scoliosis. The utilization of this bedside method for the construction of a custom shell may extend the application of this ventilatory technique to those patients.

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Adult Respiratory Distress Syndrome Caused by Mycoplasma pneumoniae*

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Two patients with the adult respiratory distress syndrome were found to have rising complement-fixation titers to Mycoplasma pneumoniae. This unusual presentation of Mycoplasma and its management are discussed. The need to consider M pneumoniae in a patient with the adult respiratory distress syndrome is emphasized.

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Pneumonia due to Mycoplasma pneumoniae is usually a benign self-limited illness, although serious life-threatening infection has been known to occur.

Case Reports
A 55-year-old man was admitted to St. Vincent’s Hospital, New York, complaining of fever, chills, a productive cough, and bifrontal headache. His medical history was unremarkable. There was phthisophobia, a fever of 40.2°C (104.4°F), and a pulse rate of 80 beats per minute. Rales were heard in the right anterior portion of the chest and axilla. The erythrocyte sedimentation rate was 40 mm/hr, the white blood cell count (WBC) was 7,300/cu mm, and the hematocrit reading was 42.7 percent. A chest x-ray film showed an infiltrate in the right middle lobe. Gram stain of sputum showed gram-positive flora, and treatment was started with intravenous administration of penicillin G.

The patient remained febrile, and the rales and infiltrate increased. On the fourth day of hospitalization, fiberoptic bronchoscopy examination showed an inflamed and edematous right middle lobe bronchus draining purulent material. Bacterial, fungal, and mycobacterial smears and cultures showed no pathogenic organisms. Tests for febrile agglutinins and the heterophil antibody screening test (Monospot test) were negative, and the results of examination of the spinal fluid were normal. Tests for streptococci M and cold agglutinins were negative on the second and ninth days of hospitalization.

Open lung biopsy on the eighth day of hospitalization showed active pneumonitis with preservation of alveolar septa. Cultures were negative. The patient became more tachypneic following bronchosopic examination, and the chest x-ray film showed opacification of the entire right hemithorax. The arterial oxygen pressure (PaO₂) while breathing 40 percent oxygen by face mask was 50 mm Hg. Therapy with mechanical ventilation was instituted, and the level of positive end-expiratory pressure (PEEP) providing maximum effective dynamic compliance was 12 cm H₂O. The PaO₂ increased to 92 mm Hg. Antibiotic therapy was changed to intravenous administration of chloramphenicol.

The fever and consolidation gradually resolved, and weaning from mechanical ventilation was accomplished. On the 19th day of hospitalization, the complement-fixation titer to Mycoplasma was 1:16, a fourfold increase over the titer during the acute phase (less than 1:4). Complement-fixation titers to adenovirus, type-A influenza virus, and respiratory syncytial virus failed to show a rise.

Case 2
A 52-year-old man was admitted to the hospital because of fever, malaise, and a productive cough. His temperature was 39.8°C (103.6°F), rales were heard over the right midlateral portion of the chest, and there was a grade 1/6 apical systolic ejection murmur. The WBC was 13,000/cu mm, with 72 percent polymorphonuclear cells and 12 percent band forms. A chest x-ray film revealed an infiltrate in the right middle lobe (Fig 1 to 3), and Gram stain of sputum showed white blood cells without bacteria. Culture of the sputum grew normal flora. Intravenous therapy with ampicillin was started. Oxygenation deteriorated rapidly, and mechanical ventilation with PEEP was instituted.

The patient’s condition began to gradually improve. On the 30th day of hospitalization, the complement-fixation titer to Mycoplasma pneumoniae was 1:16, a fourfold increase over the titer during the acute phase (less than 1:4). Complement-fixation titers to adenovirus, type-A influenza virus, and respiratory syncytial virus failed to show a rise.
Mycoplasma was greater than 1:128, a rise from a level on admission of less than 1:4. Tetracycline (500 mg every six hours) was given via a nasogastric tube. On the 39th day of hospitalization, the patient was weaned from mechanical ventilation and later was decannulated. He was discharged on the 69th day.

