Third, inflation of the balloon may distort the position of the distal orifice so that an electronic artefact is obtained. We further agree that perforation of a small pulmonary artery was possible, but would like to re-emphasize that the blood was bright red. This suggests that the bleeding was not from the pulmonary artery. Furthermore, in a patient with pulmonary hypertension, perforation of a pulmonary artery would have caused more catastrophic haemorrhage than the measured 200 ml.

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REFERENCE

SKIN SENSITIVITY TO HALOTHANE VAPOUR

Sir,—The following anecdote is recounted as I do not remember having seen such a phenomenon reported before. Recently a new nurse joined our operating room team. One day at the conclusion of the list she noticed that her face and neck had become red with itching; this increased and oedema of the eyelids developed. The discomfort was such that she could not sleep that night. On the following morning she still had residual flush of her face and puffy eyelids, which did not subside for 2 days. She then remembered that this had occurred to a milder extent one day in previous week.

On reflection, we remembered that on each occasion she had assisted at the induction of anaesthesia in an infant when I had used halothane and oxygen, using a face-mask fitted with a spill valve on the connector. I sat at the head of the table and the nurse stood on the right side facing me and holding the infant by the arms so that she was leaning forward directly over the expiratory valve: she thus received the spill of 3 litre of oxygen with up to 2% halothane directly in the face. The “paediatric set” is the only anaesthetic apparatus we use which has no scavenging device. All our anaesthetic machines are fitted with closed circuits and the gases from the spill valves are effectively removed from the room.

Scientific principles would require that I should ask the young lady to submit to an experimental exposure to halothane vapour and deliberately reproduce the effect. I am loath to do this as it is clearly an unpleasant experience, unless someone can adduce further evidence to confirm or deny that this is in fact a case of sensitivity to halothane vapour.

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EXTRADURAL ANALGESIA FOR CAESAREAN SECTION

Sir,—In his lucid editorial under the above title, Dr Donald Moir (1979) has summarized the current status of the technique. Appreciation of the physiological and pharmacological principles to which he refers should enable an anaesthetist in ideal circumstances, and after full unbiased discussion with the mother, to offer central neural blockade (CNB) by either extradural (EDB) or subarachnoid (SB) routes as an alternative to general anaesthesia. In addition to the advantages which Dr Moir has outlined, there are other potential, yet poorly documented, merits of CNB (Brownridge, 1979a, b). First, paternal participation at the birth is possible; a preliminary survey has shown considerable demand for the satisfaction of this shared experience. Second, an earlier return of appetite and oral intake is possible using EDB rather than opiates for analgesia. This is supported by Nimmo and colleagues (1978) who described improved gastric emptying following hysterectomy with extradural analgesia and by Gelman and colleagues (1977) who used electroenterographic studies in patients undergoing cholecystectomy with or without EDB. Third, successful lactation and breast feeding is more likely to become established following early mother–infant contact (Salariya, Easton and Carter, 1978). Fourth, although recent authors, cited by Dr Moir, have shown a similar infant outcome after EDB and general anaesthesia, Hodgkinson and colleagues (1978) have demonstrated superior neonatal behavioural scores following Caesarean section with SB. Fifth, blood loss is reduced, as is the need for transfusion. Finally, EDB may reduce the frequency of deep vein thrombosis after surgery by virtue of large increases in lower limb flow (Cousins and Wright, 1971) and by inhibiting platelet aggregation. These factors may override any possible disadvantage from diminished leg movements.

Undoubtedly, intra-abdominal surgery is a major test of CNB, but maternal desire to be aware of birth is developed so strongly in some women that unpleasant symptoms are accepted. Analyses of the degree of discomfort and side-effects are difficult and it is not surprising that there is considerable variation in their reported frequency. Nevertheless, the important factor is the overall recollection of the experience. Despite commonly recollected discomforts, most women are enthusiastic about the technique (Brownridge, 1979b).

Further refinements in technique and drug application may provide improvements. Dr Moir refers to imperfect and unpredictable sacral nerve blockade as a common source of discomfort following EDB. Although patient positioning is advocated by many authorities as a useful manoeuvre to improve spread, I am sceptical about its value. A simultaneous caudal block may be used to ensure sacral nerve root blockade, but systemic toxicity is more likely. The influence of local analgesic agents on the fetus remains controversial, but it seems sensible to reduce circulating concentrations to a minimum.

An alternative approach is to combine extradural blockade with subarachnoid block for Caesarean section (Brownridge, 1979a). Insertion of an extradural catheter in an upper lumbar interspace is followed by subarachnoid block and bilateral somatic blockade achieved by positioning of the patient. In this way, a rapid profound block of all sacral nerve roots is obtained. This combined blockade allows greater flexibility, a reduced total dose of local analgesic agent and permits continuous EDB for analgesia after operation. Initial experience with this technique has been encouraging. The frequency of spinal cephalgia is small.

Despite the use of oxytocin in preference to ergometrine, I have found the frequency of nausea to be greater with this drug than is commonly reported. However, it is usually transient and occurs before surgery; is it possible that magnesium trisilicate may be responsible for this?

Although the measures outlined to prevent hypotension...
are adequate in most instances, I am surprised that Dr Moir did not mention the prophylactic administration of atropine and the value of a vasopressor. Ephedrine should be immediately available since this agent is rapidly effective in reversing the undesirable effects of hypotension, but does not decrease uterine blood flow (Ralston and Schnider, 1978). Supplementary oxygen is surely desirable, especially before delivery.

The concluding sentences of Dr Moir’s editorial are particularly pertinent. Trainees must receive supervision and support and no anaesthetist should be expected to embark upon such a potentially hazardous procedure without the competence and confidence to manage the patient’s physical and psychological needs.

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REFERENCES


The effects upon the fetus and neonate have been described recently by several authors. Fetal acidosis has been reported as similar to or slightly greater than that associated with general anaesthesia (Wallis et al., 1976; James et al., 1977; Palahiñuk et al., 1977; Hollmén et al., 1978; Downing, Houlton and Barclay, 1979). Our own observations suggest that if aorto-caval occlusion is avoided and hydration before and during operation is maintained then fetal acidosis is of similar extent after extradural and general anaesthesia. An important observation is that fetal oxygen consumption is not decreased by extradural block and placental blood flow is not significantly reduced in the absence of arterial hypotension (Jouppila et al., 1978).

Whereas general anaesthesia consistently depresses neurobehavioural responses in the neonate for up to 48 h, these effects are absent after Caesarean section under extradural block with lignocaine, bupivacaine and etidocaine in the absence of arterial hypotension (Lund et al., 1977; Palahiñuk et al., 1977; Hollmén et al., 1978). Respiration is rapidly established at birth. The technique advocated involves the use of a mean dose of 115 mg of bupivacaine (range 60–170 mg). McGuiness and others (1978) used a mean dose of 168 mg of bupivacaine and there were no signs of neurobehavioural impairment in the neonates and toxic blood concentrations did not occur.

I agree that ephedrine should be immediately available and we use this agent if arterial hypotension does not respond rapidly to postural change and i.v. fluids. In our experience also, nausea or vomiting are quite frequent (17% in our series) and not always related to hypotension and certainly not to ergometrine, which is not used. All patients inhale a mixture of 20% nitrous oxide in oxygen until delivery, thereby benefiting from a high $F_{\text{N}}$, and a degree of inhalation analgesia.

Extradural analgesia can be a safe and effective technique for Caesarean section in skilled and careful hands. The delivery of the infant into the arms of a conscious and pain-free mother is one of the most exciting and rewarding moments in medicine.

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REFERENCES