Department of Anaesthesia

Obstetric Anaesthetists Handbook

First Edition

January 2013
St George’s Healthcare NHS Trust

Department of Anaesthesia

Obstetric Anaesthetists Handbook

The guidelines within are presented in good faith and are believed to be accurate. The responsibility for actions and drug administration remains with the clinician concerned.

Edition history
First Edition January 2013

The consultant members of the Obstetric Anaesthesia Group and the Care Group Lead for Anaesthesia have agreed this handbook as a clinical guideline.
# Document control for approved clinical guidelines

## History

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<th>Reviewer</th>
<th>Ratified by</th>
<th>Date</th>
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• Revision of contents  
• Handbook version |
| 5       | Renate Wendler, Jeremy Cashman | Anthony Addei | -                                               | January 2012     | • Review  
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Before January 2016
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Foreword

The Obstetric Anaesthetists Handbook has been developed from the separate guideline sections already in existence and replaces the Obstetric Anaesthetic chapter in the Maternity Unit Guideline Manual.

Most topics have been derived directly from previous 'sections’ and updated with the latest information. Some topics have been modified or split to form more appropriate topics.

This handbook is intended to act as an accessible resource to assist the labour ward anaesthetist at St George’s Hospital in his/her duties. It is however expected that other anaesthetists, obstetricians and midwives may also find the handbook useful.

This handbook will be checked on an annual basis for compliance with national guidelines. Major reviews or significant changes in guidelines would result in the production of a new edition of the handbook.

I would like to thank Dr Hammond, Dr Iqbal, Dr Light, Dr Schroeder, Dr Wendler and Dr Wood for reviewing / updating some of the guidelines.

Any suggestions for changes or improvement would be welcomed. Send your contributions to Dr Tony Addei.

Dr Tony Addei
Consultant Obstetric Anaesthetist
Obstetric Anaesthesia
Introduction

Scope of guidelines

This handbook is intended to assist you in your duties as the labour ward anaesthetist at St George’s Hospital. We expect you to perform to a high standard in a demanding environment. We have provided you with information to allow you to orient yourself, and specific advice on a number of matters that will arise.

This handbook contains clinical guidelines that have been developed from national recommendations and evidence review, reinforced by local audit. They represent a consensus of opinion on obstetric anaesthetic practice. They are not exhaustive and do not include the minor variations seen in consultants’ daily work. It is hoped that the guidelines will clarify principles of management of obstetric anesthesia at St George’s Hospital. This will lead to greater uniformity and consistency of practice, better teamwork and safety, leading to improved patient care.

The guidelines do not necessarily represent the only good practice, but they do represent good practice, agreed practice and the practice you are expected to follow. You should read this handbook through, as or before you start work as the labour ward anaesthetist. This handbook is not a textbook and nor is it completely comprehensive.

There are other sources of information that you must use:
- Your professional skills and training
- Your knowledge derived from personal study
- The St George’s Healthcare NHS Trust Anaesthetics Department Handbook
- The St George’s Healthcare NHS Trust Maternity Unit Guidelines

In any case where you are unsure as to the safe and effective way to proceed, you must seek advice from a more senior and experienced member of staff. This may be another anaesthetist, or indeed a midwife or obstetrician.

The Royal College of Anaesthetists has published ‘Raising the Standard: A compendium of audit recipes.’ Those pertaining to obstetric services can be found at www.rcoa.ac.uk.

Documents relating to training and assessment in obstetric anaesthesia can be found at www.rcoa.ac.uk and www.oaa-anaes.ac.uk.
Confidentiality

Your duties as a doctor can be found in the *Good Medical Practice (GMC-2013)*. We strongly recommend that you read it. It states under duties of a doctor that:

‘You are personally accountable for your professional practice and must always be prepared to justify your decisions and actions.’

You must pay attention to the guidance on patient confidentiality and reflect on how it applies to your practice in obstetrics. Curtained bed spaces may not be sufficiently private.

**You must be particularly mindful when other relatives or friends are present.**
Living Our Values – theatre standards

St George’s Healthcare NHS Trust has set out values to create a positive team culture within the trust for the benefit of patients and staff.

This Charter is based on our four key values, but is specifically aimed at all staff working in the operating theatre. The theatre environment can be challenging due to many different interactions with potential for conflict. Remember patient safety, high quality care and their well-being is our paramount priority.

**Excellent:**
- Always aim to deliver the best possible care.
- Put the interest of the patient at the center of decision-making.
- Be punctual to allow a timely start of your list - this simple act puts the needs of the patient and the team above your own.

**Kind:**
- Be compassionate to the need of patients. They are particularly vulnerable at this time.
- Be kind, considerate and respectful to your colleagues.
- Create a positive work environment. Try to help your team members with their tasks, for example positioning, lifting, equipment needs. Say “yes” whenever possible.

**Respectful:**
- Communicate well with patients and staff; speak in English when on duty. Wear your ID badge at all times.
- Show respect for your patients - do not talk over them, explain every step and apologize if they have to wait.
- Always maintain patient’s privacy and dignity.

**Responsible:**
- Act on patient safety concerns. Speak up in an appropriate manner if you see anything that concerns you.
- Be responsible for your own actions, don’t blame others.
- Actively engage in patient safety initiatives (Briefing/debriefing, WHO safer surgery checklist, correct site policy). They work best if everyone is engaged.
- Adhere to the hand hygiene policy.
- Respect equipment and facilities - deal with it carefully! If something breaks, organise the repair.
- Make sure your documentation is honest, accurate and clear.

Finally take the time to say “thank you” to your colleagues more often. This simple act makes a difference to everyone’s working day and a more pleasant working environment in theatres.
Orientation to the Delivery Unit

The labour ward is on the first floor of Lanesborough Wing of St George’s Hospital. The entrance is controlled by a card swipe keyed to your ID badge.

All trainee anaesthetists, regardless of prior experience in obstetric anaesthesia, should receive a formal induction to the Obstetric Anaesthetic Unit before commencing duties there. This is conducted using a standardised format and should include a physical tour of delivery suite, obstetric theatres, the learning environment and any other relevant areas.

It should ideally be conducted by a consultant obstetric anaesthetist or Advanced Level SpR.

If you have to cover obstetrics before any of the above are available, the SpR handing over to you should conduct the orientation. You should discuss with a consultant obstetric anaesthetist at the next available opportunity to clarify that no issues have been missed.

Once completed, sign the form, keep it in your training folder and put your details on the database sheet.

The anaesthetic guidelines are incorporated in the Maternity Unit Guidelines and can be found on the Trust intranet (under Maternity) and on desktop computers in the obstetric anaesthetic office.

It is your professional responsibility to ensure that you undergo and complete the above before you cover obstetrics on the unit.
## Orientation form

### Areas to cover at orientation

<table>
<thead>
<tr>
<th>Labour ward layout</th>
<th>Tick if covered</th>
<th>Reason if not covered in orientation?</th>
</tr>
</thead>
</table>

**Obstetric theatres**
- Anaesthetic machine and operating table
- Regional Anaesthesia trolley
- Intubation / Difficult airway trolley & HELP pillow
- Fridge with drugs
- Anaesthetic cupboard contents
- Level 1 infuser
- Cell saver
- Lipid infusion
- FAILED INTUBATION DRILL

**Obstetric HDU**
- HDU charts
- Monitors
- Eclampsia box

**LW**
- Office and Midwife Station
- Communication board
- Elective C/S and IOL booking system
- Epidural trolley & forms
- Major Haemorrhage trolley
- Defibrillator, resuscitation trolley & wedge

**Other**
- Anaesthetic office
- Anaesthetic Database
- Maternity Unit Guideline Manual

**Folder for High Risk Patients, Computers, intranet/internet access, protocols on-line, results**

**Patient Confidentiality**

**Clinical situations that warrant consultant input**
- Major haemorrhage – avoiding fluid overload

**Bleeps:** Obstetric anaesthetist **6392** / ODP **6650** / Senior SpR **6111** / DFA **8011**

**Maternity wards**

**Introduction to LW Lead Midwife**

Please complete: Date of orientation -------/------/--

<table>
<thead>
<tr>
<th>Name &amp; signature of person conducting the orientation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Name &amp; signature of person (SpR) having orientation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>
Unit workload

The St George’s Maternity Unit is a tertiary referral center for pregnant women with complex and high-risk pregnancies. A capping policy was introduced in 2012 to ensure the continued high quality of patient care. The unit booked 5374 women in 2012 and delivered 5128 women as compared to 6193 and 5328, respectively, in 2011. We performed 3323 anaesthesia procedures (1600 labour epidurals and 1723 theatre cases) in 2012. About 31% of women who delivered on the unit received epidural analgesia. Over 80% of requests for epidural analgesia were attended to within 30 minutes and 97% within 1 hour. At follow up, 96% of women found their epidural analgesia satisfactory / excellent and 97% would have epidural analgesia again.

What we offer

We run four services together as part of the commitment to obstetric anaesthesia:

1) A round-the-clock emergency service
   - Labour analgesia – epidurals, CSE, opioid PCA
   - Emergency operative interventions - caesarean sections, instrumental deliveries, MROP, repair of genital tract trauma
   - Obstetric high dependency care – principally haemorrhage and pre-eclampsia
   - Postnatal review of all patients

2) A planned caesarean section service on weekdays
   - As part of a dedicated operating list Monday - Friday
   - Integrated with the emergency service

3) Antenatal assessment and planning service
   - Assessment of patients referred by midwives or obstetricians during pregnancy. The High Risk Clinic runs every Thursday morning

4) Advanced Level training in Obstetric Anaesthesia and Analgesia
   - Comprehensive modular training for senior trainees who wish to develop a special interest in the subspecialty to enable them cover daytime sessions in obstetric anaesthesia as consultants
Staff

Consultant obstetric anaesthetists
We have consistently and progressively increased the pool of consultant anaesthetists who provide cover for obstetric anaesthesia and analgesia. There are 12 consultant obstetric anaesthetists providing 17-18 PA Direct Clinical Activity obstetric anaesthesia sessions a week with prospective cover. A team of three consultant anaesthetists ensure continuity of care for patients attending the High Risk Clinic. The introduction of a computerised rota system (CLW Rota) allows compliance with staffing levels outlined in the staffing levels document to be monitored continuously and reviewed / reported annually by the lead obstetric anaesthetist.

Members of the Obstetric Anaesthesia Group are:

- Dr Tina Wood Obstetric Risk Management
- Dr Emma Evans Lead for Training and Obstetric Simulation, Module Director
- Dr Karen Light Lead for Recovery
- Dr Rehana Iqbal Programme Director Foundation Year 2 and Lecturer in Medical Ethics & Law
- Dr Renate Wendler High Risk Clinic, HDU, Care Group Lead Theatres
- Dr Cleave Gass Director Medical Education, Associate Medical Director
- Dr Frank Schroeder High Risk Clinic
- Dr Sarah Hammond High Risk Clinic, Labour Ward Forum, Deputy Lead for Clinical Governance
- Dr Richard Hartopp Research
- Dr Jonathan Springett Labour ward
- Dr Khalid Syeed Lead for Transfusion *(flexible obstetric sessions)*
- Dr Tony Addei Lead Obstetric Anaesthetist

Operating department practitioners
There is an assigned ODP for the labour ward around the clock, with bleep number 6650. You are not permitted to anaesthetise a woman without assistance. In dire and life-threatening emergencies a member of the midwifery / theatre staff may be asked to assist you – to the exclusion of all other duties not related to anaesthesia – pending the arrival of an ODP or other anaesthetist.
Obstetric Anaesthesia Services at St George’s Hospital

**Staffing Levels Policy**

1. **Background**

   Requirements around staffing levels for professionals involved in the provision of safe care to women and their babies are detailed in the recommendations of Safer Childbirth (RCOG 2007). Where recommended numbers of staff are not in place business and contingency plans should be implemented and their effectiveness monitored in order to manage the situation (CNST 2011).

2. **Objective**

   This policy details the staffing levels required for anaesthetists and their assistants for safe care on the St George’s NHS Healthcare Trust Maternity Unit. It outlines the processes for review of staffing, audit and development of business and contingency plans.

3. **Clinical Management**

   **Role of Anaesthetists on the Maternity Unit**

   The role of anaesthetists in obstetrics has changed over the years, such that anaesthetists are now involved in some way or another in the care of over 50% of the women who enter the labour ward. Epidural analgesia during labour has become an expectation of many mothers and it is now used by almost one third of women who deliver at St George’s Hospital. Successive reports have emphasised the importance of anaesthetists as an integral part of the obstetric team and in the management of mothers who become seriously ill.

   **Lead Obstetric Anaesthetist**

   The Lead Obstetric Anaesthetist takes responsibility for all aspects of the clinical service and is responsible for the organisation and audit of the service, for maintaining and raising standards through provision of evidence based guidelines, for providing anaesthetic input to the labour ward forum and for training and risk management processes.
Minimum staffing levels

According to consultant obstetric anaesthetist job planning / junior doctors’ rota.

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Service available at St. George’s</th>
</tr>
</thead>
<tbody>
<tr>
<td>Duty anaesthetist with no other responsibilities available 24 hours/day</td>
<td>Yes</td>
</tr>
<tr>
<td>Duty anaesthetist assessed as being competent to undertake duties</td>
<td>Yes</td>
</tr>
<tr>
<td>Access to prompt advice and assistance from a designated consultant anaesthetist whenever required</td>
<td>Yes</td>
</tr>
<tr>
<td>Consultant presence on labour ward for at least 40 hours per week</td>
<td>Yes</td>
</tr>
<tr>
<td>Ten consultant programmed activities or sessions per week, to allow full working hours consultant cover</td>
<td>Yes</td>
</tr>
<tr>
<td>Separate consultant anaesthetist for each formal elective Caesarean section list</td>
<td>Yes</td>
</tr>
<tr>
<td>Additional anaesthetic cover in periods of heavy workload</td>
<td>Yes (DFA, Senior registrar/6111)</td>
</tr>
<tr>
<td>Consultant time specific allocated for high dependency care</td>
<td>Yes</td>
</tr>
<tr>
<td>Consultant allocated for high dependency care</td>
<td>Yes</td>
</tr>
<tr>
<td>Extra clinical time for antenatal referrals, especially if formal clinic is provided</td>
<td>Yes (1 session/week) High risk obstetric anaesthetic clinic</td>
</tr>
<tr>
<td>Consultant allocated for risk management with dedicated clinical sessions</td>
<td>Yes</td>
</tr>
<tr>
<td>Lead obstetric Anaesthetist with programmed activities/sessions for administrative work</td>
<td>Yes</td>
</tr>
<tr>
<td>Higher/advanced training for obstetric anaesthesia</td>
<td>Yes</td>
</tr>
<tr>
<td>The names of all consultants covering the Delivery Suite should be prominently displayed, and contact numbers readily available</td>
<td>Yes</td>
</tr>
<tr>
<td>Anaesthetic assistance available 24 hours/day with no other duties</td>
<td>Yes</td>
</tr>
</tbody>
</table>
Anaesthetic presence on the maternity unit

Consultant anaesthetists with an interest in obstetric anaesthesia and specialist registrars who have the required competencies to enable them to undertake the full range of obstetric procedures provide cover. When the regular Consultant is on leave, other Consultants will be timetabled to cover for their absence in the majority of cases. In exceptional circumstances, senior trainees undertaking Advanced Training in Obstetric Anaesthesia will staff the unit. During these times there will always be a Consultant Anaesthetist doubled up and immediately available to help from main theatres. At other times there is a Consultant on call system.

- During the weekdays, the changeover times for cover are 08:00 and 17:00.
- On weekends, the changeover time for cover for consultant anaesthetists is 08:00 and for the duty anaesthetists 08:00 and 20:00.
- On weekdays, between 17:00 and 08:00 and at weekends, a Specialist Registrar provides duty anaesthetic cover, with support from an on-call General Consultant Anaesthetist. The anaesthetic registrar covering obstetrics has no additional non-obstetric duties. Resident Consultant anaesthetic (bleep 8011) cover is available to help trainees:
  - Monday – Friday 17:00 – 20:00
  - Saturday and Sunday 10:00 – 20:00
  - Out of these hours trainees call for Consultant help as appropriate for clinical or manpower reasons.

