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The rational use of bupivacaine in obstetric epidural anaesthesia

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In August, 1983, Canadian anaesthetists were advised by the Drugs Directorate of the Health Protection Branch of the Department of National Health and Welfare, Ottawa, in conjunction with the drug company, Winthrop Laboratories, that bupivacaine 0.75 per cent was no longer recommended for use in obstetric analgesia and anaesthesia.* This advisory resulted from American reports of cardiac arrest in patients receiving this concentration of the drug.†‡ Since then, two Canadian publications have commented on the advice concerning bupivacaine,§ and recommended techniques for the safe use of the drug. However, despite reports about its possible cardiotoxicity, bupivacaine remains the preferred local anaesthetic agent in obstetric anaesthesia and has three major uses.

Epidural analgesia in labour

Continuous epidural analgesia (intermittent injection)

Since epidural drug dose requirements are reduced

*Blair I. New recommendations about bupivacaine (Letter). Winthrop Laboratories. 29 August, 1983.

†Albright GA. Clinical aspects of bupivacaine toxicity. Report to Anesthetic and Life Support Drugs Advisory Committee, United States Department of Health and Human Services. October 4, 1983.

‡Food and Drug Administration (FDA) Drug Bulletin. Department of Health and Human Services. 1983; 13: 23.

§McMorland GH, Biehl DR, Palahniuk RJ. Report of the Canadian Anaesthetists' Society Ad Hoc Committee on cardiotoxicity of bupivacaine. May, 1984.

in pregnancy, lower anaesthetic concentrations allow use of the smallest effective dose; additionally, minimal motor block is produced, an important obstetric consideration. Bupivacaine's potency and long duration of action prolong the interval between top-ups; the drug's latency of onset has little significance in clinical practice. Thus, 0.25 or 0.125 per cent solution works well in a dose of 25–30 mg (i.e., 10–12 ml of 0.25 per cent).³ An increase in foetal heart rate decelerations has been reported, but the aetiology and significance of this remain uncertain.⁴

Continuous infusion analgesia

Infusion techniques offer smoother control of labour pain, with less need for incremental doses.⁵ However, since infusions result in a larger total dose of local anaesthetic,⁶ accidental intravascular or subarachnoid administration must be carefully excluded. More dilute concentrations seem preferable, but paradoxically appear to cause more motor block than the administration of solutions of higher concentration.⁷ Bupivacaine 0.25–0.3 per cent provides effective pain relief with an hourly dose of 15–18 mg.⁵ The incidence of forceps delivery is increased in women receiving continuous infusion analgesia with bupivacaine in comparison to those receiving chloroprocaine or lidocaine.⁸ But use of the latter two shorter-acting drugs⁸ can also lead to tachyphylaxis. In the author's experience bupivacaine tachyphylaxis, although reported,⁸ is rare.

Anaesthesia for Caesarean section

The requirement for an extensive block, from T5–S5, increases the potential for major problems. The deaths in the United States of America apparently resulted from inadvertent intravascular injection of bupivacaine.^{1†} The danger with 0.75 per cent bupivacaine lay in the ability to administer too much too quickly,⁹ and therefore this concentration is no longer recommended for obstetric use.*

Bupivacaine 0.5 per cent can provide excellent Caesarean section analgesia in most parturients. The use of an initial dose with the patient seated improves sacral block. Essential safety measures include slow injection of the drug with increments not exceeding 5 ml and careful and repeated aspiration. Accidental intravascular or subarachnoid placement of the cannula must be carefully excluded. Three ml local anaesthetic plus 15 µg

epinephrine (1:200,000)¹⁰ and a simple "manometer" test¹¹ have a great degree of reliability.

Like all potentially hazardous drugs, bupivacaine demands respect. Maximum recommended dosage for Caesarean section is 2–2.5 mg·kg⁻¹ (150–200 mg)¹² and with continuous use in labour, 2 mg·kg⁻¹ should not be exceeded in a four hour period.¹³ These dose limits also apply when existing epidural analgesia needs augmentation for Caesarean section.

Bupivacaine remains popular for Caesarean section anaesthesia. Its prolonged duration gives excellent sensory analgesia with less motor block than lidocaine or chloroprocaine. When time is of the essence, as in foetal distress, chloroprocaine (or possibly lidocaine) may be preferred; otherwise bupivacaine retains a broad spectrum of indications in obstetric anaesthesia.

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Medical indications for regional anaesthesia

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Although many specialists in internal medicine think that they should help influence the choice of anaesthetic technique, the decision between regional and general anaesthesia in any given medical condition and surgical procedure is best left to the attending anaesthetist. Many factors influence the choice of anaesthesia.* These include patient attitude, size and metabolic-physiologic status, anaesthetist skills, accessory personnel and facilities, operative site and duration of operation, and therapeutic and diagnostic considerations.

Recent additions and advances in anaesthetic drugs and techniques for general anaesthesia, the increasing number of otherwise well-trained anaesthetists who have limited experience with regional techniques, and the inherent suspicion and fear of surgeons and their patients toward blocks have conspired to limit the use of regional anaesthesia.¹ As a result, appropriate and optimal use of local anaesthetics is often neglected, resulting in even less inclination to consider regional techniques. The economic pressure to use operating theatre time for

the maximum number of cases also mitigates against regional anaesthesia, which, especially in less experienced hands, often takes longer than general anaesthesia. It is interesting to note that among anaesthetists, 68 per cent of 3,498 respondents in a survey preferred regional anaesthesia for themselves.² Reasons cited by them for choosing regional anaesthesia included ease of administration, lower incidence of major intraoperative or postoperative complications, avoidance of the toxic effects of some general anaesthetic agents, provision of excellent operating conditions, pleasant recovery, and less difficulty in the recovery room.

Regional anaesthesia may be preferred in outpatients, emergency surgery without extensive haemorrhage, patients with a full stomach, surgery in the prone position, geriatric patients, hot and dry climates or high altitude, and surgery where patient co-operation is required.³ Local techniques may also be selected in patients with certain disease states: diabetes, hypertension, coronary artery disease, congestive heart failure, cerebrovascular accidents, respiratory disease, and urinary tract disease. In contrast, preference may be given to general anaesthesia in young, unco-operative or uncomprehending patients, hysterical patients, patients with a history of malingering, certain nervous system diseases, anaemias, coagulopathies, skin infections, and septicemia.

There are few controlled scientific studies which attempt to determine the relative advantages of either form of anaesthesia. Recent data have demonstrated the merits of regional anaesthesia with respect to haemodynamic considerations, metabolic effects, postoperative patient care, and relative morbidity and mortality.⁴ Cardiovascular depression is less and metabolic stress responses are better obtunded.⁵ Postoperatively there is improved pulmonary function, better pain control, and earlier ambulation and discharge.⁶ Mortality rates have been shown to be slightly lower in regional anaesthesia.^{7,8}

Nevertheless, large scale epidemiologic studies need to be done to further elucidate the relative advantages of regional and general anaesthetic techniques.

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