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## LETTERS TO THE EDITOR

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### VERIFYING EPIDURAL CATHETER PLACEMENT WITH A REVISED TECHNIQUE

PRANAV BANSAL\*, DEEPTI AGARWAL\*\*  
AND KUMKUM GUPTA\*\*\*

Correct placement of epidural catheter has always been an enigma with varying degrees of success rates even in experienced hands owing to the blind nature of this procedure. We advice a simple test which can improve specificity and success rate in placing epidural catheter without using advanced gadgets.

After localizing the epidural space by loss of resistance or hanging drop technique, the catheter is inserted 5 cm into the epidural space, Touhy's needle is removed and the following test performed in a stepwise fashion:

- 1) Negative aspiration is done to rule out intravascular or intrathecal placement of catheter.
- 2) The catheter is primed with 2 ml of 0.9% normal saline and catheter port splashed to get rid of excess saline. Next, the catheter is raised vertically at the level of mid-scapula in a sitting patient or approximately 1 foot above the level of insertion in a laterally positioned patient. If the catheter tip is positioned epidurally the fluid column will fall in a manner similar to CVP manometer.
- 3) During the fall of fluid column the patient is asked to cough voluntarily. While coughing the meniscus first halts, rises abruptly by 2-3 mm and then falls again. This occurs due to transmission of intrathoracic pressure into epidural space through valveless venous communications between intercostal and epidural veins.
- 4) If the catheter is now lowered below the level of insertion, the fluid column will start rising due to fluid moving out of epidural space followed by bubbles of air.

This free fall and rise of fluid level will not occur if the catheter is placed outside the epidural space, in an epidural vein or intrathecally. In the latter two circumstances the fluid level will continue to rise due to egression of blood or CSF seen at lower end of catheter.

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From NSCB Subharti Medical College, Meerut (U.P), India.

\* M.D. Assist. Prof. in Dept. of Anaesthesiology & Critical Care.

\*\* M.D. Assist. Prof. in Dept. of Pathology.

\*\*\* M.D. Assoc. Prof. in Dept. of Anaesthesiology & Critical Care.

Corresponding Author: Dr. Pranav Bansal MD, Assist. Prof., Dept. of Anesthesiology & Critical Care, Subharti Medical College, Meerut (UP), India.

**Mailing Address:** Flat No. 31, X-Block, Subharti Medical College, Delhi Haridwar Bypass Road Meerut (U.P), Phone No: +91-9837009394. E-mail drpranav\_bansal@yahoo.com

**Work Attributed To:** Department of Anesthesiology & Critical Care, Subharti Medical College, Meerut, U.P., India.

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The changes in fluid level associated with catheter raising or coughing reflect free communication between epidural space and catheter and rules out misplacement or kinking of catheter. The above test barely takes two minutes to perform without using any additional equipment. The above technique has been described earlier in literature except the coughing test (step 3) which was our incidental observation in a patient coughing on O.T. table during the procedure<sup>1,2</sup>.

In an event of inadvertent dural puncture, localize a cephalad epidural space, perform negative aspiration until air bubbles appear in catheter followed by cough test to confirm epidural placement. Though the chances of false negative results (i.e. catheter in epidural space but does not seem to be there) are higher in this scenario due to loss of negative pressure of epidural space from leaking CSF, a violent coughing will still

evoke pressure changes in epidural space and catheter fluid column.

The disadvantage of this technique is that it requires an awake and cooperative patient for stepwise assessment and is difficult to perform in pediatric patients. Moreover it cannot confirm the level of catheter tip placement as compared to specific muscle group contraction done by electrical stimulation test<sup>3,4</sup>. At our centre we have used this technique successfully in 50 patients with only two failures where the effect was patchy and delayed, probably due to migration of catheter anteriorly in epidural space.

We recommend using this simple technique routinely in clinical practice. It can be really helpful in patients with anticipated difficult epidural procedure (e.g. obesity) where correct catheter tip placement is sometimes confirmed only after achieving the effect.

## References

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