

## Section 8: Obstetrics

Edited by Dr Mike Kinsella

- 8.1 Adequacy of staffing
- 8.2 Information about obstetric anaesthesia and analgesia
- 8.3 Timely anaesthetic involvement in the care of high risk and critically ill women
- 8.4 Obesity in pregnancy
- 8.5 Antacid prophylaxis in obstetrics
- 8.6 Response times for provision of intrapartum analgesia and anaesthesia
- 8.7 Epidural analgesia during labour
- 8.8 Caesarean section anaesthesia: technique and failure rate
- 8.9 Monitoring of obstetric patients in recovery and HDU
- 8.10 Airway and intubation problems during general anaesthesia for caesarean section
- 8.11 Pain relief after caesarean section
- 8.12 Anaesthetic complications and side effects

## 8.1

## Adequacy of staffing

Dr N Lucas, Dr F Plaat

**Why do this audit?**

Obstetric anaesthetists are an intrinsic and essential part of the multidisciplinary maternity team and are involved in the care of a significant number of pregnant women.

A recent survey<sup>1</sup> has confirmed an increase in workload for the obstetric anaesthetist as result of:

- D changes in workload: rising birth rate, increased regional anaesthesia rates, the changing nature of the obstetric population, e.g. increasing age, rising levels of obesity, increasing co-morbidity
- D changes in expectations/role: the requirement for the development of new services such as anaesthetic antenatal clinics, maternity high dependency units
- D changes in workforce: the impact of the European Working Time Directive on the working hours of both consultants and trainee doctors.

**Best practice: research evidence or authoritative opinion**

Successive confidential enquiries into maternal deaths in the UK have stressed the importance of a dedicated obstetric anaesthesia service and the timely involvement of the anaesthetic team in the management of the sick obstetric patient. A study of infant mortality identified staffing issues in a significant number of the anaesthesia-related deaths.<sup>2</sup> Detailed recommendations have been produced by the Obstetric Anaesthetists' Association, the Association of Anaesthetists of Great Britain and Ireland<sup>3</sup> and the Royal College of Anaesthetists.<sup>4</sup>

**Suggested indicators**

Provision of staff as specified by the AAGBI/OAA:<sup>3</sup>

- D A basic minimum for dedicated consultant supervision of 50 hours (or more) per week. During working hours this consultant should not have any other duties and be in addition to the duty anaesthetist
- D A duty anaesthetist available immediately 24 hours per day, able to respond to requests for labour analgesia within 30 minutes and appropriately for emergency anaesthesia
- D Separate and dedicated anaesthetic staffing for
  - ◆ elective caesarean sections<sup>5</sup>
  - ◆ other regular components of service delivery such as obstetric anaesthesia antenatal clinics.

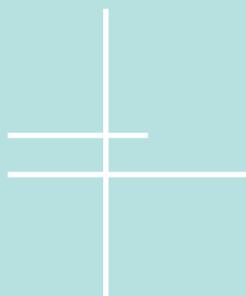
This cover should be provided by an anaesthetist who at the most requires distant supervision.

- D A multidisciplinary resuscitation team for maternal emergencies 24 hours per day.
- D A suitably trained anaesthetic assistant at every theatre procedure who does not have other duties elsewhere in theatre.

% occasions during the audit period that the attending anaesthetist considered that attending the maternity unit was detrimental to the care of a patient elsewhere.

**Proposed standard or target for best practice**

- D Staffing levels should be as described above.
- D 100% of cases in theatre should have a suitably trained assistant present.
- D On 100% occasions the anaesthetist should attend within an appropriate period of time and without compromising the care of a patient elsewhere.



**Suggested data to be collected**

- D Nominal staffing levels.
- D Actual staffing levels, including during periods of leave of regular staff:
  - ◆ Consultant
  - ◆ NCCG
  - ◆ Trainee anaesthetists
  - ◆ ODPs.
- D Proportion of duty anaesthetists having documented evidence of having achieved obstetric competencies prior to joining shift system.
- D Details of critical incidents relating to occasions where the anaesthetist had a conflict of responsibility as above, e.g. delay/cancellation of category 4 caesarean section list.

**Suggested audit frequency:**

- D Staffing levels – yearly
- D Problems of service delivery/critical incidents – continuous (prospective and retrospective).

**Common reasons for failure to meet standard**

- D Funding and recruitment problems.
- D Reduced trainee numbers
- D Provision of anaesthetic services on multiple sites within the maternity unit itself and the hospital.
- D Exceptional and unpredictable changes in workload.

**Related audits**

8.6 – Response times for provision of intrapartum analgesia and anaesthesia

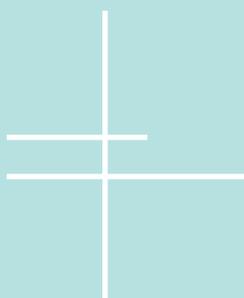
**CPD and Curriculum mapping**

CPD matrix codes: **1I02, 2B05, 3B00**

Training curriculum competences: **OB\_HS\_13, OB\_AK\_04**

**References**

- 1 OAA/AAGBI survey of obstetric anaesthetic workload (<http://www.oaa-anaes.ac.uk/content.asp?ContentID=467>).
- 2 Confidential Enquiry into Stillbirths and Deaths in Infancy (CESDI): 7th Annual Report, 2000. *Maternal and Child Health Research Consortium*, London 2000 (<http://www.cemach.org.uk/getattachment/b858e5e8-862a-4121-9348-b9284d02db1b/7th-Annual-Report.aspx>).
- 3 OAA/AAGBI guidelines for obstetric anaesthetic services – 3rd edition. *AAGBI and OAA*, London, 2012 (<http://www.aagbi.org/publications/publications-guidelines/M/R>).
- 4 Guidance on the provision of Obstetric Anaesthesia Services. *RCoA*, London 2009 (<http://www.rcoa.ac.uk/node/717>).
- 5 Clinical Negligence Scheme for Trusts (CNST) Maternity Clinical Risk Management Standards 2012/13.



## 8.2 Information about obstetric analgesia and anaesthesia

Dr J Middle, Professor M Wee

### Why do this audit?

The Changing Childbirth report<sup>1</sup> made explicit the right of women to make informed decisions about their care during pregnancy and childbirth. Changing legal and public expectations demand that we provide evidence-based information, at the appropriate time and in multiple languages to enable women to make these decisions.

### Best practice: research evidence or authoritative opinion

#### When?

Women should have access to information antenatally about all types of analgesia and anaesthesia available.<sup>2,3</sup> Women in labour should receive this information before consenting to an anaesthetic procedure. Information regarding analgesia and anaesthesia for caesarean section (CS) should be given when CS is booked. Written material should not replace discussion between women and clinicians.<sup>4</sup>

#### How?

A study in 2003 showed patients receiving the Obstetric Anaesthetists' Association (OAA) leaflet Pain relief in labour, as well as standard booking information, were more knowledgeable than those receiving standard booking information alone.<sup>5</sup> During labour, patient recall and satisfaction can be improved by using written information about regional anaesthesia.<sup>6</sup> The Epidural Information Card (EIC) should be used to provide information to women requesting an epidural before the arrival of the anaesthetist as part of the consenting process.<sup>2,7</sup> The provision of information should be given as early as possible before emergency CS.

Professional interpretation services should be provided for all pregnant women who do not speak English.<sup>8</sup> Information in multiple languages can be found on the OAA website.<sup>9</sup>

#### Who by?

Written information on anaesthesia and verbal information from other health professionals may be adequate for some women, but women who wish for more detailed responses should have access to an anaesthetist.<sup>10</sup>

#### How much?

Women should be informed of the level of availability of anaesthesia and regional analgesia in each unit.<sup>2</sup> Anaesthetists should place emphasis on the process of consent and tailor the process to the circumstances.<sup>11</sup> The women should have the opportunity to ask any questions. All information given should be clearly documented.

### Suggested indicators

- D % women receiving antenatal education/information on analgesia and anaesthesia.
- D % women receiving written information to reinforce this.
- D Existence of unit information cards to improve knowledge and satisfaction.
- D % non-English speaking women receiving written information on analgesia and anaesthesia in relevant language.
- D % non-English speaking women where an interpreter was available during delivery.
- D % women satisfied with level of information they were given antenatally and during labour.

### Proposed standard or target for best practice

- D 95% women to receive education and written information as above.
- D > 75% non-English speaking women receiving written information in relevant language.
- D > 75% cases an interpreter to be available during delivery of non-English speaking women.
- D 100% of units should have a unit information card.
- D A target of > 80% women to be satisfied they were given sufficient information both antenatally and during labour.

**Suggested data to be collected**

- D Examine notes and epidural/anaesthetic chart for documentation of information given antenatally.
- D Mothers may be seen postpartum to assess what information they were given antenatally and if they felt it was sufficient.
- D Suggested audit frequency – annual

**Common reasons for failure to meet standard**

- D Non-attendance at antenatal classes.
- D Inadequate availability of patient information leaflets.
- D Inadequate availability of patient information leaflets in foreign languages.
- D Inadequate availability of patient information in other media forms.
- D Insufficient or non-availability of interpreter services.

