Original Research Paper

Volume-8 | Issue-10 | October-2018 | PRINT ISSN No 2249-555X

Pulmonary Medicine

THE USEFULNESS OF PLEURAL FLUID URIC ACIDAND ITS RATIO TO SERUM URIC ACID LEVELS IN CLASSIFYING PLEURAL EFFUSIONS AS EXUDATES AND TRANSUDATES AND ITS CORRELATION WITH LIGHT'S CRITERIA

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ABSTRACT

INTRODUCTION

Pleural effusion is a very common clinical presentation of diseases. A correct diagnosis of the underlying disease is essential for the management of pleural effusion. Many criteria have been used to distinguish them, but none of them have been found to be satisfactory. Light's criteria is the most commonly used method.

AIMS AND OBJECTIVES

To evaluate the advantages of Total Pleural fluid Uric acid and its ratio to Serum Uric acid levels in classifying Pleural Effusions as Exudates or Transudates.

MATERIALS & METHOD

This study is to be conducted among 60 patients with pleural Effusion, attending the Department of Medicine & Department of Thoracic Medicine in Govt. Rajaji Hospital, Madurai.

RESULT

By applying Pleural fluid Uric acid in patients with transudativee pleural effusion classified clinically, 96.3 % of the cases were correctly diagnosed as transudativee pleural effusion.

CONCLUSION

From our study we came to known that there was statistically significant criteria [p value<0.001] in classifying pleural effusion as exudates and transudates by using pleural fluid uric acid and pleural fluid/serum uric acid ratio.

KEYWORDS : Pleural Fluid Uric acid, Exudates, Transudates

INTRODUCTION:

Pleural effusion is a very common clinical presentation of diseases. A correct diagnosis of the underlying disease is essential for the management of pleural effusion. A limited number of diseases cause Transudative Pleural Effusion,

whereas exudative effusions require more extensive diagnostic investigations.

Therefore, the first step is to classify them as transudates or exudates, even if this differentiation does not contribute to the etiological diagnosis. Hence, there is a need to find new parameters which will prove to be superior or supportive to the various investigations available at present.

AIMS AND OBJECTIVES

To evaluate the advantages of Total Pleural fluid Uric acid and its ratio to Serum Uric acid levels in classifying Pleural Effusions as Exudates or Transudates.

MATERIALS AND METHODS

STUDY POPULATION

This study is to be conducted among 60 patients with pleural Effusion, attending the Department of Medicine & Department of Thoracic Medicine in Govt. Rajaji Hospital, Madurai.

INCLUSION CRITERIA

In Patients with clinical and radiological evidence of pleural effusion irrespective of etiology, both sex
Age > 12 years

EXCLUSION CRITERIA

Age less than 12 years
Pregnancy
Gout
Hemothorax

LABORATORY INVESTIGATIONS

1. Pleural fluid Uric acid & Serum Uric acid
2. Pleural fluid total protein & Serum Protein
3. Pleural fluid LDH & Serum LDH

DESIGN OF STUDY

Prospective analytical study

RESULTS AND INTERPRETATION

Age and sex distribution of the population in our study is as follows 41.67% of the study subjects were in the age group of 56-70yrs, 35% were in the age group of 41-55yrs, 18.2% were less than 40 years and 5.07% above 70 years. Majority of the study subjects were males 60% while remaining 40% were females.

Exudates and transudates distribution in our study is as follows: In our study about 55% of the study subjects were exudates while 45% were transudates.

Among the study group, about 33.3 % of study groups have tuberculosis, 15 % have malignancy and6.7 % have parapneumonic effusions.15% were CCF,15% were CKD and the remaining 15% were Hepatichydrothorax.

RESULTS

By applying Light's criteria in patients with exudative pleural effusion classified clinically, 78.8% % of the cases were correctly diagnosed as exudative pleural effusion.

By applying Pleural fluid Uric acid in patients with exudative pleural effusion classified clinically, 90.9% of the cases were correctly diagnosed as exudative pleural effusion.

According to Pleural fluid/Serum Uric acid ratio, patients with exudative pleural effusion classified clinically, 96.9% of the cases were correctly diagnosed as exudative pleural effusion.

In our study by applying the Lights criteria, about 21.2 % of exudative pleural effusion was misclassified as transudative, and by applying Pleural fluid Uric acid, the misclassification was 9.1% .Whereas by Pleural fluid / Serum Uric acid ratio, the misclassification was only 3.10 %.

By applying Light's criteria in patients with transudative pleural effusion classified clinically, 85.2 % of the cases were correctly diagnosed as transudative pleural effusion.

By applying Pleural fluid Uric acid in patients with transudative pleural effusion classified clinically, 96.3 % of the cases were correctly diagnosed as transudative pleural effusion.

