by other medical conditions.

B) Any significant pregnancy related illnesses:-

E.g
- Back pain needing treatment
- SPD needing treatment

C) Anaesthetic related Problems

- History of difficult / failed intubation, anticipated difficult airway
- Previous cleft lip/palate or maxillofacial surgery
- Anaphylaxis
- Suxamethonium apnoea
- Malignant Hyperthermia
- Porphyria
- Previous traumatic anaesthetic experience
- Complications after neuraxial blockade
- Spine problems, e.g. congenital abnormalities, previous operations, trauma etc NOT minor backache).
- **Severe** needle phobia e.g refusing any needle related intervention. Must be seen by consultant obstetrician prior to decision for referral.
- Women who refuse blood transfusion
- PIH/ PET
- Placenta praevia/accrete/percreta.

**D) BMI > 40**

**E) Any patient who wants to see the anaesthetist to discuss epidurals, GA or spinal or pain relief in labour. Include in this patients who are postnatal.**

**F) If you are unsure as to whether a patient should be seen by an anaesthetist then it is best to discuss the case with one of the Obstetric anaesthetic consultants. They can be contacted via the anaesthetic dept ext 2555. Try to choose the anaesthetist that will care for this mother, if appropriate.**
APPENDIX 2 Anaesthetic Chart

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APPENDIX 3

OBSTETRIC FAILED INTUBATION DRILL

Telephone 2222 stating: ‘failed obstetric intubation Gynaec Theatre xxxx. Please fast bleep 3333 and contact the on-call Anaesthetic Consultant’.

Airway assessment in obstetric patients
1. Restricted mouth opening - at least 5cm (2 finger inter-incisor gap)
2. Temporalmandibular joint immobility - should be able to move lower incisors
3. Neck immobility - should be able to move head through 90° on neck
4. Poor pharyngeal view - should be able to visualize posterior pharynx/gull
5. Overweight - should be asleep at booking
6. Risk of airway odema - history of pre-encephal, VIT, thyroid, voice change.

If one or more of these factors is present proceed with caution. Consider having another Anaesthetist present. If two or more factors present, general anaesthesia should be avoided and a regional technique should be used. If regional contraindicated, consider awake intubation.

N.B. Always have a management strategy and back-up plan.

Induction of anaesthesia
1. Ensure patient tilted to left (hipped or table tilted)
2. Single pillow under head (not shoulder)
3. 30mls D5W, sodium citrate orally (IV) plus citrate orally
4. Propofol-novo with oxygen 15L/min for 3 minutes with tight-fitting mask and anaesthetic breathing pack. Also use nasal oxygen
5. Injection of induction agent (propofol 4-5mg/kg)
6. Ten-handed cricoid pressure (at least 4 kg) applied as consciousness lost
7. Injection of succinylcholine 1-2mg/kg
8. Wait for succinylcholine to work before attempting laryngoscopy (at least 45 seconds)

Problems with laryngoscopy
1. Unable to insert laryngoscope blade
2. Blowing in way. Put arms out on boards
3. Relaxant not working. WAIT at least 60 seconds for succinylcholine to work
4. Cricoid hold in way. Reposition but maintain pressure. Muscle rigidity FAILED INTUBATION DRILL
5. Anatomical abnormality FAILED INTUBATION
6. Maxilim 2 attempts at laryngoscopy then call for HELP. 3rd attempt should be by experienced colleague
7. Consideration to use of the glidescope should be made

Failed intubation drill
CALL FOR SENIOR ASSISTANCE
Do NOT waste time with repeated attempts
Do NOT give a second dose of suxamethonium
Give oxygen
Continue cricoid pressure

Able to ventilate?
Yes
Use spontaneously breathing technique
Maintain lateral tilt, cricoid pressure
Volatile (MAC X3) in 100% oxygen
Airway easy to maintain?
Yes
Allow spontaneous ventilation
Ensure adequate depth of anaesthesia
Proceed with surgery
Titrated analgesia at delivery

No
Wake up and turn to lateral
Feetal distress/ compromise?
Yes
Spinal
Consider waking up
Sux prophylaxis and generation. If proceeding with surgery insert NG tube
Adequate block?
Yes
Local infiltration +/- wait for assistance depending on clinical situation
Oxytocin to control bleeding
Recover head-down, lateral tilt

No
Wait for assistance
Consider tracheostomy as last resort

Failed ventilation drill
Ventilation possible
Ease cricoid pressure
Inadequate ventilation
Sux prophylaxis and generation. If proceeding with surgery insert NG tube
Inadequate ventilation
Inadequate ventilation
Consider tracheostomy as last resort

Inadequate ventilation
Consider awake fibre-optic intubation or awake video laryngoscopy as last resort in presence of a consultant and if regional technique impossible.

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Anaesthesia for Caesarean Section

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May 2016
Task Allocation at Failed Intubation

Please place this card on the top of the intubation trolley at the start of each GA Caesarean Section.

Handover/Team Brief: Know your team - ensure at the delivery suite handover and prior to who check list that introductions are made.

Anticipate

- Anaesthetic Assistant: Bring mobile phone into theatre with you.
- Anaesthetist:
  - Are we anticipating any problems with the airway (or other)?
  - Do you need any additional equipment?
  - Do you need any help?
  - Is the patient fasted?

Problems with Intubation

- Cricoid?
- Breaths?
- Position?
- Has the suxamethonium had time to work?

Anaesthetist declares: This is a failed intubation. IT IS AN EMERGENCY I NEED HELP. All team members need to be aware they may need to assist. Shout 'Generalised.