**Related audits**

- I.1 – Patient information about anaesthesia
- I.1.2 Patient information on pain management

**CPD and Curriculum mapping**

CPD matrix codes: **2B01–04**

Training curriculum codes: **OB\_BS\_02, OB\_IS\_02, OB\_HS\_10**

**References**

- 1 Changing Childbirth (The Cumberlege Report). *HMSO*, London, 1993.
- 2 OAA/AAGBI guidelines for obstetric anaesthetic services – 3rd edition. *AAGBI and OAA*, London, 2012 (<http://www.aagbi.org/publications/publications-guidelines/M/R>)
- 3 Jackson GNB. The capacity to consent to epidural analgesia in labour. *Int J Obstet Anesth* 2011;**20**(3):269–270.
- 4 Broaddus BM, Chandrasekhar S. Informed consent in obstetric anaesthesia. *Anesth Analg* 2011;**112**(4):912–915.
- 5 Stewart A et al. Assessment of the effect upon maternal knowledge of an information leaflet about pain relief in labour. *Anaesthesia* 2003;**58**(10):1015–1019.
- 6 White LA et al. Written information about epidural analgesia for women in labour: did it improve knowledge? *Int J Obstet Anesth* 2003;**12**(2):93–97.
- 7 Middle JV, Wee MYK. Informed consent for epidural analgesia: a survey of UK practice. *Anaesthesia* 2009;**64**(2):161–164.
- 8 Centre for Maternal and Child Enquiries (CMACE). Saving Mothers' Lives: reviewing maternal deaths to make motherhood safer: 2006–08. The Eighth Report on Confidential Enquiries into Maternal Deaths in the United Kingdom. *Br J Obs Gynae* 2011;**118**(Suppl 1):1–203.
- 9 Information for mothers. OAA website (<http://www.oaa-anaes.ac.uk/content.asp?ContentID=221>).
- 10 Consent for anaesthesia. *AAGBI*, London 2006 (<http://www.aagbi.org/sites/default/files/consento6.pdf>).
- 11 Siddiqi U, Clark R. Obtaining consent for obstetric anaesthesia. *Anaesth Intens Care Med* 2010;**11**(8):328–329.



## 8.3

## Timely anaesthetic involvement in the care of high risk and critically ill women

Dr S Francis, Dr M Mushambi

### Why do this audit?

Team management is essential to good obstetric practice with high risk mothers. The audit may be applied to several areas and we suggest that one of the following is chosen.

- D Women with medical diseases (e.g. cardiac diseases, severe asthma and other respiratory diseases, haematological disorders and neurological diseases)
- D Women with high BMI
- D Women with pregnancy induced hypertension(PIH)
- D Women with significant obstetric haemorrhage
- D Women with sepsis

### Best practice: research evidence or authoritative opinion

For two decades, reports of the confidential enquiries into maternal deaths in the United Kingdom have recommended timely anaesthetic involvement. Women with cardiac and other medical disease should be seen in the antenatal anaesthetic clinic and women with significant haemorrhage, PIH, sepsis and high BMI should also receive joint care from an early stage.<sup>1</sup> This is emphasised in several of the top ten recommendations in the latest CMACE report.<sup>2</sup>

A national study of the most morbidly obese women (BMI > 50 kg/m<sup>2</sup>) was undertaken through the UK obstetric surveillance system (UKOSS) and these women were found to be at risk of severe morbidities, including pre-eclampsia, gestational diabetes and intensive care unit admission.<sup>3</sup>

The 2007 CEMACH report recommended the use of obstetric early warning scoring system (MEOVS) to help in the more timely recognition, treatment and referral of women who have, or are developing, a critical illness.<sup>1</sup>

### Suggested indicators

#### High risk:

- D All units should have guidelines on referral of patients to the antenatal anaesthetic clinic.
- D % mothers with a medical problem known to the obstetric team who arrived on labour ward having had previous anaesthetic consultation. Cardiac disease, diabetes, severe asthma or other respiratory disease, neurological disease and thrombocytopenia should be included.
- D A particular group may be audited more closely. For example, % cardiac patients who are New York Heart Association grade 2 (NY2) or worse who were seen by an obstetric anaesthetic consultant before labour began. A management plan for delivery should be set out in the notes.
- D % of cases with BMI of more than 40 having had previous anaesthetic consultation.
- D % mothers with significant PIH who were known to the anaesthetist within 1 hr after arrival on the labour ward. A unit policy should exist for criteria for informing the anaesthetist.

#### Critical illness:

- D % cases where significant obstetric haemorrhage occurred and where the anaesthetist was involved at an early stage in the opinion of the auditor and the anaesthetist. Again, a unit policy should exist, for example 1,000 ml loss and still bleeding.
- D % of cases where MEOVS has been used.
- D % of cases where MEOVS was used appropriately to alert senior involvement
- D % of cases where MEOVS has been used and led to the recognition of critically ill mother and which has resulted in the initiation of multidisciplinary care.

### Proposed standard or target for best practice

- D All the above indicators should be true in 95% of the cases.

**Suggested data to be collected****High risk (Audit proforma 1):**

- D Presence of guidelines for referral
- D If, when and where woman was seen by anaesthetist
- D Was anaesthetic plan recorded in notes
- D Were there any management or outcome problems related to delays

**Critical illness (Audit proforma 2):**

- D Presence of guidelines for referral
- D Time of referral and time seen by anaesthetist
- D Were there any management or outcome problems related to delays
- D Appropriate use of MEOWS chart

**Common reasons for failure to meet standard**

- D Failure to recognise the significance of medical disease.
- D Poor data collection in the antenatal period.
- D Lack of organised route of access to an anaesthetic opinion antenatally.
- D Failure to involve multidisciplinary team at the earliest opportunity including anaesthetists and critical-care staff.
- D Poor communication between staff within the maternity hospital.

**Related audits**

8.4 – Obesity in pregnancy

**CPD and Curriculum mapping**

CPD matrix codes: **2B06, 2B05, 2C01, 2C03**

Training curriculum competences:

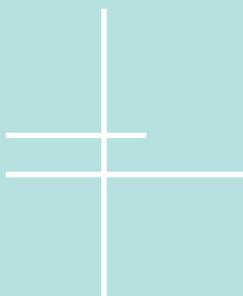
Basic: **OB\_BK\_05, OB\_BK\_06, OB\_BK\_17, OB\_BS\_11**

Intermediate: **OB\_IK\_01, OB\_IK\_08, OB\_IS\_01, OB\_IS\_11**

Higher: **OB\_HS\_01, OB\_HS\_02, OB\_HS\_03, OB\_HS\_06**

**References**

- 1 Confidential Enquiry into Maternal and Child Health. Saving Mothers' Lives – Reviewing maternal deaths to make motherhood safer 2003–2005. *CEMACH*, London 2007 ([http://www.oaa-anaes.ac.uk/assets/managed/editor/File/Reports/2003-2005\\_saving\\_mothers\\_full\\_report.pdf](http://www.oaa-anaes.ac.uk/assets/managed/editor/File/Reports/2003-2005_saving_mothers_full_report.pdf)).
- 2 Centre for Maternal and Child Enquiries (CMACE). Saving Mothers' Lives: reviewing maternal deaths to make motherhood safer: 2006–08. The Eighth Report on Confidential Enquiries into Maternal Deaths in the United Kingdom. *Br J Obs Gynae* 2011;**118**(Suppl 1):1–203 (<http://www.oaa-anaes.ac.uk/assets/managed/editor/File/Reports/2006-2008%20CEMD.pdf>).
- 3 Knight M, Kurinczuk JJ, Spark P, Brocklehurst P, on behalf of the UKOSS. Extreme Obesity in Pregnancy in the United Kingdom. *Obstet Gynaecol* 2010;**115**(5):989–997.



## 8.4

## Obesity in pregnancy

Dr M Mushambi, Dr G Stocks

**Why do this audit?**

Obesity in pregnancy is defined as a Body Mass Index (BMI) of  $\geq 30$  Kg/m<sup>2</sup> at booking. The prevalence of maternal obesity in England has increased from 7% in 1990 to 16% in 2007.<sup>1</sup> A report published in 2010 by the Centre for Maternal and Child Enquiries (CMACE) showed that nearly 5% of pregnant women had a BMI of  $\geq 35$ , 2% had a BMI of  $\geq 40$  and 0.29% had a BMI of  $\geq 50$ .<sup>2</sup> In 2007, the Confidential Enquiry into Maternal and Child Health (CEMACH) reported that 49% of all the women that died were either overweight or obese.<sup>3</sup> Obesity is associated with increased fetal and maternal morbidity including increased rates of caesarean section and postpartum haemorrhage. In addition there is a higher risk of anaesthesia-related complications and mortality.

