

Pleural exudate in a tropical hospital

N. Sinzobahamvya, H.P. Bhakta

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ABSTRACT: In one hundred consecutive patients with non-purulent pleural exudates without apparent cause, the final diagnosis was tuberculosis in 58, malignancy in 20, pyogenic infection in four, cardiomyopathy in two, pulmonary infarction in one. The aetiology remained unknown in 15. The technique of "semi-open" pleural biopsy was performed under local anaesthesia. It accurately detected 70% of cancer and 69% of tuberculosis cases with a 9% complication rate and no mortality. Tuberculosis was seen at all ages but mainly between 20 and 39 yrs, where it represented 75% of cases. In this age group, malignancy was relatively rare: 10% of cases. In our environment of limited facilities, early chemotherapy trial for tuberculosis is justified for unknown pleural exudates in patients below the age of 40 yrs.

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The aetiology of about 20% of pleural effusions remains obscure, even after complete diagnostic evaluation [1, 2]. In Zimbabwe, as in most tropical countries, pleural transudates (hydrothorax) are caused by congestive heart failure usually secondary to rheumatic heart disease, arterial hypertension and cardiomyopathy, by hypoproteinaemia and severe anaemia mainly in children in the form of kwashiorkor and by constrictive pericarditis often due to tuberculosis. Myxoedema and Meigs' syndrome are very rare in blacks [3].

Purulent pleural effusions (empyema thoracis) are common at all ages. They are frequently associated with staphylococcal pneumonia, osteomyelitis and arthritis in infancy and childhood [4], with tuberculosis, any lung suppurative disease and abdominal sepsis in the adult population and, in particular, with pelvic inflammatory disease in young women after septic abortion.

The main dilemma for the physician concerns the non-purulent exudate: is it tuberculosis or malignancy? Therapeutic trial with antituberculous drugs is quite acceptable in the regions where tuberculosis prevails. However, it is important to assess the incidence of different aetiologies of these perplexing pleural effusions in a given community in order to guide routine medical management. This was the aim of our study in one hundred consecutive patients with non-purulent exudates with no apparent cause.

Methods

Pleural effusions were confirmed by chest X-ray and thoracentesis. Specimens of pleural fluid were sent for measurement of protein content and bacterial culture. We then selected non-purulent exudates (proteins above

30 g·l⁻¹ with negative bacteriology). At least four sputum smears for tubercle bacilli, repeated chest X-ray, Mantoux test, white blood cell count and sedimentation rate, were routinely performed, and cytology of the pleural fluid was examined when possible. This work concerns the cases with aetiology still unclear after these investigations (fig. 1).

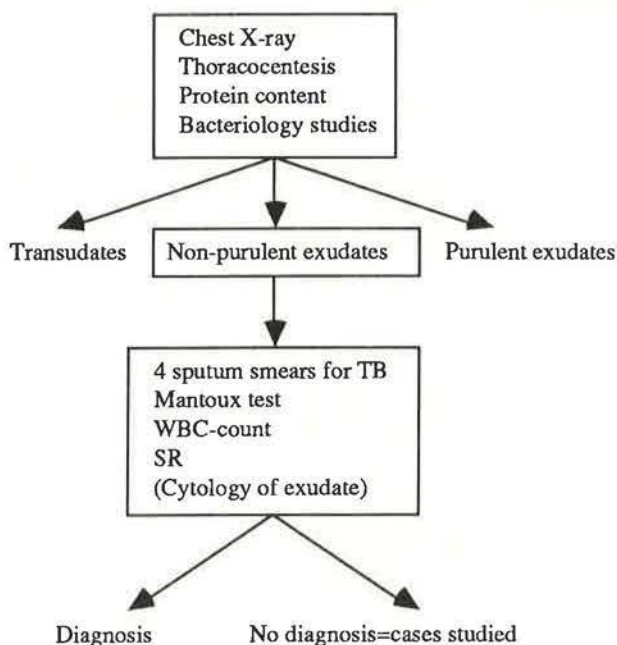


Fig. 1. - Selection of patients. TB: tuberculosis; WBC: white blood cell; SR: sedimentation rate.

