Wound infiltration with bupivacaine after surgery to the cervical spine using a posterior approach

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We have compared pain scores, morphine consumption and duration of stay for 50 adults who underwent elective cervical spine surgery via a posterior incision in a prospective, double-blind, placebo-controlled, randomized study. During wound closure, the paravertebral muscles and subcutaneous tissues were infiltrated with 40 ml of saline (control) or 0.25% bupivacaine. There were no significant differences in pain scores, morphine consumption or duration of stay between groups. In view of the potential risks of wound infiltration in the cervical region, we consider that this practice should be abandoned.

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Methods and results

All patients admitted to the Department of Neurosurgery at Derriford Hospital, Plymouth, UK in anticipation of operations for benign conditions of the cervical spine were approached to participate in this trial. Prior approval was obtained from the South and West Devon Health Authority Ethics Committee and patients gave written consent. Patients who were under 18 yr old, pregnant, or in whom it was expected that the dura would be opened were excluded.

Patients were premedicated with temazepam 10–20 mg and anaesthetized with propofol and fentanyl 2 μg kg⁻¹ followed by 0.5–1.5% isoflurane (end-tidal concentration) and 66% nitrous oxide in oxygen administered by mechanical ventilation. Additional fentanyl was given as indicated clinically. Neuromuscular block was achieved with vecuronium or atracurium and antagonized at the end of surgery using glycopyrrolate and neostigmine. Droperidol 0.5 mg was given as a prophylactic antiemetic.

Before surgical incision, the skin and subcutaneous tissues were infiltrated with 20 ml of 1% lidocaine with epinephrine 1/200 000 to produce local vasoconstriction and minimize blood loss. Treatment allocation was determined by a computer-generated randomization scheme held in individually numbered sealed opaque envelopes. After the surgical procedure had been completed and wound closure commenced, the anaesthetist opened the envelope and prepared the study solution (40 ml of 0.9% saline or 0.25% bupivacaine) in the anaesthetic room out of sight of the surgical team. The study solution was transferred to a sterile dish in the operative field from which it was drawn up into a sterile syringe for infiltration into the skin and paravertebral muscles under direct vision. This procedure ensured that all surgical staff were blinded to the study drug. No additional fentanyl was administered after infiltration of the study solution and the anaesthetist did not participate in collection of pain scores or decisions about times of patient discharge from hospital. All care after anaesthesia was given by nurses blinded to the treatment allocated.

In the postoperative recovery area, patients received morphine 2 mg i.v. at 5-min intervals until comfortable and subsequently used a patient-controlled analgesia (PCA) system programmed to give bolus doses of morphine 1 mg and droperidol 50 μg with a 5-min lockout and no background infusion.
Preoperative variables including age, sex, weight, duration of symptoms and operative indication were recorded. A baseline pain score was obtained from the patient using a 10-cm visual analogue scale (VAS) ranging from ‘no pain’ to the ‘worst pain I can imagine’. It was emphasized that we were collecting data on spinal pain only, not radicular symptoms. Operative variables recorded included the number of levels operated on, length of incision, duration of operation, grade of operating surgeon, whether the operation was unilateral or bilateral and dose of fentanyl. VAS pain scores were recorded at 3, 12 and 24 h by nurses blinded to the study drug. Twenty-four hour morphine use was recorded.

Categorical variables were analysed using the chi-square test. Continuous variables were compared with the two independent samples t test or the Mann–Whitney U test where appropriate. The null hypothesis was rejected when P<0.05. The study number was decoded only after all patients had completed the study. Sample size was determined by an a priori power calculation based on our earlier study of patients undergoing lumbar spine surgery. We sought to mirror clinical practice in the design of this investigation and therefore gave lidocaine to both groups. We considered that the duration of action of lidocaine would have only modestly overlapped that of bupivacaine. However, if lack of a demonstrable bupivacaine effect were a result of a persistent action of lidocaine infiltration, then the additional use of bupivacaine would be unjustifiable.

In view of the potential risks of wound infiltration at the end of surgery, especially in the cervical region where inadvertent intrathecal or epidural block could cause serious and possibly life threatening complications, we consider that this practice should be abandoned.

### References


### Table 1

<table>
<thead>
<tr>
<th></th>
<th>Saline</th>
<th>Bupivacaine</th>
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<tbody>
<tr>
<td>VAS (3 h)</td>
<td>40.4 (27.1)</td>
<td>35.7 (27.6)</td>
<td>0.54a</td>
</tr>
<tr>
<td>VAS (12 h)</td>
<td>30.9 (21.9)</td>
<td>32.1 (22.4)</td>
<td>0.85a</td>
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<tr>
<td>VAS (24 h)</td>
<td>33.6 (21.8)</td>
<td>33.5 (28.0)</td>
<td>0.982b</td>
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<tr>
<td>Morphine use (mg) (24 h)</td>
<td>32.0 (15.7)</td>
<td>37.6 (23.9)</td>
<td>0.34a</td>
</tr>
<tr>
<td>Duration of stay (days)</td>
<td>2.2 (1.1)</td>
<td>2.3 (0.67)</td>
<td>0.34b</td>
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