determine the wedge pressure from a clear tracing) necessitates that any study meant to assess the benefits of the pulmonary artery catheter must control for competence in the use and the interpretation of the derived data.

Furthermore, patient benefit cannot be judged solely on the basis of hard end points, such as total mortality. The extent to which a patient is helped by the use of an investigation is dependent on the diagnostic, therapeutic, and prognostic utility of the investigation. Did the use of the pulmonary artery catheter help in the diagnosis of complications of acute myocardial infarction, such as septal rupture, mitral regurgitation, cardiac tamponade, and right ventricular infarction? Was it of incremental diagnostic benefit when compared with other noninvasive investigations, such as echocardiography, surface electrocardiography, and the cardiac nuclear scan? Were major therapeutic decisions made on the basis of the catheter-derived data? If so, what were these decisions and what were the treatment modalities used? Were the decisions made solely on the basis of clinical assessment sufficiently altered by the hemodynamic data derived from the pulmonary arterial catheter? This is important, since the clinical accuracy in the estimation of cardiac output and pulmonary wedge pressures is only about 50 percent. Was the in-hospital morbidity in patients with a pulmonary artery catheter different from that in patients without one? Were the data derived from invasive monitoring of use to the physician in diagnosis, as shown in previous studies?

The study by Zion et al failed to answer these questions. However, it was not designed to answer them. The correct approach (which has been suggested by Dr Dalen) is a prospective randomized trial in which the incremental diagnostic utility (relative to other noninvasive investigations) and the therapeutic usefulness and prognostic utility of the pulmonary artery catheter are evaluated, including a cost-benefit analysis and controlling for physician competence in data interpretation as well! Until then, it would be wiser to reserve judgment on the usefulness of the pulmonary artery catheter in patients with acute myocardial infarction.

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To the Editor:

We thank Dr Vasan for his comments on our study. Our study sought to assess, from a large data base, whether the use of pulmonary artery catheterization, in its own right, could be regarded as a risk factor for increased mortality in patients with acute myocardial infarction. This was important, because a previous similar study1 had produced data that suggested this possibility. We were able to show that the apparent finding, by multivariate analysis, that the use of pulmonary artery catheterization in its own right constituted a risk factor, could be an artifact, related to different severity of congestive heart failure in patients who received, compared with those who did not receive, pulmonary artery catheters. As Dr Vasan correctly points out, our study was not in any way designed to assess the clinical value of the use of these catheters. We agree with Dr Vasan and with Dr Dalen2 that prospective randomized trials are needed to answer the outstanding questions. However, we share the misgivings of Swan and Ganz3 as to the feasibility of such studies and the ability to carry them through to a satisfactory conclusion.

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Contents of Chest Wall Cold Abscess Flowing into the Epidural Space in Miliary Tuberculosis

To the Editor:

We would like to report the case of a patient with miliary tuberculosis and a cold abscess of the chest wall, the contents of which flowed into the epidural space through the intervertebral foramen and caused paraplegia.

A 37-year-old man was admitted because of miliary tuberculosis. However, fever and his general condition did not improve even with chemotherapy. Six months later, paraplegia occurred following sudden radicular back pain without any alteration of segmental sensation. There were no abnormal findings on x-ray films of the thoracic and lumbar vertebrae. Examination by magnetic resonance imaging revealed that the contents of a cold abscess in the right chest wall had flowed into the epidural space through the intervertebral foramen (Fig 1). Cleaning of the chest wall abscess and laminectomy (L-1 to T-11) were performed.

Figure 1. Horizontal T2-weighted magnetic resonance image shows high-intensity masses in the right chest wall and epidural space. These masses appear to be connected through the intervertebral foramen.

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In this case, the atypical spinal tuberculosis was classified as type I, where the neural arch is affected, and type II, with extradural tuberculous epidural granuloma, rather than the usual type of atypical spinal tuberculosis reported previously.

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Arterial or Venous? You Make the Call

To the Editor:

A 36-year-old ventilator-dependent, C-5 quadriplegic man, living in a long-term care facility, was found unresponsive, hypotensive, and in respiratory distress. His uncuffed tracheostomy tube was in place, and arterial blood gas analysis on 100 percent oxygen with bag resuscitation revealed the following values: pH 7.04; PCO₂ 93 mm Hg; and PaO₂ 60 mm Hg. A triple-lumen catheter, for fluid replacement, was placed without difficulty with use of a right subclavian approach. There was dark, nonpulsatile blood return on insertion from all three ports. A portable chest radiograph obtained after placement (Fig 1) raised concern over the position of the catheter, since it had crossed the midline into the left hemithorax. After stabilization of the patient, simultaneous samplings of blood from the central line and an arterial line were sent for blood gas determinations. They were virtually identical. The catheter was removed without complication.

The observation that the catheter had crossed the midline from the right side suggested malposition and raised the question of which vascular structure contained the catheter. One of the more common sites is the left superior vena cava, which would give a similar radiographic appearance of a catheter crossing the midline from right to left; in such cases, the catheter need not be removed. Other possible sites include the left intercostal vein, the left pericardiophrenic vein, and the left internal thoracic vein; positioning in these vessels requires immediate removal of the catheter to avoid extravascular migration. Lateral chest radiography, not routinely employed in such cases, could assist in locating the catheter in such situations.

The clinical points that this case highlights are that reliance on rapid, pulsatile, bright-red blood flow; increased resistance during advancement of the catheter; and difficulty in administering fluids by gravity alone, frequently used to confirm arterial placement, may not be valid in all situations. Hypotension and hypoxemia can sufficiently alter these observations, thus leading to misinterpretation regarding catheter placement. Similarly, it has been observed that residual xylocaine in the needle and syringe can impart a brighter color to blood, which also could lead to misinterpretation regarding catheter location. Awareness of thoracic venous anatomy is necessary for clinical decision making, since accessory venous structures in the thorax are not suitable for infusion of fluids or other agents. While clinical observation and chest radiography are essential in determining catheter position, they may be insufficient in certain clinical settings. We suggest that blood gas analysis is a rapid and effective method for determining venous or arterial placement, especially in the setting of shock.

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