

Anaesthetic Guidelines for Rural Hospitals

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On behalf of the Rural Health Task Group of the Academy of Family Practice/Primary Care.

This series is also being produced as a booklet for the use of doctors in Rural Hospitals and will be obtainable from SA Family Practice in 1997.

ANAESTHESIA FOR CAESAREAN SECTIONS

The series will have the following sections:

1. Introduction to anaesthetics and anaesthetic safety checklist
2. Anaesthesia, intubation and extubation
3. The pre-operative assessment
4. Anaesthetic drugs I
5. Anaesthetic drugs II
6. Spinal anaesthesia
7. Caesarean Sections
8. Paediatric anaesthesia
9. Complications during anaesthesia
10. Local and regional anaesthesia
11. Ventilation and breathing systems
12. Blood transfusion

NO. 7

sarian sections (C/S) which everyone follows so that it becomes routine and familiar to everyone, and there should be no place for one doctor to do one thing, and another to do something different.

Although obstetric anaesthesia requires you to consider the safety and well-being of two patients – the mother and the baby – every anaesthetist must remember that his/her primary responsibility is towards the mother. Never hurry and rush to save a baby in foetal distress until you have followed all safety procedures that are designed to protect the mother.

GENERAL ANAESTHETIC OR SPINAL?

It is the opinion of the author that caesarian sections (C/S) in rural areas are best conducted under spinal anaesthesia where permissible because it has a number of advantages over general anaesthesia (see Table 1). On balance it is probably safer for the mother and baby. Unless there is a clear contra-indication to the use of a spinal anaesthetic, then all caesarian sections should be performed this way. These notes should therefore be read in conjunction with Chapter 6.

A short word about epidurals

Epidurals are not considered here for the following reasons:

- epidurals are technically more difficult than spinal anaesthetics
- epidurals often result in patchy and inconsistent anaesthesia
- epidurals require much bigger volumes of local anaesthetic and therefore have a much bigger risk of causing toxicity
- epidurals take 20 to 30 minutes to work, and are also time consuming to perform. This makes it unsuitable for emergency caesarian sections, and too time consuming in many under-staffed hospitals.

Unless you are working in a well-staffed hospital with a properly functioning obstetric anaesthetic department, epidural anaesthesia is an inappropriate method in most rural hospitals.

Table 1:
Advantages of spinal anaesthesia over general anaesthesia

- The risk of gastric aspiration and pneumonitis is reduced
- The difficult intubation of obstetric patients is avoided
- Maternal bonding is enhanced
- It does not cause drug induced respiratory depression of the baby
- In under staffed conditions it is quicker and safer

INTRODUCTION

Throughout the world, anaesthesia and anaesthetic mistakes make up one of the main causes of maternal deaths. These deaths are often related to the following:

- failure to intubate
- pneumonitis from gastric aspiration
- severe hypotension and cardiac failure

Often these deaths are due to avoidable factors, and are due to errors in judgement or choice in anaesthetic technique. It is therefore important that all rural hospitals have a policy for obstetric anaesthesia that is based on the primary consideration for the safety and well-being of the mother. For example, there should be a standard anaesthetic for cae-

OBSTETRIC CONSIDERATIONS FOR ANAESTHESIA

The baby

Although the main aim is to safely anaesthetise the mother, the anaesthetist must also try to ensure that the baby is delivered in a well oxygenated condition, and with minimal drug induced respiratory depression and sedation. To do this, the mother needs to be well perfused and oxygenated at all times. Drugs given to the mother which have the potential to cross the placenta and enter the fetal circulation must be minimised or avoided. Therefore, be careful of using Pethidine close to delivery, limit the concentration of Halothane to 0.5%, avoid the use of Diazepam, and anticipate a low apgar baby following a general anaesthetic.

Hypotension

When the patient is lying supine, the large pregnant uterus can compress the inferior vena cava, impede venous return and cause hypotension (see Figure 1). This is sometimes referred to as the "supine hypotensive syndrome", and can

result in fetal hypoxia and even sudden cardiac arrest in the mother. Therefore, until the baby is delivered, a supine mother should always be tilted 15 degrees to the left (or the right) by either tilting the operating table, or by placing a wedge or pillow under the hip/buttock. As well as this, a close eye should always be kept on the mother's pulse and blood pressure. Check the blood pressure every two minutes for the first ten minutes, and then no less frequently every three minutes.

Sometimes a left lateral tilt may not be sufficient to reduce pressure on the inferior vena cava. If this happens try manually moving the uterus across to one side. Another danger period is when fundal pressure is being applied to help deliver the baby. If the uterine incision is too small and fundal pressure is applied for a long time, the supine hypotensive syndrome can arise again.