Anaesthetic Assistant

Obstetric Anaesthetic Practitioner cover is available 24 hours a day by designated staff qualified to provide anaesthetic assistance. These staff are on the theatre Anaesthetic Assistants rota designated to cover the maternity unit on a particular shift. They can be contacted on bleep 6650. In the case of unexpected shortfall out of hours, the Anaesthetic Coordinator (bleep 8425) would obtain a substitute either from staff in other areas of main theatres or by bringing in a member of staff (1st or 2nd On Call) from home.

Theatre policy does not allow non-staffing of obstetric anaesthetic assistants. There is therefore a 100% compliance with the required staffing level for anaesthetic assistants in obstetrics.
4. Risk Management

**Action to be taken in the event of unexpected shortfall during office hours**

In the case of unexpected shortfall during office hours the Duty Floor Consultant Anaesthetist (bleep 8011) would ensure that a Consultant Anaesthetist or Specialist Registrar qualified to cover obstetrics would take over.

**Action to be taken in the event of unexpected shortfall outside office hours**

The Consultant anaesthetist on-call would ensure that another trainee from the pool of on-call anaesthetic registrars in the hospital would take over as duty anaesthetist for obstetrics. One of the other on call registrars would then become 1st responders for cardiac arrest and trauma calls. The relevant on call consultant anaesthetist for the subspecialty whose registrar becomes 1st responder would be made aware of the situation.

**Business planning**

In the event of ongoing staffing shortfalls, this would be identified by the Lead Obstetric Anaesthetist and escalated to the Care Group Lead for Anaesthesia, the anaesthetic business manager and anaesthetic clinical governance lead and a business plan developed to ensure adequate staffing levels as a top priority.

**Contingency planning**

In exceptional circumstances, the Duty Floor Consultant Anaesthetist in conjunction with senior management teams will delay / cancel elective operating lists to free up appropriately qualified Anaesthetists. Out of hours this responsibility falls to the on call General Consultant Anaesthetist.

5. Audit

**Audit Indicators**

The introduction of a computerised rota system (CLW Rota) allows compliance with staffing levels outlined in this document to be audited continuously and compiled annually by the Lead Obstetric Anaesthetist. The results and any action plan will be presented to the Anaesthetic department and the Maternity Risk Management Group. The Lead Obstetric Anaesthetist will be responsible for implementing any actions resulting from these audits.
Monitoring

Action plans as a result of audit, contingency plans and the progress of business plans will be monitored by the Anaesthetic department and the Maternity Risk Management Group and in line with the Maternity Risk Management Strategy.

This guideline will be checked on an annual basis for compliance with national guidelines.

6. Evidence Base

References

1. Appendices

Performance and Governance scorecard (adapted from 'Maternity Dashboard' – E Chandraharan) for Monitoring and Audit.

### Appendix 1

#### Performance and Governance Scorecard: Aiming for Excellence

| Workforce                                                                 | Goal                                      | Red Flag | Comment | Data Source | 2011 Months | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC | 20xx | CORRECTIONS / ACTION |
|---------------------------------------------------------------------------|-------------------------------------------|----------|---------|-------------|--------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|---------------------|
| Duty Obstetric Anaesthetist cover 24 hours / day                         | 100% (<100%)                              | DATIX    |         |             |              |     |     |     |     |     |     |     |     |     |     |       |                     |
| Obstetric Anaesthetic Assistant (ODA) 24 hours / day                     | 100% (<100%)                              | DATIX    |         |             |              |     |     |     |     |     |     |     |     |     |     |       |                     |
| Consultant Obstetric Anaesthetist cover for delivery suite 10 sessions / week | 100% (<50%)                               | CLW Rota |         |             |              |     |     |     |     |     |     |     |     |     |     |       |                     |
| Consultant Obstetric Anaesthetist cover for elective LSCS               | 100% (<100%)                              | CLW Rota |         |             |              |     |     |     |     |     |     |     |     |     |     |       |                     |
| Consultant Obstetric Anaesthetist for care management                    | 100% (<100%)                              | CLW Rota |         |             |              |     |     |     |     |     |     |     |     |     |     |       |                     |
| Consultant Anaesthetist cover for high risk obstetric anaesthetic clinic | 100% (<100%)                              | CLW Rota |         |             |              |     |     |     |     |     |     |     |     |     |     |       |                     |

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St George's Maternity Unit
The 'Anaesthesia Dashboard' 20xx

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Click here for contents
**General Duties**

You are the principal anaesthetist to the labour ward, and are expected to base yourself there. The obstetric anaesthetist is not an epidural technician. You are part of a team, working closely with the obstetricians, midwives and paediatricians, and should take an active part in the running of the unit.

Your principal duties are to work in the following areas:

**Documentation**

Completion and maintenance of clinical and audit records, in black ink and including your name and grade on every record.

**Labour ward work**

This includes:

- Provision and supervision of safe and effective epidural analgesia for pain relief in labour
- Check the labour ward epidural trolley and stock up on items such as epidural kits, syringes, hypodermic needles, chlorhexidine spray, Mefix etc
  **This is your responsibility**
- Provision of safe and effective anaesthesia for operative delivery and obstetric surgery
- Attending ward rounds with the obstetricians
- Management of high dependency obstetric patients in the labour ward, in conjunction with obstetricians and midwives
- Attending ‘obstetric emergency’ calls and giving prompt emergency treatment
- Intravascular access and sampling in difficult cases when requested
- Review and treatment, where necessary, of patients who have recently received an epidural, spinal or general anaesthetic
- Preoperative and other assessment of mothers who are antenatal inpatients

**Planned caesarean sections**

- Assessment and preparation of patients.
- Provision of anaesthesia for planned caesarean sections.
Antenatal referrals

Antenatal assessment of patients with medical problems that may influence anaesthetic management at time of delivery.

Always inform the senior midwifery sister if you take on a commitment elsewhere.

Assessing preoperative patients

Where you are asked to undertake preoperative assessment you should pay attention to patient confidentiality. Curtained bed spaces may not be sufficiently private. Midwives will direct you to the most suitable room and act as chaperones when required.

You should recommend regional anaesthesia for elective caesarean section, in the absence of contraindications.

Handover

The outgoing and incoming duty obstetric anaesthetists should formally hand over responsibility at the change of shift in the morning and in the evening. All clinical activities should be discussed and in particular, patients in high dependency care should be reviewed together. The bleep should also be handed over. You may not leave the bleep on the labour ward and go off duty without handing over.

Presence on the labour ward

There should be a resident anaesthetist on or near the labour ward at all times. You must be immediately available using the allocated bleep at all times.

You must not leave the building while holding the labour ward anaesthetist’s bleep unless agreed by a consultant anaesthetist.

You should be immediately available during the second stage in vaginal breech delivery and in multiple deliveries, and during external cephalic versions.

Excessive workload

It will inevitably happen that at some times the demands on your time will exceed the capacity of one person to respond, for example for epidural analgesia while you are doing a caesarean section.

Unless you are near the end of your other commitment and will be able to respond...
shortly and in an appropriate time, make sure that the midwives refer such a request through to the general on call team – usually the senior resident anaesthetist – or that you call them yourself. It is part of the senior resident’s duties to assist in labour ward at busy times, or to escalate the request to a consultant as appropriate.

Seeking advice and senior help
There will be times when you need to ask advice or request help. You should call the senior resident anaesthetist first, particularly if a second pair of hands is required urgently.

The consultant anaesthetist on call
There is always a consultant anaesthetist responsible for the labour ward.

Out of hours
The general consultant on call provides cover. You may contact this consultant at any time via the hospital switchboard, usually after calling the senior resident anaesthetist.

Calling members of the Obstetric Anaesthesia Group
Members of the Obstetric Anaesthesia Group are available for consultation. On occasion the general consultant on call will not be a member of the Obstetric Anaesthesia Group. After first calling the general consultant on call, group members may be called (contact numbers available in anaesthetic office or through the switchboard) for problems relating specifically to obstetric anaesthesia. This is an informal arrangement and there is no commitment to be available.

Asking other professionals for help
Always remember that you work with other professionals in obstetric anaesthesia. The views of midwives and obstetricians should be sought and taken into account.
**Situations that warrant input from a consultant anaesthetist**

The consultant anaesthetist on call must be informed in the following situations. Based on the information provided and after considering the clinical situation, the consultant on call may come in to manage the situation or alternatively may provide advice over the phone.

- Potential difficult intubation
- Massive obstetric haemorrhage (Cases that trigger CODE BLUE)
- Women declining blood transfusion who are to be delivered in theatre or who bleed
- Placenta praevia who are to be delivered
- Abruptio placentae
- IUD
- Admissions to obstetric HDU/other HDU/ ICU/ return to theatre / laparotomy
- Unexplained collapse and cardiopulmonary arrest
- Amniotic fluid embolism
- Maternal morbid obesity
- Severe PET/ eclampsia
- If a second operating theatre is to be opened in an emergency
- Severe complications of central neuraxial block
- Unintentional dural puncture
- Elective cases out of hours
- Major problems with consent
- Total spinal anaesthesia
- Potential conflicts between the obstetric doctors on call and duty anaesthetists with regard to the management of patients
- Patients refusal to undergo recommended treatment/ patient – anaesthetist conflict
- If you do not feel confident or do not have sufficient skills or experience to manage a clinical situation or require a second opinion
Anaesthesia for women with a booking BMI > 40 kg/m² who have operative vaginal delivery or caesarean section should be provided by an anaesthetist at Specialty Trainee level 6 or above, or with equivalent experience in a non-training post. You should liaise with the SR (6111) and inform the consultant on call.

The name of the Consultant Anaesthetist on call for Obstetrics must be displayed prominently on the delivery suite and contact number readily available (see midwives’ station). The names of all consultant anaesthetists who have regular sessions in obstetrics should be prominently displayed and contact numbers readily available (see anaesthetic office). Dr Wendler, Dr Schroeder or Dr Hammond may be contacted for advice on patients who have been seen in the High Risk Clinic.

In the exceptional situation where the consultant anaesthetist on call cannot be contacted and consultant input is essential, request assistance from other consultants using your judgement. Consultants who have regular sessions in obstetrics may be on call on other rota or may be in the hospital covering a list or non-clinical activity. If this is unsuccessful, contact the lead obstetric anaesthetist.

**Conflict**

All staff must behave in a professional manner, demonstrating mutual respect. The shared team management plan must be agreed before discussing with the patient. Divisions of opinion between staff must be settled amicably and swiftly lest standards of care be jeopardized. When conflict persists it must be referred promptly to senior staff.

**Seeking advice on unusual techniques**

No handbook can be totally comprehensive. There may be instances when it is appropriate to use techniques that are not described here. You must seek senior advice before doing so, from the senior resident anaesthetist and in many cases from the consultant anaesthetist. In particular, you must not administer any substance to the epidural or subarachnoid spaces, which is not recommended in this handbook.

If you are asked by the obstetrician to administer a drug for an obstetric indication, you may do so only if you are aware of the principal contraindications and side effects of that drug.
**Autonomy and responsibility**

These guidelines are not intended to constrain the practice of consultant anaesthetists. When a consultant is called in for advice and help, this will often be because a problem has been encountered which forces thinking and practice outside these guidelines. This will especially apply to the on call period and to patients with critical illnesses. Consultants retain clinical autonomy and the concomitant responsibility.

Working as a trainee on the labour ward can seem like protocol driven care. You will find many unequivocal statements about our recommended practices. We feel that significant deviation from these practices might be detrimental to women. This is also an area associated with high litigation caseload. Therefore, if you wish for any reason not to adhere to any of these policies, please contact one of us first. If you follow these Guidelines, or get prior approval for any deviation, you will have our full support.

There is tremendous satisfaction to be gained from communicating with women at a special time of their lives, satisfying their expectations and diagnosing and managing emergency medical and surgical conditions. We hope and believe that these clinical guidelines leave room for this satisfaction.
Preparations for emergency anaesthesia

You must be aware at all times of the options for conducting emergency anaesthesia, and be assured that cases can be conducted with the minimum of delay. The response time for a particular condition will vary and we do not presume that general anaesthesia is always the appropriate choice for emergencies – unless contraindicated or impossible, spinal anaesthesia or epidural extension should be used for caesarean section.

Theatre equipment

You should check that both the main and second obstetric theatres are available for operation in conjunction with the senior midwifery sister. If either theatre is non-operational, then enquire about a backup theatre – check its status.

Prepared drugs

One common factor for several serious drug-related incidents is the advance preparation of too many drugs. When associated with poor labelling this has the potential for lethality. It also raises issues of sterility, and adequate handover between different anaesthetists.

Any operative case should have one lead anaesthetist, whether trainee or consultant, who is primarily responsible for the conduct of the anaesthetic and the administration of drugs.

Do not draw up or prepare drugs for more than one case. Storage of other prepared drugs may seem convenient but exposes patients to a higher risk of drug error.

Emergency treatment

- All obstetric emergencies must be managed immediately in conjunction with midwifery and obstetric staff
- Call for help immediately if you are not able, for any reason, to give immediate, safe and effective treatment
- Consider sending for senior help early and in any case where this is specifically indicated

If you are the only anaesthetist nearby and you are engaged in the care of another patient, you should bear in mind the advice of the Association of Anaesthetists of Great Britain and Ireland:

“If it is essential for the anaesthetist to leave the patient to deal with a life-threatening emergency nearby (which is a matter of individual judgement), he or she should instruct another person to observe the patient’s vital signs and should delegate overall responsibility to another registered medical practitioner”
Referrals to High-Risk Obstetric Anaesthetic Clinic

Women who suffer from any condition outlined below should be referred to the High-Risk Obstetric Anaesthetic Clinic. For optimal usage of available appointments, we recommend 30-minute appointments for conditions written in red and 15-minute appointments for those written in blue.

**Anticipated anaesthesia-related problems**
- History of difficult/failed intubation or an anticipated difficult airway
- Suxamethonium apnoea
- Complications during/after neuraxial blockade / previous traumatic experience
- Spine problems, e.g. congenital abnormalities, back surgery, trauma etc. (a minor/mild scoliosis of the lumbar spine doesn’t need referral!)
- Severe needle phobia
- Malignant hyperthermia and porphyria
- Anaphylaxis / anaphylactic shock, complex allergies
- Women who categorically refuse blood transfusion (usually Jehovah’s Witness)

**Cardiovascular Disease**
- Congenital heart disease, corrected or uncorrected
- Acquired heart disease: valvular lesions, ischaemic heart disease, cardiomyopathy
- Arrhythmias: congenital or acquired
- Diseases of the aorta (e.g. Marfan’s syndrome)

**Haematological Disease**
- Complex history of thromboembolism before or during pregnancy (Women on prophylactic Dalteparin do not need a referral!)
- Congenital coagulopathy (e.g. von Willebrand’s disease)
- Thrombocytopenia / thrombocytopenic coagulopathy
- Haemoglobinopathy (e.g. thalassaemia, sickle-cell disease)

**Neurological Disorders**
- Conditions that may interfere with neuraxial anaesthesia and analgesia
- Neuromuscular disease which may affect respiration (myasthenia gravis, muscular dystrophy or any other neuro-muscular disease)
- Other intracranial pathologies (e.g. AV-malformations, neoplasm)
- Previous history of stroke or intracranial bleeding or head trauma

**Respiratory Disease**
- Severe obstructive / restrictive lung disease (e.g. asthma, pulmonary fibrosis)
- Respiratory conditions requiring special care during pregnancy and childbirth
Renal Disease

- All women with impaired renal function / regular dialysis and / or after renal transplant

Endocrinological Disorders

- Poorly controlled or uncontrolled diabetes mellitus
- Acromegaly, Addison’s disease, pheochromocytoma
- Similar significant endocrinological disorders

Autoimmune Disorders

- Systemic Lupus erythematosus
- Systemic sclerosis (scleroderma)
- Antiphospholipid syndrome

Obesity

- BMI >40 kg/m² prior to pregnancy

Other

- Any other condition associated with significant pathophysiology

Inappropriate referrals (no appointment with an anaesthetist required!)