**DISCUSSION**

Mycoplasma organisms have been implicated as a common cause of infection of the upper and lower respiratory tracts in man. The typical course of pneumonia due to *M. pneumoniae* is benign, with spontaneous resolution of fever, headache, and malaise in a few days, although cough, rales, and radiographic findings resolve over a more prolonged period. The course of illness is shortened by administration of an antibiotic effective against Mycoplasma, such as erythromycin or a tetracycline. Chloramphenicol and the aminoglycosides are also very active in *vitro*, but clinical evaluation of these agents has not been adequate. Antibiotics that are active against the cell wall, such as the penicillins and cephalosporins, are inactive, since Mycoplasma organisms lack a cell wall.

In addition to antibiotic therapy, management of the adult respiratory distress syndrome requires careful attention to adequate oxygenation and ventilation. In these two cases, PEEP was employed according to a protocol modified from the recommendations of Suter et al. The level of PEEP required to maintain optimal transport of oxygen, mixed venous oxygen tension, and pulmonary compliance varies among patients according to the decrease in the functional residual capacity. In case 1, maximum dynamic compliance was achieved at a PEEP of 12 cm H₂O, while patient 2 required a PEEP of 20 cm H₂O.

When acute nonbacterial pneumonia progresses, *M. pneumoniae* must be considered as a possible cause, and appropriate diagnostic and therapeutic measures should be promptly instituted. These include complement-fixation titers against Mycoplasma, cold agglutinins, and streptococcus MG and the use of chemotherapy effective against Mycoplasma.

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**REFERENCES**

Tricuspid Endocarditis in A Drug Addict; Detection of Tricuspid Vegetations by Two-Dimensional Echocardiography

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Endocarditis is an increasingly frequent complication of drug addiction. Precise localization of the site of involvement is necessary should antibiotic therapy fail and surgical therapy become indicated. This is a report of a patient with Pseudomonas endocarditis in whom the site of involvement was accurately localized noninvasively to the tricuspid valve by two-dimensional echocardiography. This was confirmed at the time of excision of the tricuspid valve.

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Endocarditis is becoming increasingly common in drug addicts.1-3 Involvement of the tricuspid valve is much more frequent in the addict than in the nonaddict.1-4 Detection of the injured valve is relatively easy in aortic or mitral valve involvement, but tricuspid valve involvement may be more difficult to ascertain. We have recently excised successfully the tricuspid valve without replacement in a narcotic addict in whom tricuspid involvement was detected preoperatively, noninvasively, by two-dimensional echocardiography.

METHODS

Echocardiographic Imaging System

Two-dimensional echocardiograms were performed on this patient using a previously described,7,8 real-time imaging system developed in the Duke University Biomedical Engineering Department that is currently undergoing clinical evaluation at Duke University Medical Center. This imaging system uses a hand-held, 16 element transducer array that measures 14 x 24 mm at the site of skin contact and relies upon phased array principles to electronically steer and focus the sound beam through the structures under investigation. Real-time, cross-sectional images of cardiac structures are presented in a circular sector format, 50, 60, or 90 degrees in azimuth at a frame rate of 30 per second. Images are permanently recorded on video tape for later playback and analysis. Photographic reproductions of single frames for illustrations do not represent true image quality.

Echocardiographic Technique

Real-time, two-dimensional echocardiograms were performed in the long axis of the left ventricle and serial short axis views at the level of the aortic root, mitral valve, papillary muscles and ventricular apex using previously described techniques.7 In addition, scans through the long axis of the tricuspid valve were performed by first locating the long axis of the left ventricle, then rotating the transducer counterclockwise until the characteristic rapidly moving echoes from the tricuspid valve were located.

Figure 1. Patient's hospital course. Note prompt and sustained temperature drop immediately following surgery.