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RETROSPECTIVE ANALYSIS OF THE CLINICAL PROFILE AND IMMEDIATE OUTCOME OF PEDIATRIC PATIENTS DIAGNOSED WITH PLEURAL EFFUSION OR EMPYEMA THORACIS, ADMITTED TO A TERTIARY GOVERNMENT HOSPITAL DURING JANUARY 1998 TO DECEMBER 2000

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ABSTRACT

Objective: To review the clinical characteristicsors of patients who developed complicated and non-complicated effussions

Design: This study was a case review over a 3-year period (Jan. 1, 1998 to Dec. 31, 2000) of medical records of children aged 3 months to 17yrs with a final diagnosis of pleural effusion or empyema thoracis

Setting: A tertiary government hospital

Results: Sixteen (16) case records diagnosed with pleural effusion or empyema thoracis from a primary non-tuberculous respiratory tract infection were reviewed as to demographics, duration of illness, presenting symptoms, coexisting illness, clinical and laboratory results, and outcome. Of the 16 cases, 6 had non-complicated resolution of parapneumonic pleural effusion while 9 had chest tube thoracostomy inserted. The duration of confinement for complicated effusions was significantly longer (*p*-value 0.019) than those of non-complicated parapneumonic effusions.

Conclusion: The presenting signs and symptoms of patients with pleural effusion are febrile, cough, productive cough, dyspnea, and chest pain. The development of complicated parapneumonic effusion is correlated to a prolonged duration of confinement (*p*-value 0.019).

INTRODUCTION

Pleural effusion is the accumulation of pleural fluid within the pleural space beyond which the lymphatic system can remove. This may be due to many causes including thoracic diseases, trauma, and iatrogenic injury, but the most common of which is infection. It has been said that as many as 40% of hospitalized patients with bacterial pneumonia have an accompanying pleural effusion.[1] However, only about 10% of these cases need operative intervention for their resolution. It is in these conditions that the morbidity and mortality rates are increased.[2]

Empyema thoracis by definition is pus in the pleural space. Light describes this as pleural effusions with thick, purulent appearing pleural fluid.[1] However, he goes on to elaborate parapneumonic effusions as any pleural fluid associated with bacterial pneumonia, lung abscess, or bronchiectasis. In contrast, complicated parapneumonic effusions, to which empyema thoracis belongs, refer to those effusions that do not resolve without tube thoracostomy.[iii]

Empyema thoracis is a problem that has been recognized for centuries.[1] Again, there are many causes, but it is an infected parapneumonic effusion that is the most common cause.[2] Early diagnosis and aggressive management is necessary to prevent decreased pulmonary function and the local and systemic sequelae of active infection. Delays in diagnosis will allow the empyema to become organized, at which point, percutaneous drainage techniques and systemic antibiotics are ineffective.

It is the objective of this eview to determine whether there are clinical factors that may predispose to the development of complicated parapneumonic effusions and empyema thoracis. If such factors do exist, then early surgical managment may be instituted.

GENERAL OBJECTIVES

1. To determine the clinical characteristics of patients that will correlate with a diagnosis of complicated effusion.
2. To determine and compare non-complicated and complicated effusion in relation to the following outcomes:
   a. Length of hospital stay
   b. Complications
   c. Mortality

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Specific Objectives

1. To determine whether patient factors (age, sex, birth order, social class, presenting illness, duration of illness, etc, will correlate with the development of complicated effusion
2. To determine and compare the duration of confinement in days of patients with non-complicated pleural effusion and complicated effusions.
3. To determine and compare the complications of patients with non-complicated pleural effusion and complicated effusions.
4. To determine and compare the mortality rate of patients with non-complicated pleural effusion and complicated effusions.

METHODOLOGY

A retrospective review of medical records of children aged 3 months to 17 years admitted to a tertiary medical center with a final diagnosis of pleural effusion or empyema thoracis from January 1998 to December 2000 was included in the study.

DEFINITIONS

A. Non-Complicated pleural effusion is the accumulation of pleural fluid within the pleural space
B. Complicated effusions are those effusions that satisfy the criteria defined by Light[1] as follows:
   1. pH of pleural fluid less than 7.0
   2. pleural fluid glucose less than 60 mg%
C. Empyema thoracis is effusion with thick, purulent appearing pleural fluid

EXCLUSION CRITERIA

a. Patients receiving chemotherapy or radiotherapy.
b. Patients diagnosed with tuberculous effusions.
c. Patients who are admitted within 10 days from a previous hospitalization.
d. Patients who are transferred from another hospital.

A total of 82 cases were identified. However, a total of 56 were excluded because 50 were of tuberculous etiology, 5 were nosocomial pneumonias from other hospitals, and 1 was traumatic in origin. Data collected from the remaining 16 cases included demographics, presenting symptoms and duration of illness, coexisting illness, clinical and laboratory results, and outcome.

