

An Audit of the Use of Regional Anaesthesia for Caesarean Section in the Free State: from 2002 to 2004

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ABSTRACT

Background

Regional anaesthesia (RA) is associated with a lower mortality than general anaesthesia (GA) for obstetric anaesthesia.¹ Accordingly, the Saving Mothers Report 1999-2001 proposed that 75% of Caesarean section (CS) should be performed under RA.² An initial audit found that in the Free State, 71% of CS's were performed under RA in 2002. Various educational interventions promoting the use of RA for CS were then instituted and the audit repeated for 2004, to determine whether there had been any change in the use of RA for CS's from 2002 to 2004 and the 75% target achieved.

Methods

A retrospective audit, using data gathered from theatre record books of all Level 1 and 2 hospitals in the Free State where CS's were performed. The type of anaesthesia used for each CS in the 3 month period September 1st to November 30th in 2004 was compared with the data previously recorded for the same time period in 2002.

Results

The number of CS's performed using RA rose from 71.2% in 2002 to 86.2% in 2004 ($p < 0.0001$).

Conclusions

There was a significant rise in RA use for CS's in Level 1 and 2 hospitals in the Free State from 2002 to 2004, such that the 75% target had been achieved.

Introduction

Since 1997 it has become mandatory in South Africa to report a maternal death using the confidential maternal mortality notification system. Information from this system is reported in the Saving Mothers Reports, of which two triennial reports have now been published, 1999 – 2001² and 2002 – 2004.³

In the first triennial report (1999-2001) ten key recommendations were made, one of which was that "regional anaesthesia should be promoted in all sites performing caesarean sections", with a target of 75% of caesarean sections (CS's) being performed under regional anaesthesia (RA) by 2004. This report also noted that the Free State "is 20% above the national average for deaths related to anaesthesia".²

In view of the findings of this first triennial report, the first author of this paper initiated an audit investigating possible causes of maternal deaths from anaesthesia in the Free State in 2002. RA is internationally recognised as being associated with a lower mortality when compared to general anaesthesia (GA) for CS¹, so one component of this audit was to determine the use of RA in the Level 1 and 2 Free State hospitals. This first survey found that RA had been used in 71% of all CS's during the three month study period, although this percentage was significantly lower in 11 hospitals⁴ Educational interventions were then implemented to educate doctors regarding the appropriate use of RA and the survey was repeated again in 2005 in order to determine whether there had been any change in the rate of RA use.

Methods

The survey was performed in May 2005, again retrospectively and using the same method as before. Ethics Committee approval was obtained from the University of the Free State and permission to visit each hospital obtained from the Provincial Department of Health and the individual hospital managers. Each of the nineteen Level 1 and five Level 2 hospitals performing CS's in the Free State was visited and theatre record books for September 1st to November 30th 2004 were inspected. All gave permission to inspect their theatre record books and none were missing for the required time periods.

Theatre record books document the type of anaesthesia used for each patient, and using this information the number of CS's and type of anaesthesia used in each case was obtained for the above time period.

Table 1: Use of regional anaesthesia and general anaesthesia for Caesarean sections in Free State Level 1 and 2 Hospitals (Sept 1st-Nov 30th 2002 and Sept 1st-Nov 30th 2004).

Level	TOWN/CITY (name of hospital, if different from town)	RA (02)	RA (04)	GA (02)	GA (04)	TOTAL (02)	TOTAL (04)	% RA USE (02)	%RA USE 04
1	CLOCOLAN (John Daniel Newsberry)	3	0	15	8	18	8	16.7	0.0
1	LADYBRAND (Mantsopa)	0	0	13	13	13	13	0	0.0
1	WINBURG	0	0	9	16	9	16	0	0.0
1	JAGERSFONTEIN (Diamond)	0	3	8	12	8	15	0	20.0
1	HEILBRON (Tokollo)	2	5	26	6	28	11	7.1	45.5
1	BOTHAVILLE (Nala)	0	10	17	6	17	16	0	62.5
1	FRANKFORT (Mafube)	15	22	23	12	38	34	39.5	64.7
1	ODENDAALSRUS (Thusanong)	5	90	76	23	81	113	6.2	79.6
1	SASOLBURG (Metsimaholo)	64	75	44	9	108	84	59.3	89.3
1	BLOEMFONTEIN (National)	26	45	2	4	28	49	92.9	91.8
1	VIRGINIA (Katheho)	1	36	0	2	1	38	100.0	94.7
1	HARRISMITH (Thebe)	29	46	16	2	45	48	64.4	95.8
1	THABA N'CHU (Botshabelo)	111	116	11	4	122	120	91.0	96.7
1	REITZ (Nketoana)	15	58	3	1	18	59	83.3	98.3
1	MOROKA (Dr. JS Moroka)	45	85	11	1	56	86	80.4	98.8
1	SENEKAL (Itemoheng)	11	25	3	0	14	25	78.6	100.0
1	FICKSBURG (Phuthuloha)	20	26	2	0	22	26	90.9	100.0
1	PARYS	20	8	1	0	21	8	95.2	100.0
1	BETHLEHEM (Phekolong)	23	67	0	0	23	67	100.0	100.0
2	GOLDFIELDS (Bongani)	162	156	60	53	222	209	73.0	74.6
2	KROONSTAD (Boitumelo)	123	117	22	25	145	142	84.8	82.4
2	MANAPO (Mofumahadi Manapo Mopeli)	139	230	58	44	197	274	70.6	83.9
2	BLOEMFONTEIN (Pelonomi)	327	362	55	67	382	429	85.6	84.4
2	BETHLEHEM (Dihlabeng)	90	103	23	12	113	115	79.6	89.6
TOTAL		1136	1574	404	253	1540	1827	71.2	86.2