Warning signs of hypotension include a mother with a tachycardia, who is a little sweaty and who feels nauseated or is vomiting. Although her BP may be normal, she has signs of reduced cardiac output which she is trying to compensate for.

Gastric aspiration

Everything in pregnancy and labour contrives to increase the risk of severe gastric aspiration and chemical pneumonitis. The pregnant state causes delayed gastric emptying, increased gastric acidity, and a large abdominal mass. Mothers in labour should ideally be kept nil per os, but well hydrated. Pre-

medication for a C/S should routinely include 10mg maxalon (IV or IM), and sodium citrate. For elective C/Ss, some centres also advocate the use of Ranitidine 150mg 2 hours pre-operatively. For these reasons, it is also important that patients are not extubated until they have fully regained their protective airway reflexes.

Intubation

Intubation is more difficult in the pregnant woman because of laryngeal oedema and enlarged breasts. Failed intubations occur commonly in Obstetrics. The anaesthetist must acknowledge failure at an appropriate time (persisting with repeated attempts at intubation can kill the patient), and be able to institute a failed-intubation drill (see previous section on intubation in Chapter 2).

Anaemia

Pregnant women all have a dilutional anaemia which most doctors are aware of. However, because of the extra demands of pregnancy, it is also a cause of nutritional deficiency anaemia. This should be borne in mind prior to all C/Ss because the average blood loss is about 600mls.

Respiratory capacity

Because of the large abdominal mass and because of the supine position, diaphragmatic movement and the functional residual capacity of the patient become constrained or reduced during a C/S. Respiration becomes more dependent on thoracic cage movement, and a high spinal block can therefore be extra dangerous. It is advisable that all patients be given oxygen to breathe during a C/S.

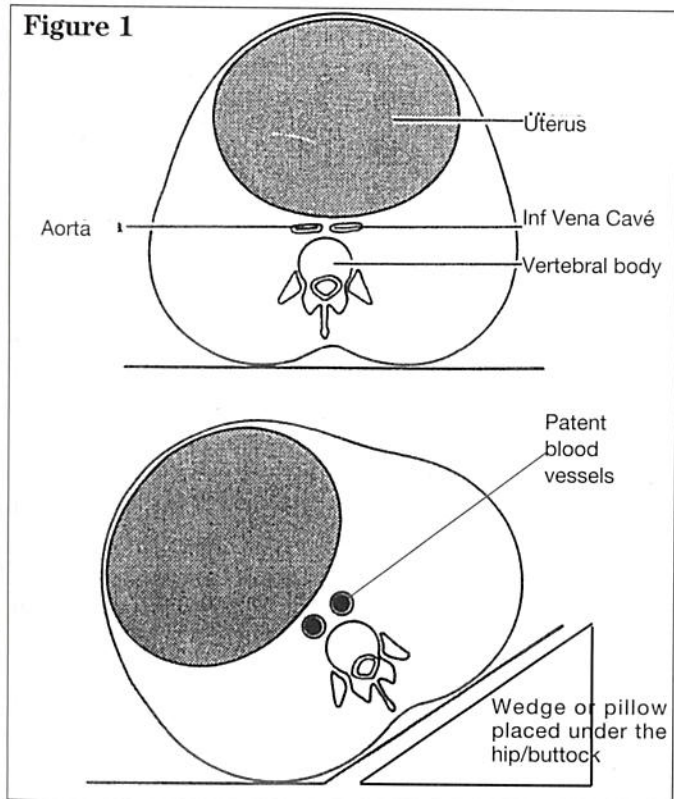
PRE-OP ASSESSMENT

Always optimise the condition of the mother before a C/S. The following are a list of checks that must become routine for all patients going for a C/S.

1. Fluid status

Pregnant patients may be dehydrat-

Figure 1



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ed for a number of reasons. It is your job to ensure that they are not fluid depleted at the time of surgery.

2. Anaemia

All patients should have their haemoglobin (HB) level checked. Do not rely on the latest routine HB which may have been taken several weeks previously, and always make a clinical assessment of the patient. If you think that the patient is anaemic, **be safe...** order an emergency HB as well as two units for cross-match.

3. Rhesus group

Always check the patient's Rhesus status, and draw all Rhesus-negative mothers to the attention of the midwife so that anti-D can be given appropriately.

4. Clotting

A number of obstetric complications can lead to disseminated intravascular coagulation (DIC). These are abruptio placentae, eclampsia and intra-uterine death. In such patients think about clotting before you cut. Many rural hospitals do not have the capability for managing patients with bleeding disorders or low platelet counts. It may be better to refer such patients to a higher level hospital.

