

Conservative Management of Non-tuberculous Pleural Fibrosis in Malnourished Children

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Summary

Oviawe O and Ogundipe O. Conservative Management of Non-tuberculous Pleural Fibrosis in Malnourished Children. *Nigerian Journal of Paediatrics* 1984; 11:53. Eighteen cases of pleural fibrosis, following drainage of empyema thoracis in malnourished children are presented. Apart from antibiotics and supportive treatment, decortication was not performed in any of the subjects, although there was incomplete expansion of the lungs in 15 patients. There was complete lung expansion in all the patients within one year of follow-up. It is concluded that pleural fibrosis complicating drainage of non-tuberculous empyema thoracis in malnourished children, will resorb completely without decortication.

Introduction

EMPYEMA is a frequent complication of non-tuberculous respiratory infection in malnourished children.¹ In recent years, because of improved medical care, the high mortality associated with empyema has been reduced and increasing attention is now being given to the management of the late complications. Pleural fibrosis, one of these late complications, may occur as early as four weeks after the onset of symptoms.² Pleural fibrosis prevents re-expansion of the lung and if untreated, causes contraction of the hemitho-

rax which may lead to postural abnormalities in later life.³

In order to avoid pleural fibrosis and other complications, decortication of the pleura has been advocated by many workers.^{3,4} However, others^{5,6} have recommended conservative management because of the complications frequently associated with decortication and the fact that well nourished children have been found to have the capacity to resorb the pleural fibrosis. On the other hand, little is known about the capacity of malnourished children to resorb this fibrosis. This study was therefore, undertaken to assess a conservative method in the management of pleural fibrosis complicating empyema thoracis in malnourished children.

Materials and Methods

The subjects consisted of 18 children, admitted to the Paediatric wards of the Lagos University Teaching Hospital (LUTH) between March, 1978 and February, 1981. The patients were

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admitted into the study if symptoms of empyema were present for at least, 4 weeks; if they met the Wellcome Classification for malnourished children⁷ and if there was any radiological evidence of pleural fibrosis. Pleural fibrosis is defined as a radiopaque density separating the air-containing lung from the contiguous ribs and is differentiated from pleural effusion by the angulation of the partially blunted costophrenic angle; it is meniscus-shaped in effusion and sharply angulated in pleural fibrosis.⁸ The severity of the pleural fibrosis was based on the amount of lung expansion present and was classified as follows:

- (a) Mild pleural fibrosis: lung expansion of more than two-thirds of the diameter of the hemithorax
- (b) Moderate pleural fibrosis: lung expansion between one-third and two-thirds of the diameter of the hemithorax
- (c) Severe pleural fibrosis: lung expansion less than one-third of the diameter of the hemithorax

Diagnosis of empyema was confirmed by aspirating pus from the affected side. The specimen of pus was cultured and sensitivity test performed, while venous blood was drawn for haemoglobin and serum proteins estimations. Pleural drainage was accomplished by either repeated aspiration in 11 cases or closed tube thoracostomy in 7 others, depending on availability of material. Other forms of treatment included systemic antibiotics, a high calorie and protein diet, physiotherapy and blood transfusion for anaemia. None of the 18 patients received either intrapleural antibiotic therapy or enzyme preparation.

Whenever possible, chest radiography was repeated weekly, while the patients were in hospital and during out-patient visits, at 4 weeks and thereafter, at 3 monthly intervals. Patients were discharged from the hospital after the temperature had been normal for at least, three

days, anaemia corrected and there was appreciable weight gain. Antibiotics to which the organism was sensitive were prescribed for 4 weeks, on discharge.

During follow-up visits, physical examination and chest radiography were carried out. The patients were followed for periods ranging between 6 months and 3½ years.

Results

Age and Sex Distribution

The subjects were aged 2-72 months (mean 20 ± 16.2). There were 12 males and 6 females a male to female ratio of 2:1.

Type of Malnutrition

The commonest type of malnutrition was kwashiorkor (Table 1) and this occurred in 9 patients. There were seven patients with marasmus and two others with undernutrition.

