Caudal clonidine for postoperative analgesia in adults

A. C. Van Elstraete1*, F. Pastureau1, T. Lebrun1 and H. Mehdaoui2

1Department of Anaesthesiology, Saint-Paul Medical Center, Fort-de-France, Martinique, France.
2Intensive Care Unit, University Hospital, Fort-de-France, Martinique, France

*Corresponding author: Département d’Anesthésiologie, Centre Médico-Chirurgical Saint-Paul, Clairière, 97200 Fort-de-France, Martinique, France

We have assessed the analgesic efficacy and side effects of caudally administered clonidine in a prospective, randomized, double-blind, placebo-controlled study. We studied 64 adult patients undergoing elective haemorrhoidectomy. Caudal block was performed in all patients using a mixture of 0.5% bupivacaine 35 mg with 2% lidocaine 140 mg and epinephrine 5 µg ml⁻¹.

Patients were allocated randomly to one of two groups. Clonidine 75 µg was added in group C and saline 1 ml in group S. Median time to first analgesic requirements was significantly longer in group C (mean 729 (SD 120) min) than in group S (276 (131) min) (P=0.01). Bradycardia occurred in seven patients in group C but did not affect mean arterial pressure.

Bradycardia, defined as a 20% decrease in HR compared with preoperative values, was treated with atropine 0.5 mg i.v. Hypotension, defined as a 20% decrease in MAP compared with preoperative values, was treated with ephedrine 5 mg i.v.

Clonidine prolongs analgesia when added to local anaesthetics in epidural anaesthesia, subarachnoid anaesthesia and plexus anaesthesia in adults. However, its use is associated with side effects including hypotension, bradycardia and sedation. Addition of clonidine to local anaesthetics significantly prolongs the duration of surgical analgesia of caudal block in children. Caudal anaesthesia is not as popular in adults as it is in children but can be used for sacro-perineal surgery. Therefore, in this prospective, double-blind, randomized, placebo-controlled study, we assessed the efficacy of caudally administered clonidine on duration of postoperative analgesia and side effects in adult patients when added to local anaesthetics.

Methods and results

After obtaining approval from the Institutional Review Board and informed consent, we studied 64 ASA I or II patients undergoing elective haemorrhoidectomy performed by the same surgeon. Exclusion criteria included contraindications to caudal block, and chronic use of opioids, calcium channel blockers, clonidine and related compounds. All patients received oral premedication with hydroxyzine 1 mg kg⁻¹, 1 h before surgery.

Standard intraoperative monitoring was used. All patients received a caudal injection of a mixture containing 0.5% isobaric bupivacaine 35 mg with 2% isobaric lidocaine 140 mg and epinephrine 5 µg ml⁻¹. Patients were allocated to one of two groups using a table of random numbers. Clonidine 75 µg (group C) or saline 1 ml (group S) was added to the mixture. Patients were unaware of their treatment group. No infusion was given throughout the study.

Mean systemic arterial pressure (MAP) and heart rate (HR) were measured using a non-invasive automated oscillometric device before operation, every 5 min during operation and 15, 30, 60, 120 and 180 min after operation. Intra- and postoperative follow-up was performed by a blinded observer. Duration of analgesia was defined as the time from caudal injection to the first request for supplementary analgesics. For patients not requiring analgesics within the 48-h observation period, duration of analgesia was defined as 2880 min. Degree of motor block was evaluated using the Bromage scale. Sedation score was assessed on a four-point categorical scale as: 0=alert, aware; 1=drowsy, not sleeping; 2=asleep, arousable by verbal contact; and 3=asleep, not arousable by verbal contact. Time to first micturition, or need for bladder catheterization were recorded.

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![Kaplan-Meier survival curve describing the effect of additives to local anaesthetics on duration of analgesia. Time from caudal block to first request for analgesics was significantly longer in group C compared with group S (P = 0.01).](image)

Ephedrine was not needed in either group. Seven patients in group C and none in group S required atropine (P = 0.006). Four patients in group C compared with one in group S had a sedation score of 1 lasting 30–45 min (ns). Time to first supported standing (148 (27) min in group C and 141 (26) min in group S) (ns) and spontaneous voiding (first micturition 140 (33) min in group C and 406 (36) min in group S) were similar in both groups. No patient required bladder catheterization.

**Comment**

Our results demonstrated that clonidine 75 µg added to caudally administered local anaesthetics significantly increased the duration of postoperative analgesia in adult patients undergoing elective haemorrhoidectomy. Our findings are consistent with those reported in children\(^2\)–\(^4\) and adults after epidural clonidine added to local anaesthetics.\(^1\)

Neuraxial administration of clonidine directly inhibits sympathetic preganglionic neurones in the spinal cord with resulting hypotension and bradycardia.\(^1\) In our study, bradycardia occurred in seven patients in group C but did not affect MAP. A possible explanation is that the low dose of clonidine used was not sufficient to induce marked sympatholysis.

Clonidine produces dose-dependent sedation.\(^1\) The duration and intensity of postoperative sedation in our study was similar in the two groups. Interestingly, the four patients who experienced sedation in group C were among the seven patients who experienced bradycardia. Therefore, the occurrence of sedation could be indicative of systemic spread of clonidine.

Sympathetic outflow to the urinary tract promotes an increase in urethral resistance and depresses detrusor contraction, favouring urinary retention. Therefore, clonidine facilitates micturition.\(^5\) There was no significant difference in time to first micturition between groups. We hypothesize that the small dose of clonidine given caudally was unlikely to have a peripheral effect on the bladder.

A study conducted in human volunteers failed to demonstrate any important effect of epidural clonidine on resting respiratory control.\(^6\) Accordingly, respiratory variables were not monitored in our study.

Seven patients in the clonidine group experienced bradycardia without MAP disturbance compared with none in the saline group. Although delayed onset of haemodynamic effects has not been observed after clonidine for analgesia,\(^1\) more specific evaluations would be valuable before using caudally administered clonidine for outpatient surgery.

In summary, we have demonstrated that addition of clonidine 75 µg to caudally administered local anaesthetics significantly prolonged the duration of postoperative analgesia after anal surgery in adults, with minimal side effects. Therefore, clonidine may be a potentially useful drug when prolonged postoperative analgesia is required after caudal block in adults.

**References**