IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)
e-ISSN: 2279-0853, p-ISSN: 2279-0861.Volume 16, Issue 8 Ver. IX (Aug. 2017), PP 84-86
www.iosrjournals.org

The Usefulness of Pleural Fluid Alkaline Phosphatase And Its Ratio To Serum Alkaline Phosphatase Levels in Classifying Pleural Effusions As Exudates And Transudates And Its Correlation with Light's Criteria

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Abstract:
Aims And Objectives: *To evaluate the advantages of Total Pleural fluid Alkaline Phosphatase(ALP) and its ratio to Serum Alkaline Phosphatase levels in classifying Pleural Effusions as Exudates or Transudates.*
Materials & Methods: *This study is to be conducted among 60 patients with pleural Effusion , attending the Department of Medicine & Department of Thoracic Medicine in Govt. RajajiHospital, Madurai.*
Result: *"By applying Light's criteria in patients with exudative pleural effusion classified clinically, 81.8% % of the cases were correctly diagnosed as exudative pleural effusion.*
By applying Pleural fluid Alkaline phosphatase in patients with exudative pleural effusion classified clinically, 87.8% of the cases were correctly diagnosed as exudative pleural effusion. Among the parameters used most specific test to classify an exudative pleural effusion from a transudative pleural effusion is pleural fluid total protein which is 95.45 % and most sensitive test is pleural fluid / serum alkaline phosphatase ratio which is 93.90 %. The positive predictive value, negative predictive value and diagnostic accuracy to classify an exudative pleural effusion from a transudative pleural effusion is higher for pleural fluid total protein which is 96.29 % , 95.23 % , 94 % respectively .
Conclusion: *For many decades Light's criteria had been used widely to differentiate exudative from transudative pleural effusion. But it also misclassified 25 % of transudates as exudates, so there was a need to identify new parameters which would prove to be superior or supportive to the array of tests at present. From our study we came to known that there was no statistically significant difference among various criteria in classifying pleural effusion as exudates and transudates.*
Keyword: *Pleural Fluid Alkaline Phosphatase in Exudates*

Date of Submission: 12 -07-2017 Date of acceptance: 23-08-2017

I. 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. 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. It was found that even Light's criteria misclassified a large number of effusions - 25% of transudates as exudates. Hence, there is a need to probe into new parameters which will prove to be superior or supportive to the various investigations available at present. Many other biochemical markers like bilirubin, cholesterol, alkaline phosphatase etc. can be taken into consideration. Hence, this study is done to evaluate the efficacy of Total Pleural fluid Alkaline Phosphatase (ALP) and its ratio to Serum Alkaline Phosphatase levels in classifying the Pleural Effusion as Exudate or Transudate and its correlation with Light's criteria.

II. Methodology

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
- Prgnancy
- Jaundice
- Bone lesions"

A Brief history with clinical examination will be done.Detailed Clinical Examination , Pleural fluid alkaline phosphatase, Serum alkaline phosphatase ,Pleural fluid total protein, Serum total protein , Pleural & SerumLDH are estimated. Patients with clinical and radiological evidence of pleural effusion are to be included in the study.Then they are classified in to exudates and transudates on the basis of the clinical , radiological and biochemical evaluation .In all the patients following investigation are done to classify them as exudates and transudates.Pleural fluid alkaline phosphatase & Serum alkaline phosphatase,Pleural fluid total protein are estimated and the patients are classified in to exudates and transudates. Then the patients are classified in to exudates and transudates on the basis of Light's criteria.Now the classification of exudates and transudates done on the basis of Pleural fluid alkaline phosphatase & Serum alkaline phosphatase is compared with results of the classification of exudates and transudates done on the basis of Light's criteria.Sensitivity, specificity , Positive predictive value , negative predictive value , diagnostic accuracy of each tests are calculated.

Design Of Study

Prospective analytical study

Analysis: Statistical analysis.

II. Results

By applying Light's criteria in patients with exudative pleural effusion classified clinically, 81.8% of the cases were correctly diagnosed as exudative pleural effusion. By applying Pleural fluid Alkaline phosphatase in patients with exudative pleural effusion classified clinically, 87.8% of the cases were correctly diagnosed as exudative pleural effusion. According to Pleural fluid/Serum Alkaline phosphatase ratio, patients with exudative pleural effusion classified clinically, 93.9% of the cases were correctly diagnosed as exudative pleural effusion. In our study by applying the Lights criteria, about 18.28 % of exudative pleural effusion was misclassified as transudative, and by applying Pleural fluid alkaline phosphatase and Pleural fluid , the misclassification was 12.2% and 25 % respectively. Whereas by Pleural fluid / Serum alkaline phosphatase ratio , the misclassification was only 3.58 %. By applying Light's criteria in patients with transudative pleural effusion classified clinically , 90.90 % of the cases were correctly diagnosed as transudative pleural effusion. By applying Pleural fluid alkaline phosphatase in patients with transudative pleural effusion classified clinically , 86.36 % of the cases were correctly diagnosed as transudative pleural effusion. According to Pleural fluid / Serum alkaline phosphatase ratio , in patients with transudative pleural effusion classified clinically, 90.90 % of the cases were correctly diagnosed as transudative pleural effusion. Among the parameters used most specific test to classify an exudative pleural effusion from a transudative pleural effusion is pleural fluid total protein which is 95.45 % and most sensitive test is pleural fluid / serum alkaline phosphatase ratio which is 93.90 %. The positive predictive value, negative predictive value and diagnostic accuracy to classify an exudative pleural effusion from a transudative pleural effusion is higher for pleural fluid total protein which is 96.29 % , 95.23 % , 94 % respectively. The sensitivity, specificity, positive predictive value, negative predictive value and diagnostic accuracy of Light's criteria are 85.71 % , 90.90 % , 92.30 % , 83.33 % , 88 % respectively

Criteria	Correctly classified as transudate N (%)	Wrongly classified as exudate N (%)
Light 's criteria	24 (88.8%)	3 (11.2%)
PLEURAL FLUID ALKALINE PHOSPHATASE	25 (92.5%)	2 (7.5%)
Pleural fluid / Sr Alkaline Phosphatase Ratio	24 (88.8%)	3 (11.2%)

Descriptive statistics	Pleural Fluid Protein (gm/dl)	PLEURAL FLUID ALKALINE PHOSPHATASE mg/dl		
Mean	**3.04**	**0.43**	**0.61**	**49.98**
Standard Deviation	0.53	0.121	0.14	19.69
Minimum	2.1	0.2	0.32	16
Maximum	4.4	0.61	0.9	80

Criteria	Correctly classified as Exudate N (%)	Wrongly classified as Transudate N (%)
Light 's criteria	27	6
PLEURAL FLUID ALKALINE PHOSPHATASE	29	4
Pleural fluid / Sr Alkaline Phosphatase Ratio	31	2

III. Discussion

One of the most common disease entity encountered by physicians worldwide is pleural effusion . In a situation where undiagnosed pleural effusion has come upon, the first and foremost thing to be resolved is whether the fluid is a transudate or exudate. The most frequently used Light's criteria, though still considered as a gold standard, often misclassify a transudate as an exudates. The present study was undertaken to evaluate the efficacy of pleural fluid alkaline phosphatase and its ratio to serum levels, and pleural fluid total protein in distinguishing pleural fluid transudates and exudates and its correlation with Light's criteria".

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