

OBSTETRICAL ANAESTHESIA PRACTICE IN THE UNIVERSITY OF TORONTO AFFILIATED HOSPITALS AND SOME RANDOMLY SELECTED COMMUNITY HOSPITALS

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ABSTRACT

A questionnaire was designed to determine the type of personnel that provide obstetrical anaesthesia care and the techniques used in the provision of this care.

All seven hospitals with an obstetrical unit affiliated with the University of Toronto and seven community hospitals responded.

All anaesthetics were given by physicians. Ninety-two per cent of those in University affiliated hospitals and 63 per cent of those in the community hospitals had obtained their specialty qualification.

Standards for preoperative assessment and communication with the patients should be similar to those applied to patients receiving anaesthesia for other reasons. It was clear from our survey that pre-anaesthetic assessment of obstetrical patients differs from that advocated for other surgical patients.

For vaginal deliveries, epidural analgesia was clearly the preferred choice. Subarachnoid block was rarely used. The majority of anaesthetists did not use a test dose. Eleven per cent in University-affiliated hospitals and 50 per cent in community hospitals sometimes conducted surgical anaesthesia without tracheal intubation for vaginal delivery. More than 60 per cent routinely encouraged their patients to accept general anaesthesia for Caesarean section. The doctors providing neonatal resuscitation may require further training.

Surveys such as this are important if standards of anaesthetic practice are to be established.

KEY WORDS: ANAESTHESIA: obstetrical; pattern of practice.

A QUESTIONNAIRE was designed to determine the pattern of obstetrical anaesthesia practice in all University of Toronto affiliated hospitals and in some randomly selected community hospitals. The questionnaire addressed the following:

- (1) The training and experience of anaesthesia personnel;
- (2) The standard of pre-operative assessment;
- (3) The type of anaesthesia used for vaginal deliveries;
- (4) The type of anaesthesia used for Caesarean sections;
- (5) The methods used for routine epidural analgesia;
- (6) The facilities for and the practice of neonatal resuscitation.

The possible answers for each question were:

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always, usually, sometimes, rarely or never. The data presented refer to the percentage of anaesthetists who answered "always or usually" to each of the questions.

All seven hospitals with an obstetrical unit at the University of Toronto and seven of nine community hospitals responded to the questionnaire. One hundred and fifty-three anaesthetists were surveyed and 84 replied (56 per cent). All replies were anonymous and hence we cannot determine if the remaining anaesthetists did not want their patterns of practice analyzed or whether they did not practice obstetrical anaesthesia. Forty-eight of 91 anaesthetists surveyed in the University affiliated hospitals responded, as did 37 of 62 anaesthetists surveyed in community hospitals. Since there were 27,502 births in 1977 in the hospitals surveyed, the responses permit us to draw some conclusions as to the pattern of obstetrical anaesthesia practice.

I ANAESTHESIA PERSONNEL

Ninety-two per cent of those in University affiliated and 63 per cent of those in community hospitals had obtained specialty qualification (Table I). University affiliated hospitals tended to

TABLE I
TRAINING OF PERSONNEL ADMINISTERING ANAESTHESIA FOR OBSTETRICS,
PERCENTAGE REPLIES*

	Affiliated	Community
Fellows of Royal College		
Yes	92	63
No	4	17
Year of Graduation		
1970–	17	3
1960–69	28	29
1950–59	38	34
before 1950	11	14
Medical School Training in		
Canada	51	43
U.K.	23	20
U.S.	0	0
Other	13	17
Residency Training in		
Canada	81	74
U.S.	4	3
U.K.	28	14
Other	9	3
Anaesthesia Experience outside Canada		
U.S.A.	6	3
U.K.	29	22
Other	15	25

*Does not add up to 100 per cent because some anaesthetists did not reply to every question.

have more recent graduates. Most were trained in Canada or the United Kingdom.

II PRE-ANAESTHETIC ASSESSMENT

It is clear from our survey that the preoperative assessment of obstetrical patients differs from that of other surgical patients. For example, 10 to 30 per cent of anaesthetists did not introduce themselves, explain what epidural analgesia is, or obtain the mother's consent before inducing epidural analgesia for routine labour and delivery. In addition, 46 per cent did not take a history before administering epidural analgesia.

Comment

It is generally agreed that preoperative assessment is an important, if not essential, part of anaesthetic management of any patient.¹ This principle is apparently not applied to obstetrical patients.

