lymphocytes, they may lack the destructive immune response necessary to cause clinically significant pneumonitis.

None of these considerations provide an explanation for the development of CMV pneumonitis, or the unusual mode of its presentation, in our patient. Nevertheless, this case and its management identifies CMV as a potential cause of pulmonary nodules in AIDS and emphasizes that CMV rarely may cause clinically significant lung disease. In such cases, specific antiviral therapy may be of benefit.

ACKNOWLEDGMENT: The authors thank Nadine Lurie for editorial assistance.

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Safety of Thoracentesis in Mechanically Ventilated Patients*

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As practicing intensivists, we frequently diagnose pleural effusions in mechanically ventilated patients and routinely perform thoracentesis even when the patient is on positive end-expiratory pressure (PEEP). In light of a recent report, we have reviewed our experience. It is of interest that all thoracenteses were performed with patients in the lateral decubitus position.

(Chest 1993; 103:1920-21)

Safety and effectiveness of diagnostic thoracentesis is well established.1 This procedure is generally considered safe following routine preparation and techniques. The importance of properly diagnosing pleural effusions and their underlying causes should be equivalent in patients with or without mechanical ventilation. Unfortunately, the safety of thoracentesis in mechanically ventilated patients is poorly addressed in the current medical literature. We have not hesitated to perform diagnostic thoracentesis in patients on mechanical ventilators and report our experience herein. We use the lateral decubitus position in all patients and believe that our rate of complications is equivalent to that of patients not receiving mechanical ventilation.

METHOD

Over a 26-month period, from July 1989 to September 1991, 31 thoracenteses were performed on 26 mechanically ventilated patients. Any patient who underwent the procedure during this time was included in the study. Patient ages ranged from 19 to 92 years. All thoracenteses were performed by one of two board-certified critical care physicians or residents and fellows under staff supervision. The effusions were initially found by clinical examination or chest radiograph and most were confirmed by a lateral decubitus chest radiograph or ultrasonography. Each of the thoracenteses was performed with the patient in the lateral decubitus position with the side to be “tapped” in the downward position. In order to prevent the patient from sinking into the bed, each patient was placed on a firm surface, such as a cardiopulmonary resuscitation (CPR) board. As the patients were already receiving mechanical ventilation, sedation or paralysis was used as needed on an individual patient basis to facilitate this positioning. After preparation in sterile fashion with iodophor solution, the site to be punctured was determined by ultrasound localization, the area of maximal dullness by percussion, or a location just inferior to the scapular tip. Local anesthesia with 1 percent lidocaine was used. The same No. 21-gauge needle used for anesthesia was then used to puncture the pleural space and confirm the presence of the fluid. This injection of anesthetic agent and puncture of the pleural space was carried out with the needle and syringe kept perpendicular to the skin surface. This was done to ensure entry into the pleural space and not continued movement of the needle merely within the subcutaneous tissues. If fluid was not encountered, the syringe was withdrawn and anesthetic agent was administered at another location. This was usually in a more lateral direction. Fluid was encountered with the small needle in all cases before proceeding. The needle and syringe used for anesthesia were removed, and further penetration for pleural fluid removal was then achieved with a disposable thoracentesis catheter-over-needle assembly. Amounts of fluid removed were determined according to the indication for thoracentesis. After the procedure, the needle was removed and a bandage was placed over the puncture site. The CPR board was then removed and the patient returned to the supine position. Portable chest roentgenograms were then obtained in all patients.

Positive end-expiratory pressure (PEEP), Fio2, and tidal volume were not adjusted. Respiratory rates were increased in patients who received paralytic agents. Absence of pneumothorax was confirmed by the follow-up chest radiograph. Chest radiographs were reviewed by the staff critical care physician soon after the procedure and followed up by routine radiology interpretation later.

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RESULTS

Of the 31 thoracenteses, 25 were performed with the patient on PEEP from 5 to 20 cm H2O. At least five of the patients had known prior chronic obstructive pulmonary disease (COPD). Volumes extracted ranged from 50 ml to 1,500 ml.

Four chest tubes were required out of the 31 thoracenteses. One was employed for a complicated parapneumonic effusion characterized by a pH less than 7.20. Two chest tubes were placed after follow-up chest radiographs revealed pneumothoraces. In the fourth patient, an intrapleural catheter with one-way valve was placed for pneumothorax. In no thoracentesis did the patient experience significant bleeding (requiring transfusion) or acquire a site infection (defined as pus at site, inflammation at site, or need for antibiotics). There were no deaths associated with the procedure.

DISCUSSION

Thoracentesis, while not without hazard, is a safe and valuable aid in the diagnosis of causes of pleural effusions.6-8 While the guidelines for thoracentesis in nonmechanically ventilated patients are well established, there are few data indicating the safety of this procedure in mechanically ventilated patients.6-8 Although pneumothorax is a greatly feared complication of thoracentesis, especially in mechanically ventilated patients on PEEP, we encountered only three pneumothoraces in our series of 31 procedures. As one series of ventilated patients reported up to 38 percent incidence of spontaneous pneumothorax,4 this incidence of pneumothorax is not excessive. This experience is also consistent with the incidence of pneumothorax after thoracentesis in nonventilated patients.4-6 Each was found by routine radiograph and there was no evidence of tension at the time of diagnosis.

The lateral decubitus position is not effective in preventing pneumothorax in needle lung biopsy.7 However, we believe that the use of the described technique using the lateral decubitus position with the patient on a firm surface, adequate sedation or paralysis, and careful puncture of the pleural space with a small needle confirming the presence of fluid make thoracentesis a safe procedure in mechanically ventilated patients.

Further benefits to the lateral decubitus position also arise. Once the patient is rolled over onto his side it is much easier to hold the sedated patient than in a sitting position. Also, ventilator tubing and endotracheal or tracheostomy tubes are more simply managed and hopefully less likely to be pulled out in the decubitus position.

CONCLUSION

Pleural effusion is not an uncommon occurrence in mechanically ventilated patients and generally requires thoracentesis for the complete diagnostic and therapeutic approach. We believe that the described technique using the lateral decubitus position makes this a safe procedure even in mechanically ventilated patients on PEEP.

ACKNOWLEDGMENT: We wish to thank our staff at Memphis Critical Care Associates for their invaluable assistance in the preparation of this manuscript.

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