New: Women on antenatal thrombo-prophylaxis only (i.e. Dalteparin 5000 IU s/c OD, 5000 IU s/c BD for obese patients) and who don’t suffer from any of the above conditions don’t need to be referred to the clinic. These patients should be seen by the Maternal Medicine Midwife/Team who will also provide a leaflet regarding thrombo-prophylaxis and neuraxial analgesia and anaesthesia.

- Back pain which is not caused by any of the above-mentioned conditions (back pain without any neurological symptoms)
- Mild scoliosis of the lumbar spine (especially when previous epidural uneventful and ‘landmarks’ of lumbar spine easy to identify)
- Minor problems (mild hay fever, very mild asthma, ‘common allergies’)

Thank you very much for your co-operation!

Sarah Hammond
Frank Schroeder
Renate Wendler

St George’s Hospital 14/01/2013
(for review: January 2014)
Regional Analgesia for Labour

Ideally the woman should have received and read a printed information leaflet (OAA epidural information card) in her preferred language prior to consideration of epidural. (Currently this is not routinely done, but is something we are aiming for).

Epidural Analgesia for Labour

Aims

To provide adequate analgesia for labour without significant side effects. The ideal block relieves that component of pain for which she sought relief in the first place, and no more.

Response time

The time from the anaesthetist being informed about an epidural until they are able to attend should not normally exceed 30 minutes and must be within an hour except in exceptional circumstances (Document “exceptional circumstances” that lead to delays in the patients notes and explain this to the woman).

Preparation

- Take a history, specifically excluding contra-indications and obtain consent.
- Explain the procedure and associated risks and obtain a verbal consent from the patient. You can use the epidural information card provided.
- Risks that should be explained include absolute failure rate (1:1000) and partial failure/patchy block (1:10), accidental dural puncture rate, (ideally less than 1 in 250) and the remote risk of neurological damage (1:100 000 or less), which may be permanent. There is also a slightly higher risk for instrumental delivery and prolonged second stage of labour with epidural analgesia.
- Record this in the notes. There is some debate as to the validity of consent obtained in labour; ideally all women should have had the risks of the procedure explained to them beforehand. A desire by the anaesthetist to take written consent is merely an urge for self-protection, and serves no useful purpose for the mother. The midwife must document in the notes that the mother agrees to regional analgesia and it may be wise for the anaesthetist to sign these notes.¹
- Make sure that continuous electronic fetal heart monitoring (EFM) during

epidural insertion and during labour analgesia is available and attached. Consider STAN monitoring if external monitoring is difficult. If at any stage there are concerns about fetal well being, the procedure should be abandoned until a proper assessment is made of the fetal status. Discussions with the women and her companion during this period should be documented in the notes.

**Absolute contra-indications**

- Patient refusal
- Septicaemia
- Infection at site of insertion
- Coagulopathy / Thrombocytopenia (platelet count < 75 x 10⁹/l). Beware of a falling count over the past few days – always check the platelet count if this has occurred. If the platelet count is between 75 and 100 x 10⁹/l perform clotting studies before proceeding with the epidural.
- Raised intra-cranial pressure
- Haemorrhage and cardiovascular instability / hypovolaemia. There may be limited circumstances where an epidural may be appropriate in these circumstances, discuss with the consultant anaesthetist prior to inserting the epidural.
- Known allergy to amide (lignocaine-type) local anaesthetic solutions or opioids
- Ideally there should be sufficient staff for 1:1 monitoring and care of the mother during the duration of the block. Please inform the consultant obstetric anaesthetists at a suitable time when this does not occur.

Existing neurological deficits are not an absolute contra-indication to the placement of an epidural, but their presence and the extent of any pre-existing deficit must be recorded in the notes prior to the insertion of the epidural. Other relative contra-indications include previous spinal surgery or gross spinal deformity – explain to the woman that the block may be patchy due to the possibility of poor spread of the solution.

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Technique

1. Make sure that there is patent i.v. access (preferably a 16G cannula).
2. Position the patient (sitting or lateral) and assess the anatomy of the lumbar spine.
3. Full aseptic precautions (gown, gloves, hat and mask) are essential as well as preparation of the site with 0.5% chlorhexidine spray, which should be allowed to dry. Note that 0.5% chlorhexidine is provided as a single patient use only spray preparation. Additionally, sterile drapes should be used.
4. Once the patient is suitably positioned, infiltrate the skin with 1% lignocaine
5. Most authorities now advocate using loss of resistance to SALINE for identification of the epidural space. Use of air is associated with an increased incidence of dural tap and patchy block. Withdraw the stilette from the Tuohy needle and advance it slowly, utilising a continuous loss of resistance technique using normal saline. Always maintain tight control of the needle, even if the patient is moving.
6. When the epidural space is reached, detach the syringe. If a copious amount of fluid is leaking from the needle, replace the stilette and ask the midwife to get a blood glucose monitoring set. This is to exclude the possibility of a dural tap. If the fluid is positive for glucose, treat the insertion as a possible dural tap and abandon further attempts at siting the epidural in that space.

Distinction between saline and CSF can be made on the following grounds:

<table>
<thead>
<tr>
<th>CSF</th>
<th>Saline</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Temperature</strong></td>
<td>Warm</td>
</tr>
<tr>
<td><strong>Protein</strong></td>
<td>Present</td>
</tr>
<tr>
<td><strong>Glucose</strong></td>
<td>at least a trace</td>
</tr>
<tr>
<td><strong>PH</strong></td>
<td>≥7.5</td>
</tr>
</tbody>
</table>

7. If there is no obvious dural tap, thread the catheter through the Tuohy needle, aiming to leave about 4 – 5 cm in the epidural space. Never withdraw the catheter back through the Tuohy needle as this can lead to the catheter shearing and part of it being left within the epidural space.
8. If there is difficulty in threading the catheter, either inject more saline through the Tuohy needle and then try to thread the catheter, or get the patient to slightly straightened her legs or her back slightly, depending on the initial position chosen to site the epidural (sitting or lying). Never rotate the Tuohy needle once the epidural space has been located - this is associated with a higher incidence of dural puncture.

9. Securely attach the epidural filter to the epidural catheter. Firmly secure the epidural catheter in place, using Mefix or equivalent.

10. Using the standard mixture of bupivacaine 0.1% + fentanyl 2 μg /ml (low dose mixture) give the first dose slowly in divided boluses i.e. 7 and then 8 ml of the low dose mixture. If there are no signs of inadvertent intrathecal placement of the catheter, proceed with the chosen regimen.

11. The usual regimen is:
   - 10–20 ml 0.1% plain bupivacaine with fentanyl 2 μg / ml every half to one hourly p.r.n. as a titrated bolus. This dose should not lead to sudden motor block in the legs [< 5 min] unless the catheter is intrathecal. Accidental intravenous injection of 15 ml of LDM will not cause local anaesthetic toxicity - neither will it cause analgesia.

12. Every dose injected down an epidural catheter should be regarded as a test dose with the potential for high spread.

13. A combined spinal-epidural technique (CSE) can be used if the woman is extremely distressed.
   - In this situation a spinal dose of 2.5 ml of the standard epidural solution (bupivacaine 2.5mg and fentanyl 5 μg) or
   - 0.25% bupivacaine 1 ml + fentanyl 25 μg can be used

If you have difficulty in inserting an epidural after multiple attempts have been made, call for more experienced assistance. Do not persist in trying to site an epidural for more than 20 minutes.

The midwives will perform routine monitoring - fetal heart rate during and after the procedure, maternal pulse rate and blood pressure every five minutes for 15 minutes following the insertion and then half hourly. Similar observations should be performed after every top-up. The midwives will give a standard prescription for top-ups as detailed before. If no top-ups are required after this, observations shall be done half-hourly with hourly assessment of the level of the sensory block.

If a woman is not pain free after 30 minutes of epidural insertion and first top up, the anaesthetist should be contacted immediately. An anaesthetist should review women with routine epidural and no complications at least every four hours. This review should also include fluid management in labour.
An anaesthetist must give top-ups in the following situations:

- When the midwife is concerned about the level of the block
- When the anaesthetist is concerned about the block
- Where an unusual prescription has been ordered
- When there is a hypotensive episode (systolic blood pressure < 100 mmHg) after the previous top-up
- When analgesia is persistently inadequate
- After a suspected dural tap
- For operative interventions e.g. forceps deliveries, caesarean sections, perineal tear repairs

An anaesthetist should be informed about instrumental deliveries that are not performed in theatre where the epidural is topped up in the delivery room.

All women who have had an epidural must be followed up post-delivery.

**Epidural Top-up Procedure**

The midwives will predominantly give the top-ups.

1. Assess fetal well being → Continuous monitoring.
2. Assess the following prior to each top up
   - Level of block – if at T10 or below consider top-up (see dermatome chart)
   - BP and pulse
   - Patent IV line
   - Encourage mother to sit upright.
3. Wash hands and wear clean gloves.
4. Check premix epidural solution as prescribed by anaesthetist.
5. Administer epidural solution dose slowly.
6. Record BP, pulse rate and fetal heart rate at 5 minute intervals for a minimum of 15 minutes, longer if vital signs unstable. Thereafter half-hourly unless woman’s condition necessitates more frequent observations.
7. The woman must not be left unattended for at least 20 minutes following epidural top up.

**Reference**

Complications of epidurals

Whilst siting epidural

- Blood in catheter
- Paraesthesia or pain
- Dural puncture

Immediate

- Hypotension
- Inadequate block
- High blocks/subdural block/total spinal block
- Intravascular local anaesthetic / local anaesthetic toxicity

Delayed

- Dural tap and post dural puncture headache (PDPH)
- Neurological complications
- Drug related complications

COMPLICATIONS OF EPIDURAL ANALGESIA

Bloody tap

- If there is an obvious amount of blood leaking back down the catheter, it is safer to re-site the epidural at a different interspace.

- If once the epidural catheter is flushed with 0.9% saline and no further aspiration of blood is possible or no evidence of blood tracking back down the catheter is observed, judiciously give the first dose of the local anaesthetic solution slowly.

Paraesthesia or pain

- Transient paraesthesia while threading catheter may be expected but if it persists you must stop threading and withdraw the needle and the catheter together. If there is pain on injection of local anaesthetic you should not proceed.

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4Yentis S.M et al. in Analgesia, Anaesthesia and Pregnancy: A practical guide 2001;62
W.B.Saunders, London
Dural tap

- If unsure about the diagnosis, test the fluid for glucose as described earlier. If it is positive, or if the tap is obvious, remove the Tuohy needle.
- Re-site the epidural at a different interspace (preferred option) If a further tap occurs, consultant input MUST be sought.
- Only anaesthetists must give top-ups. Remember that in the presence of a meningeal tear the amount of local anaesthetic required for the resited epidural may be significantly less than for analgesia with intact meninges. This is particularly important if an epidural is being topped up with large doses of local anaesthetic for Caesarean section.
- Alternatively (less preferred option – major difficult back / multiple attempts), thread the catheter into subarachnoid space.
- If catheter tap, leave catheter in CSF. Make sure that the catheter/ filter is clearly labeled as subarachnoid.
- Intermittent (1-3 hourly) top ups of standard mix (0.1% bupivacaine +/- fentanyl 2 μg /ml) of 2 ml using a 2-ml syringe.
- No top-ups are to be given by midwives in this situation. All top-ups must be given by anaesthetists only.
- Make sure that the woman is regularly followed up post-delivery and that the consultant obstetric anaesthetist is informed at a suitable time.
- There is no evidence that women should have instrumental deliveries just because they have had a dural tap.
- We do not recommend prophylactic blood patch before a headache develops.
- Refer to protocol for management of Post Dural Puncture Headache.

Hypotension

- Ephedrine should always be kept available on the epidural trolley; Phenylephrine is available in the obstetric theatre fridge (already diluted in 100 ml Normal Saline 0.9%).
- Ephedrine or phenylephrine should be given if the systolic blood pressure falls to less than 80 mmHg or if there is maternal dizziness, fainting or sudden nausea.
- Small bolus doses of either drug should be given intravenously until a satisfactory result is achieved.
- Make sure that the woman is in the left lateral position, (thus avoiding aorto-caval compression) and administer appropriate fluids and supplemental oxygen via facemask.
Inadequate analgesia

Although regional analgesia is the most effective form of pain relief in labour it is not always perfect. If asked to review the block in a labouring woman:

- Assess the distribution of the block using ethyl chloride spray or ice
- Observe the woman during several contractions and try to establish the site and nature of the painful sensations

Problems and solutions

- **Missed segment** – Try a further 10-20 ml of low dose mixture or up to 10 ml of increased concentration of local anaesthetic e.g. 0.25% bupivacaine while lying on affected side.
- **Unilateral block** - (a) Pull catheter back so that 3 cm remains in space and try further dose. (b) Resite catheter at different space.
- **Patchy block** - Try stronger dose as above. Consider possibility of subdural block.
- **Persistent perineal pain** - Try bolus of fentanyl 50μg in 10 ml 0.9% saline or bolus of 10 ml 0.25% bupivacaine with the woman sitting.
- **Pain breaking through good block** - Consider possibility of uterine scar dehiscence (risk for women attempting VBAC – vaginal birth after Caesarean).

Important Points

- Always remember that the catheter may have worked its way out of the epidural space, especially if block was previously working well. If in doubt, check the insertion site for evidence of leakage.
- Ensure that parenteral opioids are not prescribed in an attempt to improve analgesia when epidural opioids have been administered.
- If adequate analgesia has not been established within 30 minutes of attending to troubleshoot persistent pain, the epidural should be resited.
- If the above approaches fail and the woman is still unhappy, seek senior help. Persistent pain should be managed with sympathy and explanation.
- If a woman labouring with an epidural is at significant risk of proceeding to Caesarean section, it is of paramount importance that she has a good block to allow establishment of effective surgical anaesthesia, if required.
- **Poor regional analgesia in labour predicts poor surgical anaesthesia. Have a low threshold for resiting a poor epidural in a woman at risk of Caesarean section.**
Subdural block

Aetiology
Separation of arachnoid from dura mater by epidural catheter. The subdural space has more potential capacity posteriorly and laterally. Since the arachnoid and dura mater are attached together on the ventral nerve root, the anterior nerve roots (which transmit motor and sympathetic fibres) are relatively spared. In contrast to the extradural space, which terminates at the foramen magnum, the subdural space extends cranially.

Characteristics

- Block spreading unexpectedly high over 20-30 minutes, sometimes as high as the cervical dermatomes
- Nasal stuffiness and Horner’s syndrome can develop
- Patchy sensory block, often with missed segments and persisting pain
- Relative sacral sparing
- Minimal motor block
- Blood pressure can be well maintained (severe hypotension is rare)
- Probably more frequent than originally thought (up to 2%)
- Have a high index of suspicion if an epidural block has a 'bizarre' distribution. Seek advice of senior anaesthetist

Management

- Since the arachnoid is easily torn, a subdural catheter may rupture through following a bolus dose, changing the block from a subdural to subarachnoid or even total spinal. In addition, post-dural puncture headache may follow. Therefore, the catheter should not be left in situ.
- Resite epidural at different site.
- If surgical anaesthesia required shortly after the diagnosis of a subdural block, consider a combined spinal epidural technique at another space if time permits. A small subarachnoid local anaesthetic dose can be supplemented by incremental epidural doses as necessary. If delivery is urgent, general anaesthesia is indicated.
High block

An unrecognised ‘dural tap’ or a catheter that migrates subsequent to insertion may result in a high block leading to difficulty with breathing particularly if the block reaches cervical level and causes diaphragmatic impairment. Total spinal can of course occur as a complication of spinal anaesthetics, either de novo or when performed after an epidural block.

