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Sudden Cardiac Arrest during Epidural Anesthesia: Venous Air Embolism?

To the Editor:—We read the report by Gild and Crilley1 with interest. While agreeing with their conclusion that this may be a case of unexplained cardiac arrest during epidural anesthesia, we think that a more likely explanation is that the patient suffered an acute venous air embolism that produced the cardiac arrest.

Venous air embolism occurs when there is open access to the venous circulation above the level of the heart, creating a pressure gradient leading to the right atrium. Although this is most often associated with intracranial surgery with the patient in the sitting position,2 it has also been described during radical hysterectomy3 and hip arthroplasty.4

In the situation described by Gild and Crilley, we postulate that air was entrained through the bone marrow sinuses from the bone-harvesting entry point, which we presume was above the level of the right atrium. In addition, spontaneous ventilation creates a negative intrathoracic pressure, which would have increased the pressure gradient and the possibility of air embolism.

The first line of treatment of venous air embolism is prevention of further air entrainment by closing the entry point or increasing the venous pressure. In this case, this was achieved by turning the patient onto her back and administering positive pressure ventilation and cardiac massage. Her quick response to these measures and the absence of subsequent cardiovascular sequelae (indicating that she had no cardiac pathology) may also corroborate our contention that the cardiac arrest was due to an acute temporary event such as venous air embolism.

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How Best to Monitor for Detection of Myocardial Ischemia?

To the Editor:—In their previous studies, Slogoff and Keats1–3 have provided convincing evidence that in patients having coronary artery bypass surgery, myocardial ischemia prior to cardiopulmonary bypass is associated with increased risk of postoperative myocardial infarction. In their recent report comparing different electrocardiographic (ECG) systems for detection of myocardial ischemia, Slogoff et al.4 suggest that ECG monitoring with narrower-bandwidth filters provides higher sensitivity without loss of specificity in detecting myocardial ischemia, as compared with a standard diagnostic-bandwidth ECG.

We do not believe that their data support their conclusions. Their data show that, in patients known to be at risk for myocardial ischemia, ST-segment depression on the Spacelabs monitor in monitor mode (SL-MON) (0.5 Hz) was consistently more negative than on a standard ECG (0.05 Hz). The assumption that all 1.0-mm ST-segment depression observed on the SL-MON system represented myocardial ischemia requires confirmation with an independent measure of ischemia. Indeed, the authors noted that the SL-MON displayed up to 0.25-mm ST-segment depression at all heart rates from a simulator-generated isoelectric ST-segment signal. By definition, these ECG changes are artificial, yet the authors conclude that the ECG changes detected using the SL-MON system were “not artificial since specificity of the observation remains high.”5 However, none of the data in the current or previous studies allows calculation of the specificity of the SL-MON system. By recommending the SL-MON system for diagnosing intraoperative ischemia, the authors neglect the dangers of false positive or artifactual results.

The authors' implication that the SL-MON system may be appropriate, with "cautious interpretation," for detecting myocardial ischemia in patients without coronary artery disease (CAD) is especially troubling. It is easy to envision the iatrogenic cascade of costs and complications when a patient is erroneously labeled as having had intraoperative myocardial ischemia and arrives in the recovery room with a nitroglycerin infusion, receives a cardiac consultation and overnight stay in the coronary care unit, and so forth. It is surprising that Dr. Keats, an outspoken critic of monitoring without demonstration of efficacy,5 has concurred in the recommendation that the SL-MON type system replace standard diagnostic-bandwidth ECG for patients with known CAD in the operating room. We continue to believe that standard (0.05 Hz) ECG filtering in the operating room is more appropriate for detection of myocardial ischemia in all patients, and we encourage manufacturers to incorporate diagnostic-mode ECG as the default setting in operating room ECG monitors.

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