Clinical study of various kinds of pleurisy and pleural effusion pH

Niro OKIMOTO, Toshikiyo HAYASHI, Fumiyo NANBA, Michihiro KISHIMOTO
Takeyuki KURIHARA, Naoko ISHIHARA, Norikuni KAWANAKA,
Osamu MIYASHITA, Sadao TAMADA

Division of Respiratory Diseases, Department of General Internal Medicine 1, Kawasaki Hospital, Kawasaki Medical School, 2-1-80 Nakasange Kitaku, Okayama 700-8505, Japan

ABSTRACT We have examined whether or not pleural effusion pH is useful in differential diagnosis involving pleurisy. Subjects were 25 patients each of bacterial pleurisy, tuberculous pleurisy, carcinomatous pleurisy, and transudative pleural effusion. Pleural effusion pH was measured using litmus paper. Results revealed that pleural effusion pH was distributed from 7.6 to 8.2 in each disease. The mean pH was 8.0 for the 4 diseases, showing no difference between them. Based on the above, it was considered impossible to differentiate pleurisy by pleural effusion pH.

(Accepted on April 8, 2011)

Key words: Pleural effusion pH, Bacterial pleurisy, Tuberculous pleurisy, Cancerous pleurisy
Transudative pleural effusion

INTRODUCTION

When pleural effusion is suspected, pH is commonly measured along with specific gravity, protein concentration, leukocyte classification, adenosine deaminase (ADA), culture of bacteria or tubercle bacillus, and cytological diagnosis at a number of hospitals. However, the diagnostic significance of pleural effusion pH is not clear. Thus we have examined the pleural effusion pH of various types of pleurisy we have seen to clarify its usefulness in the differential diagnosis of pleurisy.

SUBJECTS AND METHODS

Subjects

The subjects were 25 patients each of bacterial pleurisy, tuberculous pleurisy, carcinomatous pleurisy, and transudative pleural effusion. Subjects were registered until 25 cases of each disease were reached.

Methods

The pleural effusion pH of these cases was measured using litmus paper. Pleural effusion pH was compared by disease to determine whether or not it is useful for differential diagnosis.
RESULTS (Fig. 1)

Pleural effusion pH was distributed from 7.6 to 8.2 for all 4 types of bacterial pleurisy, tuberculous pleurisy, carcinomatous pleurisy, and transudative pleural effusion. The mean pH was 8.0 for all four diseases, showing no difference between 4 groups.

DISCUSSION

The normal value of pleural effusion pH is 7.6, and in case of pleurisy, both effusion and transudate are to be less than 7.61.

In case of bacterial pleurisy, particularly empyema, the pH is the lowest2,3,4,5, and a paper has been published reporting that a large number of dividing walls within the pleural cavity are created at a pH of 7.2 or less, thus leading to the indication of drainage.

Kokkola et al.6 mentioned that the value frequently becomes 7.25 or less in tuberculous pleurisy, and Houston et al.5 reported values of 7.4 or less in tuberculous pleurisy, and 7.4 or greater in carcinomatous pleurisy, thus pH becomes lower in tuberculous pleurisy when compared with in carcinomatous pleurisy. A paper has been published reporting values of 7.3 or less in both in tuberculous pleurisy and carcinomatous pleurisy. Another paper reports that in carcinomatous pleurisy, the lower (from 7.38 to 7.35 or less9) pH becomes, the worse the prognosis becomes.

Funahashi et al.10 noted higher values of 7.3 or greater in cases of transudative pleural effusion with cardiac insufficiency when compared with bacterial or tuberculous pleurisy. In the end, there may be no definite opinion regarding pleurisy and pleural effusion pH.

However, in all the cases of bacterial, tuberculous, and carcinomatous pleurisy that we have experienced, values ranged from 7.6 to 8.2 with a mean value of 8.0. Furthermore, even in transudative pleural effusion, values ranged from 7.6 to 8.2 with a mean value of 8.0, indicating an absence of specificity.

![Fig. 1. Pleurisy and pH of pleural effusion](image-url)
Reasons for the differences between this and the conventional reports may include: (1) the use of litmus paper for the measurement of pleural effusion, (2) many past reports were published 20 years ago, making differences in the level of precision between the past and the current reports.

Pleural effusion pH of bacterial pleurisy, tuberculous pleurisy, carcinomatous pleurisy, and transudative pleural effusion measured using litmus paper revealed a mean value of 8.0 in all of the 4 diseases. It was, therefore, concluded that it is impossible to differentiate pleurisy using pleural effusion pH.

REFERENCES
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