Management

Your first concern should be to protect and secure the airway and prevent respiratory failure. High block can provoke great anxiety in the patient, which must not be confused with respiratory failure. Establish whether diaphragmatic weakness exists. If the diaphragm is not weak, then the patient will probably not need intubation. Advise her to take a breath in and out, and if she can do this counsel her that she is able to breathe. However, the situation may require immediate intubation or assisted ventilation.

- In the event that intubation is needed, you should intubate and ventilate the patient until the block has worn off, usually about two hours. Although muscle relaxation is not essential it is humane to provide amnesia and a routine rapid sequence induction of anaesthesia in theatre is the safest method of attaining ideal intubating conditions. Sedation can be maintained by the use of propofol.
- Prevent aorto-caval compression. Any hypotension must be treated.
- Fetal distress may indicate caesarean section, but otherwise a high block does not rule out a normal delivery. Prompt recognition and treatment of the condition should ensure that neither child nor mother come to any harm.

Total spinal

Precautions to avoid total spinal

- The epidural catheter should always be aspirated gently before giving any injection of local anaesthetic solution.
- Low dose mixture should be used whenever possible for top-up doses (10-15 ml). Total spinal with these doses is extremely unlikely.
- Following a suspected dural tap the anaesthetist must give all top-ups. The epidural catheter should be clearly labelled – anaesthetist top up only.

Signs of a total spinal

- Apnoea
- Profound Hypotension
- Unconsciousness
Management

- Increasing respiratory distress will precede apnoea. Turn the patient into the left lateral position and administer 100% oxygen. Assist ventilation if need with a bag and mask.
- Call for senior help and proceed to endotracheal intubation, if required. There is no need to give induction agents if the patient has already lost consciousness.
- Profound hypotension should be treated with rapid fluid infusions, ephedrine, phenylephrine or metaraminol. Bradycardia should be treated with atropine.
- Unconsciousness with dilated pupils should resolve spontaneously if the cardiovascular and respiratory systems are supported.
- Delivery by LSCS is usually indicated and the obstetricians should be involved at an early stage. Following resuscitation, senior anaesthetists and obstetricians should make the further management decisions.

Inadvertent Overdose of Local Anaesthetic

Systemic toxicity may occur with overdose of local anaesthetics, rapid absorption or intravascular injection.

Precautions to avoid LA overdose

- The epidural catheter should always be aspirated gently before giving any injection of local anaesthetic solution to exclude intravascular position.
- Only the premixed syringes with 20 ml of 0.1%/Bupivacaine + Fentanyl 2 μg / ml should be used on labour ward, no bags with local anaesthetic infusion.
- If there is barely any perceptible relief or NO evidence of pain relief after a top-up, consider the possibility of intravascular placement / injection and resite the epidural.

Signs of a Local anaesthetic overdose

- Metallic taste
- Dizziness/LOS
- Seizures
- Bradycardia, arrhythmia, cardiac arrest
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 LIQUID 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 LIQUID EMULSION** (following the regimen overleaf)
- Propofol is not a suitable substitute for lipid emulsion
- Lidocaine should not be used as an anti-arrhythmic therapy

4 Follow-up

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

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

Your nearest bag of Lipid Emulsion is kept... OBSTETRICS THEATRE 1 - FRIDGE

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This guideline is not a standard of medical care. The ultimate judgement with regard to a particular clinical procedure or treatment plan must be made by the clinician in the light of the clinical data presented and the diagnostic and treatment options available.

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IMMEDIATELY

Give an initial intravenous bolus injection of 20% lipid emulsion 1.5 ml.kg⁻¹ over 1 min
AND
Start an intravenous infusion of 20% lipid emulsion at 15 ml.kg⁻¹.h⁻¹

AFTER 5 MIN

Give a maximum of two repeat boluses (same dose) if:
• cardiovascular stability has not been restored or
• an adequate circulation deteriorates
Leave 5 min between boluses
A maximum of three boluses can be given (including the initial bolus)
AND
Continue infusion at same rate, but:
Double the rate to 30 ml.kg⁻¹.h⁻¹ at any time after 5 min, if:
• cardiovascular stability has not been restored or
• an adequate circulation deteriorates
Continue infusion until stable and adequate circulation restored or maximum dose of lipid emulsion given

Do not exceed a maximum cumulative dose of 12 ml.kg⁻¹

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

IMMEDIATELY

Give an initial intravenous bolus injection of 20% lipid emulsion 100 ml over 1 min
AND
Start an intravenous infusion of 20% lipid emulsion at 1000 ml.h⁻¹

AFTER 5 MIN

Give a maximum of two repeat boluses of 100 ml
AND
Continue infusion at same rate but double rate to 2000 ml.h⁻¹ if indicated at any time

Do not exceed a maximum cumulative dose of 840 ml

This AAGBI Safety Guideline was produced by a Working Party that comprised:
Grant Cava, Will Harrop-Griffiths (Chair), Martyn Harvey, Tim Masek, John Picard, Tim Short and Guy Weinberg.
This Safety Guideline is endorsed by the Australian and New Zealand College of Anaesthetists (ANZCA).

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Guidelines for Post Dural Puncture Headache

Diagnosis of Headache

Headache is common in the post-partum period, affecting up to 40% of all parturients.

Carrie and Collins define a PDPH as “a headache occurring after dural puncture that has a significant effect on the patient’s post-operative well-being i.e. a headache which is not only postural but also continues for more than 24 hours at any level of intensity or so severe at any time that the patient is unable to maintain an upright position”.¹

Symptoms

PDPH is classically occipito-frontal and often radiates to the neck and shoulders. Pain is exacerbated by sitting and standing, and alleviated by lying flat. Other associated symptoms include nausea, vomiting, hearing loss, tinnitus, vertigo, dizziness and paraesthesia of the scalp. Visual disturbances such as diplopia and cortical blindness have been described.⁴

Neurological symptoms may precede the onset of grand mal seizures. Subdural haematomas can occur as a result of dural puncture. Unless the headache is associated with postural features and a typical history can be obtained, other serious intracranial causes must be excluded. There should be a low threshold for involving other specialities (neurology, radiology) as part of a MDT approach.

Onset

Ninety per cent of headaches will occur within 3 days of the procedure ² and two-thirds within the first 48 hours ³. The headache can develop up to 14 days after the procedure, or very rarely it can occur immediately.

Diagnosis

Symptoms of a postural headache with a history of dural puncture are usually sufficient to make a diagnosis. Where doubt exists additional investigations may confirm the clinical findings. MRI scanning of the brain may demonstrate evidence of reduced CSF pressure. Myleography or thin-section MRI can be used to locate the source of the CSF leak¹².

Differential diagnoses of PDPH include: intracranial tumours, intracranial haematomas, pituitary apoplexy, cerebral venous thrombosis, migraine, chemical or infective meningitis, and non-specific headache.
Duration

72% of PDPH will resolve spontaneously within seven days\textsuperscript{4–5}. In a minority of patients the headache can persist, occasionally for months or years.

Treatment of PDPH

It is important to note that a large proportion of the literature regarding the treatment of PDPH is of poor quality, either due to small numbers of patients or inappropriate statistical analysis. The psychological impact of severe headache on a mother coping with a new baby cannot be underestimated. It is therefore of great importance to give the mother a thorough explanation of the reason for the headache, expected time course, and therapeutic options available. Regular review is essential. Consultant Anaesthetic input into the patient’s care should be sought at the earliest available opportunity.

Simple treatments and posture

There is no evidence to support bed rest, specific postures, or additional fluids above those required for maintenance, following PDPH\textsuperscript{6}. The patient should be encouraged to adopt the position, which they find most comfortable.

If the patient is not mobilising thrombo-prophylaxis should be considered.

Analgesics including paracetamol and NSAIDs, in conjunction with antiemetics, may control the symptoms and so reduce the need for interventional therapy\textsuperscript{13}. Opioids are controversial and probably do not provide any extra benefit. We recommend a regime of regular codydramol, six hourly, and diclofenac eight hourly, if not contraindicated.

Other pharmacological treatments

Many therapeutic agents have been tried, but all suffer from a lack of large, randomized, controlled clinical trials. Desmopressin (DDAVP) has no effect on PDPH following lumbar puncture\textsuperscript{14}, and the evidence for ACTH is inconclusive\textsuperscript{15}. Sumitriptan, the 5-HT\textsubscript{1D} receptor agonist and migraine treatment, has been used for PDPH but a controlled trial found no evidence of benefit\textsuperscript{16}. Similarly oral theophylline preparations have also found limited success\textsuperscript{11}.

Epidural saline and more recently, epidural dextran 40 have been used in the treatment of PDPH. Comparative trials with epidural blood patching are unable to demonstrate any long-term efficacy of either of these two solutions\textsuperscript{17}.

It has been concluded that caffeine is an effective therapy for PDPH\textsuperscript{18, 19}. The dose recommended for PDPH is 300-500mg of oral or i.v. caffeine once or twice daily.
However, therapeutic doses have been associated with CNS toxicity and atrial fibrillation. It can be considered for the treatment of PDPH where simple treatments are ineffective, and blood patching contraindicated. It should only be administered in an HDU setting. Patients should therefore be encouraged to drink caffeinated beverages.

**Epidural blood patch**

Despite the fact that a Cochrane systematic review of epidural blood patching concluded that ‘too few patients have been included in randomized trials to allow a reliable assessment of the potential benefits and harms of the technique’\(^7\), the high success rate and low incidence of complications have established it as the definitive treatment for PDPH.

The technique has a success rate of 70-98% if carried out more than 24 h after the dural puncture\(^8\). If a blood patch fails to resolve the headache, repeating the blood patch has a similar success rate.

Complications of the technique include immediate exacerbation of the symptoms and radicular pain. These symptoms do not persist and resolve with the administration of simple painkillers. Long term complications are very rare, but include back pain. There is no evidence that epidural blood patching reduces the efficacy of future epidural analgesia.

At present the evidence for prophylactic blood patching, i.e. blood patching prior to the onset of symptoms, is contradictory. For this reason it cannot be recommended at the present time.

**Guidelines for placement of epidural blood patch**

Epidural blood patch is used to manage a persistent, incapacitating dural puncture headache. Blood patching should normally be performed only after the first 24 h, as prior to this it is associated with lower success rates. Systemic infection and fever, infection on the back, coagulopathy and patient refusal are all contraindications to blood patching. The case must always be discussed with the appropriate anaesthetic consultant.

The procedure must be carried out in theatre. Two anaesthetists are required, one of whom should be a consultant.

1. Written, informed consent should be obtained from the woman following a careful explanation of the procedure. The discussion should also include the chances of success, significant side effects and the possibility of requiring a second blood patch (approximately 1 in 5).

2. The epidural space is located with a Tuohy needle, by the first anaesthetist,
the level of the supposed dural puncture, or an intervertebral space above or below. CSF may be present in the epidural space. 20 – 30 ml of the patient’s blood (provided by the second anaesthetist) is then injected into the epidural space over 30 – 60 seconds. Dull, lower back pain may limit the volume injected, although pausing for a few seconds or slowing the rate of injection may allow the full amount to be injected.

3. The second anaesthetist is responsible for drawing blood from the patient. As with the epidural, venepuncture must be carried out using a full aseptic technique. After cleaning and draping the skin of the antecubital fossa, the skin should be anaesthetized with local anaesthetic prior to the insertion of a 14 or 16 gauge cannula. This should be done when the epidural needle is sited.

4. It has previously been taught that samples of the blood should routinely be sent for culture. This is an area of much controversy, and is backed up by little evidence. There is no evidence for the routine use of prophylactic antibiotics following blood patch.

5. The epidural blood patch should be carried out in the obstetric theatre. Immediately following the procedure the patient should be taken to the recovery area for close observation. The patient is encouraged to lie still for one to two hours. After this time she can be transferred to the ward where she should be encouraged to walk.

6. It is important that the patient has repeated clinical assessment while an inpatient, although she may well go home the same day. Prior to going home, advice must be given regarding the need to contact labour ward or present to an Accident and Emergency department in the case of any complications. A thorough documentation in the hospital and maternity notes is essential. Specifically patients should be told about presenting features of cauda equina syndrome and epidural abscess. All patients should receive written information—(see PDPH leaflet within this guideline.)

Follow up for patients with PDPH

It is important that all patients with significant PDPH, from whatever cause or whether having received an epidural blood patch or not, should be followed up for at least three days by the obstetric anaesthetist on-call (via phone call once discharged). Patients should be offered an appointment at the high risk obstetric clinic after six weeks.
References
4. Vandam LD, Dripps RD. Long-term follow up of patients who received 10,098 spinal anaesthetics. JAMA 1956; 161: 586-91
Patient Pathway for Management of PDPH

N.B. All patients admitted should have FBC, CRP, urine dipstick +/- PET profile

Any patient with neurological deficit and/or abnormal vitals (BP/febrile), should be referred to the appropriate specialty asap and imaging considered

* If headache is debilitating, i.e. affecting childcare or daily activities of living, then epidural blood patch should be considered earlier
Headache after Childbirth leaflet
This information is only for patients with a dural puncture or suspected post dural puncture headache (PDPH). If you had an epidural or spinal anaesthesia during your labour or delivery and suffer from headache afterwards, you may have PDPH. Please read this information carefully. It explains what it is and what the symptoms are. It also tells you what to do if you are suffering from a suspected PDPH.

Headaches after childbirth
Headache is one of the most common complaints after childbirth. It affects up to 40% of all women. The period after delivery (the postpartum period) is characterised by many changes that may lead to headaches. These can include:

- Sleep deprivation (not enough sleep)
- Dehydration (not enough water and fluids)
- Irregular food intake (a change in eating habit)
- Stress
- Migraine (another form of headache)
- Hormonal changes
- Breast feeding.

What is a post dural puncture headache (PDPH)?
Less common causes of headaches after childbirth are those that may follow an epidural or spinal anaesthesia. The chance of this happening is about 1 in 250. This is the type of headache that we would like to highlight in this leaflet and is called a postdural puncture headache (PDPH) or spinal headache.

A postdural puncture headache can occur if the epidural needle or the catheter has gone in too far in your back. It can puncture the fluid filled sac around your spine. This is called the dura. The fluid is called cerebro-spinal fluid or CSF. As the fluid is connected to your brain, a constant leakage can cause the headache.

Leak

What does a PDPH feel like?
This headache may be severe and is typically worse on sitting up or standing and better on lying flat.

Other symptoms can also occur, for example:

- Nausea
- Vomiting
- Hearing loss
- Dizziness
• Ringing in the ears
• Double vision (seeing things double)
• Aversion to bright lights
(These are not always present).

If you develop **any** of the following symptoms, **please come immediately to the labour ward** and ask to see the obstetric anaesthetist:

- high temperature
- worsening headache with neck stiffness
- leg weakness
- you become incontinent of urine or stool.

It is very important that you look out for these symptoms as it may be a much more serious condition than a PDPH.

**What should you do if you think you have a PDPH?**

**Contact the Labour Ward direct on 020 8767 4654 and ask to speak to the obstetric anaesthetist on bleep 6392. Come directly to Labour ward if the headache is quite severe and explain that you might have a PDPH and they will contact the obstetric anaesthetist on-call to see you.**

**How can we treat PDPH?**

Initially we recommend regular painkillers, drink lots of fluid and caffeinated beverages (coffee, Coke) if possible.

Three quarter of these headaches will resolve after about a week. A small percentage will continue for up to six weeks and for sometimes longer on very rare occasions.

**How else can we help you?**

Your headache may be so serious that it affects how you care for your baby and other daily activities. If that happens, we may consider an ‘epidural blood patch’.

**What is an epidural blood patch?**

This is usually carried out more than 24 hours after the puncture has occurred. It is similar to the original epidural procedure. On this occasion we will take your own blood and inject it into the epidural space in your back to seal the leak.