According to Pleural fluid / Serum Uric acid ratio , in patients with transudative pleural effusion classified clinically, 92.6 % of the cases were correctly diagnosed as transudative pleural effusion.

DISCUSSION

One of the most common disease entity encountered by physicians worldwide is pleural effusion. In a situation where undiagnosed pleural effusion has come across, the first and foremost thing to be determined is whether the fluid is a transudate or exudate. The most commonly used Light's criteria, though still considered as a gold standard, often misclassify a 25% of transudate as exudate in certain situation like congestive cardiac failure following diuretic therapy and in patient with pulmonary TB with hypoproteinemia. The present study was undertaken to evaluate the efficacy of pleural fluid Uric acid and its ratio to serumlevels, in distinguishing pleural fluid transudates and exudates and its correlation with Light's criteria and was found to be more useful in these situations.

Metintas et al[15] reported that levels of uricacid is increase more in transudative pleural fluid (CCF, peritoneal dialysis, cirrhosis and nephrotic syndrome) than as comparatively to exudative condition. In exudative condition the local factors influencing the accumulation of pleural fluid are altered. Exudates involve increased capillary permeability and lymphatic obstruction.

Whereas transudates are the result of changes in hydrostatic forces [imbalances in hydrostatic and oncotic forces], with capillary permeability remaining normal".

The condition which produces transudative pleural effusion exerts much oxidative stress and hypoxia in the tissue .It is stated that increases in uric acid may be found in clinical conditions associated with tissue hypoxia.

Uzen et al[9] had shown that the mean pleural fluid uric acid levels vary significantly between exudates and transudates with the specificity and sensitivity of pleural fliud uric acid for diagnosis of transudative effusion being73% and 80.6% respectively,

BasanthaHazarika et al[15] reported that the increase uric acid level was observed in pleural fluid of transudative pleural effusion than exudative pleural effusion and the optimum cut off level for pleural fluid uricacid was 5.35mg/dl with sensitivity of 89.32% and specificity of 92.60%. Ashish Jain1, Raina Jain et al reported that"increase Uric acid level was observed in pleural fluid of transudative pleural effusion than exudative pleural effusion". It was also observed that the" level of uric acid was more in pleural fluid than serum and ratio (pleural fluid / serum) of uric acid was ≥1 in transudative conditions but in case of exudative condition the this ratio was < 1". The optimum cut-off level for P uric acid was 5.5 mg/dl with sensitivity of 94.00% and specificity of 83.00%. The optimum cut-off levels for P/S uric acid ratio was 1.0 with sensitivity of 96.00% and specificity of 92.16%. In our study to diagnose transudate the following parameters are used

- A pleural fluid Uric acid of more than 5.45 IU
- A pleural fluid Uric acid to serum Uric acid ratio of more than 0.45,
- A pleural fluid total protein less than 3.03mg
- A pleural fluid protein to serum protein ratio less than 0.49

According to Pleural fluid/Serum Uric acid ratio, patients with exudative pleural effusion 96.9% of the cases were correctly diagnosed as exudative pleural effusion.

CONCLUSION:

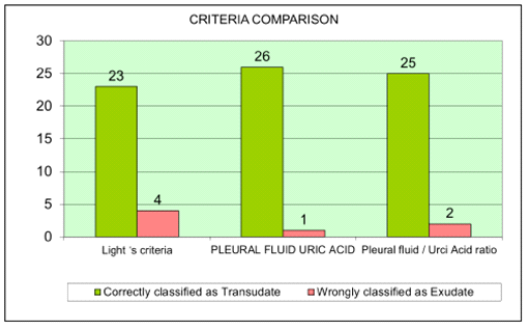
From our study we came to a conclusion that to classify transudative pleural effusion from a exudative pleural effusion most specific test is pleural fluid uric acid and most sensitive test is pleural fluid / serum uric acid ratio .

The positive predictive value, negative predictive value and diagnostic accuracy is higher for pleural fluid uric acid.

To conclude, though Light's criteria remains as gold standard to differentiate transudates and exudates, in cases where there is a mismatch between clinical diagnosis and the outcome from Light's criteria, pleural fluid Uric acid / serum Uric acid ratio and pleural fluid uric acid evaluation may add to the diagnostic accuracy.

Clinical classification	Frequency	Percent
Exudates	33	55.00
Transudates	27	45.00
Total	60	100.00

Criteria	Correctly classified as transudate N (%)	Wrongly classified as exudate N (%)
Light 's criteria	23 (85.2%)	4 (14.8%)
PLEURAL Fluid Uric Acid	26 (96.3%)	1 (3.7%)
Pleural fluid / Serum Uric acid Ratio	25 (92.6%)	2 (7.4%)



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