

Safer caesarean sections at Juba Teaching Hospital

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Introduction

This article describes a completed audit cycle of the mode of anaesthesia used for caesarean section at Juba Teaching Hospital (JTH).

There is a large body of evidence available that highlights the benefits of regional anaesthesia over general anaesthesia for caesarean sections (CS). The UK National Institute for Clinical Excellence (NICE) guidelines suggest that “women who are having CS should be offered regional anaesthesia because it is safer and results in less maternal and neonatal mortality than general anaesthesia”(1). In 2006, the Royal College of Anaesthetists proposed standards for best practice, suggesting that a minimum of 95% of elective CS and a minimum of 85% of emergency CS are conducted under regional anaesthesia (2).

A retrospective study at JTH of all caesarean sections between October 2008 and September 2009 had previously demonstrated that an average of 1.2 caesarean sections was performed per day – see Figure 1. Although the facilities were noted to be available for spinal anaesthesia to be the primary form of anaesthesia for caesarean section at JTH, this appeared to most often not be the method chosen by the anaesthetic medical assistants, with around 20% of CS being performed under spinal anaesthesia. A high neonatal mortality was also noted (7%), although maternal mortality was not recorded (3). My aim was to perform an audit investigating whether spinal anaesthesia usage had increased or fallen and to then spend time with the anaesthetists, understanding why general anaesthesia with Ketamine is their preference. I then intended to spend time with the anaesthetic medical assistants (AMAs), teaching and promoting safe spinal anaesthesia and re-audit to see if this influenced their use of spinal anaesthesia.

Audit Standards (based on Royal College of Anaesthetists' guidelines, 2006)

1. At least 85% of emergency caesarean sections should be performed under spinal anaesthesia. Cases exempt from this standard may include: Maternal refusal, spinal anatomical abnormalities, failed attempts at



Figure 1. Lady with a uterus that had entirely herniated through the abdominal wall undergoing caesarean section (credit Clare Attwood)

spinal anaesthesia, lack of drugs/equipment, Category 1 equivalent caesarean sections (e.g. umbilical cord prolapse, prolonged foetal bradycardia) or unstable patients (e.g. sepsis, severe APH).

2. At least 95% of elective caesarean sections should be performed under spinal anaesthesia. Cases exempt from this standard may include: Maternal refusal, spinal anatomical abnormalities, failed attempts at spinal anaesthesia, lack of drugs/equipment.

Methodology

This involved the retrospective analysis of the theatre logbooks kept in Theatres One and Two at Juba Teaching Hospital, which are used to document the procedures performed and the type of anaesthesia used. After discussion with most of the AMAs, it became clear that in the context of caesarean sections “SA” = spinal anaesthesia, “GA” = general anaesthesia and “KA” = ketamine anaesthesia. In other words, the terms can be used interchangeably to mean anaesthesia with ketamine. “Thio” = anaesthesia induced with thiopentone, which was used only once, in an eclamptic patient, as the high blood pressure contraindicated the use of ketamine.

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The indications for the procedure were sometimes documented, although most often this information was lacking, or just documented to be "labour pain". When the neonate died in theatre, or was stillborn, this was also documented.

I was able to use the information from the logbooks to determine how many elective and emergency caesarean sections were performed and then to calculate the rates of use of the different forms of anaesthesia available. I was also able to record the neonatal mortality. As with the 2008-2009 study, there were no documented cases of maternal mortality.

After the initial audit confirmed an even lower rate of spinal anaesthesia than previously documented, I tried to find out the reasons for this. Through discussion with the AMAs, I found that the main reasons were:

• **A lack of knowledge that spinal anaesthesia is the safest option**

- o The AMAs work unsupervised and many had not had any training for years. Only one AMA owned an anaesthetic textbook.

- The intermittent lack of ephedrine in the department.

- o Ephedrine is the vasopressor used at JTH to counteract the hypotensive effects of spinal anaesthesia.

- o The country in newly independent and the anaesthetic budget came under that of the surgical department. There had been no ordering system for drugs in place since 2009. Drugs are currently delivered through the "kit" system and do not meet the needs of the hospital.

