

Title : DEXTROSE AFFECTS GRAVITATIONAL SPREAD OF EPIDURAL ANESTHESIA

Authors : Young R. Park, M.D., and Douglas W. Eastwood, M.D.

Affiliation: Department of Anesthesiology, Case Western Reserve University School of Medicine, Cleveland OH 44106

**Introduction.** Pain relief during labor can be produced by a segmental epidural block of T10 to L1. For delivery, lower lumbar and sacral anesthesia must be provided. Grundy, et al,<sup>1</sup> have recently shown that epidural anesthetics gravitate to the dependent side when the patient is in a lateral position. Bullard<sup>2</sup> recommended adding 3.3% dextrose to control the epidural anesthetic level in case of an unintentional subarachnoid injection. We added 5% dextrose to local anesthetics and assessed the gravitational spread during epidural anesthesia.

**Method.** In a double blind design, sixty patients for whom epidural anesthesia had been selected for vaginal delivery or cesarean section were randomly assigned to control or study groups. Informed consent was obtained. Chloroprocaine 0.5% was used to provide analgesia for labor, and chloroprocaine 2.7% was used for delivery or cesarean section. Patients in the study group received anesthetic solutions containing 5% dextrose (D5W) while solutions for the control groups were diluted with normal saline (NS). The specific gravity (SG) and osmolarity were determined for mixtures of local anesthetics with dextrose and with saline diluent; specific gravity at room temperature by an optical densitometer; osmolarity by freezing-point depression. Through the 2nd or 3rd lumbar interspace, the epidural space was identified using the loss of resistance technique with local anesthetic in the syringe. A total of 10 ml of solution was injected at the rate of 1 ml per second with the patient remaining in the seated position for 4 minutes. The dermatome level of analgesia to pinprick was determined every 5 minutes for 15 minutes.

**Results.** The specific gravity and osmolarity of solutions used in the study, of tissue fluid and of cerebrospinal fluid are listed in Table I. The pH for all study and control solutions ranged from 3.14 to 3.30. The highest sensory level attained by each patient in the study is recorded in Table II. The Wilcoxon rank sum test showed that a significantly lower anesthetic level resulted when D5W was added to chloroprocaine. ( $P < 0.05$  for 0.5% and  $P < 0.01$  for 2.7% chloroprocaine.)

**Conclusion.** The addition of 5% dextrose to chloroprocaine for epidural anesthesia in obstetrics increases solution density and

reduces the upward spread of the anesthetic level when the patient is in the seated position.

Table I: Physical Characteristics of Test Solutions and Tissue Fluids.

	SG	Osmolarity
Spinal fluid	1.007	281
Interstitial fluid		281
Chloroprocaine 3%	1.019	290
NS	1.004	289
D5W	1.021	290
Chloroprocaine 0.5%		
with NS	1.007	283
with D5W	1.025	316
Chloroprocaine 2.7%		
with NS	1.018	283
with D5W	1.034	477

Table II: Highest Sensory Level

	Chloroprocaine 0.5%		Chloroprocaine 2.7%	
	D5W	NS	D5W	NS
T6	2	9	1	4
T8	2	6	1	7
T10	2	3	5	3
T12	6	1	6	0
L2	1	0	1	0
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n: 13		19	14	14

#### References.

1. Grundy, EM, et al: Epidural anesthesia and the lateral position. *Anesth analg* 57: 95, 1978.
2. Bullard, JR: Hyperbaric bupivacaine peridural anesthesia in obstetrics. *Anesth analg* 57: 593, 1978.
3. Sawinski, VJ, et al: Osmolarity of spinal anesthetic agents. *Anesthesiol* 27: 86, 1966.
4. Guyton, AC: Textbook of Medical Physiology, W.B. Saunders Co., Boston, 1976, p. 432.