

# New Device Can Accurately Determine Correct Epidural Placemen

*Detects Entrance Into Epidural Space by Electronically Sensing Loss of Resistance*

HONOLULU—Use of a new computerized device may make it possible to reliably identify the epidural space. A preliminary study showed that within seconds, the location of the needle could be determined more easily than by hand.

“The techniques we use currently to identify the epidural space rely on the operator’s subjective perception of the loss of resistance to air or saline,” said Oscar Ghelber, MD. “A method or device that could objectively identify the

epidural space could potentially decrease the incidence of complications, increase the success rate of the procedure



Oscar Ghelber, MD

and enhance patient safety.”

The Compuflo (Milestone Scientific, Inc., Livingston, N.J.) is a computerized device that integrates a pressure-limited infusion and aspirating system. It continuously monitors and provides “real-time” feedback on the pressure and resistance encountered at the tip of the needle during an injection. The data are provided audibly as well as visually to the user and can be stored for future reference. The core technology uses force/pressure transducers and a mathematical algorithm to calculate conditions at the end of the epidural needle. In the pilot study, it identified the epidural space in 100% of cases.

The study included 20 adult obstetric patients scheduled to receive epidural anesthesia. The Compuflo was used to detect the loss of pressure indicating entry into the epidural space. The device was attached to a Tuohy needle when the operator initially introduced the needle to a depth of 3 cm. The epidural space was identified when the pressure dropped and remained low—that is,

within 15 mm Hg from original loss of resistance pressure of 100 mm Hg for five seconds or longer (Figure). A false loss of resistance was identified in seven of the 20 cases, when the pressure fell but began to rise within one second.

If the pressure was determined as a false loss of resistance, the anesthesiologist continued to advance the needle until a true loss of resistance was recognized, Dr. Ghelber, Assistant Professor of Anesthesiology, University of Texas Health Science Center at Houston, noted. After the final pressure reading, the Compuflo was disconnected from the epidural needle and the epidural catheter was inserted.

The investigators compared pressures for all decreases below 100 mm Hg and categorized them as either the epidural space or false loss of resistance.

Presenting the findings in a poster session at the 2005 annual meeting of the International Anesthesia Research Society, Dr. Ghelber said that the epidural space exhibited significantly lower pressures ( $P < 0.001$ ) than the false loss of resistance within two seconds after the initial drop in pressure. The epidural space was successfully identified in all patients.

“Usually when we do an epidural, we identify loss of resistance using subjective feedback,” he told *Anesthesiology News*. “There are two problems: first, you have to teach someone to feel the subjective nature of this loss

of resistance, and the trainee makes a lot of mistakes in the beginning. Secondly, you are advancing the needle with your nondominant hand. The Compuflo technology provides precise and objective feedback in addition to allowing the anesthesiologist the use of both hands to advance and direct the needle, thereby making it easier to perform this task.”

David J. Birnbach, MD, who moderat-

ed the poster session, commented that “this new technique might have a niche, but much depends on how easy the machine is to use and how expensive it is. It might help us teach residents how to do epidurals. But the technique is in its infancy, and it’s not clear that practiced clinicians need a machine to tell them when they have loss of resistance.” Dr. Birnbach is Professor and Executive Vice Chair, Department of Anesthesiology, Perioperative Medicine and Pain Management, University of Miami/Jackson Memorial Medical Center.

—Linda Pembrook

*Based on a poster presentation at the 2005 annual meeting of the International Anesthesia Research Society and interviews with Oscar Ghelber, MD, and David J. Birnbach, MD.*