significantly higher than the proposed therapeutic range of 500-1,500 ng/mL. Evaluation of this patient's response to bretylium suggests that a broader therapeutic range exists for the drug than previously reported. Our experience with this patient and the wide range of doses summarized above suggests that some patients may require substantially higher parenteral doses of bretylium tosylate than are commonly recommended and that these doses may be administered without minimal adverse effects. Unlike many other antiarrhythmic drugs, bretylium has a positive inotropic effect and does not produce conduction disturbances. Since supine hypotension is the most serious side effect of rapid bretylium administration and some patients may respond only to doses far in excess of current recommended doses, it seems prudent to treat selected patients with increasing doses of bretylium tosylate until supine hypotension occurs before the drug is administered as ineffective. We would recommend small increments of bretylium in such situations with frequent monitoring of blood pressure if the total infusion rate exceeds 2 mg/minute or total dosage is increased beyond 15-20 mg/kg.

Chronic oral administration of bretylium poses a significant problem due to poor bioavailability. Thus, it may be impractical to attempt conversion to oral therapy except in cases where there may be a diminished need for high plasma levels.

REFERENCES

A New Treatment Modality for Pneumoperitoneum Associated with Mechanical Ventilation*

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Pneumoperitoneum as a complication of mechanical ventilation is described in a 55-year-old woman with COPD. Exploratory laparotomy revealed no perforation of vescus. Therefore, a peritoneal (Tenckhoff) catheter was connected to chest tube drainage and placed to water seal permitting respiratory weaning which previously had been prevented by pneumoperitoneum.

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To our knowledge, pneumoperitoneum has not prevented weaning from mechanical ventilation, nor has its relief been reported to permit successful weaning. The following case is believed to be an example of this problem and its solution.

CASE REPORT

Three weeks prior to her admission to Louisville Veterans Administration Medical Center, this 55-year-old white woman with a long history of respiratory insufficiency secondary to chronic obstructive lung disease, was admitted to another hospital with acute respiratory failure. She had endotracheal intubation and received assisted mechanical ventilation. Several days afterwards, her abdomen became distended. There was radiologic evidence of free peritoneal air. Perforated viscus was suspected, but not confirmed by exploratory laparotomy which revealed only a dilated cecum and ascending colon with colonic adhesions. Tracheostomy and feeding gastrostomy were performed. A right pneumothorax necessitating chest tube decompression complicated her course.

She was transferred to Louisville Veterans Administration Medical Center where respiratory assistance was necessarily continued. On admission, her blood pressure was 110/80 mm Hg, pulse rate 102 beats per minute, and oral temperature 100.3°F (37.9°C). She was somewhat cachectic. Examination of her chest revealed coarse rhonchi. The site of the right tube thoracostomy was healing. The abdomen was distended and tympanitic. A gastrostomy tube was present. Bowel sounds were present. The liver was three fingerbreadths below the right costal margin.

On a volume-cycled ventilator (Bennett MA-1) with an FiO2 of 0.25, the arterial pH was 7.49, the Pao2 87 mm Hg and Paco2 47 mm Hg. Peak pressures approximated 35 cm H2O. Minute ventilation was estimated at 4.5 liters/minute.

Abdominal distention increased and an x-ray film demonstrated a large pneumoperitoneum (Fig 1). Needle aspiration of the right lower quadrant revealed a large amount of air. Frequent manual compression of the abdomen released gas, but her abdomen became increasingly distended and this, in addition to pain, prevented weaning from mechanical ventilation. She also developed Staphylococcus aureus pneumonia which was successfully treated with cephalosporin antibiotics.

About one month after admission, a Tenckhoff peritoneal catheter was placed in the right lower quadrant and connected to a catheter under water seal drainage, resulting in continuous release of free peritoneal gas. After insertion of the Tenckhoff catheter, peak pressures dropped to 25 cm H2O. Minute ventilation increased to approximately 6 L/minute. The abdominal distention markedly decreased, and the patient required less pain medication and became more cooperative. Following this procedure, the patient was successfully weaned from mechanical ventilation using intermittent mandatory ventilation (IMV). Seven weeks after catheter placement, the patient was weaned off mechanical ventilation and the Tenckhoff catheter was removed. She was eventually discharged on home oxygen at 1 liter per minute. Her arterial blood gas levels were pH, 7.40; Pao2, 80 mm Hg; and Paco2, 53 mm Hg. When last seen as an outpatient, she continued to do well.

DISCUSSION

Banyai discussed early reports of inducing pneumo-
Peritoneum after attempting artificial pneumothorax in the treatment of pulmonary tuberculosis. He concluded that air can move from an established pneumothorax directly into the abdomen along one of the mediastinal structures passing through the diaphragm.

The association between free intraperitoneal air and mechanical ventilation has been described previously by several authors. The mechanism of airflow diversion was described originally by Macklin. He concluded that air may escape through overstretched alveoli of the lung into the pulmonary perivascular sheaths. Air may then travel along these sheaths to the mediastinum along the tissue surrounding the aorta to reach the retroperitoneal space and the abdominal cavity.

Previous reports of ventilator-induced pneumoperitoneum suggest that high inspiratory pressures ranging from 40-80 cm H2O were used. However, a case of pneumoperitoneum in an asthmatic patient following use of IPPB has also been described.

The finding of subdiaphragmatic air on an upright chest film usually leads to the diagnosis of perforated viscus and prompt laparotomy may be performed needlessly. Several authors have suggested diagnostic needle paracentesis and peritoneal lavage to confirm intra-abdominal perforation before laparotomy.

Our patient underwent laparotomy for possible viscus perforation. As none was found, the most likely etiology was pneumoperitoneum induced by mechanical ventilation. The abdominal distention caused the patient much pain, compromised diaphragmatic excursion and prevented weaning from the respirator.

Although not a common complication of mechanical ventilation, pneumoperitoneum can be serious in the already severely compromised patient with respiratory failure. Utilization of a Tnckoff catheter to decompress pneumoperitoneum associated with mechanical ventilation has not been previously reported to our knowledge. This device may aid in the care of such patients.

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Pericardial Mesothelioma*

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Pericardial mesothelioma in a 17-year-old boy presented with persistent, febrile pericarditis terminating in acute, fatal cardiac tamponade. Serial echocardiograms suggested pericardial fluid, but at autopsy a diffuse tumor mass was found to be enlarging and obliterating the pericardial space. Computed tomography of the pericardial space was interpreted as demonstrating pericardial thickening. Further investigations by computed tomography using tissue density expressed as attenuation coefficients may prove helpful in distinguishing tumor in the pericardial space from pericardial effusions.

Primary pericardial mesothelioma is a rare tumor of mesodermal origin. The existence of the tumor as a distinct pathologic entity has been established, and excellent reviews have characterized the clinical and pathologic aspects of the tumor. Dawe et al have defined the following three histologic subtypes of peri-