

Title : PHARMACOKINETICS OF BUPIVACAINE FOLLOWING CERVICAL BLOCK FOR CAROTID ENDARTERECTOMY.

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INTRODUCTION : Regional anesthesia has been proposed to decrease mortality and morbidity in patients undergoing carotid endarterectomy (1, 2,3). Local anesthesia is also used to select patients who require intraluminal shunting by allowing trial carotid cross clamping in awake patients (3). The aim of this study is to determine the pharmacokinetics parameters of bupivacaine (B) following cervical block for carotid endarterectomy.

METHODS : Seven patients ASA class II or III, from 52 to 89 years old, scheduled for carotid endarterectomy were studied after obtaining informed consent. Atropine 0,5 mg IM and flunitrazepam 10 $\mu\text{g}\cdot\text{kg}^{-1}$ IM were used for premedication. The cervical block was performed by inserting 3 needles each at C2, C3, C4 posterior to a line joining the mastoid process to Chassaignac's tubercle of the 6th cervical vertebra. 6 ml 0,5 % B with epinephrine (1/200 000) was injected in each needle. This block was completed by a superficial block performed by infiltration of 10 ml 2 % xylocaine. Continuous ECG and blood arterial pressure monitoring were used. Adequacy of cerebral perfusion was done by neurologic assessment of the awake patients and EEG recording. Subjective evaluation of pain using a 0 to 10 analogic visual scale was done at several time (injection, onset of analgesia, incision, cross clamping, closure).

Blood gas analysis was performed and arterial blood samples were assayed for B at 0, 5, 10, 15, 20, 30, 40, 60, 90, 120, 180, 240, 360, 480, 600 minutes after B administration. B plasma concentration was measured using gas chromatography with a nitrogen specific detector. Non compartment analysis was used to fit the data. Terminal half life ($T_{1/2\beta}$) was calculated using log-linear regression of the observed terminal curve. Area under the curve (AUC) was calculated using the trapezoidal rule and extrapolated to infinity. Following parameters were derived : total body clearance (CL), apparent volume of distribution (V_B) and mean residence time (MRT). Maximum peak concentration (C MAX) and time to reach the peak (T MAX) have been calculated. All results are expressed as mean \pm SD.

RESULTS : Onset of the block was obtained within 10 min. Mean duration of cervical block was 135 ± 26 min. A satisfactory pain relief was obtained in all patients till closure. However, some patients re-

quired an additional 8 ml 1 % xylocaine for successful block. No variation of mean arterial pressure was observed except in one patient who required intraluminal shunting. No respiratory depression was clinically observed and PCO_2 slightly increased during the procedure but non significantly (36 ± 14 vs 38 ± 6 mmHg). C MAX reached $1,62 \pm 0,57$ $\mu\text{g}/\text{ml}$ and T MAX was $6,4 \pm 2,4$ min. The pharmacokinetics parameters of B are summarized in table I.

DISCUSSION : Although some patients required a 8 ml 1 % xylocaine top up, pain relief was considered successful. In one patient, a transient neurologic deficit with EEG changes during trial cross clamping assessed the need for intraluminal shunting. No abnormalities of blood pressure were observed during the surgical procedure and in the post operative period. Since C MAX was relatively low ($1,62 \pm 0,57$ $\mu\text{g}/\text{ml}$), B might be used for superficial cervical block instead of xylocaine and could proceed a longer cervical block duration.

REFERENCES :

- 1 - CORSON J.D. et al. Arch Surg, 1987, 122, 807-812.
- 2 - PEITZMAN A.B. et al. AnnSurg, 1982, 196 : 59-64.
- 3 - CONNOLY J.E. Am Surg, 1982, 196 : 59-64.

Table I: pharmacokinetics parameters of Bupivacaine (CL = ml/min/kg ; $T_{1/2\beta}$ = hours ; V_B = l/kg ; MRT = hours)

Patient	CL	$T_{1/2\beta}$	V_B	MRT
1	4,3	5,62	2,09	7,64
2	4,1	5,79	2,06	6,53
3	1,7	9,41	1,38	13,69
4	9,7	3,62	3,02	4,55
5	4,5	3,69	1,44	4,15
6	12,8	2,43	2,69	3,07
7	2,5	4,71	1,02	6,52
Mean (SD)	5,65 (4,05)	5,04 (2,26)	1,96 (0,73)	6,59 (3,51)