III ANAESTHESIA FOR VAGINAL DELIVERIES

(a) *Techniques*

Only 12 per cent of anaesthetists used oral antacids routinely. Epidural analgesia was the pre-

dominant choice for normal vaginal deliveries. Continuous lumbar epidural was the technique always or usually used by 74 per cent of anaesthetists in university affiliated hospitals and 23 per cent in community hospitals. Single dose lumbar epidural analgesia was preferred by 26 per cent in affiliated and by 77 per cent in community hospitals. No anaesthetist considered general anaesthesia with inhalation agents or intravenous drugs the method of choice for vaginal delivery.

Some of the practical details of the technique for epidural analgesia are shown in Table II. Nearly everyone wore a cap, mask and gloves when administering epidural analgesia, but only 60 per cent in affiliated hospitals and 37 per cent in community hospitals scrubbed and gowned for an epidural. Most anaesthetists started epidurals in the delivery room. The majority of anaesthetists tried to obtain some analgesia during the second stage of labour (Table II). Only 11 per cent deliberately withheld analgesia.

Eleven per cent of anaesthetists at university affiliated hospitals and 54 per cent in community hospitals sometimes conducted general anaesthesia without tracheal intubation. Thirty-one per cent of all surveyed at some time during their

TABLE II
NORMAL VAGINAL DELIVERY ROUTINE FOR EPIDURAL ADMINISTRATION,
PERCENTAGE REPLYING "ALWAYS OR USUALLY"

	Affiliated	Community
When is continuous epidural started? according to degree of cervical dilation? depending on severity of labour pain?	36 64	48 52
When establishing an epidural, do you: wear cap, mask and gloves scrub and gown	98 60	100 37
Start epidural in: Labour Room Delivery Room	10 90	38 62
In the second stage of labour, do you: withhold analgesia provide mild analgesia provide deep analgesia	11 52 37	15 63 22

TABLE III
USE OF TEST DOSE NORMAL VAGINAL DELIVERY, PERCENTAGE REPLYING
"ALWAYS OR USUALLY"

	Affiliated	Community
Single dose Epidural	14	17
Continuous Epidural	45	43
Volume of test dose: 2 ml. 3 ml. 4 ml. 5 ml. or more	50 21 29 0	33 33 11 22
How long after test dose do you wait? 2 minutes or less 3 to 5 minutes 5 minutes or greater	38 28 38	44 44 12

career have had at least one patient who developed aspiration pneumonitis associated with obstetrical anaesthesia.

A test dose was not commonly used as part of the epidural technique (Table III). When it was used, both the dose and "waiting time" varied widely.

Comment

In the authors' opinions it is not necessary to scrub and gown. Experience over 25 years and approximately 75,000 epidurals support our belief.^{2,3} In addition, we feel that it is equally safe to induce an epidural block in the labour room, provided that equipment and drugs necessary for management of complications are immediately available.

The wide variation in technique when a test

dose is used is possibly explained by lack of agreement on the need for and method of doing the test. This is reflected by Scott, who recently has questioned the necessity of a test dose.⁴

(b) Choice of Agent

In university affiliated hospitals, bupivacaine was used by 92 per cent of anaesthetists for the first stage of labour. Eight per cent used mepivacaine. Nineteen per cent used these drugs with epinephrine. In community hospitals, 82 per cent used bupivacaine, 10 per cent used lidocaine and eight per cent used mepivacaine.

For delivery, lidocaine was used to provide pain relief by 86 per cent of anaesthetists.

Comment

It is of interest that eight per cent of anaes-

TABLE IV
ANAESTHESIA FOR BREECH AND TWIN PRESENTATIONS METHODS USED, PERCENTAGE RESPONDING "ALWAYS OR USUALLY"

	Affiliated		Community	
	Breech	Twin	Breech	Twin
Pudendal Block	2	0	3	3
Paracervical block	0	2	0	0
Inhalation or Intravenous Analgesia for delivery under local nerve block infiltration or pudendal	0	0	9	0
Single dose epidural	16	7	36	30
Continuous epidural	65	74	24	39
Double catheter technique	5	5	0	0
Subarachnoid block	0	0	0	0
General anaesthesia for delivery	2	2	13	23
Standby only for potential resuscitation	30	30	13	22

* Adds up to >100 because several responses possible.

thetists will use mepivacaine for the first stage of labour. Mepivacaine has been shown to accumulate in the mother with repeated doses⁵ and to have a longer half-life in the newborn.⁶

Epinephrine, even in the low doses used with local anaesthetics, may cause prolonged labour,^{7,8} adverse maternal systemic effects,⁹ and in the pregnant ewe has been shown to reduce uterine blood flow.^{10,11} We believe the addition of epinephrine is unnecessary in obstetrical anaesthesia because of the relatively long duration of bupivacaine.

