Chest Pain in a Debilitated Postoperative Patient*

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A 79-year-old woman underwent a cholecystectomy for acute cholecystitis. The patient's postoperative course was complicated by episodes of respiratory distress, congestive heart failure, pneumothorax, sepsis, jaundice, and acute renal failure. She subsequently developed a pneumonic infiltrate in the right lower lobe which slowly regressed, coinciding with general improvement in her physical condition.

On the morning of the 21st postoperative day, a narrow-bore nasogastric feeding tube was inserted for nutritional support. Later that evening, the patient complained of pain in the chest and some respiratory difficulty, with tachypnea, wheezing, and hypoxemia. An emergency ventilation/perfusion scan was indeterminate for the presence of pulmonary embolus. A follow-up film of the chest was obtained (Fig 1).

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Diagnosis: Endobronchial intubation with a nasogastric tube resulting in perforation of the bronchus and lung parenchyma into the pleural cavity

The feeding tube was observed roentgenographically to be following the course of the left main bronchus with its tip extending to the periphery of the lung and apparently lying within the left pleural cavity. The feeding tube was removed immediately. Later that evening, the patient developed worsening respiratory distress with a tension pneumothorax which required aspiration of air from the left pleural space. Despite insertion of a chest tube, endobronchial intubation and pressor therapy for maintenance of blood pressure, her condition deteriorated over the next several days; she died on postoperative day 29. No autopsy was performed.

Many cases of accidental endotracheal intubation with narrow-bore feeding tubes have been reported in the literature. This complication may be a consequence of as many as 0.03 to 2.4 percent of such attempts.1,2 In a study by Ghahremani and Gould,3 a 7.6 percent overall complication rate for placement of flexible small-bore feeding tubes was described. Patients at increased risk for endobronchial misplacement of a nasogastric tube include those who are neurologically compromised, sedated, critically ill, uncooperative, elderly, or debilitated. Also at risk are patients who have diminished gag, cough, or swallowing reflexes, or who have had previous multiple nasogastric tube intubations.

Conventional large-bore nasogastric tubes are made of pliable plastic, which decomposes and becomes rigid with prolonged use. They have been replaced with tubes made of highly flexible plastic which does not stiffen with long-term nasogastric intubation.4 The diameter and flexibility of the feeding tubes, especially those that are newer and of smaller diameter, play a role in determining their likelihood to perforate to the periphery of the lung.5,6,7 Because the cartilaginous framework of the bronchial tree diminishes peripherally, a less rigid structural support exists in the more peripheral bronchi of smaller diameter. The tubes with tips of smaller diameter are able to reach more peripheral bronchi, so that perforation occurs more readily.4 A cuffed endotracheal tube (especially the low-pressure, high-volume type) does not protect against endotracheal placement of the feeding tube and may even predispose patients to a greater risk of endobronchial intubation.8

Pulmonary intubation, while not uncommon, usually results in little or no harm to the patient if promptly recognized and corrected.9,10 However, if malposition goes unrecognized, administration of fluid into the tube may result in parenchymal consolidation and pneumonia.3 Passage of a nasogastric tube into the pleural space is rare, but probably results in a significant incidence of serious complications including pneumothorax, hydrothorax, empyema, and even death. The tendency toward the development or worsening of pneumothorax after the removal of the offending perforating tube occurred in this patient with a fatal result and has been noted by others.8,10 It has been postulated that the tube may act as a plug while in place, preventing the leakage of air.10

The severity of complications following misplacement of a feeding tube is probably associated with the poor physical condition of patients for whom such intubation is considered necessary. Such patients lack the usual feedback mechanisms that may alert physicians to potential problems.10 The morbidity related to misplacement of feeding tubes is considerable and warrants careful evaluation of both the indications for insertion of feeding tubes and the roentgenographic confirmation of the positioning of the tube.1,2,3,7 However, even roentgenographic studies may be misleading since in some tubes only the distal tip is radiodense. Such tubes may appear projected below the diaphragm, thus simulating gastric or duodenal placement when the tube actually lies in the pleural space. Properly exposed roentgenograms are essential to visualize the entire course of the faintly radiodense portion of the tube. Clinical assessment of tube position is unreliable. Performing auscultation while injecting air can erroneously suggest gastric placement, especially if the tube lies in the left pleural space or if the injected air is bubbled through a pleural effusion.2,4,7 Attempts at aspiration of gastric fluid also may be misleading since pleural fluid can be mistaken for gastric fluid.3,5,8 Some centers have instituted specially trained teams to properly place and manage feeding tubes in an attempt to avoid the complications of their use.9

References