Pulmonary Compliance and Effective Compliance in Patients Receiving Mechanical Ventilation

To the Editor:

We read with interest the article by Bone entitled "Diagnosis of Causes for Acute Respiratory Distress by Pressure-Volume Curves" (Chest 70:740-748, 1976). His results, obtained by noninvasive techniques, are of great importance to all workers in the field of intensive respiratory care. In his discussion, Bone stated that "The monitoring of lung compliance would be preferable to monitoring of compliance of the lungs and chest wall in all patients with rapidly changing respiratory status; however, in the absence of the capability to monitor lung compliance in all patients treated with mechanical ventilation, these measurements should be made" (p 745).

For about one year, we have been engaged in a similar study in which both the pulmonary compliance (dy-
Compliance can only be used as an approximation of the actual value of Cdyn. As a rule, the effective compliance was three times smaller than Cdyn.

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To the Editor:

I appreciate the comments of van Veenen et al. Data concerning comparison of pulmonary compliance and effective compliance in the patient receiving mechanical ventilation are needed. Good correlation between these measurements in patients with low compliance documents the simpler estimate of effective compliance as a useful monitoring tool in the patient who is receiving mechanical ventilation and has low compliance. Effective pulmonary compliance is altered by the state of relaxation of the patient and by characteristics of the chest wall and should be used only as an approximation of pulmonary compliance. Serial determination of either measurement does reflect alteration in mechanics of the respiratory system. Thus, changes in compliance in the patient with high compliance should be useful even though absolute values correlate poorly.

It is sometimes difficult to keep an esophageal catheter in the patient with respiratory failure for long periods of time because of the need for nasogastric feeding and the concern about mechanical irritation of the esophagus. We have recently used central venous fluctuations with respiration as an estimate of pleural pressure in patients with a thermodilution Swan-Ganz catheter in place. The approximations of pleural pressure from the esophageal balloon and central venous line have correlated closely.

We have made preliminary observations of the correlation between pulmonary compliance and effective compliance before and after production of noncardiogenic and cardiogenic pulmonary edema,1 pneumothorax,2 and mucus plugging and atelectasis3 in experimental animals. In our studies, changes in effective compliance correlated well with changes in pulmonary compliance.

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References

Bronchiolitis Obliterans
A New Form of Rheumatoid Lung?

To the Editor:

In their report entitled "Severe Airway Disease Due to Inhalation of Fumes from Cleansing Agents," Murphy and his colleagues1 rightly stated that the causative role of the chemical fumes is conjectural but can offer no other explanation for the severe disease of the airways. The patient's rheumatoid status is discussed in the light of those patterns of pulmonary disease currently recognized as associated with rheumatoid arthritis, notably interstitial fibrosis. This pattern Murphy et al. satisfactorily excluded, and it is implied that the rheumatoid arthritis is therefore coincidental; however, of the six patients with bronchiolitis obliterans whom we have encountered over the last six years, five had classic seropositive rheumatoid arthritis (American Rheumatism Association's criteria), while the sixth had circulating antinuclear antibodies. Such a strong association seems to be more than coincidental, and we have therefore suggested that rheumatoid patients may handle the agents that cause bronchiolitis (viruses and chemical fumes) particularly badly and are thus unduly prone to develop an obliterative disease of the airways.2 Bronchiolitis obliterans may therefore represent a previously unrecognized form of rheumatoid pulmonary disease. Detailed reports on our patients are in preparation.

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References

Heparin Sodium and Arterial Blood Gas Analysis

To the Editor:

Questions arise concerning the validity of arterial blood gas measurements when overdilution with a solution of heparin may have occurred. A frequently used reference states that "if too much sodium heparin is used, it will affect the pH to the acidic side."4(101) and

References