• **Surgical pressure for speed of anaesthesia.**

- o Due to the lack of staff and monitoring equipment, very few cases would be classed as "Category 1" in the UK, but all were treated as such. Most surgeons were seen to push for immediate anaesthesia, even in ladies who would be classed as "Category 2, 3 or even 4 (elective)" in the UK.

• **A lack of confidence in spinal anaesthesia.**

- o Many AMAs routinely perform spinal anaesthesia for all below waist procedures and were seen to be extremely competent. However, one AMA admitted that she had little experience in spinal anaesthesia and was keen to avoid it in her practice. I suspect that there were others who also avoided spinal anaesthesia for this reason, but were less keen to admit to it.

- o A fear of using spinal anaesthesia in labour.

- o A few AMAs admitted that they did not like performing spinal anaesthesia on screaming, moving targets! They saw ketamine anaesthesia as the ideal solution to this.

Once the reasons for low rates of spinal anaesthesia were ascertained, I tried to address them:

• **Lack of knowledge of the superiority of spinal anaesthesia**

- o I ran a bi-weekly teaching course for the AMAs and included spinal anaesthesia as one of the teaching topics

- o The teaching was backed up by posters that I put up in the department, reiterating the benefits of spinal anaesthesia, to both mother and baby –.

- o Through OAF (Overseas Anaesthesia Fund) and TALC (Teaching Aids at Low Cost) and the AAGBI (Association of Anaesthetists of Great Britain and Ireland), I arranged for anaesthetic (general, paediatric and obstetric) text books to be sent to South Sudan. Enough were provided for each AMA to have their own copy, as well as reference books to be kept in the department. These books, of course, confirm the need for spinal anaesthesia - see cover photo.

• **Lack of Ephedrine.**

- o Short term: I placed posters in the office and in theatres, explaining how adrenaline could be diluted and used safely in the absence of ephedrine.

- o Long term: Following a project researching the drug and equipment needs of the department, the Ministry of Health agreed to the provision of a regular budget and ordering system, which, when implemented, should ensure that ephedrine stocks no longer run out.

• **Surgical pressure.**

- o As junior doctors in South Sudan are often sent to work in rural hospitals, with no senior or sub-speciality support, they were keen to learn about how to perform spinal anaesthesia. As well as teaching the process, I taught the reasons behind the need for spinal anaesthesia. The senior doctors (who perform most of the caesarean sections at JTH) endorsed and attended the teaching sessions.

• **Lack of competency.**

- o I gave brief teaching to all AMAs on best practice spinal anaesthesia (see above) and gave them all handouts, with further information, to take home.

Table 1. Summary of anaesthesia for all caesarean sections – August 2011

	Emergency	Elective	Neonatal deaths
Spinal	8	0	0
Ketamine	46	5	4 (all emergencies)
Thiopentone	1	0	0

Table 2. Summary of anaesthesia for all caesarean sections – November 2011

	Emergency	Elective	Neonatal deaths
Spinal	8	0	0
Ketamine	46	5	4 (all emergencies)
Thiopentone	1	0	0

o I lead by example and also gave “hands-on” teaching in theatres to both the AMAs and the junior doctors.

• **Fear of spinal anaesthesia in labour.**

o I taught the AMAs how to make “Entonox”, using the anaesthetic machine, in order to provide pre-procedure pain relief for patients in labour.

o I reiterated that spinal anaesthesia may not be the easiest mode of anaesthesia, but it is the safest and that this should be explained to the labouring mother.

Results

The initial audit demonstrated that only 13.3% of all caesarean sections were performed under spinal anaesthesia; even less than in 2008-9. 85% of cases were performed under ketamine anaesthesia, including all elective cases. There were 4 neonatal deaths (6.67% of all caesarean sections) within theatre, but it was not recorded whether these were anticipated stillbirths. It was also not clear whether unwell babies taken to the “Nursery” (neonatal high care) from theatre survived.

The re-audit demonstrated that although the first audit standard (for emergency caesarean sections) had not been met, rates of spinal anaesthesia had increased significantly (46.38% of emergency caesarean sections and 50.67% of caesareans overall). However, all elective caesarean sections in November were performed under spinal anaesthesia, meeting the second audit standard (see tables 1 and 2). Neonatal mortality rates were similar, with four babies being stillborn or dying soon after delivery (5.33% of all caesarean sections). Although very little information about these deaths was available, it should be noted that all of them were in the babies of patients under ketamine anaesthesia.