TABLE I

Types of Malnutrition and Sex Distribution in 18 Malnourished Children with Pleural Fibrosis

<i>Type of Malnutrition</i>	<i>Sex</i>		<i>Total No of Cases</i>
	<i>Male</i>	<i>Female</i>	
Kwashiorkor	7	2	9
Marasmus	4	3	7
Undernourished	1	1	2
Total	12	6	18

Clinical Features

The duration of illness ranged between 4 and 9 weeks (mean 6 ± 1.6 weeks). Fourteen patients were febrile on admission and this fever persisted for 4-14 days in hospital (mean 6.5 ± 2.1 days). All patients were dyspnoeic on presentation, but this sign disappeared within 48 hours of initiating therapy. The initial chest radiograph (Fig. 1) of each patient revealed effusion of varying sizes.

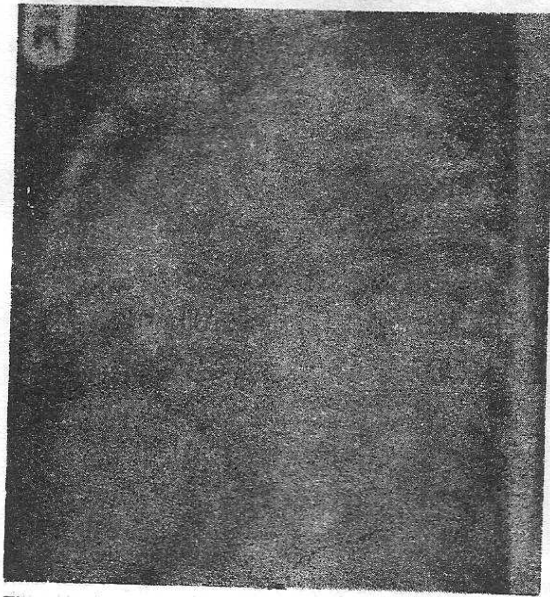


Fig. 1 A chest radiograph of a 30-month old child with kwashiorkor and massive left pleural effusion

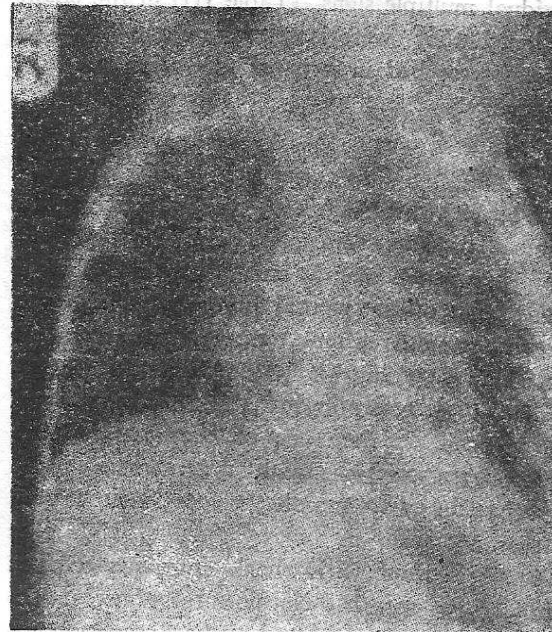


Fig. 2 A chest radiograph of the same child, five days later. Note the widening of the parietal and visceral pleurae, the intervening pneumothorax and a fibrous adhesion at the apex.

The pleural fibrosis was demonstrated on later chest radiograph (Fig. 2) and was severe in 3 cases, moderate in 12 and mild in three. Four patients, 3 with kwashiorkor and one with undernutrition, treated by repeated aspiration, showed increases in the initial size of the pleural fibrosis, but no further increase in these or other patients occurred after the 21st admission day. No patient underwent decortication.

Organisms isolated from the empyema

Table II summarizes the organisms isolated from the pus obtained from the empyema. *Staphylococcus aureus* was the commonest organism occurring in seven of the 18 cases, followed by *Haemophilus influenzae*. The pus was sterile in six cases.

Outcome of Management

The patients were in hospital for 18-48 days (mean 28 ± 4.5 days). Six patients (5 kwashiorkor, 1 marasmus) developed measles while in the ward. One patient with severe kwashiorkor died 5 days

after admission, despite evacuation of the pleural pus. No organism was cultured from the pus and mild pleural fibrosis was demonstrated before death. At the time of discharge, 15 patients had

TABLE II

Organisms Isolated from Pleural Fluid in 18 Malnourished Children with Empyema Thoracis

Type of Malnutrition	Organisms				Sterile
	Staph aureus	E. Coli	H. Influenzae	Pneumo-coccus	
Kwashiorkor	4	1	1	1	2
Marasmus	2	-	2	-	3
Under-nourished	1	-	-	-	1
Total	7	1	3	1	6

residual multiple signs (Table III) in the chest, although they were largely asymptomatic. The fibrosis resorbed in two patients prior to their discharge.