Where RA had been attempted but failed and there was conversion to GA, the investigators recorded this case as RA, as this had been the initial type of anaesthesia planned. The number of cases documented in the theatre books as converting from RA to GA was recorded. If method of anaesthesia had not been recorded, this was noted.

The educational interventions to promote RA use were as follows. Whilst visiting each hospital, the investigators gave tutorials on the use of RA to all those practitioners present. In 2003, the first author gave a series of monthly iCAM (interactive Learning Communication and Management) televised lectures on obstetric anaesthesia, broadcast to peripheral Free State

hospitals. A workshop on RA was held at Universitas Hospital (provincial tertiary hospital), followed by “hands-on” training in theatre. On request, several hospitals were revisited for further training workshops.

Results

There were 1540 CS's performed in the three month study period in 2002 and 1827 CS's in 2004 (table 1), an increase of 18.6%. In 2002, type of anaesthesia was not recorded for 5 CS's and in 2004, for 2 CS's. In all cases where RA was used, this was spinal anaesthesia (epidural anaesthesia was not used). The conversion rate of RA to GA was 1.4% (22 cases) in 2002 and 1.5% (28 cases) in 2004. Overall, the RA use rate for all the Free State hospitals studied had increased from 71% to 86%. (Mantel-Haenstel relative risk 1.16; 95% CI 1.12 to 1.2, $p < 0.0001$).

Four hospitals did not use RA for CS in 2002 and in 2004 three did not. Of the four that did not use RA in 2002, two had cases being performed under RA in 2004. Conversely, one hospital that did use RA in 2002, only used GA in 2004.

In 2002, nine Level 1 hospitals performed >75% of CS's using RA, including two that used RA for 100% of CS's. In 2004, the RA use for CS's was >75% in twelve Level 1 hospitals, and included four hospitals where the RA use rate was 100%.

In 2002, three Level 2 hospitals were above the 75% target and the other two were close at 73% and 71%. In 2004 they all reached the required target. In neither time period did the use of RA exceed 90% in any Level 2 hospital.

Discussion

The recommended target of 75% RA use for CS in the 1999-2001 Saving Mothers Report was an arbitrary one and set at a time when there were considerably more deaths in South Africa from GA than RA complications. GA had for a long time been the favoured technique for CS anaesthesia although increased use of spinal anaesthesia had been advocated for over 20 years.⁵

The 75% target was set in order to encourage institutions which at that time were doing no or very few cases under RA to increase use of this technique and it was hoped that this would be a “realistic” target to aim for (personal communication, Prof C. Rout, Member of National Committee on Confidential Enquiries into Maternal Deaths).

In 2006, the Royal College of Anaesthetists (UK) proposed that >95% of elective CS's and >85% of emergency CS's should be performed under RA, owing to “unequivocal evidence that RA is safer than GA for CS”.⁶ However, a recent Cochrane Review of RA versus GA for CS, other than finding less blood loss with RA, did not otherwise find any major differences in either maternal or neonatal outcomes.⁷

In Africa, many authors recommend the increased use of RA for CS⁸ There is some evidence from Malawi that here it is safer for

both mother and baby.⁹ A paper from Zimbabwe concluded that RA may be of benefit in preventing the airway problems associated with GA, but in that country (as in many developing countries) patients often present with dehydration, when RA is often not appropriate.¹⁰

A Nigerian study recommends greater use of RA in patients with pre-eclampsia, one of the commonest causes of maternal death in Africa.¹¹ Practitioners have previously been concerned over inducing severe hypotension after RA in pre-eclamptic patients.