5. Heart disease

Heart disease in many parts of South Africa is common. Often, the pregnancy places the heart under added strain, and an injudicious and clumsy anaesthetic may tip the patient into overt cardiac failure. It is therefore important that all patients receive a full cardio-respiratory pre-operative assessment before any operation. If there are signs of heart failure, always stabilise the patient before operating.

6. Pre-medication

Check that the patient has been nil per os, and has received her sodium citrate. Also check that maxalon has been given.

7. Check all equipment

As with all operations, there must be a thorough check of the Boyle's machine and the breathing system and other equipment. As well as this ensure that there is neonatal resuscitation equipment available and working.

PROCEDURE FOR GIVING A SPINAL ANAESTHETIC

The full procedure for spinal anaesthetics has been described in Chapter 6. For a C/S, it is important to remember three points:

- Keep the block as low as possible.
- Insert the spinal anaesthetics with the patient in a sitting position, using no more than 1,5mls of local anaesthetic.
- Keep a close and regular check of the BP.

WHAT TO DO WHEN THE SPINAL IS INEFFECTIVE, OR HAS NOT WORKED?

There are a number of options which are described below:

Option 1: Give a full general anaesthetic

Follow all the normal safety measures for general anaesthesia and for obstetric-related factors as described above. Call an experienced MO if necessary.

Induction agent: Thiopentone 4mg/kg (alternatively use Ketamine if there are no contra-indications, and if the dose is kept to no more than 2mg/kg).

Intubation: Administer the standard dose of suxamethonium, and follow this with a rapid-sequence tracheal intubation (which includes cricoid pressure and pre-oxygenation).

Muscle relaxation: Paralyse the patient with a non-depolarising neuro-muscular blocking agent such as alcuronium (never use gallamine

which can cross the placenta) and ventilate the patient mechanically.

Maintenance: Keep the patient asleep using 0,5% Halothane mixed with 50% oxygen and 50% Nitrous oxide. Once the baby has been delivered and the cord clamped, you may give the mother 50mg of Pethidine IV slowly, and increase the amount of Halothane to 1% if necessary.

With all general anaesthetic caesarian sections, anticipate a flat baby.

Option 2: Small IV doses of Ketamine

If there is a partial block, consider using small doses of Ketamine until the baby is delivered: boluses of 0,25mg/kg IV every 15 minutes or so. Doses of Ketamine up to 1mg/kg have been shown not to adversely affect the baby, and doses should never exceed 2mg/kg.

Option 3: Use a local anaesthetic technique

Use 30mls of 1% Lignocaine, and dilute this with 30mls of sterile saline to give you a 60mls 0,5% solution. To this add 1mg of adrenaline.

Method: Infiltrate two long bands of skin, two fingers breadth apart on either side of the proposed incision, from her symphysis pubis to five centimetres above her umbilicus (see Figure 2). Once anaesthetised, incise the skin. Infiltrate the rectus sheath with local anaesthetic as you approach it. When you reach the linea alba, inject 10mls of solution underneath it so as to anaesthetise the parietal peritoneum. When you reach her uterus, inject 5mls of solution under the loose visceral peritoneum where you are going to incise her lower segment.

Once the baby has been delivered and if sewing up the abdominal wall is painful, give some IV Pethidine

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slowly, or infiltrate the abdominal wall with more solution.

ANAESTHESIA FOR SPECIFIC OBSTETRIC COMPLICATIONS

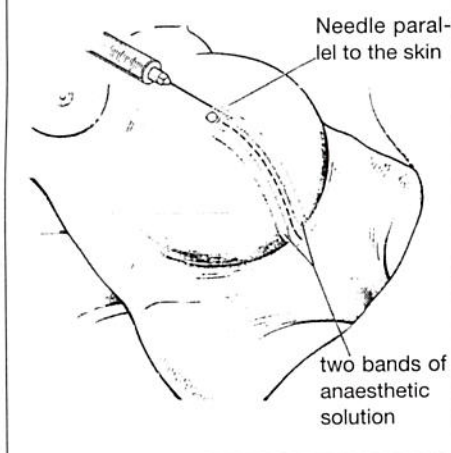
Severe ante-partum haemorrhage (APH)

Many patients with severe APH due to an abruptio will deliver vaginally, although an experienced MO should be called to make the decision on mode of delivery if the baby is still alive. If the cause of bleeding is a placenta praevia, a C/S is inevitable.

A shocked or hypotensive patient with severe APH needs an extremely careful anaesthetic. In such cases, the well-being of the foetus should not be considered, and you must focus entirely on the mother.