**Best practice: research evidence or authoritative opinion**

The CEMACH report highlighted the need for a national clinical guideline for the care of women with obesity in pregnancy and a guideline was published jointly by CMACE and the RCOG in which auditable standards were recommended.<sup>4</sup> It is recommended that all pregnant women with a booking BMI of  $\geq 30$  should be provided with accurate and accessible information about the risk associated with obesity in pregnancy and that pregnant women with a booking BMI of  $\geq 40$  should have an antenatal anaesthetic consultation with an obstetric anaesthetist so that the potential for difficulties with venous access, regional and general anaesthesia can be identified and anticipated.<sup>4</sup>

**Suggested indicators**

- 1 Maternal height, weight and BMI recorded in the maternity hand held notes.
- 2 Women with a booking BMI  $\geq 30$  receive information about anaesthesia and analgesia.
- 3 Women with a booking BMI  $\geq 40$  have an antenatal anaesthetic review and plan.
- 4 The duty anaesthetist should be informed when women with a BMI  $\geq 40$  are admitted to the labour ward.
- 5 Anaesthesia for women with a booking BMI  $\geq 40$  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.
- 6 Women with a BMI  $\geq 40$  have venous access established in a timely fashion prior to delivery.
- 7 Maternity units have accessible multidisciplinary guidelines for care of pregnant women with a booking BMI  $\geq 35$ .

**Proposed standard or target for best practice**

- D The rate of general anaesthesia for caesarean section should be equivalent in women with BMI  $\geq 40$  compared to the non-obese population (see also audit 8.8).
- D 100% of pregnant women have maternal height, weight and BMI recorded in the maternity hand held notes.
- D 90% of women with a booking BMI  $\geq 30$  receive information about anaesthesia in pregnancy in the form of a leaflet.
- D 90% of women with a booking BMI  $\geq 40$  have an antenatal anaesthetic review and a plan in the notes.
- D 90% of women with a BMI  $\geq 40$  have documentation in the notes stating that the duty anaesthetist was informed of her presence on the labour ward.
- D 90% of operative vaginal deliveries and caesarean sections in women with a booking BMI  $\geq 40$  were attended by an anaesthetist at Specialty Trainee level 6 or above or with equivalent experience in a non-training post.
- D 90% of women with a BMI  $\geq 40$  have venous access established in a timely fashion prior to delivery.
- D 100% of maternity units have accessible multidisciplinary guidelines for care of pregnant women with a booking BMI  $\geq 35$ .
- D % of women with BMI  $\geq 40$  requiring general anaesthesia for caesarean section should be the same as for non-obese women in the maternity unit.

**Suggested data to be collected**

Different indicators will require different methods of data collection:

- D **Indicator 1:** non-selected retrospective notes review
- D **Indicator 2:** prospective questioning of mothers with BMI > 30 on admission
- D **Indicators 3–6:** targeted retrospective notes review. Women with BMI > 40 selected from computer system and then a number of case notes reviewed
- D **Indicator 7:** survey of a region
- D **Indicator 8:** longer term audit using annual general anaesthesia data for CS that includes BMI data.

**Common reasons for failure to meet standard**

The ability to provide antenatal anaesthetic consultation with an obstetric anaesthetist in every patient with a BMI  $\geq$  40 may have significant workload implications and in some units may not be achievable.<sup>5</sup>

The ability to have an anaesthetist at ST6 level or above (or with equivalent experience in a non training post) available for the care of women BMI  $\geq$  40 during labour may not be possible as the anaesthetic staffing structure in the UK often relies on trainees below this level of experience.<sup>5</sup>

Reasons for failure to achieve the auditable standard for % of women with BMI  $\geq$  40 requiring general anaesthesia for caesarean section would be the same as for non-obese parturients.

**Related audits**

- 8.8 – Caesarean section anaesthesia: technique and failure rate
- 8.3 – Timely anaesthetic involvement in the care of high risk and critically ill women

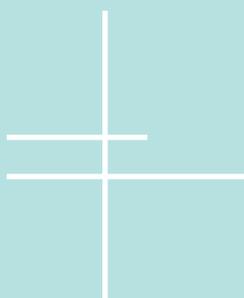
**CPD and Curriculum mapping**

CPD matrix codes: **1E05, 2B01, 2B03, 3A09, 3B00**

Training curriculum: **OB\_BK\_17, OB\_IK\_08, OB\_IK\_01, OB\_IS\_01, OB\_HS\_01, OB\_HS\_02**

**References**

- 1 Heslehurst N et al. A nationally representative study of maternal obesity in England, UK: trends in incidence and demographic inequalities in 619,323 births, 1989–2007. *Int J Obesity* 2010;**34(3)**:420–428.
- 2 Centre for Maternal and Child Enquiries (CMACE). Maternal obesity in the UK: Findings from a national project. *CMACE*, London 2010 ([http://www.oaa-anaes.ac.uk/assets/managed/editor/File/CMACE/CMACE\\_Obesity\\_Report\\_2010\\_Final%20for%20printing.pdf](http://www.oaa-anaes.ac.uk/assets/managed/editor/File/CMACE/CMACE_Obesity_Report_2010_Final%20for%20printing.pdf)).
- 3 Lewis G (Ed). Confidential Enquiry into Maternal and Child Health. Saving Mothers' Lives – Reviewing maternal deaths to make motherhood safer 2003–2005. *CEMACH*, London 2007 ([http://www.oaa-anaes.ac.uk/assets/managed/editor/File/Reports/2003-2005\\_saving\\_mothers\\_full\\_report.pdf](http://www.oaa-anaes.ac.uk/assets/managed/editor/File/Reports/2003-2005_saving_mothers_full_report.pdf)).
- 4 Management of women with obesity in pregnancy. *CMACE and RCOG*, London 2010 ([http://www.oaa-anaes.ac.uk/assets/managed/editor/File/Reports/2010\\_CMACE-RCOG\\_guideline\\_obesity\\_in\\_pregnancy.pdf](http://www.oaa-anaes.ac.uk/assets/managed/editor/File/Reports/2010_CMACE-RCOG_guideline_obesity_in_pregnancy.pdf)).
- 5 CMACE Obesity Report: Advice to OAA Members from the OAA Committee (January 2011) (<http://www.oaa-anaes.ac.uk/content.asp?contentid=415>).



## 8.5

## Antacid prophylaxis in obstetrics

Dr K Tambe, Dr J Charlton

**Why do this audit?**

All pregnant women from the second trimester develop an increased risk of regurgitation of stomach contents. At the time of delivery there is a chance of requiring general anaesthesia, which may often be required in an unstarved woman, and therefore she may have a risk of pulmonary aspiration. Historically this has been a leading cause of maternal deaths directly related to anaesthesia.<sup>1</sup>

Starvation and antacid prophylaxis guidelines are common in maternity units, but it is important to achieve a balance between safety and overbearing restrictions on normal labouring women.

There are no nationally-recommended guidelines in this situation, so audit will have to be modelled on local suggestions of best practice. Examples can be found on the Obstetric Anaesthetists' Association website (members-only).

**Best practice:  
research evidence or  
authoritative opinion**

H<sub>2</sub>-receptor blockers and non-particulate antacid are used for gastric acidity regulation in 98% of units nationally.<sup>2</sup> They may be used in combination.<sup>3</sup>

**Category 4 (elective) caesarean section (CS):**

- D Starvation guidelines can be the same as non-obstetric patients.
- D 98% of units nationally use gastric acidity prophylaxis routinely.<sup>2</sup>

**Category 1–3 (emergency) CS, other operative procedures:**

- D A low residue diet during labour increases volume of gastric contents, whereas isotonic drinks prevent ketosis but do not increase volume of gastric contents.<sup>4</sup> 54% of units routinely give gastric acidity prophylaxis to selected at-risk women and 36% give this to all women.<sup>2</sup>
- D Women may be assessed to have an increased chance of requiring an operative intervention, or at a greater risk of general anaesthesia should that be necessary, according to pre- or during-labour factors,<sup>5</sup> e.g:

**Pre-labour**

- ◆ Previous CS, other uterine scar
- ◆ Twins, breech
- ◆ Diabetes mellitus
- ◆ Pre-eclampsia
- ◆ Morbidly obesity
- ◆ Intrauterine growth retardation, other chronic fetal compromise
- ◆ Previous retained placenta, postpartum haemorrhage
- ◆ History of anaesthetic problems, predicted difficult airway on assessment

**During labour**

- ◆ Failure to progress, persisting malposition, unengaged fetal head
- ◆ Acute fetal compromise
- ◆ Opioids
- ◆ Haemorrhage

- D 97% of units nationally use gastric acidity prophylaxis routinely for category 1–3 CS.<sup>2</sup>

**Category 1 CS:**

Women may present for very urgent surgery without prior preparation. There may be time to give intravenous H<sub>2</sub>-receptor antagonist and/or oral antacid before anaesthetic induction.

