Etiology of pleural effusion in Western Saudi Arabia

Sir,

Pleural effusion imposes an important and common diagnostic problem. It can accompanied by various local and systemic diseases and in some patients it may be the initial or the only sign of the disease. The etiology of pleural effusion apart from heart failure, liver cirrhosis and nephrotic syndrome is often obscure and requires repeated laboratory tests and pleural biopsy to determine the cause.[1] However, despite all available diagnostic modalities, the etiology cannot be established in some cases. Tuberculosis (TB), post pneumonic (empyema) and cancer were the most common causes of pleural effusion. The aims of our study are to determine the etiology and treatment of some causes of pleural effusion in patients admitted to King Abdulaziz University Hospital, Jeddah, Kingdom of Saudi Arabia (KSA). King Abdulaziz University Hospital is a teaching governmental hospital in Jeddah, in the western province of KSA. A total of 50 patients were admitted either to medical or surgical wards with a computer code diagnosis of pleural effusion during 2-year-period from April 1999 to April 2001. Medical records were reviewed for demographic data, clinical features, laboratory diagnosis including pleural aspiration and pleural biopsies whether open or closed, using N Abram's needle. Pleural fluid was analyzed for exudates or transudate, presence or absence of lymphocytes, neutrophils, eosinophils and malignant cells. Statistical analysis was carried out using the Statistical Package for Social Science (SPSS) 7.5. Group results were presented as mean $\pm$ standard deviation (SD) or as a percentage. The mean age was 47.8$\pm$18.9 years. Patients included in the study were 29 (58%) males and 21 (42%) females with M:F ratio of 1.4:1. Twenty-nine (58%) were Saudi patients and 21 (42%) were non-Saudi patients. Tuberculosis was the most common cause of pleural effusion in 13 (26%) patients followed by bacterial infection (post pneumonic) in 22% and cancer in 18%. Miscellaneous causes were attributed to 6% of the cases and were mainly due to systemic lupus erythematosus (SLE) or post traumatic with liver laceration. The cause of effusion remained under-determined in 4% of cases **(Table 1)**. Tuberculous pleural effusion was found in 26% (8 males and 5 females with M:F ratio of 1.8:1). The most frequent clinical presentation was fever, night sweats and weight loss. Four (33%) had low immunity due to end stage renal disease or diabetes. Pleural fluid was clear in 80% and only showed lymphocytosis. Closed pleural biopsy using an Abram's needle or open pleural biopsies was positive for granuloma in 70% of the cases. In one patient the diagnosis was made from lymph node biopsy, while the rest of the cases received empirical treatment of tuberculosis based on clinical grounds and pleural aspiration findings. All patients received 4 antituberculous medication with

Table 1 - Causes of pleural effusion.

Causes	N of male patients	N of female patients	Total (%)
Tuberculosis	8	5	13 (26)
Cancer (Total)	4	5	9 (18)
Post pneumonic (Empyema)	6	5	11 (22)
Congestive heart failure	6	3	9 (18)
Nephrotic syndrome	1	0	1 (2)
Liver cirrhosis	1	1	2 (4)
Miscellaneous causes	1	2	3 (6)
Undiagnosed	2	0	2 (4)
Total	**29**	**21**	**50 (100)**

N - number

Table 2 - Clinical, diagnosis test and treatment of common causes of pleural effusion.

Data	Tuberculosis	Cancer	Empyema
Total number	13	9	11
M\F	8\5	4\5	6\5
Right\left side	9\4	6\3	7\4
Pleural aspiration	13	9	11
Biopsy	9	5	1
ATT (4 drugs)	13	0	0
Antibiotics	0	0	4
Chest tube and antibiotics	0	0	7
Chest tube and pleurodesis	0	9	2
Thoracoscopy with drainage	0	0	2
Mortality	1	9	0

M/F - Male/Female, ATT - Anti-tuberculous treatment

therapeutic response in 12 patients. Malignant pleural effusion was found in 18%. Fifty five percent were due to secondaries. Cytological examination of pleural fluid for malignant cells was positive in 60% of cases. Pleural biopsies either closed or open was carried out in 55.5% of the cases. The diagnosis of malignant pleural effusion was confirmed either by pleural fluid cytology, needle biopsy or both. All patients had chest tube drainage and intra-pleural instillation of a chemical agent as pleurodesis. It carried very poor prognosis, with a mortality rate of 100%. Para pneumonic (empyema) was the 2nd common cause of pleural effusion in our study. Diagnosis was based on gram stain, positive bacterial culture, high neutrophil count and lactic dehydrogenase (LDH) on pleural fluid. Five patients had uncomplicated para-pnuemonic effusion which responded to prolonged cover of antibiotics. Seven had complicated para-pneumonic effusion (empyema) requiring chest tube drainage with sterilization of empyema cavity with appropriate antibiotics. Two had chest tube drainage followed by intra-pleural fibrinolytic therapy with (streptokinase 250,000 units, while 2 patients required thoracoscopy to drain a multiloculated empyema. All of these had remarkable improvement. Pleural effusion is a common clinical finding with significant clinical importance. It may be the initial presentation or the only sign of an underlying disease. It can affect the treatment and prognosis of concomitant diseases. From the several causes of pleural effusion, tuberculosis, para pneumonic or empyema, malignancy and congestive heart failure were the most common etiologies in our series. This is in similarity with other studies. Very few pleural effusions were due to liver cirrhosis, nephrotic syndrome, or sub-phernic abscess. Miscellaneous causes like SLE or post traumatic (after liver laceration) has been reported in our series.[1,2] Tuberculosis remained the most common cause in our study. This could be explained by the fact that TB is still endemic in KSA. Low social–economic class and decreased immunity due to diabetes and end stage renal disease were other contributing factors to the high incidence. Twelve patients showed excellent therapeutic response to the combination of 4 anti-tubercuous drugs.[3] Para pneumonic pleural effusion was the 2nd most common cause in our series, which is higher in comparison to other studies. Presence of neutrophils, low pH, positive gram stain and bacteria in pleural fluid helped in the diagnosis of par-pneumonic effusion. The excellent response of treatment of empyema was attributed to early intervention with chest tube drainage, installation of effective antibiotics, fibrinolytic agents such as streptokinase and thoracoscopy for drainage of multiloculated empyema.[4] Malignant pleural effusion was due to metastasis as from primary tumors, which typically metastasize to the pleura. Cytological examination of pleural fluid for malignant cells was positive in 50% of the cases. This is similar to previous studies. The diagnosis of malignant effusions was established by either cytological examination of pleural fluid, open or closed pleural biopsy or combination of these methods. Poor outcome with 100% mortality was seen in patients with underlying malignancy with disseminated metastasis. Treatment of malignant pleural effusion was mainly palliative either by chest tube drainage or by chemical pleurodesis.[5] Despite a battery of investigations, the diagnosis of pleural effusion remained unknown in 2 patients, one was assumed to be due to constrictive pericarditis for which he was referred for cardiac catheterization to another hospital for confirmation of the diagnosis as this facility is not available in our institution. The diagnosis in the 2nd patient also remained obscure despite extensive clinical and laboratory work-up. This low figure was in contradiction to other studies. The small number of patients in our series could probably explain this.

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