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ORIGINAL ARTICLE

Conversion of regional to general anaesthesia at caesarean section: increasing the use of regional anaesthesia through continuous prospective audit

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ABSTRACT

Background: Anaesthetic-related maternal deaths have largely been attributed to complications of general anaesthesia. In our unit a retrospective audit conducted between 1997 and 2002 showed a 9.4% conversion rate to general anaesthesia for caesarean sections amongst women with epidural catheters in-situ. The Royal College of Anaesthetists has stated that <3% of cases should need conversion to general anaesthesia. To improve our figures, from 2004 to 2007 we prospectively audited all caesarean sections requiring general anaesthesia.

Methods: Data were collected on the number of caesarean sections, initial anaesthetic technique used, need for conversion either pre- or intra-operatively and the use of labour epidural analgesia, where an epidural had been in-situ.

Results: There were 2273 caesarean sections during the audit period. Neuraxial anaesthesia rates were for elective cases 95.3% (2004), 96.3% (2005), 98.3% (2006) and 98.2% (2007) and for emergency cases 82.3% (2004), 88.6% (2005), 87.0% (2006) and 85.7% (2007). Common reasons given for not using a regional technique were urgency of delivery (category 1) or anticipated large blood loss. Conversion rates from regional to general anaesthesia for elective cases were 0.8% (2004), 2.5% (2005), 0.5% (2006) and 0% (2007), and for emergencies 7.8% (2004), 2.7% (2005), 3.7% (2006) and 5.4% (2007). Improvements were seen in all but category-1 caesarean sections.

Conclusions: Prospective audit has been associated with improved rates for neuraxial anaesthesia and reduced need for conversion to general anaesthesia in all but category-1 caesarean sections. The Royal College of Anaesthetists standards may need to be reviewed to become category-specific.

Keywords: Regional anaesthesia; Epidural; Caesarean section; General anaesthesia; Conversion rates

Introduction

The Confidential Enquiry into Maternal and Child Health (CEMACH) reports have highlighted that almost all anaesthetic deaths have been associated with emergency general anaesthesia.[1,2] The Royal College of Anaesthetists (RCoA) has published audit standards for best practice in the technique of anaesthesia for caesarean section.[3,4] These standards suggest that 85% of emergency caesarean sections should be conducted under regional anaesthesia and the conversion rate to general anaesthesia should be less than 3% for emergencies and less than 1% for elective surgery. A retrospective audit conducted in our unit over from 1997 to 2002 found a conversion rate of 9.4% in women undergoing emergency caesarean section.

The aims of this prospective study were to examine the use of neuraxial anaesthesia for caesarean section and to examine the causes of conversion and, by education, reducing the rate of conversion to a figure closer to that recommended by the RCoA.

Methods

This prospective audit was conducted in our obstetric unit which has an average delivery rate of 3300 per annum. Learning points from a previously conducted retrospective audit conducted between 1997 and 2002 were presented at a joint obstetric and anaesthesia audit meeting, following which written guidelines were developed. The retrospective audit revealed that success when topping up a labour epidural was more likely if the

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catheter had been inserted at least 4 cm into the epidural space and if 20 mL of local anaesthetic solution were used to top-up for surgery. It was also recommended that the anaesthetist should start the top-up in the labour room after ensuring adequate venous access.

Data were collected on the use of epidural analgesia in labour, the number of caesarean sections, the initial type of anaesthesia used for caesarean section and the need for conversion to general anaesthesia. Data collected included the urgency of delivery classified using a four-point scale described by Lucas et al.[5] Where an epidural catheter was in place for labour analgesia, details were recorded about the level of insertion, length of catheter insertion, effectiveness during labour, rescue measures required such as catheter manipulation, requirement for rescue doses of local anaesthetic, or resiting, and whether the top-up for caesarean section had been started in the labour room or operating theatre. The time of conversion to general anaesthesia and whether pre- or intra-operative was noted.

Results were discussed and reviewed annually at a joint obstetric and anaesthetic meeting. Case notes were reviewed by obstetricians to establish that the caesarean section had been categorised appropriately. An epidural top-up box containing 10 mL 0.5% levobupivacaine and 10 mL 2% lidocaine without adrenaline together with a syringe and filter needle was made available for rapid access and administration by the anaesthetists. This regimen was introduced into to our unit guidelines in 2002. Epidural top-ups were started in the labour room. Guidelines recommended that a bilateral block to light touch to T4 was adequate for surgery to begin. There was no written protocol on how intra-operative pain was to be managed although anaesthetists were encouraged to offer general anaesthesia if sharp unbearable pain was experienced.

Results

The annual numbers of deliveries and caesarean sections performed during the study period are shown in Table 1. Neuraxial anaesthesia rates are given in Table 2. Rates varied depending on the degree of urgency. The overall neuraxial to general anaesthesia conversion rates 77/2104 (3.6%) were highest for category 1 (8%) and zero for category 3, with no consistent change over time (Table 3).

When documented (64% of cases) epidural top-ups were started in the labour room. The length of catheter inserted into the epidural space was adequate in all cases as was epidural top-up volume. Block heights were tested and recorded, with cold sensation used in 85% of cases, and sensation to light touch used in only 30%.

Of the 38 conversions during category-1 caesarean section, eight were intraoperative. In one of these cases, conversion was needed after surgery had started after an epidural top-up but before assessing block height. All other intraoperative conversions in this category were required due to a failure to wait long enough after topping up the epidural. Although the block height was deemed adequate in these cases, the patient felt pain and discomfort after the start of surgery. The other 30

Table 1 Deliveries and caesarean section rates

	2004	2005	2006	2007	Total
Total deliveries	3101	3298	3436	3379	13214
Total caesarean sections	501 (16.2%)	575 (17.4%)	569 (16.5%)	628 (18.5%)	2273 (17.2%)
Category 1	159 (31.7%)	144 (25%)	115 (20.2%)	186 (29.6%)	604 (26.6%)
Category 2	197 (39.3%)	238 (41.4%)	237 (41.7%)	238 (37.9%)	910 (40%)
Category 3	16 (3.2%)	32 (5.6%)	33 (5.8%)	30 (4.8%)	111 (4.9%)
Category 4	129 (25.7%)	161 (28%)	184 (32.3%)	174 (27.7%)	648 (28.5%)

Table 2 Use of neuraxial anaesthesia as the final technique for caesarean section

	2004	2005	2006	2007	Total
Category 1	112/159 (70.4%)	107/144 (74.3%)	78/115 (67.8%)	135/186 (72.5%)	432/604 (71.5%)
Category 2	178/197 (90.4%)	228/238 (95.8%)	225/237 (94.9%)	225/238 (94.5%)	856/910 (94.1%)
Category 3	16/16 (100%)	32/32 (100%)	32/33 (97.0%)	29/30 (96.7%)	109/111 (98.2%)
Category 4	123/129 (95.3%)	155/161 (96.3%)	181/184 (98.4%)	171/174 (98.3%)	630/648 (97.2%)

Table 3 Conversion from neuraxial to general anaesthesia by category

	2004	2005	2006	2007	Total
Category 1	12/124 (9.7%)	5/112 (4.4%)	5/83 (6%)	16/151 (10.6%)	38/470 (8.1%)
Category 2	14/192 (7.3%)	5/233 (2.1%)	8/233 (3.4%)	6/231 (2.6%)	33/889 (3.7%)
Category 3	0/16 (0%)	0/32 (0%)	0/32 (0%)	0/29 (0%)	0/109 (0%)
Category 4	1/124 (0.8%)	4/159 (2.5%)	1/182 (0.5%)	0/171 (0%)	6/636 (0.9%)