Pleural Fluid pH in the Evaluation of Pleural Effusions

To the Editor:

The proliferation of articles concerning the role of pleural fluid pH in the evaluation of pleural effusions has continued to generate interest in the usefulness of this test. The article by Good and colleagues (Chest 1980; 78:55-59) brings some of the controversies into focus, but leaves unclear the precise role of pleural fluid pH in the management of parapneumonic effusions. We are concerned that their article implies all parapneumonic effusions with pH below 7.3, as the only complicating factor, require surgical drainage. We feel that conclusion is not warranted by their data or published series to date.

Since the article by Light et al., the main value of pleural fluid pH appeared to focus on those parapneumonic effusions which could be treated by antibiotics alone as opposed to those which would require surgical drainage for resolution. In Light's initial review of 24 parapneumonic effusions, five had a pH below 7.2 (the criteria he found separated complicated from uncomplicated parapneumonic effusions). However, four of the five effusions had positive cultures, and the fifth eventually became grossly purulent before being drained.

In a recently published prospective study, Light et al. reported a group of 90 patients with parapneumonic effusions, of which 37 had a thoracocentesis. Ten patients ultimately required a chest tube for resolution of the effusion, of which seven had positive fluid cultures, and three had gross pus. All patients who required chest tubes had pleural fluid pH measurements of less than 7.2, but four patients not requiring chest tubes also had values less than 7.2. A total of eight patients (22 percent) with pleural fluid pH values of less than 7.3 did not require chest tube insertion which casts doubt on the validity of the criteria proposed by Good et al.

An article by Potts, Levine, and Sahn reviewed 24 patients with parapneumonic effusions. These were categorized as "benign" if chest tube drainage was not required for resolution. These effusions had a pH above 7.3, and none was grossly purulent or had a positive culture. In fact, nine of the ten "benign" effusions may have been transudates since their pleural fluid proteins were less than 3.0 gm (no concomitant serum protein supplied). The one exudative effusion in the "benign" group had a chest tube inserted. The patients who had surgical drainage had pleural effusions with a pH below 7.3, but every effusion had either gross pus, positive cultures, or loculation as a complicating factor (criteria usually accepted for chest tube insertion).

Another retrospective study from the same institution yielded similar results. Since all the effusions with a pH below 7.3 met previously established criteria for surgical drainage, it would appear that pleural fluid pH added little diagnostically or therapeutically useful information in the management of these patients.

It would seem that a prospective series of patients with exudative parapneumonic effusions, with pleural fluid pH below 7.3 and in whom neither gross pus, positive cultures, nor loculation is present, need to be evaluated in a random manner. These data would hopefully determine whether the measurement of pleural fluid pH alone would be clinically useful in the management of an otherwise "benign" parapneumonic effusion.

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REFERENCES


To the Editor:

As mentioned by Beekman and Cocelli, several recent articles concerning the role of pleural fluid pH in the evaluation of pleural effusions have generated interest and controversy.

The purpose of our article was to demonstrate the usefulness of this pleural fluid characteristic in narrowing the differential diagnosis of the exudative effusion. It was not the intent to discuss criteria for surgical drainage in parapneumonic effusions. A statement was made in the introduction that pleural fluid pH has been helpful in distinguishing uncomplicated from complicated parapneumonic effusions. In our experience, a pH less than 7.30 has been associated with a complicated effusion that usually requires chest tube drainage. In a previous paper from our group, 4 of 24 patients with parapneumonic effusions had a low pH with nonpurulent fluid and negative bacteriology and all had loculated effusions that required surgical drainage for resolution.

In the majority of cases, a complicated parapneumonic effusion is purulent and has positive bacteriology. In those instances, the pleural fluid pH is of no additional value in deciding on a course of management. However, there are instances when the fluid is not purulent and the gram stain is negative; in these cases, we think that the pH is extremely helpful in making an early decision about pleural space drainage. Generally these situations occur when: (1) the patient has received antibiotics prior to thoracocentesis; (2) the patient is leukopenic (failure to see purulent fluid); (3) the gram stain is performed inadequately; (4) anaerobic culture technique is improper. While waiting 48 hours for
culture results we have observed marked loculation in spite of antibiotic therapy which required open drainage. Therefore, we feel that early indicators of potential complications such as a low pleural fluid pH are extremely helpful in guiding therapy.

In the patient with a nonloculated, nonpurulent gram-，“stain negative fluid and a pH in the 7.30 range, we recommend another thoracocentesis be performed in six to eight hours while the patient is receiving appropriate antibiotic coverage for the pneumonia. If the pH is stable and the pleural space is not loculated, we would not institute surgical drainage. However, if the pH has dropped substantially we choose to drain the pleural space. The pleural fluid glucose (less than 60 mg per deciliter) and the LDH (greater than 1,000 IU/L) are also helpful in this regard, but probably are not as sensitive as the pleural fluid pH.

It is important to stress that any laboratory tests must be interpreted in light of the clinical setting. This is particularly true of the patient with a parapneumonic effusion. The patient who has become afebrile with antibiotics and has non-loculated, bacteriologically negative fluid and a pH of 7.25 will likely do well with antibiotics alone. On the other hand, the patient who continues to remain febrile and shows a fall in pH on serial thoracocenteses should have chest tube drainage performed. It has been our experience that the morbidity and economic burden from chest tube insertion and drainage is far less than from a thoracotomy and additional hospitalization. Thus, we tend to institute chest tube drainage early, as once loculation occurs, the need for a thoracotomy for resolution of the empyema increases markedly.

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Adenovirus Type 21 in a Civilian

To the Editor:

Our case report, "Diffuse Pneumonitis Due to Adenovirus Type 21 in a Civilian," appeared in the July 1980 issue of Chest. Subsequent to the acceptance of the manuscript, Hierholzer et al1 described an intermediate strain of adenovirus (20/H21 + 35) which was identified as adenovirus 21 by serum-neutralization tests and as types 21 and 35 by hemagglutination-inhibition tests. Adenovirus 35 is a candidate adenovirus strain currently under review by the World Health Organization.

The publication by Hierholzer et al prompted us to seek confirmation of the identity of our isolate in their laboratory. It now appears that our isolate more closely resembles adenovirus 35 than adenovirus 21, although it behaved atypically for an adenovirus 35 (ie, antiserum to adenovirus 21 reacted by serum-neutralization [titer ≥10] and by hemagglutination-inhibition [titer 20–80]). Type 35 was not suspected earlier because the published report detailing its reactions had shown only low level hemagglutination inhibition reactivity and no serum-neutralization activity with adenovirus 21 antisera.5

We regret the confusion caused by the incorrect identification of our isolate. The recent description of intermediate strains of adenovirus (21/H21 + 35) and our adenovirus 35 isolate, which cross reacts with type 21 antisera, illustrate the complexities inherent in adenovirus serotyping. It is possible that some adenovirus isolates reported as type 21 prior to the description of type 35 were intermediate strains or were adenovirus type 35 strains which cross reacted with type 21 antisera.

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Computerized Tomography in the Assessment of a Posterior Mediastinal Tumor

To the Editor:

In their recent article, Weinberg et al (Chest 1980; 77:}