"Semi-open" pleural biopsy was performed as described by THOMPSON *et al.* [5], but under local anaesthesia. A trocar with a cannula was inserted in the 5th or 6th intercostal space in the mid-axillary line. The trocar was removed. A biopsy forceps was advanced through the cannula and four specimens were taken from different parts of the pleura, both visceral and parietal. The chest was either closed after a Valsalva manoeuvre or a tube was set for 24 h. A postoperative chest X-ray was taken to confirm the expansion of the lung before removing the tube.

The diagnosis of tuberculosis was based on a histological finding of granulomatous inflammation with caseous necrosis.

When histology was of no help, we repeated sputum smears for tubercle bacilli in patients with a strong reactional Mantoux test (≥ 15 mm) and a high sedimentation rate (≥ 100 mm·h⁻¹). When the smears were negative, a specimen of pleural fluid was sent for tubercle bacilli culture. The other patients were either followed-up for a period of at least six weeks, or underwent bronchoscopy, mediastinoscopy and thoracoscopy.

Results

"Semi-open" pleural biopsy was performed in one hundred consecutive patients from December 1985 to April 1987. In the same period, 83 cases of empyema thoracis (purulent exudates) were recorded and the aetiology of 68 concomitant non-purulent exudates could be elucidated without pleural biopsy. The one hundred pleural biopsy cases included 72 males and 28 females aged 1–80 yrs. The pleural effusions, all unilateral, were right-sided in 67 cases.

Histology showed tuberculosis in 40 patients. Malignancy was found on 14 occasions: adenocarcinoma in six patients (four breast carcinomas, one lung and one possibly gastric carcinoma); squamous cell carcinoma in four (three lung, and one oesophageal); mesothelioma in three and anaplastic carcinoma in one. Histology showed nonspecific inflammation in 42 cases. The pleural biopsy technique failed four times, histological results being respectively fat, muscle, fibrin and anthracosis.

Table 1 summarizes the results of pleural biopsy and shows how the diagnosis was reached in the 42 non-contributory biopsies and in the four failed cases. Tuberculosis was suspected in 18 patients: it was demonstrated in six and was considered to be the cause of the pleural effusion in the other 12 after chemotherapy trial. Malignancy was found at mediastinoscopy and thoracoscopy in three patients and at autopsy in three. The other diagnoses were pyogenic infection in four, cardiomyopathy in two and pulmonary infarction in one case. The aetiology was still unknown in 15 patients.

Table 2 shows the final diagnosis for each age group in the one hundred pleural exudates. It is noteworthy that "semi-open" pleural biopsy found the cause in 54 patients and the accuracy of detection was 70% (14 out of 20) for cancer and 69% (40 out of 58) for tuberculosis. Tuberculosis was seen at all ages, but mainly between 20 and 39 yrs, where it represented 75% (35 out of 47) of cases. The youngest patient with cancerous pleural effusion was 21 yrs old. Malignancy was relatively rare in the 20–39 yrs age group: 10% (5 out of 47).

Complications due to pleural biopsy occurred in nine patients: significant haemorrhage in two, empyema in one, pneumothorax requiring active management in six. There were no post-operative deaths.

Table 1. – Procedures, investigations and aetiologies

Procedures-Investigation	All patients	Aetiologies	
Open pleural biopsy	100	40	Tuberculosis
		14	Malignancy
		42	Nonspecific inflammation
		4	Failure
Repeated sputum smear	18	2	Tuberculosis
Pleural fluid culture	16	4	Tuberculosis
Chemotherapy trial	12	12	Tuberculosis
Bronchoscopy	6	-	No diagnosis
Mediastinoscopy	2	1	Hodgkin
Thoracoscopy	4	2	Squamous cell carcinoma
Chest X-ray at follow-up	29	4	Pyogenic infection
		1	Lung infarction
		1	Cardiomyopathy
		1	Lung carcinoma
		1	Liver carcinoma
Autopsy	4	2	Lung carcinoma
		1	Liver carcinoma
		1	Cardiomyopathy
		15	Unknown