The anaesthetist will clean the skin on your back with antiseptic solution. A separate area, usually on the arm, is also cleaned with antiseptic solution. We will inject local anaesthetic to numb the area in the back. After the anaesthetist has inserted the epidural needle, another doctor will draw about 25ml (about two tablespoons) of blood from your vein. The doctor will then gradually inject the blood until you feel pressure in your back. This injection can be painful for a short moment.

**What happens next?**

In the majority of cases, there will be immediate relief of the headache but occasionally this can take 24 hours. Lie on your back for about 1 hour after the epidural blood patch. You may be able to go home later on the day or the next morning if your headache has improved.

- Do not carry anything heavier than the baby for 2 to 3 weeks.
- Squat rather than bend when picking items in a low position.
- Avoid excessive straining

All of the above can cause ‘patch blow-out’ with return of the headache.
Please **come to the hospital immediately** if you develop:
- severe back pain
- a high temperature
- worsening headache with neck stiffness
- leg weakness
- incontinence of urine or stool.

**What are the risks of the epidural blood patch?**
As with any procedure, there are some risks and side effects you should know about. The anaesthetist will visit you and explain the procedure in detail. You will also have the opportunities to ask questions.

**Commonly encountered side effects are:**
- Increased pain from the injection (usually temporary)
- Inadvertent puncture of the “sac” containing spinal fluid (may not relieve your headaches)
- Infection (very rare)
- Bleeding (very rare)
- Nerve damage (very rare)
- No relief from your headache. 1 in 10 women may require a second epidural blood patch.

**Any questions or worries?**
If you have any further questions please ask your midwife to contact the obstetric anaesthetist on-call.

**Contact details:**  
**Obstetric Anaesthetist on duty**

Telephone: 020 8767 4654; Bleep 6392

Obstetric Anaesthesia SGH  
PDPH Leaflet/September 2009Wendler/Iqbal/Bailey
Protocol for use of Remifentanil Analgesia

Brief description of the drug
Remifentanil is a fast-acting potent opioid, which undergoes rapid metabolism by non-specific tissue esterases. It is ideally suited for use in obstetric situations because of its potency and subsequent rapid degradation without any accumulation. It is envisaged that it would be prescribed for women requiring analgesia, in whom neuraxial analgesia is contra-indicated e.g. thrombocytopaenia.

Licensed indications for use
Supplementation of general anaesthesia during induction and analgesia during maintenance of anaesthesia, by continuous infusion. ¹

Dosage Regimen
A solution of 5 milligrams remifentanil is made up with normal saline to a total volume of 50 millilitres, resulting in a final concentration of 100 micrograms per milliliter. The drug is to be administered via a patient controlled analgesia device (PCA) programmed with the following settings:

- Bolus dose – 0.5 micrograms per kilogram, lockout period 2 minutes, hourly limit 1 milligram.

The PCA is connected to an intravenous infusion that has a one-way valve in place in order to prevent the backtracking of any solution into the lower resistance circuit. This is to prevent the administration of an unexpectedly large bolus dose.

Monitoring
- Continuous pulse oximetry, CTG or STAN.
- Half-hourly respiratory rate, pulse and blood pressure.

Criteria for stopping
- Criteria for stopping the PCA would include unresponsiveness to verbal commands, respiratory rate of less than 8 breaths per minute, severe vomiting unresponsive to an anti-emetic, fetal distress and maternal request for the device to be removed.

Inform the anaesthetist immediately

Unwanted effects and contra-indications
Unwanted effects: Sedation, nausea, itching, respiratory depression.
Contra-indications: Allergy/anaphylaxis to opiate drugs.

¹ British National Formulary 40, September 2000, page 578
Interactions

Increased effects if administered with other sedative drugs.

Prescriber restrictions

Anaesthetic staff working in the obstetric unit only.

Advice to patients

See attached Patient Information Sheet.
Patient information leaflet - Remifentanil
Patient-Controlled Analgesia (PCA) in labour

This information sheet is for pregnant women who have been told by their doctor that they cannot have an epidural catheter for the treatment of labour pain.

**Why might I not be able to have an epidural during my labour?**
Common reasons can include:
- Bleeding disorders (inability of blood to clot normally)
- Previous surgery to the spine
- Infection

The doctor will explain to you why you may not be suitable for an epidural during labour.

**What is remifentanil?**
Remifentanil is a strong painkiller that belongs to the same family of drugs as pethidine and morphine. These are called opioid drugs. In contrast to pethidine and morphine it works very quickly and is broken down rapidly by the body. This minimizes long lasting unwanted side effects.

**How is remifentanil used to relieve pain in labour?**
Remifentanil pain relief is administered directly into the vein via a patient controlled administration (PCA) system. It requires you to have a cannula (also known as a line or drip) sited. A cannula is commonly inserted for women in labour regardless of the type of pain relief that they have. To receive the remifentanil pain relief your cannula is connected to a special pump. You control the pump by pressing a button to give yourself a dose of painkiller whenever you need it. The pump has built in safety features that prevent you from accidentally giving yourself too much. Your midwife or anaesthetist will show you how to use the pump for best effect.

You can use remifentanil pain relief for the entire duration of your labour. You midwife will ask how much pain you are experiencing. The dose you require may need to be increased as you labour progresses.
If you wish you can continue to use Entonox and a TENS machine.

**What are the side effects?**
Common side effects of remifentanil can include nausea and sickness, itching, drowsiness and slowing of your breathing rate. Your midwife will monitor you for side effects by regularly measuring your
- Heart rate
- Blood pressure
- Oxygen levels with a finger clip

Your baby will also be monitored continuously.
Is it safe for my baby?
Remifentanil is very rapidly broken down by your body. This means the amount which passes to your baby is extremely small. No scientific studies have shown that remifentanil causes serious side effects or harm to babies. It has been used safely for many years in the UK to provide pain relief for women in labour. As it is impossible to perform controlled drug studies in pregnant women, remifentanil is not officially licensed for use in labour in the UK; however, it is used routinely for labour pain in many other European countries. It is also a drug that can be given safely to new born babies and children.
We hope that this has answered your questions. The anaesthetist on labour ward will be happy to talk to you about remifentanil PCA and answer any questions that you have. Please ask if you have any questions or concerns.

For review August 2015.
Oral Intake in Labour

Introduction
Labour causes an unpredictable delay in gastric emptying and this is markedly potentiated by opiates. All pregnant women in labour are considered to have a full stomach putting them at risk of acid aspiration when they are unconscious during general anaesthesia. Fasting may result in dehydration and acidosis but other than unnecessary discomfort, there is very little evidence that a policy of ‘nil per os’ causes other harm.

Maternal intravenous hydration using 5% and 10% dextrose solutions has been shown to result in rebound neonatal hypoglycaemia, jaundice and lactic acidosis. Oral intake of clear fluids reverses the biochemical markers associated with fasting and provides some maternal comfort. Isotonic drinks may be more beneficial than water. Limited evidence suggests that a light diet or fluid carbohydrate intake in labour may reduce ketone body production. However, the volume of stomach contents may increase, with the risk of the woman being sick.

Low risk labour
• A light diet may be offered in established labour. Isotonic drinks may be more beneficial than water.
• Once opiates have been administered or other risk factors develop that make general anaesthesia more likely, clear fluids only.

High risk labour (e.g. IOL, slow progress, VBAC, Twin delivery, opioids in labour, epidural analgesia)
• Once the mother is in established labour, she should drink only clear fluids. Isotonic drinks may be more beneficial than water.
• Ice cubes can be offered to ease dry mouths caused by breathing entonox.

References
1. NICE Guidelines Intrapartum Care 2007
3. Kenepp W, Sheeley WC. Fetal and neonatal hazards of maternal hydration with 5% dextrose before Caesarean section. The Lancet 1:1150-1152, 1982
7. Reid J. Fasting in labour. Guideline -The Queen Mother’s Hospital Women & Children’s Division, Greater Glasgow and Clyde NHS, 2006
RISK: There is a potential that in performing a regional block in a patient with a clotting disorder, trauma to the epidural veins may cause an expanding spinal or epidural haematoma with the potential for permanent neurological damage.

SPECIFIC CIRCUMSTANCES:

- **Aspirin Therapy.** Low dose aspirin may affect platelet function for 7 – 10 days from the time of administration. The evidence now seems to suggest that regional anaesthesia is safe in patients on low dose aspirin.

- **Low dose unfractionated heparin.** This is prescribed antenatally for those with a proven DVT or who are at high risk for thromboembolic disease. It is designed not to have an effect on the clotting times and is thought to be safe. Low dose heparin should not be given within 6 hours of insertion or removal of an epidural catheter. Ideally, a spinal should not be performed within six hours of low dose heparin administration.

- **Low molecular weight heparin (LMWH).** This therapy requires more caution. It is important to distinguish whether it is being used as at a prophylactic or therapeutic dose.
  - **Prophylactic doses** – the insertion of a regional block should be performed twelve hours after a dose has been given and similarly epidural catheter should be removed twelve hours after the dose of LMWH has been given and at least two hours before the next dose.
  - **Therapeutic doses** – insertion of the regional block should not be done for at least 22 hours post the dose having been given. Ideally anti–Xa assays should be performed.

- **Pre-eclampsia** The same principles apply to thrombocytopenia due to other causes. Beware of a downward trend. Check the platelet count:
  - If >100 x 10⁹ /l proceed
  - If >75 x 10⁹ /l check clotting and proceed if normal
  - If <75 x 10⁹ /l do not perform regional technique
### Table 3 - Relative risks related the performance of neuraxial blocks in obstetric patients with abnormalities of coagulation

<table>
<thead>
<tr>
<th>Normal Risk</th>
<th>Increased Risk</th>
<th>High Risk</th>
<th>Very High Risk</th>
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<tbody>
<tr>
<td><strong>Pre-eclampsia</strong></td>
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<tr>
<td>Platelets &gt;100 within 6 h</td>
<td>Platelets 75-100 stable and normal coagulation tests</td>
<td>Platelets 75-100 falling and normal coagulation tests</td>
<td>Platelets &lt;75 or abnormal coagulation tests with indices ≥1.5 or HELLP</td>
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<tr>
<td><strong>Idiopathic thrombocytopenia</strong></td>
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<tr>
<td>Platelets &gt;75 within 24 h</td>
<td>Platelets 50-75</td>
<td>Platelets 20-50</td>
<td>Platelets &lt;20</td>
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<tr>
<td><strong>LMWH</strong></td>
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<tr>
<td>Prophylactic does &gt;12 h</td>
<td>Prophylactic dose 6-12 h</td>
<td>Prophylactic dose &lt;6 h</td>
<td>Therapeutic dose &lt;6 h</td>
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<tr>
<td>Therapeutic dose &gt;24 h</td>
<td>Therapeutic dose 12-24 h</td>
<td>Therapeutic does 6-12 h</td>
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<tr>
<td><strong>UFH - infusion</strong></td>
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<tr>
<td>Stopped &gt;6 h and APTTR ≤1.4</td>
<td></td>
<td>APTTR 1.4 – 1.7</td>
<td>APTTR &gt;1.7</td>
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<tr>
<td><strong>UFH – prophylactic bolus dose</strong></td>
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<tr>
<td>Last given &gt;6 h</td>
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<td>APTTR 1.4 – 1.7</td>
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<tr>
<td><strong>NSAID + aspirin</strong></td>
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<tr>
<td>Without LMWH in addition</td>
<td>With LMWH dose 12-24 h</td>
<td>With LMWH dose &lt;12 h</td>
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<tr>
<td>Warfarin</td>
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<td>INR ≤1.4</td>
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<tr>
<td><strong>IUFD</strong></td>
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<tr>
<td>FBC and coagulation tests normal within 6 h</td>
<td>No clinical problems but no investigation results available</td>
<td>With abruption or overt sepsis</td>
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<tr>
<td><strong>Cholestasis</strong></td>
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<tr>
<td>INR ≤1.4 within 24 h</td>
<td>No other clinical problems but no investigation results available</td>
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**Abbreviations:**
- GA = General Anaesthetic, LMWH = low molecular weight heparin, NSAID = non-steroidal anti-inflammatory drug, FBC = full blood count, UFH = unfractionated heparin, APTTR – activated partial thromboplastin time, INR = international normalised ratio, IUFD = intra-uterine fetal death
Table 1 – Recommendations relating to drugs used to modify coagulation

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<tr>
<td>UFH s.c. prophylactic</td>
<td>&lt;30 min</td>
<td>1-2 h</td>
<td>4 h and normal APTT</td>
<td>1 h</td>
<td>4 h and normal APTT</td>
<td>1 h</td>
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<td>UFH i.v. treatment</td>
<td>&lt;5 min</td>
<td>1-2 h</td>
<td>4 h and normal APTT</td>
<td>4 h</td>
<td>4 h and normal APTT</td>
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<td>LMWH s.c. prophylactic</td>
<td>3-4 h</td>
<td>5-7 h</td>
<td>12 h</td>
<td>4 h</td>
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<td>24 h</td>
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<td><strong>Heparin alternatives</strong></td>
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<td>Lepirudin</td>
<td>0.5-2 h</td>
<td>2-3 h</td>
<td>10 h</td>
<td>4 h</td>
<td>10 h</td>
<td>4 h</td>
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<tr>
<td>Desirudin</td>
<td>0.5-2 h</td>
<td>2-3 h</td>
<td>10 h</td>
<td>4 h</td>
<td>10 h</td>
<td>4 h</td>
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<tr>
<td>Bivalirudin</td>
<td>5 min</td>
<td>25 min</td>
<td>10 h</td>
<td>4 h</td>
<td>10 h</td>
<td>4 h</td>
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<tr>
<td>Argatroban</td>
<td>&lt;30 min</td>
<td>30-35 min</td>
<td>4 h</td>
<td>4 h</td>
<td>2 h</td>
<td>2 h</td>
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<td>Fondaparinux*</td>
<td>1-2 h</td>
<td>17-20 h</td>
<td>&gt;36 h</td>
<td>12 h</td>
<td>43 h</td>
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<td><strong>Antiplatelet drugs</strong></td>
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<tr>
<td>NSAIDs</td>
<td>1-12 h</td>
<td>1-12 h</td>
<td>Not relevant</td>
<td>No additional precautions</td>
<td>No additional precautions</td>
<td>6 h</td>
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<td>Aspirin</td>
<td>12-24 h</td>
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<td>Irreversible effect</td>
<td>7 days</td>
<td>After block performance</td>
<td>7 days</td>
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<tr>
<td>Clopidogrel</td>
<td>12-24 h</td>
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<td></td>
<td>No additional precautions</td>
<td>After block performance</td>
<td>10 days</td>
</tr>
<tr>
<td>Ticlopidine</td>
<td>8-11 days</td>
<td>24-32 h but 90 h in chronic use</td>
<td>10 days</td>
<td>After block performance</td>
<td>10 days</td>
<td>6 h</td>
</tr>
<tr>
<td>Tirofiban</td>
<td>&lt;5 min</td>
<td>4-8 h</td>
<td>8 h</td>
<td>After block performance</td>
<td>8 h</td>
<td>After catheter removal</td>
</tr>
<tr>
<td>Epifibatide</td>
<td>&lt;5 min</td>
<td>4-8 h</td>
<td>8 h</td>
<td>After block performance</td>
<td>8 h</td>
<td>After catheter removal</td>
</tr>
<tr>
<td>Abciximab</td>
<td>&lt;5 min</td>
<td>24-48 h</td>
<td>48 h</td>
<td>After block performance</td>
<td>48 h</td>
<td>After catheter removal</td>
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<tr>
<td>Dipyridamole</td>
<td>75 min</td>
<td></td>
<td>10 h</td>
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<td></td>
<td>6 h</td>
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<tr>
<td><strong>Oral anticoagulants</strong></td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>Warfarin</td>
<td>3-5 days</td>
<td>4-5 days</td>
<td>INR ≤ 1.4</td>
<td>After catheter removal</td>
<td>INR ≤ 1.4</td>
<td>1 h</td>
</tr>
<tr>
<td>Rivaroxaban*</td>
<td>3 h</td>
<td>7-9 h</td>
<td>11 h</td>
<td>After catheter removal</td>
<td></td>
<td>*</td>
</tr>
<tr>
<td>Dabigatran*</td>
<td>0.3-1.0 h</td>
<td>12-17 h</td>
<td>36 h</td>
<td>After catheter removal</td>
<td>6 h</td>
<td>*</td>
</tr>
<tr>
<td><strong>Thrombolytic drugs</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alteplase, anistreplase</td>
<td>&lt;5 min</td>
<td>4-24 min</td>
<td>Contraindicated</td>
<td>Contraindicated</td>
<td>Not applicable</td>
<td>10 days</td>
</tr>
</tbody>
</table>

Notes: The data used to populate this table are derived from the German guidelines adopted by ESRA [2], the ASRA guidelines [1] and data presented by drug manufacturers. Ticlopidine no longer has a UK licence. These recommendations relate primarily to neuraxial blocks.

