POSTER SESSION II

A725

TITLE: EFFECT OF PUNCTURE LEVEL ON L5 AND S1 NERVE ROOTS BLOCKADE DURING LUMBAR EPIDURAL ANESTHESIA (LEA)

AUTHORS: D. Bouguet, M.D., E. Fabas, M.D., B. Riou, M.D., P. Viars, M.D.

AFFILIATION: Department of Anesthesiology, CHU Pitié-Salpétrière, Paris, France

L5-S1 segments are lately blocked during LEA. We conducted a prospective randomized study to determine whether the level of puncture during LEA influences the onset of complete L5-S1 blockade.

Methods. After ethical approval and informed consent had been obtained, 60 ASA 1 patients scheduled for orthopedic surgery under LEA, were randomly assigned to 3 groups according to the level of LEA puncture : L1-L2 (n = 20) ; L2-L3 (n = 20) ; L3-L4 (n = 20). LEA was performed using 25 ml of a mixture (50%-50%) of 2% lidocaine and 0.5% bupivacaine with 1/200,000 epinephrine. Then, patients were lying in a semi-setting position during 20 min. Sensitive blockade was assessed every 5 min, up to 60 min, using pinprick in specific areas supported by L4, L5 and S1 roots (1). Complete sensitive blockade was defined as the absence of any sensation during pinprick. *Tibialis anterior* (L4), *Extensor hallucis longus* (L5) and *Gastrocnemius* (S1) muscles were tested every 5 min, up to 60 min, to assess motor blockade. Data are mean $\pm$ SD. Analysis of variance, Newman-Keuls test, and Fisher exact method with the Bonferroni correction were used.

Results. No significant differences were noted between groups for age (30 $\pm$ 11 yrs), weight, height, and sex ratio. Complete sensitive blockade of L5 and S1 roots occurred earlier after puncture at the L1-L2 level (Table). Complete motor blockade within 60 min after LEA, occurred more frequently after L1-L2 puncture (100 and 100 %, respectively), as compared to L2-L3 puncture (35 and 50 %, $P < 0.05$) and L3-L4 puncture (5 and 20 %, $P < 0.05$).

Table : Onset (min) of complete sensitive blockade after LEA.

	L4	L5	S1
Level of puncture :			
L1-L2	23 $\pm$ 4*	35 $\pm$ 5*	36 $\pm$ 6*
L2-L3	30 $\pm$ 3	40 $\pm$ 3*	44 $\pm$ 6
L3-L4	32 $\pm$ 5	48 $\pm$ 6	48 $\pm$ 6

* : $P < 0.05$ vs L3-L4 level

Conclusion. When L5 and S1 nerve roots blockade are warranted, LEA should be preferably performed at the L1-L2 level to obtain an earlier L5-S1 blockade.

Reference. 1. J Bone Joint Surg 1985 ; 67A : 1219-24

A726

TITLE: INTERCOSTAL NERVE BLOCK BY JET INJECTION

Authors: J. Katz, M.D., D. Knarr, B.S.N., M. Juneja, M.D.
Affiliation: U of Cincinnati, Cincinnati OH 45267

Background: Intercostal nerve block (INB) is an effective method for providing post-cholecystectomy analgesia, but it is associated with rapid absorption of local anesthetic and the risk of pneumothorax.(1) In a previous open study comparing INB by jet injection (JI) of 1 ml 1.5% bupivacaine to IM narcotics, JI provided effective analgesia without the risk of lung puncture and with the possible advantage of lowered blood concentrations of local anesthetic.(2) This abstract presents a randomized blinded study which compared Med-E-Jet injection device INB to conventional INB with a needle.

Methods: 13 female patients scheduled for elective subcostal incision cholecystectomy under general anesthesia were entered into an institutionally approved single blind randomized protocol. All patients were ASA I or II, weighed 55-120 kg, and had given informed consent. Preoperatively, patients were instructed in the use of the 10 cm visual analog pain scale (VAS) and received midazolam 1-2 mg IV. Anesthesia for surgery was made similar in all patients: sodium pentothal, succinylcholine, vecuronium, O_2/N_2O (50%/50%), isoflurane (0.5-2%), and fentanyl ($\leq$ 5 ug/kg). No narcotic was given for $\geq$ 30 min before the end of surgery. After recovery from anesthesia, patients rated their pain on VAS and received an observer score of discomfort (OS: 1=no pain to 4=severe pain) and were randomly assigned to receive INB on the right fifth to eleventh intercostal nerves using either a 23 g, 1 in needle or by JI using methods described previously.(2) In order to provide equal dosages between the two study groups, patients receiving needle INB received bupivacaine 0.5% with 1:200,000 epinephrine 3 ml at each nerve, while those in the JI group received 2 ml of 0.75% bupivacaine with epinephrine via two injections at each intercostal space (the Med-E-Jet can only deliver a maximum of 1 ml). Venous samples obtained 7.5,15,30,60,120, and 180 min after INB were analyzed for bupivacaine by gas chromatography. The VAS and OS were obtained post-INB by an observer blinded to the method of INB every 15 min for 1 hr and then hourly until the patient requested the first narcotic dose. Narcotic use for 24 hr postoperatively was noted. An unpaired two tailed t test was used to detect differences between the groups. The null hypothesis was rejected for $p < 0.05$.

Results: All values reported are mean(SD)

	N	Age (yrs)	Wt (kg)	VAS 0 min(cm)	VAS 30 min(cm)	OS 0 min	OS 30 min
Needle	6	26(5)	80(9)	7.1(2.1)	4.9(2.2)	2(0)	2(0)
Jet	7	39(9)	85(22)	7.4(2.0)	6.2(3.1)	3(0)	2(0)

Patients in the needle group required an average 6(2) narcotic doses in the first 24 hr postop vs. 8(3) in the JI group. The mean highest measured bupivacaine serum concentration was 0.548 (0.259) ug/ml in the needle group vs. 0.413 (0.222) ug/ml in the JI group. No significant differences were detected in any measured parameters between the two groups.

Discussion: This study did not support the previous open trial of INB via JI as an effective method of analgesia after cholecystectomy. While the Med-E-Jet injector may offer increased safety, it is limited by the following: 1) a maximum 1 ml volume per injection, 2) the pain of each injection, and 3) the decreasing penetration as patient weight increases. Of significance also was the relatively poor analgesia provided by only 3 ml per nerve using the needle method compared to previous reports. Possible reasons for the relatively poor outcome in the needle INB group include minimal narcotic supplementation, minimal volume used (in order to allow dosages comparable to what the Med-E-Jet could provide with presently available concentrations of bupivacaine) (3), and injection after recovery from anesthesia vs. during anesthesia(2).

References:
1. Neural Blockade 2nd ed, 1988, pp 508-514
2. Seddon S et al.: Anaesthesia 1984 39:484-486
3. Moore D et al.: Anesthesiology 1976 45:39-45