Discussion

As health professionals trained and working in the UK, it is clear to us that spinal anaesthesia for caesarean section is preferable to ketamine anaesthesia. However, for health

professionals working in South Sudan, to whom little or no ongoing postgraduate education has been given, this is less clear. When compounded by a lack of senior support, a lack of available drugs and equipment and a lack of reference material, it is easy to see why ketamine anaesthesia is the anaesthetic of choice for most surgical procedures in South Sudan.

Following some “powerpoint” teaching on spinal anaesthesia, alongside the provision of practical advice and support, rates of spinal anaesthesia for caesarean section at Juba Teaching Hospital increased significantly. Although the rates for emergency caesarean sections did not meet the guidelines agreed by the Royal College of Anaesthetists or the first audit standard, this nevertheless represents an obvious improvement. It should be noted that in November all elective caesarean sections were performed under spinal anaesthesia, compared to none in August 2011. As a result, the second audit standard was successfully met.

My presence in the department will probably have resulted in some cases being performed under spinal anaesthesia that would have been performed under ketamine if I had not have been there. However, as I was present in the department for around 1/3 of cases, I am sure that this is not the only reason for the increase in spinal usage. It will be interesting to see if rates of spinal anaesthesia for caesarean section fall now that I am not working in the department.

Although the neonatal mortality rates did not fall significantly with the fall in rates of ketamine anaesthesia, it should be noted that all documented cases of neonatal mortality occurred with mothers who had been given ketamine anaesthesia. Due to the paucity of written documentation in the departmental records it was not possible to determine whether ketamine anaesthesia was used to reduce maternal distress in cases where fetal demise had already been diagnosed. As hospital notes are not stored in an organised manner, it was not practical to investigate this further.

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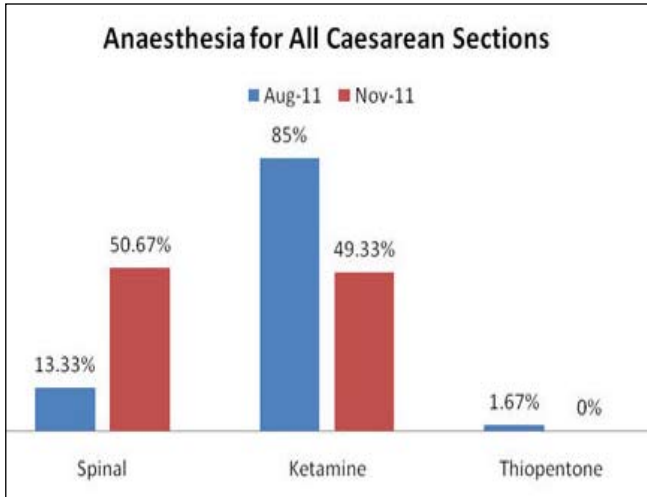


Figure 2. A comparison between modes of anaesthesia used for caesarean section in August and November 2011

Conclusion

The anaesthetic medical assistants at Juba Teaching Hospital work hard to serve the people of South Sudan. Their department is often under-equipped and undersupplied with drugs. Until recently they have had access to very little senior support and there is no provision of ongoing training. However, following some department-based training and advice and support, their practice has improved significantly – see Figure 2. Thankfully, there are now two anaesthetic doctors from Ethiopia and Kenya working in the department, who will be able to continue to support and enable sustained clinical improvement in this and other areas.

Ongoing improvement will also be facilitated by a new drug and equipment ordering system that should be coming into effect in the near future. Improved documentation of the indications for caesarean section, as well as reasons for the choice of mode of anaesthesia would enhance individual accountability and make further investigation of departmental practice more informative. The anaesthetic medical assistants of Juba Teaching Hospital are very keen for ongoing training in the form of “refresher courses”, similar to those already offered to AMAs working in

other East African nations. I wholeheartedly agree that enabling them to attend such courses would improve not only clinical practice, but also morale.

References

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Figure 3. Baby born by caesarean section being cared for in the nursery at JTH (credit Clare Attwood)