**Category 4 CS:**

- D % of women who followed the starvation guidelines; % of women who were prescribed antacid prophylaxis; % who had the prescribed medication.

**Category 1–3 CS, other operative procedures:**

- D % of labouring women who had a risk assessment of need for dietary restriction and antacid prophylaxis.

**Suggested indicators**

	<ul style="list-style-type: none"> <li>D % of at-risk women during labour who followed starvation and antacid prophylaxis guidelines.</li> <li>D % of women who have surgery who followed the starvation guidelines.</li> <li>D % of women who were prescribed antacid prophylaxis.</li> <li>D % who had the prescribed medication.</li> </ul> <p><b>Category 1 CS:</b></p> <ul style="list-style-type: none"> <li>D % of cases who present with no warning period when advance preparations could have been made such as during labour or during other obstetric intervention (external cephalic version, fetal medicine procedure etc).</li> </ul>
<b>Proposed standard or target for best practice</b>	<ul style="list-style-type: none"> <li>D 100 % category 4 CS should follow starvation and antacid prophylaxis guidelines.</li> <li>D 100% of category 2–3 CS should be risk assessed into low risk or at-risk of requiring general anaesthesia.</li> <li>D 90% of category 2–3 CS who are at-risk of requiring general anaesthesia should follow starvation and antacid prophylaxis guidelines.</li> <li>D 100 % of obstetric patients who have a general anaesthetic should have drugs to regulate gastric acidity, or the reason why these were not given should be recorded.</li> </ul>
<b>Suggested data to be collected</b>	<ul style="list-style-type: none"> <li>D Type of surgery; urgency grade of CS.</li> <li>D Type of anaesthesia.</li> <li>D Non-labouring: period of starvation.</li> <li>D Labouring: type of oral intake, use of opioids.</li> <li>D Presence of at-risk factors.</li> <li>D Prescription of gastric acidity regulators.</li> <li>D Administration of gastric acidity regulators.</li> <li>D Other manoeuvres to reduce aspiration risk, e.g. use of nasogastric tube after general anaesthetic induction.</li> <li>D See audit proforma.<sup>5</sup></li> </ul>
<b>Common reasons for failure to meet standard</b>	<ul style="list-style-type: none"> <li>D No/unclear starvation guidelines for women in labour.</li> <li>D Midwives/obstetricians do not risk assess women for starvation/antacid prophylaxis.</li> <li>D Lack of anaesthetic involvement in management until too close to time of operation.</li> </ul>
<b>CPD and Curriculum mapping</b>	<p>CPD matrix codes: <b>2B02, 2B05</b></p> <p>Training curriculum: <b>OB_BK_07, OB_BS_02, OB_IK_08, OB_HS_08, OB_HS_11</b></p>
<b>References</b>	<ol style="list-style-type: none"> <li>1 Confidential Enquiry into Maternal and Child Health. Why Mothers Die 2000–2002. <i>CEMACH</i>, London 2004 (<a href="http://www.hqip.org.uk/assets/NCAPOP-Library/CMACE-Reports/33.-2004-Why-Mothers-Die-2000-2002-The-Sixth-Report-of-the-Confidential-Enquiries-into-Maternal-Deaths-in-the-UK.pdf">http://www.hqip.org.uk/assets/NCAPOP-Library/CMACE-Reports/33.-2004-Why-Mothers-Die-2000-2002-The-Sixth-Report-of-the-Confidential-Enquiries-into-Maternal-Deaths-in-the-UK.pdf</a>).</li> <li>2 Thomas J, Paranjothy S. The national sentinel caesarean section audit report. <i>RCOG Press</i>, London 2001.</li> <li>3 Paranjothy S et al. Interventions at caesarean section for reducing the risk of aspiration pneumonitis. <i>Cochrane Database of Systematic Reviews</i>, January 2010. Issue 1. Art No: CD004943 (<a href="http://onlinelibrary.wiley.com/doi/10.1002/14651858.CD004943.pub3/abstract">http://onlinelibrary.wiley.com/doi/10.1002/14651858.CD004943.pub3/abstract</a>).</li> <li>4 Caesarean Section. NICE Clinical Guideline 132. <i>NICE</i>, London 2011 (<a href="http://publications.nice.org.uk/caesarean-section-cg132">http://publications.nice.org.uk/caesarean-section-cg132</a>).</li> <li>5 Webster SR, Noblet JM, Lewis NL. Audit of the administration of antacid prophylaxis to high-risk labouring women on delivery suite. <i>Int J Obstet Anesth</i> 2005;<b>14</b>:S24.</li> </ol>

## 8.6

## Response times for provision of intrapartum analgesia and anaesthesia

Dr E Pickering, Dr N Lucas

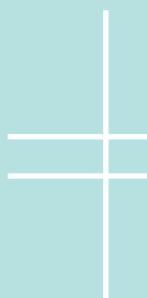
### Why do this audit?

When the condition of the mother or baby requires an urgent operative or instrumental delivery it is important that satisfactory arrangements exist for immediate access to an anaesthetist and a staffed operating theatre. Delay may result in unnecessary morbidity and mortality for the mother and or baby.<sup>1,2</sup>

The urgency of caesarean section (CS) has been classified into four categories:<sup>3,4</sup> Category 1) Immediate threat to the life of the woman or fetus; Category 2) Maternal or fetal compromise which is not immediately life threatening; Category 3) No maternal or fetal compromise but needs early delivery and Category 4) Delivery timed to suit woman or staff. For this audit only categories 1 and 2 are considered.

In obstetric units where there is a 24-hr anaesthetic service, attendance of the anaesthetist after request for regional analgesia during labour should be within an appropriate period of time, minimising delay and improving patients, experience and satisfaction with care.

### Best practice: research evidence or authoritative opinion



#### Caesarean section

Fetal emergency: The optimal decision to delivery interval (DDI) in the presence of fetal distress remains controversial. The diagnosis of fetal distress in labour is imprecise. The widely quoted '30 minute decision to delivery interval' lacks a firm evidence base. The recently published update to the NICE Caesarean Section guideline states that 30 minutes should be the audit standard for category 1 CS, and 30 and 75 minutes the audit standards for category 2 CS. The guideline recommends that these times should not be used to judge performance in individual cases.<sup>5</sup>

#### Maternal emergency

Life threatening maternal emergencies such as massive blood loss requires a prompt response time to minimise maternal and fetal morbidity and mortality.<sup>6,7</sup>

#### Regional analgesia during labour

Where a 24-hour regional analgesia service is offered, the time from the anaesthetist being informed about an epidural until being able to attend the mother should not normally exceed 30 minutes, and must be within 1 hour except in exceptional circumstances.<sup>6</sup> Women who require anaesthesia for delivery should take preference over those who request epidural analgesia for labour.

### Suggested indicators

- D % CS categories 1 and 2.
- D % CS categories 1 and 2 who have DDI within 30 min.
- D % CS category 2 who have DDI within 75 min.
- D % Women who are attended by the anaesthetist within 30 or 60 minutes of requesting labour regional analgesia.

### Proposed standard or target for best practice

- D ≥90% category 1 CS have DDI ≤ 30 min.
- D ≥90% category 2 CS have DDI ≤ 75 min.
- D ≥ 80% of women attended by anaesthetist within 30 minutes of requesting labour regional analgesia.
- D ≥ 90% of women attended by anaesthetist within 60 minutes of requesting labour regional analgesia.

### Suggested data to be collected

#### For CS:

- D Category of urgency.
- D Grade of anaesthetist/supervision.
- D Reason for delivery: maternal/fetal compromise.
- D Time of decision to deliver.
- D Time anaesthetist informed.
- D Time of patient arrival in theatre.

### Common reasons for failure to meet standard

### Related audits

### CPD and Curriculum mapping

### References

- D Time anaesthesia commenced.
- D Place anaesthesia commenced (in room if epidural in-situ).
- D Type of anaesthesia: GA, De-novo CSE, De-novo Spinal, Epidural/CSE top-up.
- D Time patient adequately anaesthetised.
- D Time of knife to skin.
- D Time of delivery
- D Apgar Score 1 and 5min.
- D Reasons for any delays.

#### For labour regional analgesia

- D Grade of anaesthetist.
- D Time anaesthetist informed of request.
- D Time of attendance with mother.
- D Reasons for any delays.

#### CS:

- D Slow response time from all parties.
- D Lack of communication.
- D Anaesthetist unavailable.
- D Failure to establish regional anaesthesia or inappropriate use of regional anaesthesia.
- D Theatre in use, second theatre not staffed or secondary anaesthetist unavailable.

#### Labour regional analgesia:

- D Blood results unavailable in women with coagulopathies (e.g. HELLP syndrome).
- D Stage of labour e.g. fully dilated, labour not fully established.
- D Anaesthetist unavailable.
- D Lack of communication.

