Brief Review

Obstetrical epidural anaesthesia in a rural Canadian hospital

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Few rural hospitals offer obstetric epidural analgesia services and of those that do, there is a paucity of information about these anaesthetics. A retrospective review was conducted of all obstetrical epidurals from 1984–1988 in an 85-bed hospital in Saskatchewan to examine the indications, complications, and infant outcomes. During that period there were 1224 deliveries. From a total of 915 vaginal deliveries, 42 (4.6%) received an epidural. Caesarean sections numbered 309: 183 (59.3%) were with epidural analgesia of which 69 were urgent and 114 elective. The overall complication rate was 23% with the most important being hypotension (12%), dural punctures (1.8%), inadequate block requiring an intravenous supplement (4.0%) or a general anaesthetic (3.1%). Infant outcomes were favourable except for two unrelated intra-uterine deaths preceding labour.

Peu d'hôpitaux situés en région rurale offrent à leur clientèle un service d'anesthésie obstétricale et lorsque de tels service sont disponibles, nous possédons peu de renseignements sur leur fonctionnement. Une étude rétrospective a été conduite dans un hôpital de 85 lits en Saskatchewan portant sur toutes les anesthésies obstétricales de 1984 à 1988 pour en examiner les indications, les complications et l'évolution néonatale. Pendant cette période, on a décompté 1224 accouchements. Sur un total de 915 accouchements par la voie vaginale, 42 (4,6%) ont eu lieu sous épidurale. Les césariennes ont été au nombre de 309 : 183 (59,3%) ont été réalisées sous épidurale dont 69 urgentes et 114 programmées. Le pourcentage total de complications a été de 23% dont la plus fréquente fut l'hypotension (12%), la ponction de la dure-mère (1,8%), l'anesthésie inadéquate nécessitant un supplément intraveineux (4,0%) ou une anesthésie générale (3,1%). Pour le foetus, le résultat fut favorable à l'exception de deux mortalités intra-utérines pré-partum non reliées à l'anesthésie.

Key words
ANAESTHESIA: obstetric;
ANAESTHETIC TECHNIQUES: epidural.

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The benefits of epidural anaesthesia for obstetrical patients are well known and have promoted its use in urban settings. Numerous reports support a low rate of complications but have referred principally to tertiary-care hospital practices. In Canada, during 1984–85, over 10% of infants were born in hospitals with fewer than 100 beds.[1] In rural Canada a large number of anaesthetics are given by family physicians and little is known about the quality or quantity of epidural anaesthetics in these communities. The ability to remain competent in a skill, because of fewer deliveries, may be a problem.

Epidural services have been available since 1976 in Melfort, Saskatchewan, a farming community of 6,000. Melfort Union Hospital has 85 beds serving a rural population of 12,000; it also receives surgical and obstetrical referrals from neighbouring community hospitals as far as 100 km away (representing an additional 20,000 people). The nearest tertiary referral centre is one hour and 45 min away by road. As well as a resident radiologist and pathologist, there is a specialist general surgeon and one general practitioner (GP) surgeon. Anaesthesia is provided by four GP-anaesthetists who have four to six months of anaesthesia training; only one (R.W.) has experience with epidural analgesia and he administered all procedures documented in this study. Twenty-four hour and weekend coverage for emergency Caesarean sections is provided although an epidural service is not always available.

Methods

The charts of every obstetrical patient who had epidural anaesthesia during 1984–1988 were reviewed by a nurse.

TABLE I Deliveries at Melfort Union Hospital 1984–88

	n	%
Vaginal delivery		
– epidural	42	3.4
– no epidural	873	71.3
Total	915	74.8
Caesarean sections		
– general anaesthesia	126	10.3
– epidural anaesthesia	183	15.0
Total	309	25.2
Total deliveries	1,224	100

TABLE II Method of delivery with epidural anaesthesia

	n	%
Vaginal		
– spontaneous	10	4.4
– vacuum	19	8.4
– forceps	13	5.8
Total	42	18.6
Caesarean		
– emergency	69	30.7
– elective	114	50.7
Total	225	100

TABLE III Complications of epidural anaesthesia for Caesarean section

	n	%
Hypotension	27	12.0
Inadequate block		
– requiring *iv* supplement	9	4.0
– requiring GA	7	3.1
Dural puncture	4	1.8
Vascular puncture (×2) requiring GA	2	0.9
Failure to locate space	1	0.4
Vascular absorption of dose	1	0.4
Urinary retention	1	0.4
Toxic reaction	0	0
Subarachnoid injection	0	0
Total	52	23.0

The data included patient age and parity, indications for epidural, stage of labour, insertion technique, mode of delivery, newborn Apgar scores, and complications during insertion and maintenance of the epidural.

Epidural blocks were performed either in the operating room or in the adjoining labour and delivery rooms which have facilities for neonatal and maternal resuscitation. All patients received fluid loading with 500–1500 ml lactated Ringers' solution *iv*. All patients for Caesarean section received 15–30 ml sodium citrate *po* immediately before operation, with elective cases also receiving metoclopramide 10 mg *po* 90 min before surgery.

