Spinal anaesthesia: a comparison of plain ropivacaine 5 mg ml⁻¹ with bupivacaine 5 mg ml⁻¹ for major orthopaedic surgery

Editor—I am interested in the article by McNamee and colleagues¹ comparing the use of plain bupivacaine 0.5% with plain ropivacaine 0.5% during spinal anaesthesia for orthopaedic surgery. Both groups received 3.5 ml of 0.5% of the chosen local anaesthetic.

The authors report spinal blockade with a median sensory block of T2 in the bupivacaine group and T3 in the ropivacaine group. They report ‘moderate fall in arterial blood pressure in keeping with expected sympathetic block’. Hypotension requiring ephedrine in the two groups occurred in 12 and 26% of patients, respectively. Up to ephedrine 35 mg was required in patients in either group. Adverse events included oliguria, hypotension and nausea, although incidences are not reported. The high levels of sensory blockade are considered as acceptable and part of the consequences of regional anaesthesia in elderly patients. I believe that this incidence of high blocks and hypotension is avoidable.

Preoperative hypotension and postoperative complications as listed are common with regional anaesthesia for orthopaedic surgery. However, the level of blockade required for hip and knee surgery is only T10. The reported adverse events may be related to the height of the regional block. In particular, hypotension is common with sensory blocks above T5,² ³ and in elderly patients.⁴ In most cases, a high block is of limited importance but high blocks, hypotension in elderly patients, and the use of vasoactive drugs in this population cannot be considered entirely benign.⁵ ⁶ The effect of high blocks on respiratory function leads to a restrictive defect even in young patients,⁷ and these changes are not ideal in an elderly population. The absence of respiratory distress or a fall in oxygen saturation in the sedated patients in this study does not ensure adverse changes were not present.

The single shot spinal technique requires that a relative overdose of intrathecal drug is given to the majority of patients, to ensure that even those with the lowest levels of blockade have an adequate block. This is seen in this study, as two of the 34 patients in the ropivacaine group achieved a barely effective T10 block and six of the 34 only a level of T8. Unfortunately, to achieve adequate block in both groups, 21 of 68 patients received blockade extending into the cervical dermatomes.

Several studies have used the combined spinal epidural technique (CSE) to study the effect of smaller doses of subarachnoid local anaesthetic.⁸ ⁹ The elegance of this technique is that much smaller doses of drug may be given and
unnecessarily, potentially harmful, high blocks may be avoided. If a block develops that is too low for surgery to be performed, then the epidural may be used to extend the block by use of saline or more local anaesthetic. If a CSE technique were used in a study such as McNamee’s when the block was too low to allow surgery, epidural top-up would be used and the patient would be withdrawn from the study. This would slow recruitment slightly but would be likely to avoid the high blocks reported in the study.

I have recently audited 256 CSEs in patients undergoing surgery (65% orthopaedic, 10% vascular, median age 71 yr, median weight 78 kg). All patients had the level of blockade assessed with cold ethyl chloride spray (as in McNamee’s study) up to 15 min after blockade, and 80% received sedation with a propofol infusion until unresponsive to gentle touch. My audit group would appear to be similar to those patients studied by McNamee. Of 45 CSEs performed with 2.0 ml of isobaric bupivacaine 0.5%, median block height was T9 with a range of L3–T5, and in 94 cases with 2.5 ml the median height was T9 with a range of L4–T3. Of these 139 patients, only 22 had a block level below T10 and six had a block at T5 or above. In the last 144 patients, the use of vasoconstrictors was recorded. These were necessary in only six (4%) patients.

The CSE technique has some side-effects associated with it, but most are minor and there is no evidence of a greater morbidity associated with it than other forms of central neuraxial blockade. The CSE technique also allows prolonged regional analgesia should this be required. While the CSE technique is not a panacea for central regional blockade, it provides a suitable technique for evaluation of intrathecal drug administration without the need to expose patients to unnecessarily high (or low) neuraxial blockade.

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Editor—Thank you for the opportunity to reply to the points raised in this letter. Dr Cook is right to express concern at the incidence of hypotension in the patients in this study. However, it must be borne in mind that the hypotension described is that of intraoperative hypotension. Hence factors other than spinal anaesthesia (e.g. continuous intravenous infusion of propofol for sedation or ongoing blood loss due to surgery) may have had a significant contribution to this incidence. As can be seen from Figure 1, the median trough value for systolic blood pressure occurred approximately 1 h after the onset of spinal anaesthesia and hence these two additional factors are likely to be of significance. Furthermore, different anaesthetists have different thresholds for the use of vasoconstrictors. In our unit, it is common practice to maintain the systolic blood pressure to within 20% of the baseline reading.

It is difficult to relate the studies quoted to our study, in that Shiroyama and colleagues conducted a retrospective observational study in patients undergoing gynaecological surgery under spinal anaesthesia, and Kamenik and colleagues compared the haemodynamic changes after spinal anaesthesia in 30 patients scheduled for arthroscopic knee surgery. These represent very disparate populations from those undergoing total hip replacement. Cook’s conclusion from the paper of Kelly and colleagues that the effect of ‘high blocks on respiratory function leads to a restrictive defect in young people’, fails to mention that these patients were term parturients undergoing Caesarian section, a group of patients renowned for having a degree of compromised respiratory function.

We would take issue with Dr Cook’s statement that ‘a relative overdose is given to the majority of patients to ensure that even those with the lowest levels of blockade establish an adequate block’. Whilst all anaesthesia is associated with some form of risk, his statement implies that a routine technique, spinal anaesthesia,
is somehow inherently more dangerous than a modification of the same technique, combined spinal epidural. There is no evidence offered of any differences in rates of complications between the two techniques. The doses of ropivacaine used in this study have previously been shown to be safe and effective in a similar population undergoing the same procedure.\textsuperscript{12} The dose of bupivacaine used has also been shown to be safe and effective.\textsuperscript{13} His argument fails to mention any complications inherent in his suggested replacement technique including catheter failure, catheter migration, unilateral epidural blockade, and aseptic meningitis. With regard to the upper level of assessment of the block, it must be born in mind that both choice of method of assessment and patient position during assessment will influence the resulting dermatomal level. His assessment that ‘two of the 34 patients in the ropivacaine group achieved a barely effective T10 block’ is somewhat contradictory. These two patients underwent uneventful total hip replacement with no supplemental analgesia. Hence their block was completely effective. This contrasts with his audit in which 22 patients out of 139 (16%) had a block below T10. In our unit, this would present an unacceptable delay in the onset of surgical anaesthesia. Whilst it may be possible to study patients using smaller doses with the combined spinal epidural technique, we feel that our study is more relevant as it closely mirrors routine clinical practice. Furthermore, we know of no evidence that a block above T4, for example, is associated with an increased morbidity compared with a block to T8.

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1 McNamee DA, McLelland AM, Scott S, Milligan KR, Westman L, Gustaffson U. Spinal anaesthesia: a comparison of plain ropivacaine 5 mg ml\textsuperscript{1} with bupivacaine 5 mg ml\textsuperscript{1} for major orthopaedic surgery. \textit{Br J Anaesth} 2002; 89: 702–6
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DOI: 10.1093/bja/aeg584