Lidocaine is presumably chosen for its rapid onset, although it is said to cause "alert but floppy" babies.¹² This latter effect led the American College of Obstetricians and Gynaecologists and the American Academy of Paediatrics to recommend in 1978 that the use of lidocaine and mepivacaine be avoided in obstetrics.¹³ The anaesthetists surveyed are either unaware of this recommendation, or do not feel that the evidence is sufficiently strong. Further investigations are necessary to clarify this question.

(c) Breech and Twin Presentations

The anaesthetic techniques used are presented in Table IV. It appeared that epidural analgesia was well accepted for those obstetric difficulties.

(d) Accidental Dural Puncture

If dural puncture occurred during administration of a single-dose epidural, 58 per cent of anaesthetists in affiliated hospitals and 65 per cent in community hospitals would carry on with a subarachnoid block. During a continuous

epidural, three per cent would carry on with a subarachnoid block, 87 per cent would make the epidural injection at another interspace and ten per cent would abandon the procedure.

(e) Epidural Blood Patch

Only 64 per cent of anaesthetists in affiliated and 30 per cent in community hospitals would do an epidural "blood patch" for severe persistent "spinal headache."

Comment

Recent data have shown the epidural blood patch to be 97 per cent effective and relatively risk-free in the treatment of persistent "spinal headache",^{14,15} while there is evidence that prophylactic "blood patches" are not effective.¹⁶ Comparison of epidural saline injection with epidural blood patch for the treatment of post-lumbar puncture headache clearly demonstrates that the use of a blood patch is far superior.¹⁷

IV ANAESTHESIA FOR CAESAREAN SECTION

(a) Preoperative Preparation

If regional analgesia was used, 32 per cent of anaesthetists gave oral antacids routinely. When general anaesthetics were used, oral antacids were given to 59 per cent of elective and 75 per cent of emergency patients.

More than 60 per cent of anaesthetists routinely encouraged patients to accept general anaesthesia for elective or emergency Caesarean section.

Twenty per cent of anaesthetists did not re-

TABLE V
TECHNIQUE OF GENERAL ANAESTHESIA ELECTIVE CAESAREAN SECTION,
PERCENTAGE RESPONDING "ALWAYS OR USUALLY"

	Affiliated	Community
Supine Position	57	68
Preoxygenation	89	59
Prehydrate	45	17
Prepare and drape mothers before induction	60	42
Pretreat with non-depolarizing muscle relaxant	85	65
Intubate with succinylcholine	89	90
Intubate with pancuronium or curare as the sole muscle relaxant	11	10
Cricoid pressure	69	38
Intubation of Trachea	100	100

TABLE VI
GENERAL ANAESTHESIA FOR CAESARIAN SECTION CHOICE OF AGENTS BEFORE DELIVERY: PERCENTAGE OF ANAESTHETISTS THAT GIVE 90 TO 100 PERCENT OF THEIR PATIENTS THE FOLLOWING DRUGS

	Affiliated	Community
Induction		
Thiopentone	100	89
Ketamine	0	0
Maintenance		
N ₂ O greater than 60%	58	74
N ₂ O less than 60%	42	26
Halothane	15	3
Methoxyflurane	2	3
Enflurane	6	0
Muscle Relaxants		
Succinylcholine	81	73
Curare	65	3
Pancuronium	8	27

quire blood to be typed and cross matched before an elective Caesarean section and less than 30 per cent held cross matched blood in the delivery room.

Comment

The authors agree with Crawford that all patients due to have a Caesarean section should be typed and cross matched for two units of blood, which are then kept in the delivery room.¹⁸ Ideally, a technician should be available in hospital to type and cross match blood for obstetrical emergencies.