8.9 – Monitoring of obstetric patients in HDU and recovery

8.11 – Pain relief post caesarean section

CPD matrix codes: **2B01–03**

Training curriculum: **OB\_BK\_04, OB\_BK\_09, OB\_BK\_13, OB\_BS\_04–08, OB\_IS\_03, OB\_HS\_04, OB\_HS\_08**

- 1 Confidential Enquiry into Stillbirths and Deaths in Infancy (CESDI). 7th Annual Report. *Maternal and Child Health Research Consortium*, London 2000.
- 2 Confidential Enquiry into Maternal and Child Health. Why Mothers Die 1994–1996. *CEMACH*, London 1998.
- 3 Classification of urgency of caesarean section – a continuum of risk. Good Practice Guide 11. *RCOG and RCoA*, London April 2010 (<http://www.rcog.org.uk/classification-of-urgency-of-caesarean-section-good-practice-11>).
- 4 Lucas DN et al. Urgency of caesarean section: a new classification. *J Roy Soc Med* 2000;**93**:346–350.
- 5 Caesarean Section. NICE Clinical Guideline 132. *NICE*, London 2011 (<http://publications.nice.org.uk/caesarean-section-cg132>).
- 6 OAA/AAGBI guidelines for obstetric anaesthetic services – 3rd edition. *AAGBI and OAA*, London, 2012 (<http://www.aagbi.org/publications/publications-guidelines/M/R>).
- 7 Confidential Enquiry into Maternal and Child Health. Why Mothers Die 2000–2002. *CEMACH*, London 2004 (<http://www.hqip.org.uk/assets/NCAPOP-Library/CMACE-Reports/33.-2004-Why-Mothers-Die-2000-2002-The-Sixth-Report-of-the-Confidential-Enquiries-into-Maternal-Deaths-in-the-UK.pdf>).

## 8.7

## Epidural analgesia during labour

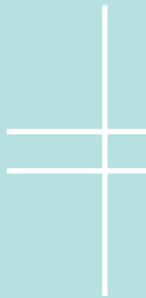
Dr M Purva, Dr M Kinsella

## Why do this audit?

Epidural analgesia (EA) is considered to be the gold standard for labour analgesia. The success or failure of EA may be considered in terms of the procedural aspects of insertion, the quality of analgesia during labour or a retrospective satisfaction score of the overall experience. The complication of accidental dural puncture (ADP) is also embedded as a service quality indicator (see audit 8.12).

A composite 'failure' endpoint has been defined that includes several of the above individual factors.<sup>1</sup> This has been used as a training tool.<sup>2</sup>

## Best practice: research evidence or authoritative opinion



There is higher failure rate for epidural analgesia among maternity patients compared to general surgical patients. Reasons include the use of low concentration local anaesthetic, anxiety and anatomical differences.<sup>3</sup> Cervical dilatation > 7 cm, history of opioid tolerance, previous failed epidural and trainee anaesthetist increase the risk of inadequate pain relief.<sup>4</sup>

Definitions of failure include: failure to site, high VAS scores 30 minutes after initiation of epidural, resite of ineffective epidural, accidental dural puncture and failure to provide effective anaesthesia if topped up for caesarean section,<sup>4,5</sup> or a combination of these factors.

The incidence of ADP is 1.0%–1.2%<sup>5,6</sup> and resiting because of no analgesia or unilateral block is 13.1%.<sup>6</sup> 7.1% of epidurals were replaced due to failure to work at CS.<sup>5</sup>

A patient satisfaction score of 98% was found even with repeated resiting,<sup>6</sup> although inadequate pain relief 45 minutes after starting to insert the epidural has been shown to correlate to dissatisfaction.<sup>1</sup>

A definition of failure which includes a composite endpoint (any of inadequate pain relief 45 min after placement, ADP, resiting, abandonment, dissatisfaction at follow up) has been assessed. The failure rate using this was 20%.<sup>1</sup>

## Suggested indicators

- D % of epidurals placed by training and non-training grade doctors in an obstetric unit that are successful (can be split into grades CT2, ST 3–8).
- D % of epidurals providing adequate pain relief 45 min after placement (from start of epidural insertion).
- D % of epidurals resited at any time during labour.
- D % of ADP.
- D % patients satisfied with epidural at follow up visit.
- D % of epidurals successful using a composite endpoint (none of inadequate pain relief 45 min after placement, ADP, resiting, abandonment, dissatisfaction at follow up).

## Proposed standard or target for best practice

- D Adequate pain relief 45 min after placement (from start of epidural insertion) ≥ 88%.
- D Epidurals replaced at any point during labour < 15%.
- D ADP rate < 1%.<sup>5,6</sup>
- D Satisfaction at follow up visit ≥ 98%.<sup>6</sup>
- D Success using composite endpoint ≥ 85%<sup>1,5,6,7</sup> by grade of anaesthetist:
  - ◆ CT 2 – 78%
  - ◆ ST 3 – 76%
  - ◆ ST 4 – 84%
  - ◆ ST 6 – 80%

## Suggested data to be collected

- D Anaesthetist identity/code and grade.
- D Date and time of procedure.
- D Position (lateral vs sitting).
- D BMI; parity; cervical dilation; anatomical factors e.g. scoliosis, previous surgery.

	<ul style="list-style-type: none"> <li>D Following insertion: <ul style="list-style-type: none"> <li>◆ analgesia within 45 minutes of starting epidural needle insertion, using a definition 'Are you happy with the pain relief?'</li> <li>◆ ADP</li> <li>◆ insertion abandoned or sited by another anaesthetist.</li> </ul> </li> <li>D At follow up visit: <ul style="list-style-type: none"> <li>◆ epidural resited during labour</li> <li>◆ patient satisfaction (excellent, satisfactory, unsatisfactory, no benefit)</li> <li>◆ headache typical of post-dural puncture headache.</li> </ul> </li> </ul>
<b>Common reasons for failure to meet standard</b>	<ul style="list-style-type: none"> <li>D Operator inexperience/inadequate training.<sup>6</sup></li> <li>D High BMI.</li> <li>D Frequent use of sitting position to insert epidural.<sup>8</sup></li> <li>D Operator fatigue.<sup>9</sup></li> <li>D Epidural migration.<sup>10</sup></li> <li>D Rapid progression of labour.</li> <li>D Inability to palpate spinous processes.<sup>11</sup></li> <li>D Spinal abnormality.<sup>12</sup></li> </ul>
<b>Related audits</b>	<p>8.3 – Timely anaesthetic involvement in the care of high risk and critically ill women</p> <p>8.6 – Response times for provision of intrapartum analgesia and anaesthesia</p> <p>8.12 – Anaesthetic complications and side-effects</p> <p>11.2 – Patient information on pain management</p>
<b>CPD and Curriculum mapping</b>	<p>CPD matrix codes: <b>2B01, 2B03, 3B00</b></p> <p>Training curriculum: <b>OB_BK_11–12, OB_BS_04, OB_IS_03, OB_HS_13</b></p>
<b>References</b>	<ol style="list-style-type: none"> <li>1 Thangamuthu A, Purva M, Murgotroyd H. Failure rates of epidural: results from the Cusum project. Abstract presentation ASA meeting 2011.</li> <li>2 Sivaprakasam J, Purva M. Cusum analysis to assess competence: what failure rate is acceptable? <i>The Clinical Teacher</i> 2010;<b>7</b>:257–261.</li> <li>3 Collier CB. Why obstetric epidurals fail: a study of epidurograms. <i>Int J Obstet Anesth</i> 1996;<b>5</b>:19–31.</li> <li>4 Agaram R et al. Inadequate pain relief with labor epidurals: a multivariate analysis of associated factors. <i>Int J Obstet Anesth</i> 2009;<b>18</b>:10–14.</li> <li>5 Pan PH, Bogard TD, Owen MD. Incidence and characteristics of failures in obstetric neuraxial analgesia and anesthesia: a retrospective analysis of 19,259 deliveries. <i>Int J Obstet Anesth</i> 2004;<b>13</b>:227–233.</li> <li>6 Eappen S, Blinn A, Segal S. Incidence of epidural catheter replacement in parturients: a retrospective chart review. <i>Int J Obstet Anesth</i> 1998;<b>7</b>:220–225.</li> <li>7 Crawford JS. Lumbar epidural block in labour: a clinical analysis. <i>Br J Anaesth</i> 1972;<b>44</b>:66–74.</li> <li>8 Tsen LC. Neuraxial techniques for labor analgesia should be placed in the lateral position. <i>Int J Obstet Anesth</i> 2008;<b>17</b>:146–152.</li> <li>9 Aya AGM et al. Increased risk of unintentional dural puncture in night-time obstetric epidural anesthesia. <i>Can J Anesth</i> 1999;<b>46</b>:665–669.</li> <li>10 Bishton IM et al. Factors influencing epidural catheter migration. <i>Anaesthesia</i> 1992;<b>47</b>:610–612.</li> <li>11 Faitot V et al. An observational study of factors leading to difficulty in resident anaesthesiologists identifying the epidural space in obstetric patients. <i>Int J Obstet Anesth</i> 2011;<b>20</b>:124–127.</li> </ol>

## 8.8 Caesarean section anaesthesia: technique and failure rate

Dr M Purva, Dr I F Russell, Dr M Kinsella

### Why do this audit?

There is unequivocal evidence that regional anaesthesia (RA) is safer than general anaesthesia (GA) for caesarean section (CS)<sup>1</sup> and the majority of women now wish to be awake for their CS.

