Adenosine Deaminase in Pleural Effusion

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communications to the editor

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Adenosine Deaminase in Pleural Effusion

To the Editor:

We read with interest in the February 1991 issue of *Chest* the article by Bañales and colleagues[1] on the utility of adenosine deaminase (ADA) determination in pleural effusions to discriminate between the diagnosis of pleural tuberculosis and other pathologic conditions. The authors confirm the need to include this parameter in the routine study of pleural effusions with a suspected diagnosis of tuberculosis and unknown exudates.[2-5] However, the outstanding factors were the high ADA level (70 IU/L) used as the discriminating level and the absence of empyemas and transudates in their series of 218 cases. These absences impede evaluation of the meaning of ADA in these pathologic conditions relative to the results in our experience. The authors also refer to sensitivity and specificity without mentioning the ADA level in each specified group.

Recently we prospectively analyzed 101 cases of pleural effusions (malignant, 42; paramalignant, 10; tuberculosis, 17; idiopathic, 11; cardiac, 7; ascites, 3; empyemas, 5; parapneumonic, 3; pulmonary embolism, 1; and others, 2). The ADA analysis was performed with use of the Blake-Berman and Slaates methods. Discrimination levels of ADA were studied for all pathologic conditions, for tuberculosis versus other causes, and for transudates versus exudates. The values were analyzed in terms of sensitivity and specificity. The ADA levels were also correlated with significant prognostic parameters. Statistical analysis was performed with the use of χ^2 and Fisher's exact test with Yates' correction.

The ADA levels in our cases were as follows: malignant, 13.8 ± 5.8 IU/L; paramalignant, 19 ± 11 IU/L; tuberculosis, 51 ± 14 IU/L; idiopathic, 14.2 ± 4.5 IU/L; cardiac, 6.2 ± 1.6 IU/L; ascites, 6 IU/L; empyemas, 17 ± 17.2 IU/L (identified microorganism [four cases], <40 IU/L; nonidentified organism [one case], >40 IU/L); parapneumonic, 13 ± 6 IU/L; pulmonary embolism, 12 IU/L. Significant differences were found between tuberculosis and other pathologic conditions ($p<0.001$) and between transudates and exudates ($p<0.001$). In this study, ADA levels >40 IU/L in tuberculosis showed a sensitivity of 88.8 percent and a specificity of 98.8 percent, and ADA levels <8 IU/L in transudates showed a sensitivity of 92.3 percent and a specificity of 100 percent.

Correlation between ADA levels and other parameters of prognostic value showed significant differences: pH <7.30 ($p<0.001$), glucose <60 mg/dl ($p<0.01$), lactate dehydrogenase (LDH) >1,000 U/L ($p<0.001$), and cholesterol >60 mg/dl ($p<0.05$). The ADA levels showed an inverse relation with pH and glucose and a direct relation with LDH and cholesterol levels.

On the basis of these results, we believe that (1) levels of ADA >40 IU/L in pleural fluid are highly suggestive of tuberculosis (sensitivity, 88 percent; specificity, 98.8 percent; (2) levels of ADA <8 IU/L can differentiate transudates from exudates (sensitivity, 92 percent; specificity, 100 percent); (3) ADA levels have a good correlation with parameters of significant prognosis (pH and glucose); and (4) ADA levels >40 IU/L in empyemas with unidentified organisms are suggestive of pleural tuberculosis.

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References

1 Bañales JL, Pineda PR, Fitzgerald JM, Rubio H, Selman M, Salazar-Lezama M. Adenosine deaminase in the diagnosis of tuberculous pleural effusions: a report of 218 patients and review of the literature. Chest 1991; 99:355-57
2 Ocaña I, Martinez JM, Segura RM, Fernandez ST, Capdevilla TA. Adenosine deaminase in pleural fluids: test for diagnosis of tuberculous pleural effusion. Chest 1983; 84:51-3
3 Fontan-Bueso J, Verea Hernando H, Perez-Garcia BJ. Diagnostic value of simultaneous determination of pleural adenosine deaminase and pleural lysozyme/serum lysozyme ratio in pleural effusions. Chest 1988; 93:303-07
4 Fontes Baganha M, Pêgo A, Lima MA, Gaspar EV, Robalo Cordeiro A. Serum and pleural adenosine deaminase: correlation with lymphocytic populations. Chest 1990; 97:605-10
5 Blanco Vaca F. Analysis of adenosine deaminase and its subfractions as a diagnostic parameter in tuberculous pleural effusion. Rev Clin Esp 1989; 184:7-11

To the Editor:

We appreciate the comments by Dr Peréz-Rodriguez and his colleagues on our article, and we agree with him that our cutoff is the highest being used currently. It is not surprising because in our review of the English-language literature we found many different cutoffs.[1-7] In two studies,[2-7] the method was quite different from the method of Giusti used in our research, as well as in the work of Peréz-Rodriguez et al. For this reason we think that the method should be calibrated in each region where the ADA determination would be used.

On the other hand, it has been shown that empyemas have high levels of ADA. However, the diagnosis is made at the bedside; therefore, the ADA determination is not necessary to the diagnosis.

A problem in our country, as in other developing countries, is difficulty in making a differential diagnosis among pleural effusions provoked by tuberculosis or cancer; therefore, we determined the sensitivity and specificity of diagnosis of tuberculous pleural effusions because of the difficulty in getting *Mycobacterium tuberculosis* from the pleural fluid, culture, and/or biopsy. We used the other diseases as control groups. It is well known that ADA determination cannot be used to differentiate pleural effusion from other diseases. Therefore, we do not worry about the sensitivity and specificity in the other groups.

Furthermore, in 2,251 patients in the English-language literature we found 116 false-positives (20 cases of lung cancer; 18, lymphoma; 52, empyema; 6, mesothelioma; 5, suspected tuberculosis; 4,