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ORIGINAL ARTICLE

The extension of epidural blockade for emergency caesarean section: a survey of Scandinavian practice

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ABSTRACT
Background: Little is known about drugs and safety precautions used during epidural top-ups for emergency caesarean section in Scandinavia. We surveyed Scandinavian practice of epidural top-up regimens for emergency caesarean sections.
Methods: Anaesthetic departments in Denmark, Norway and Sweden were identified via National Boards of Health. An electronic questionnaire was sent to Scandinavian specialist anaesthesiologists performing obstetric anaesthesia asking for information on anaesthetic practice for emergency caesarean section.
Results: The response rate was 80% (n=145). One hundred and twenty (83%) specialists reported the existence of local guidelines for epidural top-ups. Fourteen (9.7%) specialists gave a full-dose top-up in the delivery room, 34 (23.4%) initiated the top-up with a test-dose, and 87 (60%) only administered local anaesthetics in the operating theatre. Twenty-five different drug combinations for epidural top-ups were reported. Lidocaine was used by 67 (47.9%) and ropivacaine was used by 53 (37.9%). Seventy (50%) specialists added opioid to the top-up, 15 (10.7%) added bicarbonate and 53 (37.9%) supplemented with adrenaline. Median top-up volume ranged from 16 to 19 mL for lidocaine, ropivacaine and chloroprocaine. One-hundred-and-eighteen (81%) specialists recommended trainees use the same regimen. Forty (83%) of 48 specialists topping-up in the labour unit had ephedrine readily available. During transport, pulse oximetry was used by nine (19%) and non-invasive blood pressure monitoring by eight (17%).
Conclusions: Epidural top-ups for emergency caesarean section in Scandinavia are used frequently but normally performed in the operating theatre. Drugs used differ greatly between countries and departments although top-up volumes appear similar. During transport, available equipment and drugs were limited. Best practice guidelines and national guidelines present little information on epidural top-ups that could explain the variation found.

Keywords: Obstetric anaesthesia; Epidural anaesthesia; Caesarean section; Scandinavia

Introduction

Caesarean section (CS) is often performed in order to reduce the risk of complicated vaginal births, but both mother and child may still be at risk when CS is performed.[1] The risk increases when CS is performed as an emergency procedure.[2] General anaesthesia, and in particular airway management, has been a source of maternal mortality and neuraxial block has long been the recommended method of anaesthesia.[3–6] Epidural analgesia is frequently used in labour, and an epidural top-up represents a convenient alternative to spinal anaesthesia for operative delivery.[3,7] Guidelines on extending epidural analgesia for operative delivery have been made available by national societies in the UK and USA since 1998. Denmark has presented detailed recommendations for anaesthesia including epidural top-ups for caesarean section since 2007. No such national recommendations exist in Norway, while summary guidelines in Sweden alone recommend the use of top-ups when a working labour epidural is in situ.[3,8–10]

Local recommendations and practicalities of how to top-up an epidural for CS have been investigated in the UK but not in Scandinavia.[11] Guidelines for extending epidural analgesia are likely to exist in most anaesthesia departments performing obstetric anaesthesia in Denmark, Norway and Sweden, yet what is recommended and what is practised locally are not known. The aim of this survey was to describe existence of local guidelines and local practice when extending epidural analgesia for emergency caesarean section in Denmark, Norway and Sweden. This information may guide

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future implementation of local and nationwide guidelines for epidural top-ups for emergency CS.

Methods

The study did not require ethical approval as it was a questionnaire and included no medical or personal information. Electronic registration of data was approved by the Danish Data Protection Agency (no. 2007-58-0015). The Norwegian and Swedish Data Protection Agencies waived registration referring to registration in Denmark as sufficient. Data were stored according to guidelines from the Danish Data Protection Agency. Funding was exclusively from the authors' departments.

In Denmark, Norway and Sweden, all departments that provide obstetric services are registered by the National Boards of Health. Using publicly available data from the National Boards of Health, hospitals with departments performing obstetric anaesthesia in 2012, including the number of births and total number of caesareans at the institution (for one institution only 2011 data were available), were identified. In January and February 2014 the heads of departments were contacted, first by mail and then by telephone, to obtain names and e-mail addresses of two specialists from each department who regularly performed obstetric anaesthesia. Study participation required physicians to have an authorisation from The National Board of Health to practise anaesthesia. The exposure of each participant to obstetric anaesthesia was left to the discretion of the heads of departments. In March 2014 specialists from responding departments were sent a link to an electronic questionnaire with information about the purpose of the investigation and a referral link to the publicly available study protocol.[12,13] Reminders were sent out twice, after which telephone contact was attempted with non-responders. No inducements for completing the survey were offered. Replies from respondents were pseudo-anonymised using an encrypted key handled by the survey software. The questionnaire was closed on the 4 May 2014.

The questionnaire was based on a previous study by Regan and O'Sullivan,[11] with some additional questions. The scenario was identical to the UK study; a well-functioning epidural catheter for labour analgesia and a 30 min decision-to-delivery interval (DDI).[11] Data were collected on: use of epidural top-ups; existence of local guidelines; use of test doses and where top-ups are given; the choice of drugs and their doses; recommendations by specialists to trainees; estimated patient transport time from maternity ward to theatre and whether this includes elevator use; and what monitoring and equipment are available or used when transferring the patient after administration of an epidural top-up (Appendix A).

The questionnaire was available in Danish, Norwegian, Swedish and English allowing participants to choose their preferred language. All questions were mandatory but included the option "do not want to reply/no answer".

Statistical analysis

Data are presented as numbers and percentages. Analyses were performed using SPSS version 20.0 (IBM Corp, Armonk, NY, USA).

Results

A total of 116 departments performing obstetric anaesthesia in Denmark, Norway and Sweden were surveyed. Of these, 92 departments replied to the request for email addresses of two specialist anaesthesiologists regularly performing obstetric anaesthesia, and 145 specialists from 82 departments at 82 institutions replied. The overall specialist response rate was 80% (Fig. 1). The number of births at the responding institutions varied from 202 to 10 354 and the number of CS per department varied between 31 and 1699 (Fig. 2). The frequency of CS varied between 5.5% and 26.7%.

One-hundred-and-twenty (83%) specialists reported availability of local guidelines for administration of epidural top-ups for emergency CS (Denmark:79%, Norway:74%, Sweden:92%) whereas 25 (17%) reported no local guidelines were available. Of the 82 departments surveyed, both specialists agreed on availability of local guidelines in 47 (57%) departments, agreed on missing guidelines in 11 (13%) departments and were in disagreement about the existence of local guidelines in 11 (13%):19 (23%) departments had only one responder.

Eighty-seven (60%) specialists preferred transfer to theatre before initiating an epidural top-up (Table 1). The anticipated full dose for a top-up was administered in the labour ward by 14 (9.7%) specialists and 34 (23.4%) would give a test dose in the labour ward. Ten specialists (6.8%) gave unclear replies or did not perform top-ups. Of the 47 departments in which specialists agreed on the presence of local guidelines for epidural top-ups, specialists proceeded with top-ups using an identical approach in 35 departments (74%) and disagreed in 12 (26%).

One-hundred-and-eighteen (81%) specialists recommended that trainees follow the same practice (Table 1). Fourteen (10%) recommended trainees delay drug administration until arrival in theatre; two specialists (1.4%) advised a test dose, but did not do so themselves. Four replies were unclear and seven specialists (2.8%) reported no trainees in their department.

Twenty-five different combinations of local anaesthetics for epidural top-ups were reported by 140 specialists (Table 2). Lidocaine was used by 67 (47.9%)