Abbreviations:
- UFH = unfractionated heparin, APTT = activated partial thromboplastin time, LMWH = low molecular weight heparin, s.c. = subcutaneous, i.v. = intravenous, NSAIDs = non-steroidal anti-inflammatory drugs, INR = international normalised ratio
- * Manufacturer recommends caution with use of neuraxial catheters
- † Manufacturer recommends that neuraxial catheters are not used

(Regional Anaesthesia in Patients with Abnormalities in Coagulation A guidance document produced by a Joint Working Party of the: Association of Anaesthetists Of Great Britain & Ireland (AAGBI) Obstetric Anaesthetists’ Association (OAA) Regional Anaesthesia UK (RA–UK) 2011)
Patient information leaflet – Anticoagulation and pain relief in labour with epidural analgesia

This information sheet is for pregnant women who have 'blood thinning' (anticoagulating) injections to prevent blood clots during pregnancy.

Why do I need injections to prevent blood clots?

Pregnancy is a time where blood clots form more easily - a natural change to protect mothers from bleeding during childbirth. This is why every pregnant woman is assessed for the risk of developing blood clots at the time of booking with the hospital. Depending on your personal risk factors, you might have been told to inject 'blood thinning' (anticoagulating) drugs such as Fragmin© or Clexane©.

Why can this affect my options for pain relief in labour?

The effect of any anti-coagulating drug is to make blood clot less easily. If you have an epidural for pain relief, you will need an injection in your back to place a fine plastic catheter into your epidural space. To avoid bleeding complications, this can only be done safely 12 hours after your last Fragmin© or Clexane©.

What should I do if I go into labour?

If you think your labour has started or if your waters have broken, do not give yourself the injection. Come to the labour ward to be assessed by a midwife. After this assessment you will be advised whether to take your injection or not.

What happens if I cannot have an epidural?

There are other methods for pain relief, for example a different injection or through a drip. If you are admitted to the labour ward, the anaesthetist on duty can advise you when you can have an epidural and will be happy to answer any questions that you might have. You can also ask your midwife to refer you to the anaesthetic clinic if you would like to discuss any question in detail.

Department of Anaesthesia, St. George’s Hospital, London,
Tel. 020 8725 0051
For review September 2015.
**Acid Aspiration Prophylaxis**

**Aims**

Obstetric patients having caesarean sections are at risk of acid aspiration. Antacid prophylaxis aims to reduce the acidity of the mother’s gastric contents prior to an anaesthetic intervention.

**Elective Procedures**

- Ranitidine 150 mg orally the night before
- Ranitidine 150 mg and metoclopramide 10 mg orally two to four hours before the procedure
- 30 ml of a 0.3M sodium citrate solution orally immediately before the procedure.

**Emergency Procedures**

- If no ranitidine has been administered during the labour, 50 mg i.v. should be given as soon as the decision is made to operate. (Note this should be diluted up into 20 ml with normal saline as bolus administration of ranitidine has been associated with cardiac arrhythmias)
- Additionally, metoclopramide 10 mg i.v. should be given.
- 30 ml of a 0.3M sodium citrate solution orally immediately before the procedure.

Routine antacid administration should be considered in the following high-risk groups:

- Multiple pregnancy
- Breech presentation
- Meconium stained liquor
- Slow progress
- Oxytocin infusion in labour
- Fetal distress
- Prematurity less than 36 weeks / IUGR
- APH
- Previous LSCS
- Pregnancy induced hypertension
- BMI >35 kg/m²
- Diabetes
Perioperative Fasting

Women having elective C/S must not have any food or milky drinks after **02:00 a.m.** on the morning of surgery. After 02:00 a.m., they may continue to drink water (clear fluids) until **06:00 a.m.** on the morning of surgery. They should bring a bottle of still water on the day of admission.

Some women may continue to drink a little longer. They will be informed when they arrive on the day of admission. (Women who may drink because surgery is delayed for more than 2 hours should be informed about what time they must stop and this should be documented).

Classification of urgency of Caesarean Section

The urgency of CS is determined using the following standardised scheme:

1. immediate threat to the life of the woman or fetus
2. maternal or fetal compromise which is not immediately life-threatening
3. no maternal or fetal compromise but needs early delivery
4. delivery timed to suit woman or staff

Decision to delivery interval (DDI) for unplanned CS

Perform category 1 and 2 CS as quickly as possible
Perform category 2 CS in most situations within 75 minutes of the decision

In addition, the Royal College of Anaesthetists proposes the following audit standards:

- ≥ 90% category 1 CS have DDI ≤ 30 min
- ≥ 90% category 2 CS have DDI ≤ 75 min

Choice of anaesthesia

The choice of anaesthesia for LSCS rests with the competent mother. Information for mothers is available in a variety of formats via the OAA website. The type of anaesthesia used is audited continuously and the results monitored annually against the Royal College of Anaesthetists’ proposed audit standards. These are as follows:

<table>
<thead>
<tr>
<th>Category</th>
<th>4</th>
<th>1-3</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>CS Carried out with RA</td>
<td>&gt;95%</td>
<td>&gt;85%</td>
<td>&gt;50%</td>
</tr>
</tbody>
</table>

Reference


Click here for contents
Planning

In order to allow for Lanesborough recovery staff planning, please liaise with the nurse in charge of recovery each morning. The anaesthetist covering the elective list is probably best placed to do this. Informing recovery of expected obstetric theatre case load, both elective and anticipated non-elective, will help to avoid delays in acceptance of post-operative obstetric cases. In particular, highlight any GA cases or cases with special post-operative requirements. Early communication with recovery is also extremely important out of hours.
Epidural Anaesthesia for Caesarean Section / Instrumental Delivery in Theatre

Aims
To provide anaesthesia during surgery or instrumental delivery, whilst the patient is awake.

Technique
1. Take an adequate anaesthetic history pre-operatively, document this in the preoperative assessment page in the anaesthetic chart and exclude any contraindications.

2. Warn the patient of possible sensation that she may feel during the procedure (i.e. tugging, pushing and pulling). Reassure her that she may require further methods of pain relief during the operation and that she can opt for a GA during the procedure at any time, should the block be insufficient to proceed with the surgery.

3. If a patient is on a Syntocinon infusion during labour and needs to be transferred to theatre, disconnect the infusion before taking it out of the IVAC pump. The infusion can be taken to theatre and can be reattached if necessary. NEVER connect a Syntocinon infusion that is not running via an IVAC infusion pump.

4. Check the anaesthetic machine and that any drugs that may be required are readily available.

5. Make sure that adequate antacid prophylaxis is given, ranitidine 50 mg i.v. and metoclopramide 10 mg i.v. immediately before the procedure for emergencies or oral ranitidine 4 - 6 hours before elective procedures.

6. Acceptable top up solutions for epidural caesarean sections in this labour ward are:
   - Plain bupivacaine 0.5% 15-20 ml +/- fentanyl 75 - 100 μg (depending on whether the woman has received opiates during her labour).
   - 2% Lidocaine 10 ml with 10 ml 0.5% plain bupivacaine
   - We would strongly advise against the addition of either bicarbonate or adrenaline to the solution.5

7. Patient should be monitored with a minimum of continuous 3 lead ECG, pulse oximetry and non-invasive blood pressure every 3 minutes.

8. Phenylephrine is the vasopressor used to manage hypotension, given in 50 - 100 microgram bolus doses or via infusion (100 μg/ml) titrated against the blood pressure.

9. Remember that it is important to fully document the following prior to starting the procedure:
   - The time of the epidural top-up
   - The method used for testing the extent of the block – should include two different modalities i.e. cold and light touch
   - The upper level of the block
   - The lower level of the block
   - The degree of motor block

10. Do not start surgery until the following are present:
    - Bilateral sympathetic block (warm, dry feet)
    - Bilateral motor block
    - Sacral sensory block – no sensation to cold on perineum or feet
    - Upper level of block to T4 bilaterally
    If the block has not reached T4 by the start of the surgery, give a further 10 ml of 0.5% plain bupivacaine

11. Give i.v. Cefuroxime 1.5 g (i.v Clindamycin 600 mg if allergic to Penicillin) before knife to skin.

12. Immediately after delivery in LSCS give 5 i.u. oxytocin i.v. slowly and commence 40 units oxytocin infusion. 40 units Syntocinon is added to 500 ml 0.9% saline and run over four hours.

13. After instrumental delivery discuss with obstetrician regarding use of syntometrine or syntocinon.


15. If additional anaesthesia is required peri-operatively, consider giving further top-ups of 0.5% bupivacaine 5–10 ml, intravenous alfentanil (250 μg aliquots up to a total of 1 mg) and/or nitrous oxide by facemask. Ketamine 10 mg i.v. may also be given but should be used with caution and only after the baby is delivered.

17. If no contra-indications give diclofenac 100 mg P.R. at the end of the procedure (see post–operative pain relief guidelines).

18. Accompany the patient and hand over to recovery staff.
Spinal Anaesthesia for Caesarean Section / Instrumental Delivery in Theatre.

Aims
To provide complete pain relief during surgery whilst maintaining the patient awake. Spinal anaesthesia is useful for a variety of procedures including caesarean section, manual removal of the placenta and instrumental delivery.

Advantages
- Avoids the hazards of inhalation of gastric contents and failed intubation during GA
- Reduces blood loss
- Minimises neonatal depression
- Enables partners to participate in the birth process

Technique
1. Take an adequate history pre-operatively, excluding any contra-indications. Warn the patient of a small failure rate and also the small possibility of a post dural puncture headache.
2. Check all drugs as well as the anaesthetic machine, as for a general anaesthetic.
3. Routine antacid therapy as before.
4. Full aseptic precautions (gown, gloves, hat and mask) are essential as well as preparation of the site with 0.5% chlorhexidine spray which should be allowed to dry. Note that 0.5% chlorhexidine is provided as a single patient use only spray preparation. Note that this is provided as a single patient use only preparation. Additionally, sterile drapes should be used.
5. Consider a CSE if the procedure is anticipated to be prolonged (e.g. repeat LSCS)
6. Infiltrate skin with 1% lignocaine solution (3 – 5 ml)
7. Identify L3/L4 interspace
8. Once clear CSF is obtained, inject 2.0 – 2.8 ml 0.5% heavy bupivacaine with an opiate added (diamorphine 0.25 mg – preferred if available or fentanyl 20 μg).
9. Remember to avoid aorto-caval compression and maintain lateral tilt at all times. As soon as the mother is positioned into the left lateral position the side rail for the operating table is to be used to keep the patient in a stable position.
10. Blood pressure should be monitored every minute for the first twenty minutes
following the intrathecal injection.

11. Maternal hypotension should be avoided and treated aggressively. Maternal dizziness/ fainting/ nausea/ vomiting or sudden tachycardia are almost always due to hypotension. **Phenylephrine is the vasopressor used to manage hypotension, give 50-100 microgram bolus doses or via infusion (100 μg /ml) titrated against the blood pressure.**

12. Remember that it is important to fully document the following prior to starting the procedure

- The time of the intrathecal injection
- The method used for testing the extent of the block — should include two different modalities i.e. cold and light touch
- The upper and lower levels of the block
- The degree of motor block

13. If the block is inadequate try head down tilt or turning the patient onto the opposite lateral side (this will help to spread intrathecal anaesthetic solution).

14. Do not start surgery until the following are present:

- Bilateral sympathetic block (warm, dry feet)
- Bilateral motor block (just able to move feet, not legs)
- Dense sacral sensory block – no sensation to cold on perineum or feet
- Upper level of block to T4 bilaterally

**IF THE SPINAL ANAESTHESIA IS UNSATISFACTORY AT ANY STAGE, THE PATIENT SHOULD BE GIVEN THE OPTION OF HAVING A GENERAL ANAESTHETIC.**

15. Give i.v. Cefuroxime 1.5 g (i.v Clindamycin 600 mg if allergic to Penicillin) before knife to skin.

16. Post–delivery give 5 units oxytocin slowly i.v. if no contra-indications, followed by a 10 units / hour oxytocin infusion (40 units oxytocin are added to 0.9% Saline 500 ml and run over four hours via an infusion pump).

17. At the end of the procedure, give diclofenac 100 mg P.R. (see post–operative pain relief guidelines).

18. Accompany the patient and hand over to recovery staff.
General Anaesthesia for Caesarean Section

Aims

To provide optimal surgical conditions in women requiring an operative procedure, whilst aiming for the best neonatal outcome.

Technique

Preparation

1. Take an adequate pre-operative history and examine the patient, noting any possible difficulties in intubation.
2. Explain the procedure including pre-oxygenation and cricoid pressure, and exclude any contra-indications.
3. Prescribe/administer appropriate antacids as per guidelines.
4. Request presence of second anaesthetist (this may not always be possible)
5. The emergency caesarean section drugs should be in the fridge and should have been checked at the beginning of your shift in the labour ward.
6. Ensure that you are familiar with the Obstetric Failed Intubation Guidelines.
7. Check all anaesthetics equipment (bougie, laryngoscopes-including short handle, and endotracheal tubes-including smaller ETT) as well as the anaesthetic machine.
8. Choose rescue airway device (classical LMA; if trained: ILMA or Pro-seal) and have ready and checked on airway trolley. Inform ODA of your Airway PLAN B.

Induction

9. Establish adequate i.v. access, if not already sited, and place the patient in a left lateral tilt. This should be maintained until delivery.
10. Establish monitoring as used for all general anaesthetic cases.
11. Optimise head/neck position.
12. The surgeons should be ready and the abdomen cleaned and ready for surgery.
    Knife to skin must not commence until the airway is secured. This should be communicated with the surgeon prior to induction.
13. Perform a rapid sequence induction:
    - Adequate pre-oxygenation – at least 3 minutes of breathing 100% oxygen. Make sure that the capnograph is attached and that you are obtaining a good trace whilst performing pre-oxygenation – this will also allow you to gauge the end tidal oxygen concentration to ensure adequacy of your pre-oxygenation.
    - Adequate sleep dose of thiopentone and cricoid pressure, followed by suxamethonium 1.5 mg/kg – 2 mg/kg.
• Intubate the patient.
15. Ventilate with 2% isoflurane in 50:50 oxygen: nitrous oxide mixture for the first minute in order to decrease the chance of awareness. This can then be reduced to 1% or less for the rest of the procedure.

Maintenance/Delivery
16. Do not hyperventilate the mother pre-delivery; this can lead to a decrease in placental perfusion and fetal oxygenation.
17. Immediately after delivery give the woman 5 units oxytocin i.v. and commence Oxytocin infusion 40 units/500 ml at 10 units/hour (unless the surgeon declines).
18. The inspired oxygen concentration can also be reduced to 30% at this stage.
19. Ask the surgeon whether they would like the left lateral tilt removed.
20. Administer supplemental analgesia, e.g. morphine 10 – 15 mg i.v., i.v. Paracetamol and PR Diclofenac. Consider local anaesthetic infiltration by surgeon.