(b) *General Anaesthesia*

A significant percentage of anaesthetists did not always preoxygenate the lungs, prehydrate with 500 to 1000 ml of intravenous fluid, or pre-

pare and drape the patient before induction of anaesthesia (Table V). Most anaesthetists did not use lateral tilt.

Thiopentone was the induction agent of choice with the occasional use of ketamine (Table VI). More than half of the anaesthetists used more than 60 per cent nitrous oxide before the birth of the baby. Few anaesthetists reduced the concentration of nitrous oxide and replaced it with a volatile agent.

The technique used for emergency Caesarean sections was similar to that used in elective Caesarean sections.

(c) *Epidural Anaesthesia*

Fifty-eight per cent in affiliated hospitals and 43 per cent in community hospitals prehydrated their patients. Similar percentages were seen for

TABLE VII
EPIDURAL ANALGESIA FOR ELECTIVE CAESARIAN SECTION CHOICE OF LOCAL ANAESTHETIC, PERCENTAGE RESPONDING "ALWAYS OR USUALLY"

	Affiliated	Community
Lidocaine HCL-2%	34	26
Lidocaine CO ₂ -2%	16	21
Mepivacaine-2%	20	24
Bupivacaine-0.5%	30	18
Bupivacaine-0.75%	0	3
Other (e.g. mixtures)	0	8
Addition of Epinephrine	17	15

the use of lateral tilt, administration of oxygen to the mother, and electrocardiographic monitoring.

The choice of local anaesthetic is outlined in Table VII. There was no clear favourite among the agents used. As for vaginal deliveries, there is similar controversy concerning the addition of epinephrine.

Comment

It is of interest that most anaesthetists do not use lateral tilt despite its proven value in avoiding aortocaval compression.^{19,22} Potent volatile agents are not widely used during general anaesthesia even though they have been shown to improve the condition of the neonate without increasing maternal complications.^{23,24} We have no explanations as to why these techniques are not used routinely.²⁵

(d) Fathers in the Caesarean Section Room

Thirty-three per cent of anaesthetists in affiliated and six per cent in community hospitals permitted fathers in the delivery room.

Comment

It is not clear whether this practice represents personal belief of the anaesthetists or hospital policy.

(e) Use of Vasopressors

Only 62 per cent of anaesthetists in affiliated and 71 per cent of those in community hospitals used vasopressors if hypotension persisted. Of these anaesthetists 20 per cent in affiliated and 85 per cent in community hospitals used agents that cause uterine vasoconstriction. The remaining anaesthetists would not use vasopressors in these circumstances.

Comment

Persistent maternal hypotension (systolic less than 100 torr or 20 per cent less than baseline²⁶) for five to seven minutes or longer may lead to foetal distress.²⁷ Hypotension remains a common complication of regional anaesthesia.²⁸ When it is transient, there are usually no foetal complications.²⁸ The management of maternal hypotension includes further uterine displacement, acute intravenous volume expansion, and administration of oxygen.²⁸

In the past vasopressors have not been used because of fear of uterine vasoconstriction and, thus, foetal hypoxia. In the sheep, uterine blood flow is only minimally affected by ephedrine or mephentermine (Wyamine®).²⁹ This is in contrast to other vasopressors such as methoxamine (Vasoxyl®), phenylephrine (Neosynephrine®), metaraminol (Aramine®),²⁹ and dopamine (Intropin®).³⁰ Ephedrine or mephentermine should be given if severe hypotension persists for longer than one or two minutes.

V NEWBORN RESUSCITATION

(a) Monitoring and Patterns of Practice

Fifty per cent of anaesthetists in affiliated and 38 per cent of those in community hospitals monitored the newborn's temperature. Less than ten per cent monitored the electrocardiogram or blood pressure during resuscitation.

Twenty-five per cent in university affiliated hospitals would not apply external cardiac compression in spite of bradycardia of 60/min or less in a newborn despite "adequate resuscitation". Most centres had the capability of establishing an intravascular line if needed. However, only 30 per cent of anaesthetists played a role in establishing the umbilical artery or venous line, or a peripheral venous line. Fifty per cent of anaes-

TABLE VIII
NEONATAL RESUSCITATION ROLE OF PAEDIATRICIANS VS. ANAESTHETISTS,
PERCENTAGE RESPONDING AFFIRMATIVELY

	Affiliated	Community
Can you adequately monitor the mother and resuscitate the child?	30	47
Should another M.D. be available for either the resuscitation or for the maternal anaesthetic?	80	60
What is the ideal role of an anaesthetist in resuscitation of the newborn?		
1. Anaesthetist is in charge and works with paediatrician	59	67
2. Anaesthetist should hand over responsibility for care of infant when paediatrician arrives or if he is present	10	13
3. Anaesthetist is responsible for respiratory support and monitoring, paediatrician is responsible for establishing intravascular lines, monitoring and treatment of haemodynamic status	31	25

thetists in affiliated and 70 per cent in community hospitals administered drugs to the newborn.

to carry out adequate resuscitation of either the mother or baby.

