

Evaluation and Comparison of serum and pleural fluid procalcitonin in patients with prevalent type of pleural effusion

Abstract

Background

Pro-calcitonin (PCT) is a precursor of calcitonin hormone, comprising 116 amino acids, which is produced in thyroid neuroendocrine cells. However, in conditions such as septic shock, metastatic cancers, bacterial and fungal infections, PCT is secreted by lung neuroendocrine cells, liver cells, and leukocytes. PCT is involved in acute phase of inflammatory process as a reactant protein. Hence, in this study, serum and pleural fluid PCT was evaluated in common types of pleural effusion.

Material and Methods

Current cross-sectional study was carried out on 60 patients with pleural effusion. In this study, effusion cases due to tuberculosis, malignancy, effusion followed by pneumonia, and also transudate were investigated. Other cases of pleural effusion were excluded from this study. After collecting the samples, PCT levels in pleural fluid and serum of patients were measured and were compared statistically with respect to the primary etiology of effusion.

Results

In present study, 60 patients (10 patients with TB, 10 patients with malignancy, 10 patients with para-pneumonic, and 30 patients with transudative pleural effusion) participated in which 61.7% were men and 38.3% women ($p=0.204$). The mean age of participants was 62.68 ± 19.38 years. Results showed that mean of PCT in pleural fluid of patients with exudative effusion was 0.74 ng/ml (in malignancy 0.63 ng/ml, in TB was 0.42 ng/ml and in para-pneumonic 1.51 ng/ml) and in patients with transudative was 0.42 ng/ml. In addition, mean of PCT in the serum of patients with exudative pleural effusion was 0.74 ng/ml (in malignancy 0.65 ng/ml, in TB 0.40 ng/ml and in para-pneumonic 1.20 ng/ml) and in patients with transudative was 0.43 ng/ml. The analyzed data showed that there was a significant difference in the pleural fluid PCT ($p=0.016$) and serum ($p=0.009$) of patients with pleural effusion transudate and exudates. After excluding patients with transudative, a significant difference among patients with exudative was also observed in such a way that in the para-pneumonic group the amount of PCT serum level and pleural fluid was more than tuberculosis and malignancy groups.

Conclusion

Serum and pleural fluid PCT is increased as a marker in response to inflammation. Although its increase in patients with bacterial and pneumonia infection is significant, it can be increased in patients with secondary inflammation of tuberculosis or malignancy and consequently, it can be used as an inflammatory indicator in the evaluation of patients with pleural effusion.

Keywords: procalcitonin, pleural fluid, pleural effusion