Emergence
21. At the end of the procedure, extubate the patient awake with adequate airway protective reflexes, either in the left lateral position or supine head up.
22. Consider NG tube drainage of stomach prior to extubation if high risk of full stomach.
23. Prescribe adequate analgesia e.g. morphine i.m./p.o. and regular paracetamol / diclofenac, if there are not any contra-indications to NSAIDs.
24. Prescribe thromboprophylaxis.
25. Decide, in discussion with surgeon, if obstetric HDU is required postoperatively.

Follow-up
26. If general anaesthesia was administered for an emergency section, ensure that the patient is seen post operatively to address any questions/anxieties that she may have.
General Anaesthesia for Caesarean Section in Patients with Severe Pre-Eclampsia

General anaesthesia for Caesarean section in severe pre-eclamptic patients may be necessary in a small number of cases for various reasons (coagulopathy, pulmonary oedema, eclampsia, severe fetal distress, placental abruption). Mothers with severe pre-eclampsia (PET) and poorly controlled blood pressure are at increased risks of complications during the induction of anaesthesia for emergency Caesarean section. Particular attention must be directed towards preventing the potentially fatal hypertensive response to tracheal intubation, which has been associated with increased intracranial pressure, cerebral haemorrhage and cardiac failure with pulmonary oedema. This hazardous hypertensive response may also occur with surgical stimulation and extubation. If time allows, all attempts should be undertaken to control the blood pressure prior to induction of anaesthesia and surgery, and you should communicate with the obstetrician to this end.

The following potential problems should be anticipated when planning a general anaesthetic for patients with PET:

- There can be increased pressure response during intubation and extubation which can lead to hypertensive crisis with intracerebral haemorrhage
- Airway problems can be exaggerated in PET due to facial, tongue and laryngeal oedema
- Intravenous Magnesium therapy can potentiate non-depolarising muscle relaxants

Anaesthetic Technique

The importance of ablating the pressure response is well documented. As there are currently no national guidelines, below is a list of accepted regimes on labour ward for this situation, the anaesthetist should use the one he/she is most familiar with.

For general management see above, in addition:

- Have a low threshold for direct arterial blood pressure monitoring (prior to induction if time allows) in patients with severe PET requiring a Caesarean section under GA
- Aim to have 2 anaesthetists present for these complex cases (Consultant if appropriate)
• Induction of Anaesthesia: Use a modified rapid sequence induction technique with an opioid, for example:
  - Fentanyl 2.5 μg/kg or up to 200 μg iv
  - Alfentanil 10 μg/kg iv or 2 mg iv
  - Remifentanil If you are not familiar with use of Remifentanil, this should not be your agent of choice.
    Remifentanil is not routinely used on labour ward/obstetric theatres, therefore not suitable for very urgent cases.
    Loading dose 0.5 - 1 μg/kg/min and/or 0.1 - 0.15 μg/kg/min infusion.
• Inform the Neonatologists that you will be giving i.v opioids to the mother on induction
• Remember to control the pressure response at emergence of anaesthesia
• Dilute/slow administration of Oxytocin. Considered use of utero-tonics (eg: avoid Ergometrine)
• Arrange post-operative care on Obstetric HDU (or GICU if indicated)
Postoperative Pain Relief following Caesarean Section

The following is recommended as a post-operative analgesia regimen:

- Paracetamol 1 g at 4 times per day and
- Diclofenac 100 mg p.r. at the end of the procedure if there are no contra-indications and then a further 50 mg p.o. at an appropriate interval – i.e. at least 8 hours. The maximal daily dose is 150 mg. From the next day, diclofenac 50 mg p.o. should be given three times a day with food.

If patients are allergic to diclofenac or there are other contraindications to its administration, e.g. severe asthma they should receive Paracetamol 1 g p.r. at the end of the operation and NO diclofenac subsequently.

Rescue medication for all patients is: Oramorph 10 – 20 mg, four hourly (first choice), or 5-10 mg Morphine i.m./s.c. 4 hourly. Prescribe Cyclizine PRN every 8 hours.

Thromboprophylaxis after Caesarean Section

According to international, UK and RCOG guidelines prophylactic LMWH (Fragmin on this unit) should be given after all LSCS - if not contraindicated. The time interval after uncomplicated spinal or epidural puncture is 4 hours, (12-24 hours after a complicated or bloody puncture) which normally means 3 hours after the end of the LSCS.

The time interval between the last dose of prophylactic Fragmin and spinal or epidural puncture or removal of epidural catheter should be at least 12 hours. After a LSCS done under GA, Fragmin should be given immediately after the end of the operation / before the patient leaves recovery.
Post-operative Care

Transferring a patient to the recovery room

- All patients receiving anaesthetic care in theatre should be transferred to recovery post operatively (unless immediate transfer to HDU/ITU is required).
- Recovery should be telephoned prior to leaving the theatre to ensure that the recovery staff are able to take responsibility for the patient. If this cannot be assured, you should stay with the patient, either in the operating theatre or recovery room.
- The patient should be physiologically stable on departure from the operating theatre and you must decide on the need for monitoring during transfer.
- You should formally hand over care of the patient to a qualified member of the recovery room staff, highlighting any specific concerns/management plans.
- Obstetric patients will usually be recovered in Lanesborough recovery. However, on occasion, recovery staffing levels or skill mix may require transfer of obstetric post-operative patients to St James’ Recovery. You are responsible for ensuring that this transfer is accomplished safely with adequate mobile monitoring. A minimum of pulse oximetry, and non-invasive blood pressure is required, with the immediate availability of an ECG.

Care in recovery

The frequency of observations will depend on the stage of recovery, nature of surgery and clinical condition of the patient.

Consistent with NICE Guidelines, as a minimum, the following should be recorded every 5 minutes for the first 30 minutes in recovery, then every 15 minutes for the next 30 minutes:

- Non-invasive blood pressure
- Heart rate and rhythm
- Respiratory rate
- Continuous pulse oximetry (giving haemoglobin saturation) and oxygen administration
- Level of consciousness
The following information should also be recorded:

- Pain intensity e.g. verbal rating scale
- Temperature
- Haemoglobin level (Haemacue)
- Intravenous infusions
- Drugs administered
- Application of TEDS (unless contraindicated)

Prior to leaving recovery you must ensure that the patient is stable and that the recovery staff are happy with the patient's condition. You should provide contact details (Bleep 6392) in case patient review is required.

Discharge from the recovery room is the responsibility of the anaesthetist but the adoption of strict discharge criteria allows this to be delegated to recovery staff. If the discharge criteria are not achieved, the patient should remain in the recovery room and the anaesthetist informed.

References
1. AAGBI Immediate Post anaesthetic Recovery. September 2002
2. NICE Clinical Guideline 132. Caesarean Section. November 2011
Airway Management in Obstetrics

FAILED INTUBATION

Prevention:
Assess the airway before the patient comes to theatre. If difficult intubation is anticipated consider regional block or send for senior help before induction.

Ensure that:

- Equipment is fully checked - circuit is on manual.
- You choose rescue airway device (classical LMA, ILMA or Pro-seal LMA if trained) and have open and checked on airway trolley. Check you have short handle laryngoscope and bougie.
- You perform full pre-oxygenation for three minutes. Aim for ETO$_2$ of $>0.90$, although may not be achievable.
- Capnograph is attached to circuit and CO$_2$ trace is visible during pre-oxygenation.
- Patient is correctly positioned pre-induction. (In obese patients fold blankets under upper body, neck and head. Aim for horizontal alignment between the sternal notch space and external auditory meatus or use Oxford Head Elevated Laryngoscopy Position (HELP) Pillow). In obese patients place both arms out on arm boards, NOT on chest.

AIM TO OPTIMISE 1st ATTEMPT (position, correct dose of induction agent / suxamethonium, wait for suxamethonium to work!).

![Image of an intubation procedure]
Difficult intubation/ Grade 3 or 4 laryngoscopy:

- Send for senior help
- Adjust head/neck position
- Adjust or remove cricoid pressure, incorrect applied cricoid pressure may be the reason for difficult view. Remember it can be reapplied
- Alternative laryngoscope (McCoy, etc)
- Try bougie +/- smaller tube
- Do not give second dose of muscle relaxant
- Maximum 2 attempts = FAILED INTUBATION

Failed intubation

- OXYGENATE PATIENT. SEND FOR HELP AND FOR CONSULTANT
- Face mask (Remove cricoid pressure if unable to facemask ventilate. Remember to reapply if no difference)
- Classic LMA (ILMA, Proseal if trained). May need to remove cricoid pressure to place LMA.
- Needle Cricothyroidotomy (if failed intubation and unable to ventilate with mask or LMA)
- DECIDE WHETHER TO WAKE UP MOTHER OR CONTINUE SURGERY

(There may be occasions when waking the mother is not an option e.g., surgery has already commenced, massive haemorrhage or cardiac arrest. If she has a good airway with the mask +/- airway adjunct or the LMA whilst maintaining cricoid, continue manual ventilation until spontaneous ventilation returns and allow surgery to continue. Maintain anaesthesia with volatile agent.)
Remember:

- The mother’s life takes precedence over the baby’s, in cases of severe fetal distress it is feasible to carry on, but only if mother can be oxygenated safely
- Get someone to summon senior help early
- Always use a capnograph to confirm intubation
- If you have a failed intubation: do not give further dose of muscle relaxant
- If you proceed with GA, maintain anaesthesia with O₂ and inhalational agent
- Prepare for increased blood loss
- Maintain lateral tilt
- If the mother goes into cardiac arrest deliver the fetus immediately

Reference:
Davies J.M. Difficult intubation in the parturient Can J Anaesthesia 1989:36.6; 668-74
AIRWAY MANAGEMENT IN OBSTETRICS

(To be replaced by DAS/OAA version - available shortly)

- Preoxygenate (Capnography, ETO₂)
- Discuss with surgeon plan to wake / continue if failed intubation
- Allocate member of staff to call for help if required
- Choose rescue airway device

- Optimise 1st attempt
  - Optimal positioning (head/neck, arms out on sideboards, ramping)

- Grade 3 or 4 laryngoscopy
  - Attempts to improve view
    - Adjust head/neck position
    - Adjust/Remove cricoid pressure
    - Adjust laryngeal position
    - Alternative laryngoscope/bougie/smaller tube

- Maximum 2 attempts

- FAILED INTUBATION
FAILED INTUBATION

Call for Help/Contact Consultant
- Give 100% inspired oxygen
- Do not give further doses of muscle relaxant drugs
- Maintain wedged position

OXYGENATE PATIENT
- Removal of cricoid pressure might be necessary to allow facemask/LMA oxygenation
  (Progress down this list until you can oxygenate)

Face Mask

Classic LMA (ILMA/Proseal if trained)

Needle Cricothyroidectomy
**MOTHER’S LIFE IN IMMEDIATE DANGER? SEVERE FETAL DISTRESS?**

**YES**
- Maintain Airway
- 100% Oxygen
- Allow spontaneous respiration to return
- Maintain anaesthesia with volatile

**MOTHER’S LIFE IN IMMEDIATE DANGER? SEVERE FETAL DISTRESS?**

**NO**
- Maintain Airway
- 100% Oxygen
- Allow patient to wake up
- Regional anaesthesia / AFOI

---

If ventilation / oxygenation possible decide whether to wake patient up or continue surgery
Resuscitation of the Pregnant Woman

There are many causes of maternal arrest or peri-arrest. These include pre-existing cardiac disease, thromboembolism, sepsis, haemorrhage and amniotic fluid embolism. The management of all of these should incorporate an ABCDE approach with immediate relief of aorto-caval compression which exacerbates any cardiovascular compromise in pregnancy after 20 weeks gestation.

Call for help. (Remember Mrs TILT)

- A  airway assessment and oxygen delivery
- B  breathing assessment, intubate early if respiratory arrest
- C  2 x 14G access. Assessment and correction of circulation compromise including blood sampling and cross match as necessary. Wedge 15-30 degrees
- D  disability assessment i.e. GCS, blood sugar and fetal assessment
- E  exposure to reveal haemorrhage, drains

Maternal cardiac arrest management should follow current Resuscitation guidelines. Look for reversible causes using 4 H and 4 T approach. The highlighted causes are the most likely in pregnancy:

- Hypoxia
- Hypovolaemia includes sepsis and haemorrhage
- Hypo/hyperkalaemia
- Hypothermia
- Tension pneumothorax
- Tamponade
- Toxic includes drugs for instance associated with regional and / or general anaesthesia
- Thromboembolism

Remember ECLAMPSIA and pre-existing cardiovascular disease

Consider delivery of fetus in all cases to give best chance of maternal survival

There are various physiological changes in pregnancy that make the resuscitation attempt more difficult and need to be addressed:
Aorto-caval compression

At term approximately 90% of pregnant women have complete vena caval occlusion when lying flat. This amounts to the production of a cardiac output of 30% of what the cardiac output would be in the non-pregnant state. To optimise cardiac output and oxygen delivery to both the mother and the fetus, a 15-30 degree tilt should be used during resuscitation. In addition by delivering the fetus early the caval compression will be released and the oxygen demands on the mother will be reduced.

Changes in lung function

Mothers become hypoxic more readily due to the 20% reduction in FRC that occurs by term. This diminishes the oxygen reservoir in the lungs during apnoea significantly and is exacerbated by the oxygen demands of both the fetus and the uterus. These effects make it difficult to provide enough oxygen delivery during CPR to resuscitate at term.

Effectiveness of ventilation

In the later part of pregnancy it becomes increasingly difficult to provide effective breaths to the mother due to the increased weight of the abdominal contents, the size of the breasts and the risk of regurgitation and aspiration. It is important to protect the airway as soon as possible preferably with intubation.

Peri-arrest / Peri-mortem Caesarean section

The Resuscitation Council has recommended that prompt caesarean delivery should be considered as a resuscitative procedure in near term pregnancy. This should occur within 4 minutes of cardiac arrest to give the best chances of a successful neonatal and maternal outcome.

- Gestation < 20 weeks no, as unlikely to compromise maternal cardiac output
- Gestation 20-23 weeks for mother's survival only
- Gestation >24 weeks yes, to save both lives

References

2. Managing Obstetric Emergencies and Trauma - The MOET Course Manual (2nd edition) Charles Cox, Kate Grady and Charlotte Howell
**Admission / Discharge criteria to / from obstetric HDU**

The obstetric HDU is located adjacent to the labour ward – two single rooms and a four bedded bay for postnatal HDU care.

All referrals must be discussed with the Obstetric Senior Registrar before transfer as they are in charge for the patient care on the obstetric HDU. However, HDU care requires a team approach from obstetricians, midwives and obstetric anaesthetists and it is therefore important for the duty obstetric anaesthetist to familiarize themselves with the monitoring and other medical equipment on the unit. It is also necessary for the duty obstetric anaesthetist to be informed about HDU patients.

If a woman requires invasive monitoring (CVP, arterial line), the lines should be checked regularly by the duty obstetric anaesthetist. Epidural analgesia or pain management such as PCA is also an anaesthetic domain. Help may also be required for fluid management and cardiovascular stabilisation e.g. after massive haemorrhage. It is therefore essential to liaise with the Obstetric Senior Registrar and the Midwife to ensure best possible patient care. Documentation in the patient’s notes as well as a handover to the duty obstetric anaesthetist and/or the Consultant anaesthetist on-call is mandatory.

**Admission Criteria for Obstetric HDU Care:**
- Moderate to severe PET and complications (e.g. oliguria, coagulopathy)
- HELLP syndrome
- Major ante- or postpartum haemorrhage
- Suspected Sepsis
- Pre-existing maternal disease
- Requirement for invasive haemodynamic monitoring
- Transfer from ITU if the women is not well enough to be transferred to a postnatal ward

**Discharge Criteria for Obstetric HDU Care (to postnatal ward):**
- Patient haemodynamically stable, no further continuous intravenous medication or frequent blood tests required
- No invasive monitoring required
- No bleeding tendency
- No supplementary Oxygen required
- Patient mobilized

Admission to general ITU (to be discussed with ITU consultant on consultant to consultant basis)

- Worsening clinical condition
- Ventilator therapy
- Organ support
Other Guidelines

The following are incorporated in the Maternity Unit Guidelines which can be found on the Trust intranet (under Maternity) and on desktop computers in the obstetric anaesthetic office.