(b) Role of Paediatricians vs. Anaesthetists

Most anaesthetists did not feel that they can adequately monitor the mother and resuscitate the infant at the same time (Table VIII). They would welcome another doctor to help with the resuscitation of the newborn or with the anaesthetic for the mother. Fifty-nine per cent in affiliated and 67 per cent in community hospitals felt that the ideal role for the anaesthetist is that of the physician-in-charge of newborn resuscitation, working with and utilizing the skills of paediatricians.

Comment

The importance of newborn resuscitation in the delivery room cannot be over-emphasized. A French cost-benefit study states that one of the best and certainly most cost-effective methods of preventing perinatal death and major morbidity is immediate resuscitation of the neonate.³¹

One of the main advantages of hospital over home births is the presence of personnel and facilities for neonatal resuscitation should this be required. Ideally, a doctor competent in neonatal resuscitation should attend all births. The doctors involved in neonatal resuscitation may require further training. Our aim should be to discourage "home births" where the obstetrician, general practitioner or midwife is usually unable

VI DISCUSSION

Previously only a few surveys have assessed the training of residents and the practice of obstetrical anaesthesia in the United States³² and Britain.³³ Our study is the first to document anaesthetic methods and techniques used by Canadian anaesthetists. We have attempted to document the pattern of practice in the University of Toronto affiliated hospitals and some randomly selected community hospitals. We did not assess the factors which influence the pattern of practice. We believe that some of the practices documented are good, while others are not.

Our study does not allow any conclusion concerning maternal or perinatal mortality or morbidity.

The inconsistent use of accepted techniques such as left uterine displacement by lateral tilt, the failure to use vasopressors despite persistent hypotension, the reliance on general anaesthesia for Caesarean section are of great interest. New scientific knowledge takes time to become incorporated into medical practice. This might be a factor in some of the practices described.

Surveys such as the one described must be conducted if an attempt is to be made to establish standards for anaesthetic practice. In addition, the factors which determine the patterns of prac-

tice need to be assessed. Only by proceeding in this manner could one hope to assess and thus improve anaesthetic practice.

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RÉSUMÉ

Dans le but d'identifier le type du personnel qui administrait l'anesthésie obstétricale et les techniques utilisées à cet effet, on a distribué un questionnaire auquel ont répondu tous les hôpitaux affiliés à l'Université de Toronto qui possédaient un département d'obstétrique et sept hôpitaux communautaires.

Toutes les anesthésies obstétricales étaient administrées par des médecins dont quarante-deux pour cent possédaient des qualifications de spécialiste dans les hôpitaux universitaires et soixante-trois pour cent dans les hôpitaux communautaires.

Les standards reconnus en usage pour l'évaluation pré-anesthésique et les communications avec les patients devraient être les mêmes pour tous les patients qui reçoivent l'anesthésie; or, il devint évident que l'évaluation pré-anesthésique des parturientes différait de celle qu'on exige pour les autres patients.

Pour les accouchements, l'anesthésie de choix a été l'anesthésie péridurale alors que l'anesthésie sous-arachnoïdienne était rarement utilisée. La majorité des spécialistes n'employaient pas de dose-test. Lors d'anesthésie générale pour accouchement, le trachée n'a pas été intubée dans onze pour cent des hôpitaux affiliés à l'Université et dans cinquante pour cent des hôpitaux communautaires. Plus de soixante pour cent des anesthésistes ont suggéré à leurs patientes d'accepter l'anesthésie générale pour la césarienne. Les médecins qui pratiquaient la réanimation néonatale avaient besoin de formation plus avancée.

Des enquêtes comme celle-ci sont importantes si on veut maintenir à un niveau élevé les standards d'exercice de l'anesthésie.