

## Monitor of Sensory Level during Epidural or Spinal Anesthesia

*To the Editor:*—We have developed a device for monitoring the sensory level of blockade following epidural or spinal anesthesia. The device is composed of an electric pulse generator, a box with a crossover system\* and a double set of coaxial cables\* ending in

\* Contact authors of letter for the details of their design. Send correspondence to: Pedro Andrade, M.D., Catedra de Anestesiologia, Apartado Postal 62.387, Caracas 106, Venezuela.

small metal disks, which serve as electrodes (fig. 1). Any ordinary nerve stimulator is connected to the input side of the crossover box and is used as an impulse generator. The frontal panel of the crossover box has a double series of microswitch buttons, which are connected to individual, isolated wires that end in two groups of bipolar outlets, one group for the right and the other for the left side of the body. The coaxial cables are plugged into their respective outlets

FIG. 1. Diagram of the sensory level monitor, which is composed of a nerve stimulator, a box with a crossover system and double microswitch buttons, and a coaxial cable connected to individual electrodes, which are applied to the patient's skin.

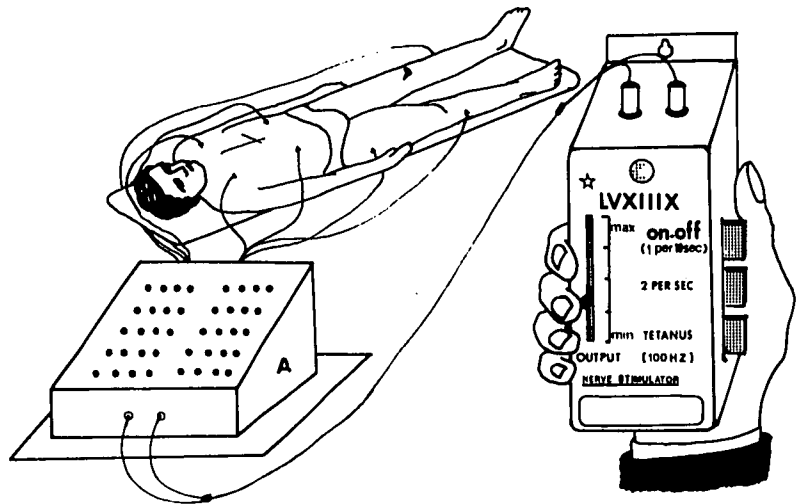


FIG. 2. The unit in place on a patient.

on the box and their terminal electrodes are fixed on the corresponding areas of the skin with small pieces of Steridrape®. All switches and outlets, as well as the coaxial cables, are identified with labels showing the sites of the electrodes' placement and hence stimulation.

Before the preparation of the surgical field, the electrodes are applied on the desired dermatomes of the skin (fig. 2) and the minimally perceptible electric stimulus determined. The tolerable sensations may vary among patients from a slight pinprick to a fleeting, painful sensation. Once the threshold intensity of current has been found, it must remain unchanged for the subsequent evaluations, although it may be changed for special studies. After the

epidural or spinal anesthesia has been completed, and at any time during the operation, it is easy to test for sensory level on either or both sides of the body by pressing the appropriate switches on the panel.

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### Moisture-proofing the Beckman D2® Oxygen Analyzer

*To the Editor:*—The Beckman D2® oxygen analyzer does not function properly when moisture is allowed to enter the magnetic unit analysis cell assembly. Once water has entered the analyzer cell it must be replaced. Current replacement cost is approximately \$375, not including labor. To prevent this problem, a silica gel drying tube is provided to dry sample gas prior to entry into the unit. This drying tube is adequate when used with nonpressurized systems or ventilator circuits without PEEP. However, the silica gel drying tube is not capable of preventing entry of water when gas is sampled from ventilator circuits used to deliver higher levels of PEEP, especially when used with in-line nebulization therapy.

Hemodialysis units have used in-line venous pressure isolators (transducer filters) to prevent blood or fluid contamination of venous pressure monitors. We have adapted the Gelman transducer protector\* for use with the Beckman D2 analyzer to prevent water contamination of the analyzer cell. The filters contain a 0.2 µm Acropor® hydrophobic membrane that acts as a barrier to any aqueous or aerosol medium, but allows free transmission of sampled gas. It is placed in the gas sampling line just prior to the silica gel drying

tube using a short length of disposable oxygen tubing. The filter need only be changed when it becomes wet.

We have tested D2 analyzers with this modification both in clinical use and with a lung simulator, using heated humidifiers, aerosol and ultrasonic nebulizers, tubing partially filled with water, and from zero to 25 torr PEEP, without being able to force water into the analyzer cell. The modified analyzers were compared with unmodified units regarding response time, reproducibility and accuracy. This modification does not produce any alteration in the functional characteristics of these analyzers. Prior to our regular use of this modification, we had been replacing eight to 12 magnetic unit analyzer cells per year. Following installation of these filters we have not replaced any unit because of water contamination.

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### An Anesthesiology Liaison Service

*To the Editor:*—In 1975, after serving for more than 25 years as the chairman of an anesthesiology department and as a program director for a residency

training program in anesthesiology, and after having experienced one major myocardial infarction, I made the decision to shed the stresses of anesthesiology