RESULTS

Sixteen (16) case records diagnosed with pleural effusion or empyema thoracis from a primary non-tuberculous respiratory tract infection were reviewed. They ranged in age from 6 months to 202 months (mean 86 months). Seven (44%) were male. All cases were confined at the charity ward. 11 cases (69%) were the 3rd born or younger. The duration of illness ranged from 4 to 60 days (mean 26 days). Common presenting symptoms were pyrexia, cough, productive cough, dyspnea, and chest pain (Table 1). Nine (9) cases (57%) had intake of antibiotics either through self-medication or through a physician prior to consult at the tertiary hospital. One patient had acute gastroenteritis while the other 15 did not have any concomitant illnesses at the time of consult.

Table 1. Presenting Symptoms in 16 Patients Diagnosed With Pleural Effusion or Empyema Thoracis

Symptom	Number (%)
Febrile	15 (94)
Cough	15 (94)
Productive cough	11 (69)
Dyspnea	11 (69)
Chest Pain	7 (44)
Weakness	1 (7%)

Of the 16 cases, 6 had non-complicated resolution of parapneumonic pleural effusion while 9 had chest tube thoracostomy inserted. Of the latter, 5 were discharged with open tube thoracostomy in place (Table 2).

Table 2. Outcome of 16 Cases of Pleural Effusion

Type of Effusion	Number of Cases	Average Duration of Confinement (Days)	Number Discharged with OpenTube Thoracostomy
Complicated	10	29	5
Non-complicated	6	10	N/A

The duration of confinement, as shown in table 2, for complicated effusions ranged from 15 to 45 days (mean 29 days), while those with non-complicated effusions ranged from 4 to 22 days (mean 10 days). There was 1 case of nosocomial pneumonia in a patient with complicated effusion. There were no cases of pneumothorax nor were there any mortalities.

DISCUSSION

Pleural effusions and empyema thoracis are relatively common and are associated with significant morbidity and mortality. Treatment is directed at controlling the infection and maximizing pulmonary function.[1] Delays in the diagnosis will significantly increase morbidity and will result in a prolonged clinical course.[vi] Furthermore, valuable medical resources are consumed that may not necessarily influence patient recovery. These assets are important considerations most especially in this setting of constrained medial care.

This study focused on non-tuberculous parapneumonic pleural effusions and empyema thoracis. The demographics, duration of illness, presenting symptoms, coexisting illness, clinical and laboratory results, and outcome were reviewed. However, there was no statistical significance in the results that correlates to the development of complicated effusions. The presenting symptoms noted correlate with those in other studies.[1]

The diagnosis of effusion was based on the history and physical examination, together with chest roentgenogram and pleural fluid analysis. The criteria were as described by Light.[vi] The outcome of pleural effusion is dependent on the stage of the disease. Complicated effusions that become organized will no longer respond to percutaneous drainage and systemic antibiotics alone.[vi] Many factors are believed to contribute to its development. These include prolonged duration of illness, prior antibiotic intake, and delay in proper diagnosis. These three factors, however, were not shown to be statistically significant with the development of complicated effusions in this review.

The duration of confinement for patients with complicated effusions was shown to be significantly longer in this review (*p*-value 0.019) of 16 cases. The small sample failed to show any difference in the incidence of morbidities and mortalities.

In our setting, most cases of both complicated and non-complicated effusions are secondary to or are complicated by pulmonary tuberculosis. In this 3-year review, tuberculous effusions accounted for 68% of all cases while parapneumonic effusions accounted for 20%.

CONCLUSION

In the review of cases over the three years from January 1998 to December 2000, only 16 cases of bacterial parapneumonic effusion were seen. The presenting signs and symptoms of patients with pleural effusion are febrile, cough, productive cough, dyspnea, and chest pain.

Due to the small sample size, the statistical power is weak and differences are not readily observed. The only significant result was the correlation of prolonged hospitalization with the presence of complicated pleural effusions (*p*-value 0.019). In order to further elicit any probable relationships, a larger sample size is needed. It is suggested that the review include several other tertiary hospitals and to increase the duration of the review.

REFERENCES

1. Light RW, Girard WM, Jenkinson SG, George RB: Parapneumonic effusions. Am J Med 1980; 69: 507-511.
2. Brewin A, Arango L, Hadley WK, Murray JF: High-dose penicillin therapy and pneumococcal pneumonia. JAMA 1974;230:409-413.
3. Light, RW: Pleural Diseases; 3rd Edition. William and Wilkins 1995: 130.
4. Hippocrates. Genuine works of Hippocrates. Translated by F. anderer. London (UK): Syndenham Society; 1847.
5. LeMense GP, Strange C. Sahn SA: Empyema thoracis: therapeutic management and outcome. Chest 1995; 107:1532-7.
6. Light RW: Pleural diseases, 3rd Edition. William and Wilkins 1995: 138-142.
7. Shaknar KR, Kenny SE, Okoye BO, Carty HM, Lloyd DA, Losty PD: Evolving experience in the management of empyema thoracis. Acta Paediatr 200 Apr; 89(4): 417-20.
8. Chu M, Dewar L, Burgess J, Busse E: Empyema thoracis: lack of awareness results in a prolonged clinical course. J Canadien de Chirurgie 2001; 44(4): 284-288.