RA has a significant failure rate. This may lead to pain during surgery<sup>2</sup> or the need for conversion of the RA to GA. The latter exposes the woman to the complications of both anaesthetic methods. There is little data on Category I CS<sup>3</sup> but this carries the greatest maternal and fetal risk.

### Best practice: research evidence or authoritative opinion

Previous editions of this topic set standards based on two large studies with comprehensive and detailed data on anaesthetic type for CS and failure. Those figures are now somewhat outdated,<sup>3,4</sup> however the core of that information can be supplemented with data from the National Obstetric Anaesthesia Database (NOAD)<sup>5</sup> plus other publications.<sup>6,7</sup>

The rate of RA for CS in the UK was 91% in 2008.<sup>5</sup> Rates of RA for Cat I CS between 54% and 72% have been found in single units or pooled data.<sup>5,6,7</sup>

The published data on rate of intraoperative pain at CS are limited but 5% for spinal and 15% for epidural are to be expected.<sup>6,8</sup>

Data from the NOAD/NPSA project has found a RA to GA conversion rate for spinal anaesthesia of around 1.5% overall, 1% for Cat 4, 2.5% for Cat I–3.<sup>9</sup>

Much published work on RA to GA conversion defines RA as that which is specifically started either for CS or a prior attempt at assisted vaginal delivery. We prefer the more stringent approach of defining cases where regional analgesia was started during labour as having had RA for CS whether used for CS or not. The rationale is that it should be possible to convert effective labour regional analgesia to surgical anaesthesia with good reliability, and this should be attempted in the majority of cases where regional analgesia has already been established (**NB** some units do not routinely top up labour epidurals but perform a spinal instead; to be valid, this alternative approach should lead to the same or lower GA conversion rate as units which practise routine top up of epidurals).

### Suggested indicators

- D % CS carried out with RA – divided into Cat 4, Cat I–3, Cat I.
- D % pain during RA – divided into Cat 4, Cat I–3, Cat I.
- D % conversion from RA to GA – divided into Cat 4, Cat I–3, Cat I.

#### Urgency classification<sup>10</sup>

<b>Category 1</b>	Maternal or fetal compromise, immediate threat to life of woman or fetus
<b>Category 2</b>	Maternal or fetal compromise, no immediate threat to life of woman or fetus
<b>Category 3</b>	No maternal or fetal compromise, requires early delivery
<b>Category 4</b>	Delivery at a time to suit the woman and maternity services

*Elective = Category 4. Emergency = Category 1–3.*

### Proposed standard or target for best practice

	Cat 4	Cat I–3	Cat I
CS carried out with RA	> 95%	> 85%	> 50%
Pain during CS	< 5%	< 15%	< 20%
RA to GA conversion	< 1%	< 5%	< 15%

**Suggested data to be collected**

Basic unit data for annual summary statistics (e.g for NOAD) should include number of CS, urgency category, type of anaesthetic.

- D **PRIMARY GA** includes cases where the patient has not received any other regional technique e.g. epidural or CSE during labour.
- D **PRIMARY RA** includes:
  - ◆ all cases with epidural or CSE during labour; whether topped up for CS or not
  - ◆ attempted RA where a needle is inserted in the patient's back, whether any anaesthetic drugs are given through the needle/catheter or not and whether surgery is carried out under RA or not.
- D Frequency – continuous.
- D Detailed data if non-compliant with standards:
  - ◆ Grade of anaesthetist, surgeon
  - ◆ Indication for primary GA (urgency, maternal preference, fetal indication, RA contraindicated, etc)
  - ◆ Indication for RA to GA conversion (urgency, technical difficulty, raised BMI, maternal request, pain, poor block, fetal reasons, surgical reasons, etc; location of epidural top up and drugs used)
  - ◆ In particular; the data collected should allow units to identify reasons for a low RA rate (or high RA to GA conversion rate) for Category I CS.
- D If the figures for primary GA rate or GA conversion rate in a unit are significantly higher than the standards above, then the use of a quality improvement approach (monthly data analysis and plan-do-study-act cycles) should be considered to remedy the problem.<sup>11</sup>

**Common reasons for failure to meet standard**

- D Lack of a dedicated obstetric anaesthetist. Staff inexperience.
- D Poor/slow communication between staff. Obstetric preference for GA because of time constraints or obstetric pathology.
- D High number of 'maternal requests' for GA, especially in ethnic minority women.
- D Misunderstanding/misclassifying urgency. Poor selection of RA type in complex cases.
- D Inappropriate assessment/recording of block.
- D High rate of pain or GA conversion in epidural top up anaesthesia. Management of epidural top up – time and place of commencement, drugs used.

**CPD and Curriculum mapping**

CPD matrix codes: **2B02–03**

Training curriculum: **OB\_BK\_09, OB\_BK\_13, OB\_BS\_05, OB\_BS\_06, OB\_BS\_07, OB\_HS\_08**

**References**

- 1 [http://www.cemach.org.uk/publications/WMD2000\\_2002/content.htm](http://www.cemach.org.uk/publications/WMD2000_2002/content.htm).
- 2 Carvalho B et al. Patient preferences for anesthesia outcomes associated with cesarean delivery. *Anesth Analg* 2005;**101**:1182–1187.
- 3 Thomas J, Paranjothy S, Royal College of Obstetricians and Gynaecologists Clinical Effectiveness Support Unit. National Sentinel Caesarean Section Audit Report. RCOG, London 2001 ([http://www.rcog.org.uk/files/rcog-corp/uploaded-files/nscs\\_audit.pdf](http://www.rcog.org.uk/files/rcog-corp/uploaded-files/nscs_audit.pdf)).
- 4 Shibli KU, Russell IF. A survey of anaesthetic techniques used for caesarean section in the UK in 1997. *Int J Obstet Anesth* 2000;**9**:160–167.
- 5 National Obstetric Anaesthesia Database (<http://www.oaa-anaes.ac.uk/content.asp?ContentID=241>).
- 6 Kinsella, M. A prospective audit of regional anesthesia failure in 5080 Caesarean sections. *Anaesthesia* 2008;**63**:822–832.
- 7 Rafi MA, Arfeen Z, Misra U. Conversion of regional to general anaesthesia at caesarean section: increasing the use of regional anaesthesia through continuous prospective audit. *Int J Obstet Anesth* 2010;**19**:179.
- 8 Arzola AC, Wieczorek PM. Efficacy of low-dose bupivacaine in spinal anaesthesia for Caesarean delivery: systematic review and meta-analysis. *Br J Anaesth* 2011;**107**:308–318.
- 9 Monitoring of adverse outcomes at CS/NOAD (<http://www.oaa-anaes.ac.uk/content.asp?ContentID=448>).
- 10 Classification of urgency of caesarean section – a continuum of risk. GP11 2010 (<http://www.rcog.org.uk/classification-of-urgency-of-caesarean-section-good-practice-11>).
- 11 Peden, CJ. Emergency Surgery in the elderly patient: A quality improvement approach. *Anaesthesia* 2011;**66**:440–445.

## 8.9 Monitoring of obstetric patients in recovery and HDU

Dr E Pickering, Dr N Lucas

### Why do this audit?

The appropriate management of the critically ill parturient, (timely recognition and response) is essential to reduce maternal morbidity and mortality.<sup>1,2</sup> The most recent Confidential Enquiry into Maternal Death showed that sepsis was the number one direct cause of maternal death and that almost 50% of women who died received substandard care.<sup>3</sup>

The provision of care for the critically ill parturient has been specified in the joint RCOG/ RCoA document, 'Providing equity of critical and maternity care for the critically ill pregnant or recently pregnant woman'.<sup>4</sup> The Intensive Care Society has defined levels of care a patient may require.<sup>5</sup> The provision of Level 2 ("high dependency care") in obstetrics has been a national recommendation for several years. Minimum recovery facilities and HDU facilities have been defined.<sup>4,6,7,8,9</sup>

### Best practice: research evidence or authoritative opinion

Post-operative recovery and HDU standards have been developed by the Association of Anaesthetists of Great Britain and Ireland, Royal College of Anaesthetists, Obstetric Anaesthetists Association, Royal College of Obstetricians and Gynaecologists and NICE.<sup>4,6,7,8,9</sup>

### Suggested indicators

- D Existence of the facilities described below as 'standard' of care in maternity recovery.
- D Existence of facilities described below as 'standard' for HDU care of sick women in antenatal and perinatal period.
- D % women who have the observations below documented on a suitable chart.
- D Existence of protocol for discharge from recovery area.
- D % women who meet the discharge criteria before leaving the area.

