

Glucose levels in pleural fluids of effusive pleural diseases

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Abstract

Background: Pleural effusion is accumulation of excess pleural fluid in the pleural space. The effusion may be caused by infectious, malignant and non malignant diseases. **Objective:** The aim of present study was to evaluate the pleural fluid glucose levels in the patients of pleural effusion due to various causes. **Material and methods:** This was an observational cross sectional study. Patients attending chest clinic of Nair hospital with finding of pleural effusion were included in the study. The pleural fluid was processed for estimation of glucose. **Results:** In the study, 63 patients were included. Tuberculosis was the most common cause of pleural effusion among the patients. Glucose content in pleural fluid was significantly decrease in tuberculosis, synpneumonic effusion, empyema and malignant effusion. **Conclusion:** The finding of low glucose levels may indicate a complication of bacterial infection or malignancy.

Key Word: Pleural effusion, Glucose estimation, empyema, tuberculosis, malignant effusion, O Tolidine test

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INTRODUCTION

Glucose in the pleural fluid has been studied to find out the cause of pleural effusion in the past. In empyema and synpneumatic effusion glucose concentration is reported by Peterson¹, Gelenger², Vienna³ and potte⁴. Low glucose levels in serous effusion are a result of glycolysis by a higher number of cells in the fluid⁵. This also occurs due to abnormal pleural membrane due to tumour or fibrosis which results in impaired glucose transfer from blood to pleural fluid⁶. Previous studies^{7,8,2} concerning the usefulness of pleural fluid glucose levels in differentiating causes of pleural effusion have been conflicting. Calnan⁷ and Barber⁸ concluded that for lower the level of pleural

fluid glucose, the more likely cause was tuberculosis and that tuberculosis was unlikely if the pleural fluid glucose level more than 80mg/ml. Gelender² concluded that the pleural fluid glucose levels were not useful in the differential diagnosis of pleural effusion. More of the effusion with glucose levels less than 60mg/100ml were neoplastic rather than tuberculous origin in a study⁹. Light reported that in majority of tuberculous pleural fluid the glucose concentration was high (81.7mg/dl) rather than low⁹. Low pleural fluid glucose concentration in empyema and Synpneumonic effusion was reported by Peterson¹, Gelenger², Carr¹⁰ and Vienna⁴. Clarkson⁵ reported low glucose levels in six out of nine patients of malignant pleural effusion. The present study was aimed to evaluate the serum as well pleural fluid levels of glucose in patients with pleural effusion.

METHODOLOGY

It was a descriptive cross sectional study. Patients with findings of pleural effusion irrespective of who attended Chest OPD and were admitted in the wards of BYL Nair Charitable Hospital, Mumbai, were the study population. Patients attending chest clinic with evidence of pleural fluid in lungs on radiological examination, of both gender

and all age groups, irrespective of co morbidities were included in the study. Patients as well as control's blood and pleural fluid weresubjected for estimation of glucose. The blood sample was collected in fluoride bulb in the

morning after 12-14 hours of fasting during the night. O Toluidine test was used for estimation of Glucose in pleural and blood.

RESULTS

The study included a total of 63 patients with pleural effusion, of which 45 were males and 18 were females.

Table 1: Distribution of Age And Sex

Age	Males	Females	Total	Percentage
11-20 yrs	2	2	4	6.35
21-30 yrs	18	10	28	44.44
31-40 yrs	14	3	17	26.98
41-50 yrs	8	1	9	14.29
51-60 yrs	3	2	5	7.94
Total	45	18	63	

The age group of 21-30 (28, 44.44%) followed by 31-40 (17, 26.98) years had majority of study population (Table no.1).

Table 2: Distribution of cases in different diseased groups

S. no	Diseases	No of patients	Percentage
1	Tuberculosis	29	46.03
2	Nephrotic syndrome	7	11.11
3	Bacterial empyema	7	11.11
4	Malignant effusion	5	7.94
5	Synpneumonic effusion	5	7.94
6	Pseudopancreatci cyst	5	7.94
7	Cirrhosis of liver	5	7.94
	Total	63	

Upon diagnosis of the cause of pleural effusion, it was observed that Tuberculosis (46%) was the most common cause of effusion (Table no. 2).

Table 3: Pleural fluid glucose levels in different diseased groups

S. no	Diseases	No of patients	Lowered		Normal/raised		
			Number	Mean	Number	Mean	SD
1	Tuberculosis	29	20	20	9	88.5	20
2	Nephrotic syndrome	7	1	52	6	80	10.4
3	Bacterial empyema	7	6	49	1	80	10.3
4	Malignant effusion	5	4	58	1	76	2
5	Synpneumonic effusion	5	3	59	2	78	14
6	Pseudopancreatci cyst	5	1	58	4	80	8.8
7	Cirrhosis of liver	5			5	96	5.3

Table no 3 shows pleural fluid glucose levels in different disease groups. In the present study, pleural fluid concentration of glucose in malignancy, empyema and synpneumonic effusion is low.

DISCUSSION

Glucose estimation is not done for categorizing the nature of pleural fluid into transudates or exudates. However, the pathology behind the pleural effusion does influence the glucose levels in the pleural fluid. In the present study, it was found that the majority of patients were suffering from tuberculosis. In studies conducted by Lueallen¹¹, tuberculosis was found to be the most common cause of pleural effusion. However, Hirsch¹² and Finney¹³ observed the most common cause of pleural effusion to be carcinoma followed by tuberculosis. Thus, tuberculosis and carcinoma are the major causes of

pleural effusion. In the present scenario, Tuberculosis was more common, which might be reflection of higher prevalence of tuberculosis in Indian community. Upon glucose estimation of the pleural fluid (Table no. 3), it was observed that pleural fluid concentration of glucose in malignancy, empyema and synpneumonic effusion is low. This finding is confirmed with the work done by Peterson¹, Geleger², Carr¹⁰ and Vienna⁴. It was further observed that the pleural fluid glucose concentration in tuberculosis is very low in majority of patients (68.9%), which is in agreement with Light⁹. Low glucose levels in serous effusion occur as a result of glycolysis by

increased number of cells in the fluid⁵. Thus, the findings of previous studies are supported the findings of the present study.

CONCLUSION

Glucose content in pleural fluid is significantly decreased in tuberculosis, synpneumonic effusion, empyema and malignant effusion. The finding of low glucose levels may indicate a complication of bacterial infection or malignancy.

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