Patients were placed in the left lateral position and a 17 G Tuohy needle was inserted at the L_{2-3} or L_{3-4} interspace using a "loss of resistance to air" technique. All received a test dose of 2–3 ml of either lidocaine 2% with adrenaline 1:200,000 (for all Caesarean sections) or bupivacaine plain 0.25%–0.5% (for most of those in labour). This was followed by 0.25%–0.5% bupivacaine plain for labour (total doses varying from 9–25 ml), or a 1:1 mixture of lidocaine 2% with adrenaline 1:200,000 and bupivacaine plain 0.5% for Caesarean sections (total doses varying from 15–25 ml). The mixing of agents was discontinued in 1989. Patients in labour were maintained on their left or right side and those for Caesarean section had a wedge placed under the right hip. Epidural top-up injections were administered by the anaesthetist or occasionally by another physician.

Results

During the five-year review there were 1224 deliveries (Table I). The Caesarean section rate was 25.2%, including cases referred from other hospitals (7.2%). Two hundred and twenty-five parturients (18.4%) received epidural analgesia, and all blocks were performed by the same anaesthetist. Of the 309 Caesarean sections during this period, the majority (183 or 59.2%) were performed with epidural blockade.

Patients who did not need epidural analgesia either required no analgesia at all (40%) or received nitrous oxide and/or meperidine *im*. We did not record how many of those with epidurals had prior analgesics.

Elective Caesarean section (114 patients, 50.6%) was the most common indication for epidural blockade (Table II). Of the remaining 111 women, 69 required an emergency Caesarean section for undiagnosed breech (all 21 breech presentations had Caesarean delivery), dystocia, persistent occiput posterior, pre-eclampsia, or failed induction. The other 42 patients had epidural analgesia for pain and delivered vaginally (Table II). The majority of non-elective blocks were performed in the later stages of labour.

Infants were healthy with 12 (6%) Apgar scores <5 at one minute and only two (1%) <5 at five minutes; the latter two were both intrauterine deaths before the initiation of epidural anaesthesia for elective Caesarean section. There were six (3%) who had scores of 5–6 at five minutes and the remaining 213 (94%) scored 7–10. In four charts the Agpar score was not recorded.

The overall complication rate was 23% (Table III) and all complications were confined to Caesarean sections. The most common complication was hypotension, defined as systolic BP < 80 mmHg or a 20% decrease from baseline,[2] which occurred in 27 (12%) of patients. All

of these responded to fluids and/or ephedrine, without evidence of fetal distress. The incidence of hypotension diminished in the latter part of the study period when the intravenous preload was increased from 500 to 1000–1500 ml. Dural puncture occurred in four women (1.8%): one with insertion of the catheter through the needle, two with needle punctures, and all three received general anaesthesia: the fourth had a successful insertion at a second interspace. Two of the four experienced post-dural puncture headache and one required an epidural blood patch which was effective.

Discussion

Epidural anaesthesia for obstetrical patients is performed less frequently in community than in university-affiliated hospitals.[2–4] In larger centres between 20% and 90% of parturients receive epidural analgesia for vaginal delivery[3–6] and the trend is for most Caesarean sections to be performed using epidural anaesthesia. The majority (59.2%) of Caesarean deliveries in our hospital were performed using epidural anaesthesia, but only a few patients (4.6%) required epidural analgesia for labour pain before delivery.

The complication a rate was comparable with that reported from larger centres and no life-threatening problems occurred. Hypotension was the most common adverse effect (12%) but was short-lived and easily treated. The frequency of hypotension that requires treatment despite *iv* loading is variously reported to be between 7% and 63%[7–9] depending on the criteria used to define hypotension. Dural punctures occurred in four women (1.8%) and 1–3% is usually considered acceptable.[10,11] Only seven (3.8%) of 183 epidural anaesthetics were considered inadequate for Caesarean section, and there were no accidental subarachnoid injections or serious toxic reactions.

Although there is some controversy about the necessity for epidural analgesia in labour,[12] the benefits of epidural anaesthesia for Caesarean section are well established;[13–16] it has become the anaesthetic of choice in most institutions.

However, epidural anaesthesia remains underutilized in community hospitals. Problems include the availability of staff to provide immediate management of complications, training of GP-anaesthetists who were never taught the technique, the adequacy of case-load size to maintain skills, and interference with an often already hectic lifestyle.

Practice guidelines published in 1986 by the Canadian Anaesthetists' Society recommended that a physician be "immediately available" to manage complications of epidural analgesia for childbirth.[17] In rural areas most GP-anaesthetists take call from home[3] or office and are able to be at the hospital with minimal delay. In our review, the anaesthetist was able to reach the hospital easily within five minutes of being called. No maternal or fetal problems occurred as a result of this practice.

More recently, the Council of the CAS has recommended that "... it is not necessary for an anaesthetist to remain physically present or immediately available during maintenance of continuous infusion epidural anagelsia ..." but that "When a bolus dose of local anaesthetic is injected into the epidural space, an anaesthetist must be available to intervene appropriately should any complications arise."*

The interpretation of "available" is left to the discretion of the individual hospital or department.

Our study demonstrated that epidural anaesthesia by bolus injection can be a safe procedure. However, based on the safety record and better analgesia of continuous infusion, the recent update of the CAS guidelines should encourage more community hospitals to adopt this method.

We did not use spinal anaesthesia for obstetric anaesthesia during the study but have subsequently added to it our armamentarium. Spinal techniques may be more valuable in a rural setting if a physician already has the skill to perform them but not epidural experience. The increasing interest by specialists to teach these skills to GP anaesthetists is helping to improve the quality of care.

Conclusion

Our results indicate that epidural anaesthesia can be performed safely and effectively in smaller Canadian hospitals.

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