Tasks

- Theatre Runner - must:
  - Use phone to put out the 2222 call stating: "Obstetric Failed Intubation Gymae Theatre xx. Fast bleep the Anaesthetic bleep 3333 and contact the on call Consultant Anaesthetist."
  - Switch will fast bleep 3333 and the Anaesthetic Consultant on call with the message.
  - As back up Theatre Runner to call switch board 5 minutes later via 2222 to ensure consultant has been contacted.

- Anaesthetic Assistant - should offer:
  - Generally LMA most useful. Cricoid pressure should be released to allow correct insertion of the LMA. Once in place it may be possible to neaply increase cricoid pressure but if this compromises ventilation it should again be released as the need for oxygenation outweighs the risk of regurgitation.
  - When the patient begins to breathe at any point transfer her to the left lateral or tilted position.

- Midwife - should offer:
  - To squeeze the anaesthetic bag.

- Scrub Practitioner - should offer:
  - Help to the anaesthetic assistant.

Oxygenation of the Mother is Crucial

Ventilation Possible

- Maintain oxygenation. Re-establish Urgency of the Procedure.
- Is it safe to proceed with surgery?

(Ventilation) Wake

Ventilation Possible

- Ventilation possible
- Anaesthesia responsive to ventilation
- Non-restrictive

Ventilation Not Possible

- Anaesthesia unresponsive
- Ventilation not possible
- Airway not adequate
- Unsuccessful intubation
- Ventilation requires intervention
- Anaesthesia still not possible
- Cann't intubate/cann't ventilate

Ventilation Still Not Possible

- Anaesthetic Declares
- Proceed to CS
- Anaesthetist declares
- Proceed to wide bore canula cricothyroidotomy
- Ensure additional help (ENT) coming

Anaesthetist

- Oxygenation restored?
- Consults/Specialist
- Normal
- No-risk factor
- Failed, not in labour, antenates given
- First generation SAD
- Second generation SAD
- Maternal ALS with perimortem CS

Material Condition

- No Compromise
- Mild acute compromise
- Severe anaesthesia unresponsive to ventilation

Fetal Condition

- No Compromise
- Compromise connected with CMV, pH 7.2, bicarbonate 7.15
- Continuing fetal heart rate abnormalities in spite of ULA, pH 7.15
- Sustained abnormality, fetal heart rate, abnormality in spite of laryngoscopy, succinylcholine

Airway

- Awake
- Anaesthesia responsive to ventilation
- Anaesthesia responsive to ventilation

BMI

- Standard
- Obese
- Underweight

Surgical Factors

- Complex surgery or major haemorrhage anticipated
- Recent food

Aspiration Risk

- No risk
- High risk
- Extreme risk

Airway Device

- Difficult face mask ventilation
- Adequate face mask ventilation
- Suboptimal airway

Airway Pathology

- Airway oedema
- Potential oedema
APPENDIX 4 Cell Salvage

http://online.lthtr.nhs.uk/app/fileshare/view.asp?noredirect=y&uid=32150&gpuid=40

Women’s Health Obstetric and Gynaecology Theatres Cell Saver Clinical Indications for Use:

- Anticipated blood loss is 20% or more of the patient’s estimated blood volume.
- Blood would ordinarily be cross-matched.
- More than 10% of the patients undergoing the procedure require a transfusion.
- The mean transfusion for the procedure exceeds one unit.
- Where indicated by surgeon or anaesthetist.
- Specific request by patient.

Contraindications for use:
- Sickle Cell Disease
- Malignancy
- Infection
- Potentially harmful substances:
  - (a) Amniotic fluid. (filters can be used to prevent this).
  - (b) Antibiotics not licensed for parenteral use.
  - (c) Avitene®
  - (d) Betadine®, Hydrogen Peroxide, sterile water, alcohol.
  - (e) Clotting adjuncts (microfibrillar collagen agent, topical thrombin).
  - (f) Faecal contamination.
  - (g) Fibrin glue
  - (h) Gastric fluids.
  - (i) Methyl methacrylate.

INDICATED PROCEDURES THAT THE CELL SAVER WILL BE PRO ACTIVELY PREPARED AND AVAILABLE FOR:

- 3rd or more CS
- Placenta Praevia
- Anterior placenta and previous CS
- Refusal of blood products
- Known fibroids, or other anticipated difficult surgery
- Clotting disorders
- Jehovah’s Witness patients
- Major Gynaecology Oncology Surgery
- Surgery with anticipated blood loss of <500ml
APPENDIX 5 Post Operative Assessment of Level of Block

How to test the sensory level of a regional block:

Apply a cold stimulus to an area of the patient’s skin using a steret. (Ethyl spray can also be used as an alternative). The patient should be asked to identify when there is a change in temperature sensation.

On unblocked skin areas the patient will feel the coldness of the street.
On partially blocked areas the steret will feel slightly cold.
On blocked areas the patient will only be able to feel the touch of the street and not the cold sensation.

The sensory levels need to be assessed on right and left sides and documented in the notes.

Modified Bromage Score for assessing motor power

<table>
<thead>
<tr>
<th>Score</th>
<th>Criteria</th>
</tr>
</thead>
</table>
| 1     | Able to raise legs against gravity and resistance  
The woman should be able to perform a deep knee bend whilst weight-bearing. |
| 2     | Partial block (able to raise legs against gravity but not against resistance) |
| 3     | Almost complete block (able to move legs but unable to raise against gravity) |
| 4     | Complete block (unable to move legs at all) |