The incidence of hypotension has however been found to be lower after RA in patients with severe preeclampsia than in healthy parturients.¹²

The anaesthetist in South Africa is faced with an increasing percentage of patients with HIV/AIDS. The complications associated with this disease can include severe sepsis and pneumonia.¹³ Patients with sepsis and haemodynamic instability are not suitable for RA,¹⁴ and patients with severe pneumonia may suffer an acute exacerbation of respiratory failure after RA, as spinal anaesthesia reduces lung volumes.¹⁵ Consequently, these patients, who frequently present acutely to Level 1 hospitals with fetal distress, may require GA for an urgent CS at these hospitals, before being transferred to a higher level hospital. Clearly, there thus are specific contraindications to RA, as well as potential benefits.

The 1999-2001 Saving Mothers Report report emphasised in its key recommendations in Chapter 7 that practitioners of obstetric anaesthesia in South Africa must be skilled at *both* RA and GA. Whilst the achievement of the target of 75% RA could be regarded as a success, and it could be inferred that the educational interventions may have contributed to this, it should be noted that RA was not used in three hospitals and, conversely, that it was the only method employed in four hospitals. Is it possible that the doctors in these hospitals were able to use both techniques, but there was no indication to use the alternative technique due to the small number of patients treated? This may have been the case for the Level 1 hospitals which seemed to do entirely RA's, as they each had less than 70 cases in the three month study time period.

Perhaps they had time to refer patients with severe co-morbidity, for whom GA may have been required, to a Level 2 hospital for CS; this could explain the fact that there were GA's performed at all the Level 2 hospitals. Closer inspection of data revealed that in two of the hospitals shown to use only RA, cases were converted to GA during the operation, showing that the skills required to perform GA were present, but only used when necessary.

It should be noted that this study did not specifically investigate the rate of conversion of RA to GA. In some, but not all, theatre record books it was noted that a RA had been converted to GA. One cannot be certain that the theatre nurse always recorded this conversion, so that the RA conversion rate may have been underestimated.

We noted during our visit that in the Level 1 hospital where some CS's had been done under RA in 2002 but not in 2004 (Clocolan), the Community Service doctor in 2002 had been able to do RA's, but had moved on by 2004, leaving no-one able to give RA then, as the technique had not achieved acceptance in this hospital. Relatively few CS's were performed in each of the hospitals giving only GA's, so these are not ideal hospitals in which one can frequently demonstrate a new anaesthetic technique to colleagues.

Moreover the investigators, whilst visiting these hospitals in the course of this study, found that the older practitioners here, whilst never having been trained to do RA's, were generally experienced and competent at administering GA for CS. In view of the recent Cochrane Study which showed no major maternal or neonatal benefits to RA (in otherwise uncomplicated patients),⁷ it would probably be inadvisable to actively encourage such practitioners, working in relative isolation, to change an anaesthetic technique with which they are comfortable, to one of which they have no previous knowledge. In one busy Level 1 hospital, the Senior Medical Officer trained new appointees (mostly Community Service Doctors) initially in the performance of GA for CS, and then introduced training in RA. This was in line with recommendations from the Saving Mothers Report of 1999-2001.

This survey did find a significantly increased use of RA from 2002 to 2004, but whether this increase can be attributed to the implemented educational interventions is debatable, as there were severe staff shortages at our institution. We are not certain how many of the doctors were able to attend the iCAM sessions in the rural hospitals. The workshop only gave a few doctors brief, supervised RA training and even here most were general practitioners, unable to leave their busy rural practices for long enough to perform the recommended 20 cases for basic competence.² The '02-04 Saving Mothers Report recommends that Outreach programmes in anaesthesia should exist in each province.³ Clearly this is required to provide on-site training in RA to those hospitals where it is not used.

Another factor that may have contributed to the rise in RA use, is the change in the practice of obstetric anaesthesia in the rural hospitals by predominantly older practitioners, who were largely trained to give GA's, to more recently qualified doctors, with more training in RA. A manpower survey we performed at the same time as the present survey, found that there were fewer experienced general practitioners now working in these hospitals than more recently qualified doctors (unpublished data).

Whilst promoting increased use of RA in South Africa, it should be noted that as the use of RA is now so widespread in developed countries, there are now concerns in these countries as to whether junior anaesthetists have sufficient training in GA.¹⁶ Clearly, intensive training in both GA and RA for CS is required, in order to reduce the case fatality with either method in South Africa.

Conclusion

There has been a significant increase in RA use for CS in the Free State from 2002 to 2004. Whether this change in practice has improved mortality from obstetric anaesthesia is not known, as the Free State continues to have a relatively high rate of maternal mortality from obstetric anaesthesia.³

Conflict of Interest

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