CORRESPONDENCE

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Tense Diaphragm in Tension Pneumothorax

To the Editor:—In the case report by Ibrahim *et al.*,[1] in which a 64-kg man developed tension pneumothorax and systemic air embolism during positive pressure ventilation with a rather large tidal volume of 1,000 ml, there seems to have been unnecessary delay before a chest tube relieved the left-sided pneumothorax with immediate improvements in hemodynamic parameters. The exact time between the circulatory collapse and the chest tube placement that relived the tension pneumothorax is not clear. But there seems to have been enough time to perform, along with routine resuscitation, a transesophageal echocardiographic study of the cardiac chambers and a fiberoptic study and manipulation of the airway before the pneumothorax was relieved by chest tubes.

The patients abdomen was open for pancreatic debridement at the time of circulatory collapse. Under these circumstances, the tension pneumothorax can be diagnosed/ruled out by examination of the diaphragm by the operating surgeons. If the diaphragm is tense and bulging down into the abdomen, the tension pneumothorax can initially be relieved *via* an opening through the diaphragm followed by a formal chest tube placement on the same side. This approach not only avoids unnecessary delay in the definite therapy for pneumothorax, but also eliminates the need for bilateral chest tubes in unilateral pneumothorax. We have personal experience in managing intraoperative spontaneous tension pneumothorax using the diaphragm sign during laparotomy on a patient with cystic fibrosis (unpublished data, September 1995). When pneumothorax occurs during laparoscopic procedures, the status of the diaphragm may be visualized using the laparoscope.[2]

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In Reply:—We thank Drs. Dorje and Cueto for their interest in our recent publication.[1] Dr. Dorje has focused on the possibility that a tension pneumothorax may have been unrecognized and has offered suggestions as to how the diagnosis could have been made more expeditiously. In response, one of the initial resuscitative measures performed during the described event was to place angiocatheters in bilateral second intercostal spaces of the anterior chest wall because of the clinical suspicion of a tension pneumothorax. Because this resulted in only partial improvement of the patient's clinical signs, the transesophageal echocardiographic (TEE) examination was performed to determine the possibility of cardiac tamponade, pulmonary embolus, or acute myocardial infarction. As our surgical team prepared for chest tube placement, the initial TEE examination of the heart was already being performed. We understand that other institutions may not have TEE readily available. However, our operating rooms have immediate availability of TEE and fiberoptic bronchoscopy as well as exceptional technical support; thus, acquiring these instruments in our institution is accomplished in minutes. In addition, a tension pneumothorax would be identifiable by the surgeon during the operation only if the diaphragm is in direct view. If the surgeons were operating in the lesser sac, debriding necrotic pancreas, and the patient had a narrow-angled costal margin, a tension pneumothorax may be difficult to appreciate. Nevertheless, the purpose of our case report was not to discuss the management of tension pneumothorax, which may be found in numerous anesthesia, surgical, and medical textbooks, but to illustrate the interesting finding of systemic air embolism associated with barotrauma documented by TEE, which had not been described previously.

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