Figure 2

Local anaesthesia for Caesarean Section



A spinal anaesthetic is totally contraindicated and one advisable method is to give a full general anaesthetic using Ketamine (2mg/

kg). If there is severe shock with loss of consciousness, an induction agent may not be required at all. Maintenance of anaesthesia will depend on the condition of the patient. Often an oxygen and nitrous oxide mix is sufficient until the patient's blood volume and cardiac output is returned to normal.

In all cases, at least two large-bore IV cannulas should be in place at the outset. If the APH is due to an abruptio, remember that the patient may be developing DIC.

Eclampsia or imminent eclampsia

Always call for the most experienced MO first!

News

INDUSTRY

Boehringer Mannheim announces the launch of UNAT (torasemide) on the 15th of April 1996, which further enhances the company's cardiovascular image.

UNAT is a new generation loop diuretic and with its advantageous pharmacological profile offers a substantial advance in heart failure treatment.

UNAT is reliably absorbed with an absolute bioavailability of 80-90% for the oral dose. Urinary excretion of $\text{Na}^+\text{C1}^-$ and water is dose proportional for the 2,5mg, 5mg and 10mg dose. Based on its longer elimination half life UNAT exhibits a longer duration of action than loop diuretics of the furosemide type without a rebound phenomenon = True once a day dose.¹

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UNAT reduces the vascular

tone by mediation of small shifts in intracellular electrolytes.²

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the drug in renal failure.³

UNAT is available in 2,5mg, 5mg and 10mg tablets, in packs of 30 tablets each. Also available in ampoules of 10mg (5 x 2ml).

(S3) Unat tablets

Reg # UNAT 2,5: 28/18.1/0292.

Reg # UNAT 10: 28/18.1/0294.
Reg # UNAT 5: 28/18.1/0293

Unat ampoules

Reg # UNAT 10 solution: 28/18.1/0296.

References:

1. Taylor S. Cardiology (suppl 2);1994:1-3.
2. Kruck F. Drugs 41 (suppl 3);1991:60-8.
3. Achlammer et al. Drugs 41 (suppl 3);1991:80-91.



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The next step is to stabilise the patient (control active fitting, prevent aspiration and give 100% oxygen). Administer magnesium sulphate and hypotensive agents carefully and appropriately (there should be clear protocols for this).

Aim to keep the diastolic BP between 90 and 120. The risk of a CVA in the mother is only apparent with a diastolic above 120, whilst on the other hand, reducing the diastolic BP to below 90 risks under-perfusing the brain and causing ischaemia.

Check, monitor and optimise fluid status. Your aim is to achieve a urine output of at least 30mls/hour, but without causing over hydration because these patients are **extremely** prone to the development of severe pulmonary oedema. Do not give a patient more than 1 litre of fluid from the time you see her to the time she has her C/S (some would limit preoperative fluid to 500mls). Use a colloid (Haemacel) and **never** use 5% dextrose.

If the patient is still not producing any urine, give a renal dose of

dopamine (2,5mcg/kg/min). Frusemide should ideally not be given to induce a urine output unless you can show (with a CVP) that the patient has adequate filling pressure on the right side of the heart. The treatment for oliguria is to improve renal perfusion through peripheral vasodilation.

Check for coagulation disturbance. Consider transferring the patient if the platelet count is 80 or below.

If you can insert a CVP line, aim to keep the pressure between +3 and +5cm. After that, fluid therapy should be administered according to urine output. At delivery, remember that blood loss is more significant because of the patient's contracted blood volume. If blood loss is above average, consider giving an early transfusion.

If the patient is to be delivered by C/S, stabilise the patient for between two to four hours until after the last fit before proceeding to theatre. It is thought that this period allows a number of metabolic disturbances to be corrected before the added insult of an anaesthetic and operation.

Both a spinal anaesthetic and Ketamine are contraindicated. A careful general anaesthetic using Thiopentone as the induction agent is probably the first choice method. **However, remember that eclamptic patients are more difficult to intubate than ordinary obstetric patients and that a clumsy induction and intubation can lead not only to hypoxia, but also a dangerous rise in BP.** Giving Pethidine as a pre-medication may help to reduce the incidence of high blood pressure during laryngoscopy.

An alternative to general anaesthesia is a local anaesthetic technique (see later). The problem with this is that you may have an uncooperative patient who will then need additional sedation, eg using Diazepam. This runs the risk of causing sedation and hypoventilation in an already compromised patient.

If there is any evidence of pulmonary oedema or aspiration, then you **must**, at the very least, secure the airway with an endotracheal tube, and ventilate the patient mechanically.

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