DIAGNOSIS OF PLEURAL EFFUSIONS

Pages with reference to book, From 178 To 179

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ABSTRACT

Sixty patients of pleural effusion with different aetiology are described. Various microbiological and biochemical parameters were done simultaneously in blood and pleural fluid to differentiate tuberculosis and non-tuberculosis effusions. Some biochemical tests were thought to be helpful in differential diagnosis but no single parameter was found diagnostic. Routine investigations of pleural fluid, sputum and pleural biopsy still remain the best method of diagnosis (JPMA:42, 178, 1992).

INTRODUCTION

Pleural effusion caused by number of diseases, poses a common diagnostic problem[1-4] and a fair number of cases remain undiagnosed inspite of extensive investigations. This is particularly true for cases other than congestive cardiac failure and cirrhosis where cause is evident. Inspite of extensive research the distinction between tuberculosis and non- tuberculosis effusions remain hazy. In Pakistan, where tuberculosis is a common problem, majority of cases are treated as tuberculosis, not only those that are suggestive of tuberculosis but also those in which no cause can be determined[5,6]. This study -was designed to develop a criterion (if possible) to differentiate tuberculosis from non-tuberculosis effusions by using different microbiological and biochemical parameters.

PATIENTS AND METHODS

A total of 60 patients with pleural effusions admitted Centre, Karachi were studied. Their detailed clinical history and relevant demographic data was recorded on a specially designed proforma. The samples of the blood and pleural fluid were drawn simultanously and subjected to analysis within the minimum possible time (not exceeding 48 hours). Each specimen was analysed for proteins, lactate dehydrogenase, sugar and alkaline phosphatase. Sputum and pleural fluid was examined for AFB on direct smear and culture. In addition cytology was performed on pleural fluid and blood examined for CP and ESR.

RESULTS

Of 60 patients examined, 40 (66.7%) had tuberculosis, 9 (15%) malignancy, 8 (13.3%) cirrhosis of the liver and 3 congestive cardiac failure. Sugar levels were low in tuberculosis as compared to malignancy and cirrhosis. Pleural fluid lactate dehydrogenase values were higher than the serum levels in malignant effusions whereas serum lactate dehydrogenase levels were elevated in cirrhosis. Protein levels were higher in tuberculosis and ‘malignancy than in cirrhosis. Alkaline phosphatase levels in blood were low in tuberculosis as compared to cirrhosis and malignancy (Table I).

TABLE I. Blood and pleural fluid values in tuberculosis, malignancy and cirrhosis.

Disease		Sugar (mg/dl)		LDH (mIU/L)		Protein (G/L)		ALP (mIU/L)	
		Blood	PF	Blood	PF	Blood	PF	Blood	PF
Tuberculosis									
	Mean±S.D.	87.40±23.50	62.60±40.60	185.14±194.40	178.30±237.20	69.70±10.40	48.70±15.30	27.9±12.20	12.08±9.98
	S.E.	4.50	7.82	42.44	40.60	14.30	2.50	3.48	2.76
	Range	41-135	0-160	23-703	7.2-888	40-93	12-84	3-49	2-38
Malignancy									
	Mean±S.D.	98.61±29.61	86.51±55.42	146.40±100.30	216.80±180.20	65.60±6.80	43.00±6.50	67.50±24.84	13.40±7.52
	S.E.	9.87	18.47	37.99	63.67	2.20	2.10	10.13	3.36
	Range	50-140	5.6-200	46-292	27-492	50-76	28-51	37-110	2-25
Cirrhosis									
	Mean±S.D.	102.00±38.40	83.10±45.80	208.50±133.40	105.00±128.90	49.50±22.10	28.7±21.60	55.30±17.90	14.00±10.70
	S.E.	15.73	17.34	54.44	52.61	7.80	7.60	10.30	6.18
	Range	56-180	10-170	22-352	9-388	2-78	1.2-67	30-68	2-28

Pleural fluid/blood ratio for sugar was low (Table II)

TABLE II. Ratio (pleural fluid/blood) of different biochemical parameters for tuberculosis and non-tuberculosis effusions.

Type of effusion	Sugar	Lactate dehydrogenase	Proteins	Alkaline Phosphatase
Tuberculosis	0.72	0.96	0.70	0.43
Malignancy	0.88	1.48	0.66	0.20
Cirrhosis	0.81	0.47	0.58	0.25

in tuberculosis as compared to malignancy and cirrhosis. Lactate dehydrogenase was higher in tuberculosis than in cirrhosis and lower than in malignancy. Alkaline phosphatase ratio was higher in tuberculosis than in malignancy and cirrhosis. Sputum examinations were not always positive, nor was AFB seen in pleural fluid in all the tuberculosis patients. Even tuberculin test was not very helpful in confirming the diagnosis.

DISCUSSION

Over the past hundred years various chemical tests have been described to distinguish tuberculosis from non-tuberculosis effusions. Historically based on the protein levels and specific gravity, the pleural fluid effusions were classified into transudates and cxudates[7,8]. Laullen and Carr found that 72% patients of congestive cardiac failure had specific gravity below 1.0 16 whereas 73% of the tuberculosis and malignancy above 1.016[9]. Later protein levels of 3.0 gram per 100 ml were taken as a dividing line and was found slightly better in differentiating transudates and exudates[10]. Furabashi and Sarkar[11] have suggested pH measurements of less than 7.28 in the non-malignant and inflammatory effusions. Pleural fluid and serum protein ratio was suggested by Luetschers[12]. Higher pleural fluid lactate dehydrogenase values than serum were reported by Wrobeiski and Wrobeiski[13]. Light and co-workers developed a criterion for the diagnosis of exudates as pleural fluid to serum protein ratio of more than 0.5 pleural fluid lactate dehydrogenase levels of more than 200 units per litre and pleural fluid to serum lactate dehydrogenase ratio of above 0.6 which has become a standard[14]. Pleural fluid and serum bilirubin ratio of over 0.6 has also been suggested[15]. Though the differentiation between transudates and exudates narrows such possibilities, distinction between tuberculosis and non-tuberculosis effusions is still not clear. Lower levels of sugar among tuberculosis effusions as compared to serum but normal in malignancy and cirrhosis, are consistent with the previous studies Pleural fluid lactate dehydrogenase levels were elevated in both tuberculosis and malignancy but levels in

malignancy were much higher which in the presence of normal or low level of proteins is also consistent with the malignant effusions[14]. Elevated lactate dehydrogenase levels in malignant pleural fluid than in serum is in agreement with Wrobeiski[13]. Pleural fluid/serum ratio for lactate dehydrogenase in tuberculosis is higher in comparison to cirrhosis and low in malignancy. The alkaline phosphatase ratio in tuberculosis is higher as compared to malignancy and cirrhosis. Though this study compares well with the previous studies, the parameters studied do not confirm the diagnosis. The determination of lactate dehydrogenase and alkaline phosphatase may help to differentiate tuberculosis from malignant effusions but are not diagnostic. The pleural fluid/blood ratio for lactate dehydrogenase and alkaline phosphatase may also contribute. In the absence of any diagnostic parameter, the routine investigations of pleural fluid, sputum and pleural biopsy for direct smear and culture remains important in the workup of tuberculosis effusions. Some encouraging results have been reported when all investigations are undertaken[16]. Recent advances in molecular biology of the DNA hybridization with polymerase chain reaction promises to be a great advance, but is not yet available for the routine laboratory investigations[17].

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