

TITLE: INFLUENCE OF CATHETER DIRECTION ON TOTAL DOSE OF LOCAL ANESTHETIC IN EPIDURAL ANESTHESIA

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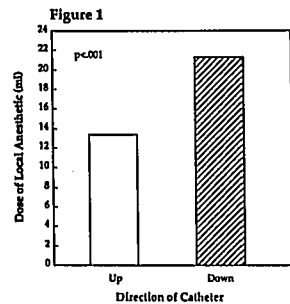
The volume of local anesthetic required to achieve a particular dermatomal sensory level in epidural anesthesia varies significantly between patients. Studies have demonstrated random cephalad or caudad migration, and direction of the epidural catheter. However, no studies have investigated the relationship between catheter direction and total volume of local anesthetic.

The study was approved by the Institutional Review Board for the Protection of Human Subjects. After obtaining informed consent, fifteen patients (6 males, 9 females) scheduled for elective total knee or hip replacements were enrolled. The epidural catheter was placed to a depth of 3 cms at L2-3 using a standard 18 gauge Tuohy needle with the bevel directed cephalad. After test dose, incremental volumes of 0.75% Bupivacaine were injected to achieve a sensory anesthetic level of T6 and the total volume of drug recorded. Immediately after surgery, 1 ml of omnipaque dye was injected through the catheter for x-ray determination

of catheter tip position. Statistical analysis utilized the student t-test.

Age varied from 47-79 years (mean 66.4 years). Weight ranged from 51-105 kg (mean 80.2 kg). Height ranged from 150 cms-188 cms (mean 167.1 cms). All patients had good surgical anesthesia. Statistically significant differences ($p < .001$) were seen between average volumes necessary to achieve a T6 sensory level for catheters in the cephalad direction (13.5 ml) ($n=12$) and for catheters in the caudad direction (21.3 ml) ($n=3$) (Fig.1). Age, sex, weight, and height did not significantly affect the total volume.

In this study the epidural catheter direction influenced the total volume of local anesthetic required. A reliable method for ensuring cephalad catheter direction should reduce the total dose and obviate the need for large volumes of local anesthetic.



References:

- Moore DC, Bagdi P, Bridenbaugh PO, Bridenbaugh DL: "The position of plastic tubing in continuous-block techniques: an x-ray study of 553 patients." *Anesthesiology*, 29:1047-9, 1968.

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Title: Low Dose Epidural Clonidine Enhances Morphine Analgesia Without Causing Hypotension in Rabbits
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Introduction: In order to provide good analgesia without dose related side effects of respiratory depression and hypotension, this study focused on the combined use of low dose epidural (Epi) clonidine (C) and morphine (M). The differential effects of C: analgesia > hypotension > bradycardia made it possible to achieve analgesia without causing hypotension.¹ By tail flick test, C was found to be 10 times more potent than M. C potentiated M antinociceptive activity 5-fold and M potentiated C 4-fold.²

Method: With institutional approval, one week after lumbar laminectomy and Epi catheter implantation, 47 3-4 kg New Zealand albino rabbits were studied in 8 groups. G1: n=6 Analgesic testing only, without surgery or Epi injection; G2: n=6 normal saline (NS) 0.4 ml, pH 5; G3: n=6 M (Duramorph) 0.4 mg in 0.4 ml; G4: n=6 M 0.2 mg; G5: n=6 C 0.03 mg in 0.2 ml; G6: n=6 C 0.015 in 0.1 ml; G7: n=6 M 0.2mg+C 0.015 mg; G8: n=5 blood pressure transduced through an ear artery, after Epi C 0.03 mg and 3 hrs later following M 0.2 mg+C 0.015 mg. All injections were epidural and preceded and followed by testing nociceptive response time (L) with electric stimulation (1 Hz, 3 msec, 50-75 volts delivered from a Grass 6 stimulator through 2 electrodes adhered on shaved skin of the lower back.) The interval between time zero of stimulation to withdrawal of hind limbs was recorded as L and compared between groups, using analysis of covariance. $p < .05$ was considered statistically significant.

Results: L of M and C increased with time except M in the 4th hour (Fig.1). L from the combination of half dose M&C matched L from a full dose M within 3 hours. No statistical difference was detected between G3 and G7. The intercepts were not

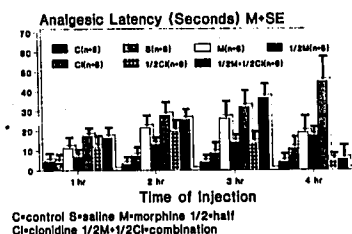
significantly different. In G8, blood pressure dropped from pretreatment level: $22 \pm 1.8\%$, $13 \pm 2.8\%$ and $2 \pm 1.8\%$, respectively at 1, 2 & 3 hrs after 0.03 mg C, but not after 0.2 mg M+0.015 mg C.

Discussion: Data in this study suggest that within 3 hrs, half dose M combined with half dose C, a dose short of that causing hypotension,³ resulted in analgesia equal to that produced by full doses of M or C. This was not true in the 4th hour as the peak effect of the drug had declined. In addition to potentiation of opioid analgesia, C offers other advantages: antianxiety,⁴ antiwithdrawal,^{5,6} potentiation of dopamine transmission, counteraction of the dopamine depletion effect of chronic cocaine abuse⁵ & is a good substitute analgesic for patients tolerant to opiates.⁷

References:

- Exp Neurol* 2:338-346, 1984.
- Eur J Pharmacol* 58:19-25, 1979.
- Anesthesiology* 72:423-427, 1990.
- Neuropharmacology* 22:153-156, 1983.
- J Psychoactive Drugs* 20:233-242, 1988.
- Pharmacol Biochem Behav* 25:989-993, 1986.
- Anesthesiology* 62:34-38, 1985.

Nociceptive Response Time after C and Epidural S,M,1/2M,C,1/2C,1/2M+1/2C



C=control S=saline M=morphine 1/2=half
C=clonidine 1/2M+1/2C=combination