Follow-up

The 15 subjects with residual signs at the time of discharge were followed up as out-patients for between 6 months and 3½ years. Marked resorption of the pleural fibrosis was observed at three months in most cases and was complete in each case within one year of follow-up (Fig 3). The rate of resorption of the fibrosis appeared to depend on the type of organism isolated. Fibrosis associated with *Staphylococcus aureus* resolved in 9 ± 1.5 months; that associated with other organisms in 4 ± 0.5 months, while the fibrosis in those with sterile empyema resolved in 5 ± 1.2 months. No postural abnormalities were observed at the end of the study and each patient remained asymptomatic.

TABLE III

Respiratory Signs on Discharge in 15 Malnourished Children with Pleural Fibrosis

Sign	No of Patients	% Frequency
Depression of lower anterior chest wall	2	12
Mild dyspnoea at rest	1	6
Minimal tracheal deviation	2	12
Dull percussion note on the affected side	12	71
Reduced breath sound on the affected side	15	88
Normal chest findings	2	12

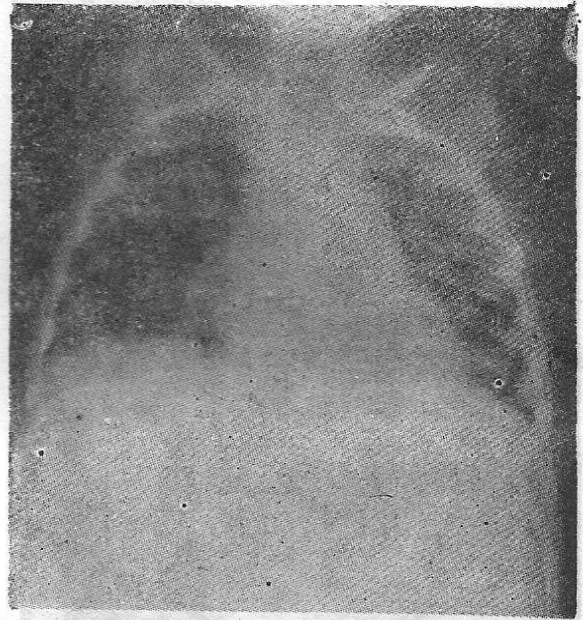


Fig. 3 The chest radiograph of the same child, 9 months later. Note the disappearance of the earlier changes except a thin line of pleural fibrosis.

Discussion

The present study has shown that malnourished children like well-nourished children, ^{5 6 9} have the capacity to resorb pleural fibrosis. Decortication of the pleura was not required in any of the patients. There was an initial increase in the size of the fibrosis as demonstrated radiologically in four of the patients, but this was not accompanied by worsening of symptoms. Thus, astute clinical observation is to be preferred in assessing these patients since radiological appearance may prompt an unnecessary surgical intervention. Although 15 patients (88%) still had respiratory signs indicating restricted lung expansion due to the pleural fibrosis, on discharge, these signs disappeared by 6 months in a majority

of the patients, while full lung expansion occurred by one year in all the patients. The single death in the present series was attributed to malnutrition rather than to the mild pleural fibrosis which existed.

Decortication is a major operation. In order to achieve satisfactory results, experienced personnel and adequate operative and post-operative facilities are required. Furthermore, there is the problem of post-operative infection. It is therefore, not surprising that Adebonojo Osinowo and Oyemade,¹⁰ reporting from Ibadan achieved only a "fairly good" result on two supposedly well-nourished children who had decortication after empyema treatment. Results from other hospitals in Nigeria, with less facilities than Ibadan, might be expected to be worse.

Three important factors seem to be responsible for the development and severity of pleural fibrosis complicating empyema thoracis. These factors include the duration of symptoms, the drainage method used and the causative organism. The longer the duration of symptoms, the more likely is the development of fibrosis and in order to prevent this, health education on the importance of seeking early medical attention by parents and guardians should be intensified. Twenty-four percent of the patients who were treated by repeated aspiration developed increasing size of the pleural fibrosis. Severe restriction of lung expansion was frequently associated with *Staphylococcus aureus* and the resulting pleural fibrosis was slow to resolve. Based on the present experience, it is recommended that cases of staphylococcal empyema should be treated

vigorously with appropriate antibiotics and such cases should be followed-up for a minimum of 9 months.

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