- Cell salvage
- Management of major obstetric haemorrhage including Code Blue to trigger major haemorrhage transfusion protocol
- Management of pre-eclampsia and eclampsia
- Modified Early Warning Score (MEWS) use
- Category 1 Caesarean Section

National guidelines immediately available

The following national guidelines are on display or immediately available in all locations where obstetric anaesthesia is delivered:

- Adult resuscitation guidelines [Resuscitation Council (UK)]
- Anaesthetic machine checklist [AAGBI]
- Management of:
  - Anaphylaxis [AAGBI and/or Resuscitation Council (UK)]
  - Failed intubation [to be produced by DAS / OAA]
  - Malignant hyperthermia [AAGBI]
  - Neonatal life support [Resuscitation Council (UK)]
  - Peri-arrest arrhythmias [Resuscitation Council (UK)]
  - Severe Local Anaesthetic Toxicity [AAGBI]
In Utero Fetal Resuscitation

In the event of a Category 1 CS, the following measures (SPOILT) to improve fetal well-being should be considered in conjunction with the midwifery and obstetric teams.

- **Syntocinon off**
- **Position full left lateral**
- **Oxygen**
- **I.v. infusion of 1 litre crystalloid**
- **Low blood pressure: i.v. vasopressor**
- **Tocolysis: terbutaline 250 μg s.c., GTN 2 × 400 μg puffs (sublingual), repeat after 1 min until contractions stop; max 3 doses. (Not if abruption / antepartum haemorrhage).**

**Reference**
**Maternal Obesity**

**Antenatal referral**
Women with a BMI greater than 40 kg/m² are usually referred to the high risk antenatal clinic for a discussion with a consultant anaesthetist, but may present to the resident anaesthetist. You should pay attention to:

- Assessment of the airway
- Potential difficulty of intravenous access
- Lumbar anatomy for regional block with regard to fat distribution

In talking with the mother it is important to convey the recommendation for regional techniques while not giving the impression that general anaesthesia is not safe – the failure rate for regional techniques will be higher due to difficulty in placement and the extent of subcutaneous fat allowing distraction of the catheter.

She should also understand that regional techniques do take additional time to establish when compared with the average, and that therefore it may be useful to request them earlier.

Nevertheless, epidural analgesia in labour is preferred because it can facilitate the more interventionist delivery experienced by obese women.

**Management during caesarean section**
Morbid obesity is defined as a BMI greater than 45 kg/m². The following are important points:

- You should seek consultant input when referred such women for caesarean section.

- Management by consultant anaesthetists is essential and difficulties with airway management and intubation should be anticipated. The difficult intubation rate is 10% or more. You should use an uncut 7mm endotracheal tube and we suggest that if you have familiarised yourself with it, the polio blade would be a good choice.

- Positioning the women requires skill and sufficient manpower in the event of a requirement for induction of general anaesthesia. Use the Oxford HELP Pillow.

- You should consider placing an arterial line as it will facilitate blood pressure measurement and may be the only accurate means.

- The mother will be at greater risk of postpartum haemorrhage and you should anticipate this.
• She is also at greater risk of venous thromboembolism and you may need to seek advice on increasing the LMWH dose.

References
**Information for mothers**

The following unit produced PlNG endorsed leaflets are available in the obstetric anaesthetic office.

- Headache after childbirth
- Remifentanil PCA in labour
- Anticoagulation and pain relief in labour with epidural analgesia

The following information for mothers are available for download via www.oaformothers.info (translated to up to 40 languages)

- Pain relief in labour
- Caesarean section
- Epidural info card
- Phrases card
- High body mass index (BMI)
- Headache after epidural
- Regional anaesthesia for unplanned Caesarean section
Supervising Midwife epidural top ups

Midwives are responsible for performing epidural top ups for epidural pain relief in labour. When they are training it is the anaesthetic departments role to supervise trainee midwives top ups.

In supervising these points should be considered.

- Communication → the student midwife should clearly communicate with the parturient what they are going to do and what they are doing during the procedure.

- Hygiene → the midwife should wash their hands prior to doing the top up and then employ a "no touch technique" keeping the ends of the filter and the filter cap clean and untouched throughout.

- Safety → the midwife should check the ampoule and dose against the prescriptions before drawing up and administering the drug.

- Technique
  
  o Discussion with patient.
  o Hands washed, clean gloves.
  o Drug checked against prescription and drawn up.
  o "No touch technique" - removal of cap of filter and placed safely with sterile surface upwards in safe position where unlikely to be contaminated.
  o Syringe attached and aspiration attempted to ensure catheter has not migrated into the CSF or epidural veins.
  o 5 ml increments injected up to prescribed dose. No injections during contractions.
  o Wait, watch and ask between top ups if any symptoms or signs of intrathecal / spinal injection (sudden onset of very good analgesia, symptoms and signs of decreased blood pressure e.g. Pallor, N&V) or toxicity (peri-oral numbness etc.).

- Demonstrates understanding of post top up care.

20 minutes of continuous care with midwife in the room. 5 minutely observations for 15 minutes
Information recording

Identifying yourself
Always use black ink and print your name and grade on all notes entries.

Operative interventions
You must complete a standard Trust anaesthesia chart for all cases in the operating theatre. A drug chart which also incorporates a fluid chart will be required. You must input the anaesthetic details into the Audit System database.

Epidural analgesia
You must complete the record via the Audit System database and complete a prescription chart.
In the case of extension to surgical anaesthesia, a standard Trust anaesthesia chart must also be completed.

Entries in the main patient record
There will be occasions when you should make entries in the main patient record. Always cross-reference these entries to any anaesthetic documentation, and ensure that the notes are continuous with those made by the midwife and the obstetrician.
Major Obstetric Haemorrhage

Essential reading

RCOG Green-top Guideline No 52 Prevention and Management of Postpartum Haemorrhage May 2009

Definitions

- Minor (500-1000 ml) or major (more than 1000 ml)
- Major could be divided to moderate (1000-2000 ml) or severe (> 2000 ml)
- Life threatening haemorrhage – blood loss >40% of total blood volume (2800 ml)

An appropriate combination of clear fluids, blood and blood products must be used for continuing resuscitation. A total volume of 3.5 L clear fluids is the maximum that should be infused while awaiting compatible blood. Group specific blood is available in 10 minutes. In an extreme emergency, Group O negative blood should be used.
## Major Obstetric Haemorrhage Protocol
### Table of responsibilities

<table>
<thead>
<tr>
<th>Team Member</th>
<th>Responsibility</th>
</tr>
</thead>
</table>
| **Central Co-ordinator**           | • Contacts switchboard on 2222 to issue Obstetric Emergency call.  
• Contacts Haematology Department (Ext 6789) to declare Code Blue.  
• Opens theatre or arranges a space in general theatre.  
**Designates:** -  
• Recorder  
• Receptionist (out of hours, designate a person not directly required to assist the team).  
• Staff to theatre.  
**Alerts:** -  
• ITU  
• Midwifery Supervisor  
**Ensures:** -  
• Continuous progress of Major Obstetric Haemorrhage Protocol procedure. |
| **The most senior medical person available** | • Undertakes / delegates measures to ensure that the team proceed with Major Obstetric Haemorrhage protocol  
• Arranges transfer to theatre. |
| **Anaesthetist**                   | • The anaesthetist will assess the woman quickly, initiate or continue resuscitation to restore intravascular volume and provide adequate analgesia / anaesthesia |
| **Obstetrician**                   | • The obstetrician will assess the woman quickly, initiate or continue with efforts to identify the cause of bleeding and arrest it |
| **Porter**                         | • Takes blood samples to the Haematology lab / Blood Transfusion and collects the blood products specified |
| **Recorder**                       | • Keeps a record of events including times  
• Use the Haemorrhage Form as soon as possible  
• Liaises with other team members |
| **Receptionist**                   | • Waits at the reception desk to take any calls and direct team members as they arrive  
• At night, informs Security that the doors need to be unlocked and then man the desk to open the doors for each team member until the locks have been deactivated |
| **Haematology technician**         | • Notifies the Senior Registrar / Consultant Haematologist on-call of the details of the Code Blue via Switchboard. |
MAJOR OBSTETRIC HAEMORRHAGE PROTOCOL
(Simultaneously & apply clinical judgement)

Communication

- Call for Help
  - Contact Team via Switchboard
  - Major Haemorrhage Trolley
- Dial 2222
  - State 'Obstetric Emergency'
  - & give location. Switchboard will call midwife in-charge, Obstetric & Anaesthetic on-call teams, ODA & Porter
- Blood Loss >2L or 1.5L & ongoing
  - Declare CODE BLUE
  - Dial 6789 for blood bank
  - State 'Code Blue' & give details
- Inform
  - Consultant Obstetrician & Consultant Anaesthetist

Resuscitation & Monitoring

- Assess and Manage
  - Airway & Breathing
    - O2 by mask 10-15 L/min
- Evaluate Circulation
  - Position flat. Lateral tilt for APH
    - Insert two 14G cannulae
    - Blood for Crossmatch, FBC, Clotting Screen+Fibrinogen, Renal & Liver function
- Volume Replacement
  - Rapid
    - Crystalloid or Colloid infusion
    - Transfuse blood as soon as available
    - Use O RhD negative blood if life threatening haemorrhage
- Continuous
  - Pulse & O₂ saturation using pulse oximeter, BP, ECG, hourly urine output and temperature
- Consider
  - arterial line monitoring
  - CV line

Identification & Treatment of Cause

- Rub up a contraction
  - Empty the bladder
  - Bimanual compression
  - Examine the placenta
- Oxytocin 5 units slowly IV
  - *Ergometrine 0.5mg IM
  - Oxytocin infusion 10 units per hour for 4 hours
  - *Carboprost 250 micrograms IM
- Remember
  - Uterine Rupture
  - Uterine Inversion
  - Amniotic Fluid Embolism
- If bleeding persists proceed to Examination under Anaesthesia
  - Remove retained products
  - Repair any tears
  - Bimanual compression
- If bleeding remains uncontrolled request the PRESENCE of Consultant Obstetrician & Consultant Anaesthetist

Second Line Management

- Medical
  - *Misoprostol 800 micrograms rectally
  - *Carboprost 250 micrograms IM
  - *Tranexamic Acid
  - *Recombinant activated factor VII
- Uterine/Vaginal Tamponade
  - Rusch catheter
  - Sengstaken-Blakemore tube
  - Bakri balloon catheter
  - Uterine/vaginal packing (gauze roll)
- Surgical
  - Repair laceration
  - Laparotomy
  - Uterine haemostatic suturing techniques - B Lynch
  - Arterial ligation
  - Hysterectomy
- Interventional Radiology
  - Selective Arterial Occlusion or Embolisation

Documentation, Discharge, Debriefing

- Haemorrhage Form Fluid Balance
- Admit to High Dependency Unit or transfer to Intensive Care Unit
- Debriefing
  - Patient
  - Staff

* IF NO CONTRAINDICATIONS

Click here for contents
**Transfusion ratios**

Transfusion ratios are based on units, not volume!

1 unit of fresh whole blood (FWB) has approximately 1 unit of RBCs, plasma, and platelets

**Red cell concentrates**

1 unit of packed RBCs (RBC) = 1 unit

**Fresh frozen plasma**

1 Dose FFP-(12-15 ml/kg body weight) = 4 units for an adult

**Platelet concentrates**

1 adult therapeutic dose = One apheresis platelet unit is equal in number to approximately 6 to 10 units of leukocyte-reduced platelets

One ATD typically gives a rise in platelet count of 20 - 40 x 10⁹/l

**Cryoprecipitate**

1 Dose (1 unit/5kg body weight) = 10 units for an adult

**FIBRINOGEN CONTENT IN VARIOUS BLOOD PRODUCTS**

1 10-unit Cryoprecipitate 2500 mg/150 ml
1 unit of FFP 400 mg/250 ml
1 unit of RBC <100 mg
1 six pack of platelets 480 mg
1 unit of apheresis platelets 300 mg
1 unit of whole blood 1000 mg

**CODE BLUE**

The following blood and blood products will be issued

**1st stage**

6 units of packed RBC
1 litre of FFP
2 pools of platelets

**2nd stage**

As 1st stage but includes 10 units of Cryoprecipitate if fibrinogen < 0.8 g/l
2 pools of platelets if platelet count < 100 x 10⁹/l

**3rd stage:** As 1st stage
Group O negative blood is kept in the satellite blood fridge in the following locations:

- LANCESBOROUGH THEATRE - 1ST FLOOR LW
- ST JAMES THEATRE RECEPTION - 1ST FLOOR SJW

A ratio of 1 - 2 RBC units: 1 unit FFP has been shown to be more effective and lifesaving in major haemorrhage.

RBC:FFP ratio is a time-dependent variable. Transfusing 10 units of RBCs followed by 10 units of plasma is not equivalent to the same total number of blood products with RBCs and plasma units alternating, even if both are of 1:1 ratio.

References
1. Indications for transfusion of blood components – National Blood Service
**CODE BLUE**

Code Blue is the terminology used to alert Blood Bank of ongoing Major Obstetric Haemorrhage that requires packed red cells and clotting products. A set of combination blood products will be issued at each stage of the transfusion. It is not necessary to request platelets or FFP, they will automatically be provided. The criteria for activating Code Blue is based on the rate / magnitude of ongoing blood loss, i.e. > 2000 ml or >1500 ml and ongoing.

Code Blue is an important therapeutic measure for managing anticipated and unanticipated bleeding. Switchboard DO NOT activate Code Blue. Switchboard (2222) will put out an obstetric emergency call. The Central coordinator calls blood bank on extension 6789 (dedicated line) to declare a CODE BLUE. Note that whilst Major Obstetric Haemorrhage is always an obstetric emergency and help is requested through switchboard – obstetric emergency, not all cases of Major Obstetric Haemorrhage require Code Blue.

**Discrepancy between EBL and clinical condition**

Occasionally, there may be a discrepancy between an estimated blood loss of 2L and the woman’s clinical condition. Your clinical assessment may suggest that the woman does not need the full range of blood products.

Such a situation could occur when a high index of suspicion for the development of major haemorrhage during the early period of blood loss has been acted on such that:

- Cross-matched blood is already available
- There has been an early response to medical / surgical intervention

A decision may be taken in such a situation NOT to declare a CODE BLUE. This must be a joint decision between the anaesthetist (confirms patient is stable and circulating blood volume has been restored) and obstetrician (confirms bleeding has been arrested).

Note that the Major Obstetric Haemorrhage Protocol remains active until documentation, discharge and debriefing have been completed.

You must do the following:

- Confer with the obstetrician and communicate the joint decision to the midwife and members of the team
- Document in the woman’s notes why a Code Blue was not called e.g. crossmatched blood already available, early response to treatment etc.
- Indicate in the notes
  - the number of packed red cells to be transfused
  - haemocue or blood gas Hb result taken at the time of decision
• Repeat the above test in recovery / after 20 minutes, whichever is earliest
• Ensure a request for FBC and clotting including fibrinogen is sent

It is highly unlikely that a woman who bleeds 2000 ml or more would not require as a minimum, packed red cells. You may request for a Rapid Crossmatch of 2 units packed red cells (dedicated line extension 6789 – Rapid Crossmatch).

You should declare a CODE BLUE if there is doubt or the situation changes.

It is important for individuals to remember their respective roles as indicated in the table of responsibilities. If there is disagreement between the anaesthetist, the obstetrician and the midwife about a decision not to declare a Code Blue, the consultant anaesthetist should be contacted immediately. There is always a named consultant anaesthetist responsible for the delivery suite.

• Activating Code Blue without blood products is confusing
• Requesting for blood products without transfusing is wasteful and expensive
• Transfusing blood products when not needed is wasteful and may be harmful