forming the loss of resistance test with saline or local anesthetic rather than air.

There are two aspects of their epidural technique that may have contributed to the high incidence of air embolism. First, they used the "hanging drop" sign to identify the epidural space. I would propose that if carefully investigated, this method for identifying the epidural space would be associated with a higher incidence of entry of the epidural needle tip into an epidural vein than if the space is identified by "loss of resistance" in which continuous pressure is applied to the plunger of a small syringe filled exclusively with fluid, either saline or local anesthetic. Second, it has been shown that the incidence of insertion of an epidural catheter into an epidural vein is greater when the epidural space is not first expanded by the injection of fluid, than when it is.[2] I believe that the incidence of air embolism from epidural anesthesia reported by Naulty *et al.* would have been far lower if greater care had been taken to push the epidural venous plexus out of the way by the use of continuous pressure with fluid as the needle was being inserted and by expansion of the space with 7 to 10 ml of fluid before inserting the catheter. Further, I suggest that these simple precautions are more important than hydration or posture for minimizing this complication.

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In reply:—The "hanging drop" sign is used at our institution as a training device for residents, and since this is our standard technique, this is what we evaluated in the study. We noted in the paper that the possibility of air embolism would be reduced by using the loss of resistance technique "with saline or local anesthetic rather than air." However, I feel that if 7 to 10 ml of "fluid" are used to distend the epidural space prior to insertion of the epidural catheter, the fluid should *not* be local anesthetic, since this large volume given intrathecally or intravenously could cause obvious difficulties. *All* aspects of technique in epidural anesthesia are critical.

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Pulmonary Artery Catheters in Eisenmenger's Syndrome: Many Risks, Few Benefits

To the Editor:—I read with both interest and chagrin the case report by Devitt *et al.*[1] recounting the fatal outcome of pulmonary artery monitoring in a parturient with Eisenmenger's syndrome. Although their discussion of the risks was entirely reasonable, the discussion of the benefits of a PA line in this disease demands further consideration.

A number of potential benefits for pulmonary artery catheterization in this patient could be postulated:

1) Pulmonary artery catheterization allows measurement of PA occluded pressure to evaluate left ventricular volume status. Eisenmenger's syndrome is characterized by obliterative pulmonary vascular disease in which PAOP may not truly reflect LVEDP or LVEDV. In this syndrome, the right ventricle, not the left, is at highest risk for dysfunction. Right atrial pressure should provide an adequate assessment of vascular volume.

2) The authors' discussion of PA catheterization for evaluation of shunting should be reevaluated. In the patient with pulmonary hypertension and a right-to-left shunt, the degree of shunting is easily evaluated by serial analysis of arterial blood gases and by observing the clinical signs of increasing tachypnea, cardiac rhythm