circuit is to be assembled for use, the inner tube is simply pushed in and through the outer tube until the end of the smaller tube touches a stopper provided at the patient end; this detachment of the two limbs allows one to check the integrity of the inner tube at any time.

The circuit was also presented at the 1979 American Society of Anesthesiologists Annual Meeting in San Francisco and at the Second International Dental Congress on Modern Pain Control in London, 1979.

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REFERENCES

EFFECTS OF CONCENTRATION OF LOCAL ANAESTHETIC DRUGS IN EXTRADURAL BLOCK

Sir,—I read with interest the article by Scott and others (1980). The authors have confirmed our findings—0.75% bupivacaine must be used if single-injection extradural block is to produce consistently complete nerve block (motor and sensory) for intra-abdominal surgery (Moore et al., 1971, 1978). Bupivacaine 0.75% with 1:200,000 adrenaline added was found to be safe and reliable when up to 30 ml (225 mg) was used in more than 5000 patients (Moore et al., 1971, 1978). Scott stated correctly that increasing the concentration and the dosage of the local anaesthetic drug beyond a certain maximum (as yet undetermined for many local anaesthetic drugs in man) will ultimately lead to systemic toxicity and localized nerve damage. No sequelae from 0.75% for spinal anaesthesia have occurred (Moore, 1980) or from up to 200 mg of 0.5% injected accidentally to the subarachnoid space via the caudal canal in three patients (two previously reported) (Moore et al., 1971, 1977, 1978).

At least one of our studies comparing bupivacaine and etidocaine (Moore et al., 1974) was controlled to the same extent as that of Scott and others (1980). Our studies compared (1) solutions of like composition—all solutions contained 1:200,000 adrenaline which had been added by us; (2) like procedures— intra-abdominal gynaecological surgery (Moore et al., 1974) or vaginal delivery (Moore et al., 1975); (3) in patients undergoing pelvic surgery, the same therapeutic doses (20 ml) were given. One study showed that 1.0% etidocaine was inadequate for intra-abdominal gynaecological surgery, but 0.75% bupivacaine provided complete nerve block (Moore et al., 1974). These results have been substantiated by others (Bromage, 1978; Datta et al., 1980). Therefore, Scott’s finding that 1.5% etidocaine is required to produce analgesia consistently for intra-abdominal surgery is important.

Another of our studies showed that when adrenaline is added to solutions of local anaesthetic drugs it enhances any differences between the drugs, particularly as to onset, duration and motor and sensory blockade (Moore, 1980). Unfortunately, in Scott’s study, 1.5% etidocaine with adrenaline 1:200,000 was compared with 0.75% bupivacaine without adrenaline. Therefore, these data are not directly comparable. The reason for this (“Adrenaline 1:200,000 was used with etidocaine as plain solutions of 1.5% solution are not available commercially”) is not correct. That part of the study was at the University of Massachusetts Medical Center, where 0.75% bupivacaine with 1:200,000 adrenaline is commercially available. Furthermore, adrenaline could have been added to the other solutions in this study so that its final concentration was 1:200,000, thus standardizing all comparisons.

Finally, although this is not a criticism but more of a caution, Dr Scott and his colleagues should be aware that commercially prepared local anaesthetic solutions with adrenaline contain preservatives and have a low pH in order to stabilize the adrenaline. The possibility of neuropathy resulting from acid pH if such a solution is unintentionally injected to the subarachnoid space during an attempt to perform extradural block remains unresolved (Covino et al., 1980; Friedman and DiFazio, 1980; McLeskey, 1980). Also, since Scott and others are using etidocaine for extradural block, they should be aware that, on contact with cerebrospinal fluid of man under aerobic or anaerobic conditions, etidocaine becomes cloudy—a precipitate appears to form. This does not occur with bupivacaine (Moore, 1980). Whether this has any significance should a large dose of etidocaine be injected unintentionally to the subarachnoid space likewise needs clarification.

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REFERENCES
Sir,—We thank Dr Moore for his comments on our article. His main reservations appear to be in regard to the choice of drugs used, particularly that etidocaine with adrenaline was compared with plain bupivacaine. The title of the paper clearly sets out the object of the study: the within-drug differences in local anaesthetic profile when the concentration is changed. The fact that the study was done in such a way that etidocaine and bupivacaine could be compared, albeit one solution containing adrenaline and the other not, was considered a bonus and not a major objective. We referred to the comparison only in the last paragraph and pointed out that the lack of difference between the two drugs may have been a result of the adrenaline.