### Proposed standard or target for best practice

#### Maternity recovery Areas:

##### Annual facility survey

- D The facilities provided must be to the same standard as for general recovery facilities.
- D Training undergone by staff must be to the same standard as for general recovery facilities.
- D All staff in the area require training in cardiopulmonary resuscitation.
- D Minimum nursing ratio of 1:1 available 24 hrs.

##### Prospective or retrospective data collection over one month period

- D > 90% of women should have the following observations documented on a suitable chart at least every 15 minutes for first hour: oxygen saturation, respiratory rate, heart rate and rhythm, blood pressure, temperature, level of consciousness, pain score, sensory level of regional blockade, blood loss from wound, vagina and drain, IV infusions and fluid balance.
- D > 90% women should have observations continuing at 30 min intervals for 2 hrs then hourly thereafter after initial hour of recovery post anaesthesia.
- D > 90% women should meet the discharge criteria as per protocol before leaving the area.

#### HDU:

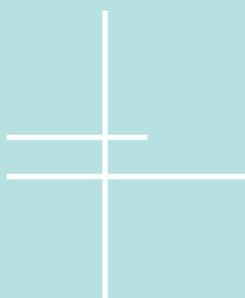
'Providing equity of critical and maternity care for the critically ill pregnant or recently pregnant woman'<sup>4</sup> has laid out a comprehensive list of auditable standards.

In addition:

##### Annual facility survey

- D There should be a named consultant anaesthetist and obstetrician responsible for all HDU patients 24 hrs per day.
- D Minimum nursing ratio of 1:2 available 24 hrs.
- D Training of staff should be to the same standard as general HDU nursing staff.
- D Facilities and training for invasive monitoring of systemic and central venous pressures.

	<ul style="list-style-type: none"> <li>D Antenatal fetal monitoring, assessment and facilities to conduct labour should be available.</li> <li>D Staff should be trained in the physiological and pharmacological effects of pregnancy, including cardiopulmonary resuscitation of pregnant women.</li> <li>D For all women with a live infant facilities for breastfeeding (or use of breast pump) should be available.</li> </ul> <p><b>Retrospective or prospective data collection over one month</b></p> <ul style="list-style-type: none"> <li>D &gt; 90% of women to have the same observations as for post CS documented on a suitable HDU chart. In addition, hourly urine output and fluid balance and intravenous infusions should be recorded.</li> </ul>
<b>Suggested data to be collected</b>	<ul style="list-style-type: none"> <li>D Information as above during a nominated audit period.</li> <li>D Critical incident analysis in these areas according to the standards above.</li> </ul>
<b>Common reasons for failure to meet standard</b>	<ul style="list-style-type: none"> <li>D Inadequate training of staff.</li> <li>D Lack of suitably trained staff.</li> <li>D Lack of equipment.</li> <li>D Failure to realise the importance of the recovery period, changes related to pregnancy and the requirements for the fetus and neonate.</li> </ul>
<b>CPD and Curriculum mapping</b>	<p>CPD matrix codes: <b>2A04, 2B02, 2B03, 2B05, 3A12</b></p> <p>Curriculum: <b>OB_BK_16, OB_BS_11, OB_BS_12, OB_BK_17, OB_IK_08, OB_HK_01, OB_IS_11, OB_HS_13</b></p>
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## 8.10

# Airway and intubation problems during general anaesthesia for caesarean section

Dr S Joy, Dr R Wilson

## Why do this audit?

Patients do not die from failure to intubate, but from the consequences of failing to manage the situation<sup>1</sup>. This is a core anaesthetic skill which should be rehearsed and assessed regularly.<sup>2</sup> Current anaesthetic trainees find difficulty gaining experience of this in obstetrics because of the reduced number of caesarean sections (CS) performed under general anaesthesia (GA) and their restricted working hours; many trainees will do one or less GA for CS per year.<sup>3</sup>

Every GA case for CS can be critically appraised and used in a learning exercise and to inform realistic simulator training and failed intubation drills and protocols. Protocol violation still occurs frequently in real incidents of failed intubation.<sup>4</sup>

Additionally, changing practice in GA for CS, e.g. use of laryngeal mask airway, rocuronium and the increasing age, weight and medical complexity of pregnant women requires continual review to audit local minimum standards of care (where they exist) and to benchmark against national and international data.<sup>3,5</sup>

## Best practice: research evidence or authoritative opinion

A difficult intubation can be defined as immediate abandonment of the initial attempt at intubation, more than one attempt at intubation or based on the subjective opinion of the anaesthetist.<sup>5</sup>

A failed intubation can be defined as the inability to intubate the trachea and subsequent abandonment of intubation as a means of airway management.<sup>5</sup>

Difficulties with intubation occur in 1:30 to 1:100 GA for CS.  
Failure to intubate occurs in 1:250 to 1:300 GA for CS.<sup>5,6,7</sup>

## Suggested indicators

- D 100% of GA charts should be reviewed.
- D % GA CS used for teaching.
- D % difficult intubation at CS.
- D % failed intubation at CS.
- D % trainees attending failed intubation drills/simulation during obstetric training block.

## Proposed standard or target for best practice

- D Failed intubation incidence should be no more than 1:250.<sup>5</sup>
- D Difficult intubation should be no greater than 1:30.<sup>5</sup>
- D 100% GA for elective CS should be used for teaching GA skills.
- D Simulation-based training should be incorporated in obstetric training modules.<sup>8,9</sup>

## Suggested data to be collected

### Case by case:

- D Urgency category of CS, indication.
- D Grade of anaesthetists.
- D Indication for GA.
- D Anaesthetic history of difficult airway.
- D **Pre-operative airway assessment:** dentition, anatomical deformity; Mallampati score; Wilson's score; thyromental distance.
- D **GA technique:** antacid prophylaxis; GA drugs/doses; airway adjuncts used/available; patient positioning; cricoid pressure; monitoring.
- D **Intubation:** grade of laryngoscopy; number of attempts; failed intubation drill used; stomach emptying.
- D **Outcome:** maternal, fetal adverse outcome – temporary or permanent sequelae.

### Unit caseload and facilities:

- D Annual number of GA for CS.
- D Induction and competencies for solo obstetric anaesthetic trainees.
- D Presence of competent assistance.
- D Availability of senior supervision on rota.

	<ul style="list-style-type: none"> <li>D Availability of failed intubation fire drills or simulator training.</li> <li>D Difficult airway operating lists,</li> <li>D Written patient information regarding relative safety of different anaesthetic techniques.</li> </ul>
<p><b>Common reasons for failure to meet standard</b></p>	<ul style="list-style-type: none"> <li>D Trainees and consultants have reduced experience in GA for CS.</li> <li>D Disproportionate number of cases occurs as emergencies out-of-hours, reducing training opportunities.</li> <li>D Poor record keeping and lack of senior review.</li> <li>D Lack of regular failed intubation drill practice on the delivery suite.</li> <li>D Lack of high fidelity simulator workshops to develop skills, teamwork and situational awareness.</li> </ul>
<p><b>CPD and Curriculum mapping</b></p>	<p>CPD Matrix code: <b>2B02</b></p> <p>Training curriculum competences: <b>OB_BS_07, OB_IK_08, OB_HS_08</b></p>
<p><b>References</b></p>	<ol style="list-style-type: none"> <li>1 Cook TM, Woodall N, Frerk C. Major complications of airway management in the UK: results of the Fourth National Audit Project of the Royal College of Anaesthetists and the Difficult Airway Society. Part 2: Anaesthesia. <i>Br J Anaesth</i> 2011;<b>106</b>:617–631.</li> <li>2 CCT in Anaesthetics – Basic level training (Annex B) 2010. <i>RCoA</i>, London 2010 (<a href="http://www.rcoa.ac.uk/node/230">http://www.rcoa.ac.uk/node/230</a>).</li> <li>3 Searle R D, Lyons G. Vanishing experience in training for obstetric general anaesthesia: an observational study. <i>Int J Obst Anesth</i> 2008;<b>17</b>:233–237.</li> <li>4 Rahman K, Jenkins JG. Failed tracheal intubation in obstetrics: no more frequent but still managed badly. <i>Anaesthesia</i> 2005;<b>60</b>:168–171.</li> <li>5 McDonnell NJ et al. Difficult and failed intubation in obstetric anaesthesia: an observational study of airway management and complications associated with general anaesthesia for caesarean section. <i>Int J Obstet Anesth</i> 2008;<b>17</b>:292–297.</li> <li>6 Djabatey EA, Barclay PM. Difficult and failed intubation in 3430 obstetric general anaesthetics. <i>Anaesthesia</i> 2009;<b>64</b>:1168–1171.</li> <li>7 Hawthorne L et al. Failed intubation revisited: 17-year experience in a teaching maternity unit. <i>Br J Anaesth</i> 1996;<b>76</b>:680–684.</li> <li>8 Lipman S, Carvalho B, Brock-Utne J. The demise of general anaesthesia in obstetrics revisited; prescription for a cure. <i>Int J Obst Anesth</i> 2004;<b>14</b>:2–4.</li> </ol>

## 8.11

## Pain relief after caesarean section

Dr N Lucas, Dr E Pickering, Dr F Plaat

**Why do this audit?**

Adequate pain relief should be provided after caesarean section (CS) to improve patient experience and reduce morbidity. Analgesic drug efficacy is important for patient comfort but this must be balanced against maternal side effects and drug transference to the neonate via breast milk.

