

DIAGNOSTIC SIGNIFICANCE OF PROTEIN CONCENTRATION IN SEROUS FLUIDS

V. K. G. PILLAY, M.B., CH.B. (NATAL), Registrar, King Edward VIII Hospital, Durban, and
Department of Medicine, University of Natal

The concentration of protein in a serous fluid is often used to differentiate an exudate from a transudate. An accepted level of total protein for this differentiation is 3 G. per 100 ml., a higher level denoting an exudate and a lower level a transudate. We have found this method not altogether reliable in a hospital population characterized by abnormalities of serum proteins.^{1,3} Since there is a relationship between proteins in the serum and in partition fluids,^{4,6} it was thought that the accuracy of distinguishing an exudate from a transudate might be improved if allowance were made for the serum levels of protein. The present investigation was undertaken to elucidate this point.

MATERIAL AND METHODS

The patients selected for study were those who had pleural or peritoneal effusions which on aspiration were neither turbid nor blood-stained. There were 64 patients with tuberculous pleural effusions, 20 with tuberculous peritonitis, 23 with cirrhosis of the liver, and 57 in cardiac failure — 22 with pleural effusions and 35 with ascites. The diagnosis in each instance was made on evidence other than the protein concentration of the fluid. A specimen of serous fluid and blood was collected from each patient at the same time, and the total protein concentration was estimated simultaneously in the serous fluid and the serum by a biuret procedure.⁷

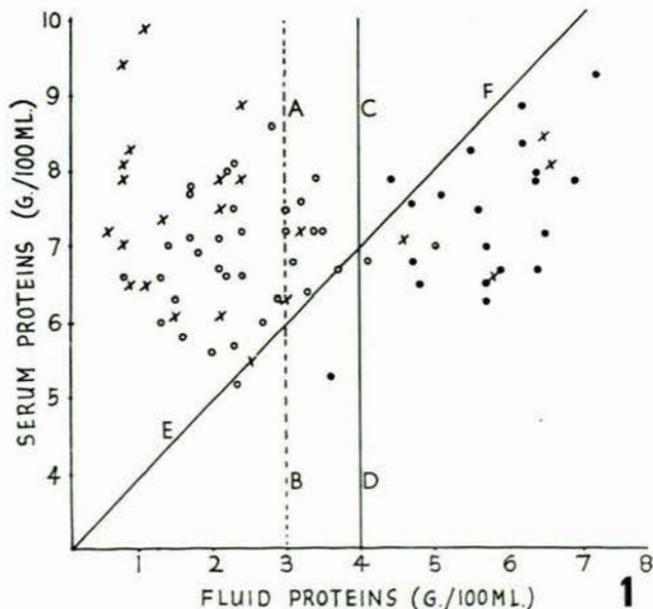


Fig. 1. Findings in ascitic fluid of various patients (● = those with tuberculosis, O = those with cardiac failure and × = those with cirrhosis of the liver).

TABLE IV. TUBERCULOUS PLEURAL EFFUSION

Concentration of protein in serum (G./100 ml.)	Concentration of protein in pleural fluid (G./100 ml.)										
	2·5-3	3-3·5	3·5-4	4-4·5	4·5-5	5-5·5	5·5-6	6-6·5	6·5-7	7-7·5	7·5-8
5-5·5	1			1							
5-5-6		1		2							
6-6·5		2	1	2	2	1					
6-5-7			2	2	3		1				
7-7·5				2		5	1				
7-5-8						7	5				
8-8·5						4	3	3	1		
8-5-9							2	2	2		
9-9·5						1				1	1
9-5-10											1

TABLE V. CARDIAC FAILURE PLEURAL EFFUSION

Concentration of protein in serum (G./100 ml.)	Concentration of protein in pleural fluid (G./100 ml.)						
	0·5-1	1-1·5	1·5-2	2-2·5	2·5-3	3-3·5	3·5-4
5-5·5							
5-5-6		1				1	1
6-6·5	2			1	1	1	
6-5-7	2	4	1	1			
7-7·5			1	1		1	
7-5-8							
8-8·5			1			1	
8-5-9					1		
9-9·5					1		

CONCLUSIONS AND SUMMARY

1. The differentiation of an exudate from a transudate by the conventional dividing line of protein concentration

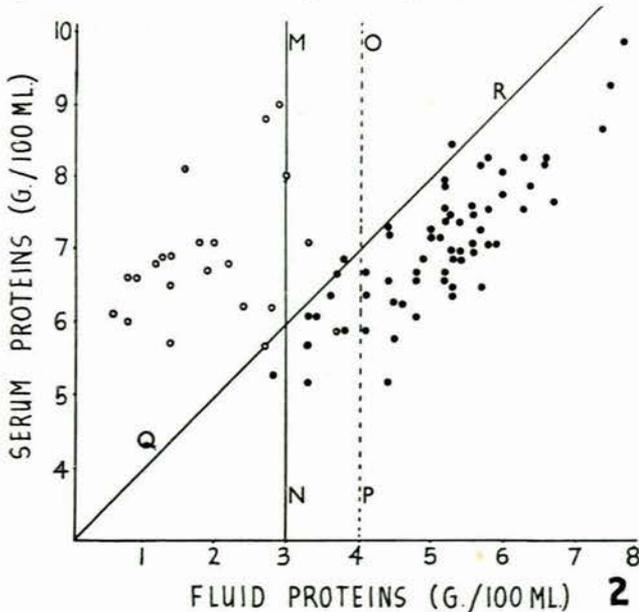


Fig. 2. Findings in pleural fluid of various patients (● = those with tuberculosis and ○ = those with cardiac failure).

of 3 G. per 100 ml. is efficient for pleural effusions. This accords with the results of other workers.⁸

2. The dividing line of 4 G. per 100 ml. will give satisfactory distinction between an inflammatory exudate and the transudate of cardiac failure in ascitic fluid.

3. The dividing line obtained by the equation: total proteins in the fluid in G. per 100 ml. = total serum proteins in G. per 100 ml. - 3, is fairly accurate in distinguishing an exudate from a transudate in both peritoneal and pleural effusions. This equation makes allowance for the serum levels of protein.

4. No satisfactory dividing line has been found in this investigation to distinguish cirrhosis of the liver from the other causes of ascites.

I should like to thank Proff. J. V. O. Reid and E. B. Adams for their advice, Dr. S. M. Joubert and the Department of Chemical Pathology for the protein estimations, and the Superintendent of King Edward VIII Hospital, Dr. T. M. Adnams, for permission to publish.

REFERENCES

1. Abramson, J. H., Gampel, B., Scotch, N. and Slome, C. (1960): *Brit. J. Prev. Soc. Med.*, **14**, 190.
2. Powell, S. J. (1958): *S.Afr. J. Lab. Clin. Med.*, **4**, 273.
3. Joubert, S. M., Hookins, K. W. and Hunter, W. G. (1959): *Ibid.*, **5**, 1.
4. Antonaci, B. L. and Macagnino, G. (1957): *Acta med. Scand.*, **159**, 133.
5. Freeman, T. and Joeke, A. M. (1955): *Ibid.*, **153**, 243.
6. Bohle, E. and Schmitt, A. (1957): *Z. klin. Med.*, **154**, 358.
7. Weichselbaum, T. E. (1946): *Amer. J. Clin. Path.*, **7**, 40.
8. Carr, D. T. and Power, M. H. (1958): *New Engl. J. Med.*, **259**, 926.