In attempting to measure the effect of increasing the concentration of local anaesthetic drugs, we would have liked to use only plain solutions. However, plain 1.5% etidocaine is not available, even in the U.S.A. We hope that Dr Moore agrees with us that 0.75% bupivacaine and 1.5% etidocaine are superior as local anaesthetics to the weaker solutions and should be made available in countries where they are not.

The comments concerning pH and precipitation are of interest, but are not relevant to the main objective of this study. It is true that all local anaesthetic solutions containing adrenaline have a low pH (approximately 3.5). However, plain solutions of etidocaine and bupivacaine are prepared as acidic solutions (pH 5.0-5.5) since these agents are not very soluble at a neutral pH. Since adrenaline-containing solutions of lignocaine have been used on a large scale for approximately 30 yr, we are encouraged that accidental sub-arachnoid injection during attempted extradural block does not result in neurological damage because of the low pH per se.

With regard to precipitation of local anaesthetic drugs with cerebrospinal fluid, this is, of course, related to their relative insolubility at pH 7.4. The precipitate is the basic un-ionized form of the drug which disappears slowly from the subarachnoid space. Precipitation may occur with etidocaine, bupivacaine and amethocaine and is not unique to etidocaine as Dr Moore implies. To our knowledge, the intrathecal injection of bupivacaine, etidocaine or amethocaine in animals and man is not associated with neural toxicity.

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REPEAT CAESAREAN SECTION ASSOCIATED WITH GROSS OBESITY

Sir,—In a report of the anesthetic and surgical problems encountered during Caesarean section in eight obese parturients weighing more than 150 kg, the most obese, a 43-yr-old primigravida weighing 204 kg (height 150 cm), was the only one delivered of a stillborn fetus (Hodgkinson and Husain, 1980). Subsequently, a second Caesarean section has been performed on this patient, resulting in the birth of a healthy baby. We wish to emphasize the difference in difficulty associated with the operation on the two occasions and to stress that such a patient can undergo a successful pregnancy provided that she has the discipline to adhere to a rigid diet and receives appropriate medical care.

Five months after the first Caesarean section the patient underwent a lipectomy and panniculectomy. The second Caesarean section was performed for maternal hypertension in the 36th week of the pregnancy. She had a 10-yr history of hypertension treated with methyldopa 500 mg twice daily, lifetime psoriasis treated with 0.25% hydrocortisone cream, diabetes treated with a 2000 calorie diet, temporal lobe epilepsy, a strained shoulder and obesity (weight 125 kg).

Arterial, central venous and venous catheters were inserted 4 h before operation. Breathing room air, $P_{aO_2}$ was 11.5, 12.0 and 11.6 kPa, and the arterial pressure 150/100 mm Hg. Extradural anaesthesia was produced with 0.75% bupivacaine 15 ml. Oxygen 100% was administered by mask. Arterial pressure and oxygen tensions were satisfactory throughout the procedure. A Pfannenstiel's incision was performed and 19 min later the baby was extracted with difficulty. The baby weighed 3.6 kg and its Apgar score was 9 at 1 and 5 min. The operation was completed in 70 min. Extradural anaesthesia using 0.125% bupivacaine was continued after operation to reduce the use of narcotics and encourage respiratory movements. The mother and baby were discharged on the 5th day after operation.

The success of the second Caesarean section may be attributed to a lack of a panniculus, a reduction in weight from 204 to 125 kg and an elective Caesarean section in contrast to a night-time emergency operation. On the first occasion the panniculus could not be retracted cephalad before the baby was delivered without causing severe hypotension and there was difficulty with respiration during wound repair. A panniculus large enough to produce these effects is a contraindication to a Pfannenstiel's incision unless it can be retracted vertically. The parturient's weight was reduced considerably between the two operations, but even at the second Caesarean section the baby was delivered with considerable difficulty because of the thickness of the adipose tissue. The incision to delivery time was only 19 min, compared with 45 min on the previous occasion.

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REFERENCE