Table 2. - Age, sex and diagnosis in 100 non-purulent exudates

Age yrs	Malignancy		Tuberculosis		Unknown		Others*		Total	
	M	F	M	F	M	F	M	F	M	F
0-19	0	0	2	1	1	1	2	0	5	2
20-39	4	1	27	8	2	3	0	2	33	14
40-59	6	3	6	3	2	0	2	0	16	6
60-80	2	4	10	1	5	1	1	0	18	6
Total	12	8	45	13	10	5	5	2	72	28

*: 4 pyogenic infection, 2 cardiomyopathy, 1 pulmonary infarction.

Discussion

The differential diagnosis between tuberculous and carcinomatous pleurisy is difficult. Needle biopsy of the pleura is efficacious for the diagnosis of tuberculosis with rates varying from 60 to 95%, whereas cytological analysis is more effective in the detection of malignancy [2, 6, 7]. Both procedures should ideally be performed at the time of the first thoracocentesis in addition to protein-content and bacteriology. The estimation of adenosine deaminase levels can also be helpful [8]. If the diagnosis is still unclear, thoracoscopy, preferably, or limited thoracotomy for open pleural biopsy are the complementary procedures.

In most tropical hospitals, such management is not possible. The physician has to adapt to local conditions. Cytological examination being usually unavailable, as there were no needles for closed pleural biopsy, we had to use the "semi-open" technique. This had a good detection rate for both tuberculosis and malignancy, although the cases selected were non-purulent exudates. The complications were comparable to the closed techniques [9]. The inconvenience for patients was slight as the procedure was performed under local anaesthesia.

Tuberculosis was the most frequent diagnosis. In the population studied, tuberculosis is still prevalent. According to the Director of Health Services, 7.2 new cases per 10,000 population were diagnosed in Bulawayo in 1987; compared to 6.1 in 1978 [10]. It is possible that the total number of tuberculosis cases in this study has been overestimated as 12 patients were diagnosed as having tuberculosis on the grounds of their response to chemotherapy. This might also explain the low incidence of undetermined aetiologies in the series.

Malignancy being relatively rare in patients aged 20-39 yrs and tuberculosis representing 75% of cases, early chemotherapy trial for tuberculosis is acceptable in this group of patients. For older patients, complementary diagnostic procedures should first be performed as malignancy is more frequent (15 out of 46).

The presence of pleural exudate instead of transudate in the two patients with cardiomyopathy may be explained by occult pulmonary emboli which are common in this disease and are too small to cause radiologically evident infarction. The paucity of parapneumonic effusions is due to the selection of cases: only non-purulent exudates with no apparent cause were studied.

We conclude that the technique used for pleural biopsy is a good alternative to both needle biopsy and cytological studies. In our environment with limited facilities, early therapeutic trial with antituberculous drugs for non-purulent pleural exudates with no apparent cause appears to be justified in patients below the age of 40 yrs.

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Exsudats pleuraux dans un hôpital tropical. N. Sinzobahamvya, H.P. Bhakta.

RÉSUMÉ: Sur 100 patients consécutifs atteints d'exsudats pleuraux non purulents de cause inapparente, le diagnostic final s'avère la tuberculose chez 58, le cancer chez 20, l'infection à

pyogène chez 4, la cardiomyopathie chez 2, et l'infarctus pulmonaire chez 1. L'étiologie reste imprécise chez 15 patients. La technique de biopsie pleurale "semi-ouverte" a été pratiquée sous anesthésie locale. Elle a pu détecter de façon précise 70% des cas de cancer et 69% des cas de tuberculose, avec un taux de complications de 9% et aucune mortalité. La tuberculose a été observée à tous les âges, mais principalement entre 20 et 39

ans, où elle représente 75% des cas. Dans ce groupe d'âge, les tumeurs furent relativement rares: 10% des cas. Dans notre environnement, où les possibilités techniques sont limitées, un traitement précoce par chimiothérapie pour la tuberculose est justifié dans les exsudats pleuraux d'étiologie inconnue chez les patients en dessous de l'âge de 40 ans.
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