

PLEURAL FLUID GLUCOSE

By S. C. Poh

SYNOPSIS

The glucose concentration in the pleural fluid was measured in 26 cases of pleural effusion. Five out of 14 cases of tuberculous effusion and five out of 10 cases in which pleural effusion was associated with malignancy had decreased pleural fluid glucose. The estimation of glucose in the pleural fluid is not of great clinical value in distinguishing tuberculous from malignant effusions.

INTRODUCTION

Reports suggest that a low concentration of glucose in the pleural fluid is of value in differentiating various causes of pleural effusions. Decreased pleural fluid glucose concentration has been reported in tuberculosis (Barber *et al*, 1957, Calnan *et al*, 1951, Gelenger and Wiggers 1949, Russakoff *et al*, 1962), rheumatoid disease (Carr and Power, 1960, Carr and Mayne 1962), empyema (Berger and Maher 1971) and malignancy (Glenert 1962, Sochocky 1966, Berger and Maher 1971). This report describes the frequency of decreased pleural fluid glucose concentration in a series of 26 cases of pleural effusion admitted to the wards of one of the chest units of the Tan Tock Seng Hospital.

A concentration of 60 mg. per 100 ml. or less of glucose in the pleural fluid was arbitrarily defined as a decreased glucose concentration. Blood samples were obtained simultaneously with the pleural aspiration and the glucose concentration determined by the method of Folin and Wu. The diagnosis in cases of malignancy was confirmed by pleural biopsy or by the presence of malignant cells in the fluid or at autopsy. Tuberculous effusions were confirmed by bacteriological culture of the pleural fluid or by pleural biopsy. Patients with diabetes mellitus were excluded from the study.

RESULTS

Of the total of 26 cases investigated, 14 were due to tuberculosis, 10 were associated with malignancy and one each was due to empyema and cirrhosis of the liver.

There was no correlation between the glucose concentration in the pleural fluid and the protein

content, the presence of blood, leucocyte count or type, or malignant cells in the fluid. Neither was there any clinical correlation between the size of the effusion and the low glucose concentration.

The diagnosis, glucose concentration in the pleural fluid and blood and the size of the effusion of the 11 patients with a decreased glucose concentration are presented in Table I. Five of the 14 tuberculous effusions had a decreased glucose concentration ranging from less than 20 mg. to 58 mg. per 100 ml. The one case of empyema (due to *K. aerogenes*) had a glucose concentration of less than 20 mg. per cent. Of the 10 effusions due to malignancy, 9 were associated with carcinoma of the lung and one was due to metastases from carcinoma of the liver. Decreased pleural fluid glucose concentration, with values ranging from less than 20 mg. to 56 mg. per 100 ml. were found in 5 cases.

TABLE I

DATA ON 11 CASES WITH DECREASED GLUCOSE CONCENTRATION

Diagnosis	Size of effusion Zones involved	Glucose Concentration	
		Blood	Pleural Fluid mg./100 ml.
Tuberculous Effusion	1	105	31
Tuberculous Effusion	1	129	58
Tuberculous Effusion	2	85	25
Tuberculous Effusion	1	133	36
Tuberculous Effusion	2	68	<20
Empyema	2	125	<20
Carcinoma Lung	2	73	56
Carcinoma Lung	2	102	36
Carcinoma Lung	3	132	22
Carcinoma Lung	2	124	<20
Carcinoma Liver	3	67	41

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DISCUSSION

The findings are at variance with a statement by the Committee on Therapy of the American Thoracic Society which noted that a decreased glucose concentration was rarely found in malignancy (Busey *et al*, 1968). However, Berger and Maher, 1971 reported an incidence of 15% with decreased glucose concentration in 88 patients with pleural effusion due to malignant tumour.

The mechanism responsible for the decreased pleural fluid glucose concentration has not been established. It has been postulated as due to a high content of free cells in the effusion associated with a thickened pleural membrane (Glenert, 1962), to interference with the transport of glucose from blood to pleural fluid in rheumatoid pleural effusions (Dodson and Hollingsworth, 1966, Carr and McGuckin, 1968), and to the presence of a large effusion interfering with the diffusion of glucose into the pleural fluid (Duriue, 1954, Berger and Maher 1971).

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