Effect of i.v. diamorphine on the regression of spinal block

D. J. HENDERSON AND G. JONES

Summary

Twenty patients undergoing transurethral prostaticctomy under spinal anaesthesia were allocated randomly in one of two groups. After operation dermatomic levels to cold were measured every 30 min until they had receded to T10. Patients in group 1 were then given diamorphine 5 mg in 0.9% saline 5 ml i.v. and in group 2 0.9% saline 5 ml i.v. Block level to cold and degree of motor block were assessed at 15-min intervals for 1 h after injection. Block regression continued in the control group while there was no decrease in the diamorphine group for 30 min \( P < 0.01 \) after which it then receded at a similar rate as the control group. There was no significant difference in motor block between the two groups. (Br. J. Anaesth. 1995; 74: 610–611)

Key words
Anaesthetic techniques, subarachnoid. Analgesics opioid, diamorphine.

The administration of long-acting opioids after spinal anaesthesia is commonplace. Previous work has shown a cephalad increase in the level of spinal analgesia after administration of i.v. fentanyl, although changes in sensory block level were not tested [1]. A similar increase in analgesic level was seen when i.v. morphine was given to patients with extradural anaesthesia [2]. However, other work has failed to support the latter [3].

This study had three aims: first, to assess any effect of i.v. diamorphine on the rate of spinal block regression; second, to examine if this was a true change in sensory level of block rather than alteration in the patient’s perception of pain. For this reason we used ethyl chloride spray to test cold sensation rather than pinprick which would assess analgesic level. Finally, we examined any effects on degree of motor block.

Methods and results

This study was approved by the local Hospital Ethics Committee. Informed consent was obtained from 20 patients (ASA I or II), less than 75 yr of age, who were undergoing transurethral prostatectomy under spinal anaesthesia. They were allocated randomly, using sealed envelopes, to one of two groups in a double-blind design.

A standard anaesthetic technique was used in all cases. Oral temazepam 20 mg was given as pre-medication. Spinal anaesthesia was achieved with 0.5% hyperbaric bupivacaine 2.5 ml administered at the L2–3 interspace via a 24-gauge Sprotte needle, with the patient in the left lateral position.

The level of sensory block was assessed using ethyl chloride spray 15 min after intrathecal injection. All assessments in the study were performed by a single investigator (D. J. H.) in an effort to avoid subjective bias. After operation, block level to cold was assessed every 30 min until T10 dermatomic level was reached. Motor block was assessed simultaneously using the Bromage scale.

At this time patients in group 1 were given diamorphine 5 mg in 0.9% saline 5 ml i.v. over 5 min and in group 2 0.9% saline 5 ml over 5 min. Sensory block level and degree of motor block were assessed every 15 min for the next 60 min.

There was no significant difference in physical characteristics between the two groups (Student’s \( t \) test). Mean age in group 1 was 67.5 (range 63–73) yr, and in group 2 68 (61–75) yr. Mean height was 173 (158–185) cm in group 1 and 167 (142–182) cm in group 2. Patients in group 1 had a mean weight of 79.2 (57–96) kg and in group 2 81.6 (64–109.5) kg.

The time for block to recede to T10 was similar in both groups (group 1: mean 129 (90–185) min; group 2: 139 (100–190) min). Block level in the control group then continued to recede at the same rate. In contrast, in the diamorphine group there was no regression of block level for 30 min after administration of the opioid (fig. 1). After this time it decreased at a similar rate to that in the saline group. There was a statistically significant difference \( (P < 0.01, \text{Wilcoxon rank sum test}) \) in block level at 30, 45 and 60 min after injection. There was no difference in motor block between the groups at any time.

Comment

We have found that there was a transient cessation of regression of sensory block level in spinal anaesthesia when i.v. diamorphine was given. This is supported by other studies which have shown an increase in the level of analgesic block [1, 2] when pinprick sensation was tested. The mechanism by which i.v.
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opiods affect sensory block level is not yet fully understood, although three possibilities have been suggested.

I.v. morphine is known to decrease spinal cord blood flow [4]. This would reduce the rate of absorption of bupivacaine and so prolong block duration. At the upper level of any subarachnoid block is an area of incomplete sensory block. It is possible that stimulation of opioid receptors at a supraspinal level may modulate central transmission of sensory input thereby altering appreciation of peripheral stimuli. Diamorphine may also act by an effect on conscious level. If this is reduced then central registration of peripheral sensation is altered.

Clinically this effect is both useful (e.g. in prolonged Caesarean section) and safe. Further work, however, is required to elucidate the mechanism of interaction.

References