Opioids provide good pain relief and can be given by many routes including subarachnoid, epidural, intravenous, intramuscular, subcutaneous and oral. Opioids are unfortunately associated with unwanted side effects, in particular pruritus, sedation, nausea, vomiting and respiratory depression.<sup>1</sup>

Pain relief provided by NSAIDs has been shown to reduce opioid requirements. However, this group of drugs also has unwanted side effects.<sup>2</sup>

**Best practice: research evidence or authoritative opinion**

There is little definitive evidence about what constitutes appropriate, achievable parameters in best practice for the provision of post-caesarean section analgesia. Difficulty arises as a result of the varying use of visual analogue scores and verbal rating scales to measure pain. There is also evidence that maternal satisfaction is not compromised by less than perfect analgesia. Use of drugs that do not have significant effects on the fetus should be used, particularly in breast-feeding women.

NICE guidelines for caesarean section recommend:<sup>3</sup>

- D Women should be offered peri-operative subarachnoid diamorphine (0.3–0.4mg) or epidural diamorphine (2.5–5mg) if CS performed by regional anaesthesia.
- D If there are no contraindications, regular NSAIDs should be used as an adjunct to opioid therapy.
- D Women who have received opioids should be monitored for respiratory rate, sedation and pain scores and prescribed an anti-emetic and laxative.

**Suggested indicators**

- D Use of subarachnoid or epidural opioids.
- D Women who are prescribed regular NSAIDs after CS unless there are contraindications.
- D Pain management plan for women who have severe pain or have contraindications to standard analgesics e.g. indications for continuous epidural analgesia.
- D Documented hourly observations of respiratory rate, sedation and pain intensity scores in those who have received opioids 12 hours for diamorphine and 24 hours for morphine.
- D Data on post-operative day 1 of women who were satisfied with management of pain after CS.

**Proposed standard or target for best practice**

- D > 95% women to be satisfied with analgesia on day 1 post-caesarean section.
- D 100% women received subarachnoid or epidural opioids if CS performed by regional anaesthesia.
- D Unless contraindicated, 100% women to be prescribed regular NSAIDs.

**Suggested data to be collected**

- D Observations as above.
- D Patient satisfaction with pain management day 1 post-operatively.
- D Percentage of women given opioids via the subarachnoid or epidural route during or post CS.
- D Percentage of women receiving NSAIDs post CS.
- D Percentage of women requiring opioid PCA post CS.
- D Frequency of side effects.
- D Relevant critical incidents.

**Common reasons for failure to meet standard**

- D Lack of follow up post-operatively.
- D Staff shortages causing delay in giving analgesia and lack of observations.
- D Lack of explanation to patient about available analgesia.

**Related audits**

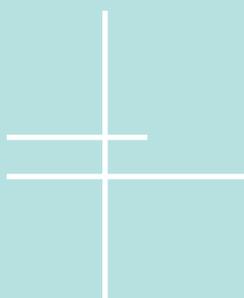
8.9 – Monitoring of the obstetric patient in recovery and high dependency unit

**CPD and Curriculum mapping**

CPD matrix codes: **ID02, 2B03**

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## 8.12

## Anaesthetic complications and side effects

Dr M Girgis, Professor M Wee

## Why do this audit?

Routine follow up after obstetric anaesthesia is recommended. The necessity for assessment of side effects after anaesthesia is self-evident. There are a number of potentially serious complications which can occur after anaesthetic intervention during pregnancy. Some of these may be amenable to treatment and should be recognised and treated promptly.

## Best practice: research evidence or authoritative opinion

For regional anaesthesia (RA) – The accidental dural puncture (ADP) rate may vary from 2% in novices or for difficult epidurals to < 0.26% with good technique and supervision.<sup>1,2</sup> It is accepted that narrow gauge pencil point needles reduce the incidence of post-dural puncture headache (PDPH).<sup>3,4</sup> Reviews of epidural blood patches (EBP) and other methods for prophylaxis of PDPH show current evidence is insufficient to support their use for prevention of PDPH.<sup>5,6</sup> EBP remains the gold standard treatment for PDPH, with between 58–75% receiving complete relief after the first blood patch, although the headache returned in 31% and 28% required more than one EBP.<sup>7,8,9</sup> There are many possible neurological complications after central neuraxial blockade including nerve root damage, spinal haematoma, cauda equina syndrome, meningitis and epidural abscess. The incidence of complications has been quoted as 1:13,000 for neurological complications after spinal blockade and 1:25,000 after epidural blockade.<sup>10,11</sup> Spinal haematoma after obstetric epidural blockade carried an incidence of 1:200,000<sup>12</sup> and the National Audit Project 3 estimated the rate of permanent harm after central neuraxial block in the obstetric population to be between 1:320,000 (optimistically) and 1:80,000 (pessimistically).<sup>13</sup>

For general anaesthesia (GA) – Incidence of recall of < 0.5% and dreaming < 5% in patients with an inspired isoflurane concentration of 1%;<sup>14,15</sup> 1:250–1:1250 incidence of failed intubation;<sup>6,17</sup> 1:10–1:100 incidence of sore throat and post-operative nausea and vomiting (PONV).<sup>18</sup>

## Suggested indicators

**Denominator:** Delivery suite caseload, type of anaesthesia provided – split into caesarean section (CS), operating theatre non-CS, labour ward.

- D % of women followed up after receiving an anaesthetic intervention
- D For regional anaesthetic procedures:
  - ◆ % of women having an obstetric epidural who have a dural puncture
  - ◆ % of women who have PDPH after spinal or epidural anaesthesia
  - ◆ % of women receiving EBP
  - ◆ % of women left with long-term (> 6 months duration) neurological complications
  - ◆ % of women followed up after EBP or neurological complications
  - ◆ % of women who are converted to GA due to inadequate regional anaesthesia
- D For general anaesthetic procedures:
  - ◆ % of women who report awareness after GA section
  - ◆ % of difficult airway/failed intubation
  - ◆ % suffering from PONV
  - ◆ % suffering from sore throats

## Proposed standard or target for best practice

- D 100% of parturients having an anaesthetic intervention should be followed up.
- D For RA:
  - ◆ < 1% of epidurals should have ADP
  - ◆ < 0.5% of spinal anaesthesia should be followed by severe PDPH
  - ◆ 100% followed up after EBP or neurological complications.
- D For GA:
  - ◆ < 0.4 incidence of recall
  - ◆ < 5% should have dreaming during GA
  - ◆ After failed intubation: 100% should be given Airway Alert Letter (can be obtained from <http://www.das.uk.com/guidelines/downloads.html>) with copy to GP and anaesthetic department
  - ◆ 100% should have warning put in medical notes with adequate explanation.

**Suggested data to be collected**

- D % of parturients followed up.
- D Total number of epidurals, spinals and GA.
- D Grade of anaesthetist, experience and supervision level.
- D For RA: Number of known ADP, number of PDPH, number of conversion to GA and reason. Gauge and type of needle and number of attempts. Management and outcome of PDPH. % receiving EBP, % who have 2nd EBP, % parturients followed up after EBP and neurological complications.
- D Recommended audit frequency – continuous
- D For GA: Incidence of recall or dreaming when questioned, record of machine check, incidence of PONV and sore throat. Incidence of failed intubations. For cases where awareness has occurred, documentation of induction agents and dosages used, end-tidal concentration of N<sub>2</sub>O and volatile agent. Recommended audit frequency – continuous.

**Common reasons for failure to meet standard**

- D Workload problems leading to poor follow up of patients; early discharge from hospital.
- D Poor supervision of trainees and lack of senior input.
- D Urgency of CS.
- D Lack of training in regional anaesthesia and airway management.
- D Failure to check anaesthetic equipment according to AAGBI guidelines.
- D Poor training in GA for obstetrics.

**Related audits**

- 8.8 – Caesarean section anaesthesia: technique and failure rate
- 8.10 – Airway and intubation problems during general anaesthesia for caesarean section
- 2.8 – Awareness and general anaesthesia

**CPD and Curriculum mapping**

CPD matrix code: **2B04**

Training curriculum competences: **OB\_BK\_12, OB\_IS\_05, OB\_HS\_13**

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