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IBI (India) = 4.260

SOI: [1.1/TAS](#) DOI: [10.15863/TAS](#)

International Scientific Journal Theoretical & Applied Science

p-ISSN: 2308-4944 (print) e-ISSN: 2409-0085 (online)

Year: 2018 Issue: 10 Volume: 66

Published: 30.10.2018 <http://T-Science.org>

QR – Issue



QR – Article



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SECTION 20. Medicine.

FREQUENCY OF VARIOUS CAUSES OF PLEURAL EFFUSION: A STUDY CONDUCTED ON CHILDREN WITH AGE UP TO 5 YEARS

Abstract: Objective: This study was carried out to determine different causes of pleural effusion among children having age up to 5 years.

Study design and duration: This is a cross sectional study. Study was started in January 2018 and completed in July 2018 comprising on duration of 7 months.

Setting: Study was conducted in a tertiary care hospital Shahida Islam Teaching Hospital Bahawalpur.

Patients and Methods: All pediatric patients up to five years of age admitted in study institution due to pleural effusion during study duration were included in this study. These cases were diagnosed with pleural effusion due to different causes. Those cases in which diagnosis was suspected but not confirmed, they were not included in the study. These cases were belonging to male and female both genders. They were admitted in pediatric ward from outpatient-door and emergency department. All relevant data was documented properly such as age, gender, presenting complaints, important points of history taken from parents and important findings on physical examination. All baseline investigations such as CBC, RFTS, LFTS, pleural fluid examination and chest x ray were done from within the study institution. Pleural tap was done in all cases and minimum 5 ml pleural fluid was taken and sent for examination to the hospital laboratory. Proper management gave included antibiotics, intravenous paeds solution and oxygen inhalation. Mechanical ventilation was done in few cases having difficulty in breathing with decreased blood oxygen saturation.

Results: Total 105 cases were included in this study. Age range was from one month to 5 years with mean age of 2.7 years. There were 16.2% cases below one year age, 28.6% cases between 1-2 years, 18% cases between 2-3 years, 21.9% between 3-4 years and 15.2% cases were between 4-5 years of age. Presenting signs and symptoms were Fever in 97% cases, cough in 85.7% cases, breathlessness in 75.2%, tachypnea in 80% cases, Pallor in 61.9%, chest pain in 48.6% cases, loss of appetite in 71.4%, vomiting in 36.2% and cyanosis was reported in 25.7% cases. Causes of pleural effusion found in study cases include pneumonia in majority cases (62.8%) followed by other causes such as tuberculosis in 23.8% cases, malignancy in 2.8%, congestive cardiac failure in 4.8% and nephritic syndrome in 5.7% cases. There were 33% cases treated with antibiotics alone, 58% treated with antibiotics and chest intubation while in 8.5% cases decortications was done in which did not respond to conservative treatment.

Conclusion: pleural effusion in pediatric patients is associated with high morbidity and mortality. Most common cause of pleural effusion in this age group is pneumonia in which exudative type of pleural effusion is present.

Key words: pleural effusion, parapneumonic effusion, chest intubation.

Language: English

Citation: Munir, S., Qiass, N., & Safdar, W. (2018). Frequency of various causes of pleural effusion: a study conducted on children with age up to 5 years. *ISJ Theoretical & Applied Science*, 10 (66), 597-601.

Soi: <http://s-o-i.org/1.1/TAS-10-66-69> **Doi:**  <https://dx.doi.org/10.15863/TAS.2018.10.66.69>



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Introduction

There is small quantity of fluid present between two pleural layers of lungs for lubrication.¹ When this fluid becomes excessive due to any disease, that condition is called pleural effusion. This condition is more common in adults and less common in children. In children this may occur due to pneumonia.² When pneumonia persists for long time and not relieved by medications may develop parapneumonal effusion. This is main cause of effusion among children. Other causes include malignancy of lungs or pleura. In congestive cardiac failure effusion occurs in both lungs symmetrically. In this case main treatment is control of underlying cardiac disease.³ In nephritic syndrome protein loss occurs through kidneys and oncotic pressure of blood decreases which leads accumulation of fluid in extra vascular space such as pleural cavity and peritoneal cavity. Pulmonary and extra pulmonary tuberculosis is a very common disease in Pakistan which is also a cause of pleural effusion. Initial treatment of pleural effusion in children is done with antibiotics after culture and sensitivity of pleural fluid.⁴ Cases not responding to medical treatment are underwent therapeutic tube thoracostomy in which a drainage tube is inserted into the pleural cavity and it is connected to underwater seal. Most of the cases are cured by antibiotics and chest intubation and very few cases which don't respond to treatment, decortications is done in them. Pleural fluid may be transudative type having low protein content and exudative type with protein content more than. Congestive cardiac failure, nephritic syndrome and liver cirrhosis are causes of transudative pleural effusion while pneumonia, malignancy and tuberculosis are causes of exudative pleural effusion. In exudative pleural effusion ratio of pleural fluid protein to plasma protein is more than 0.5 and in transudative pleural effusion it is vice versa. In children pleural effusion mostly occurs due to infection. Staphylococcus aureus and streptococcus pneumoniae are very common bacterial causes of effusion secondary to pneumonia.⁵ Pleural effusion can also caused by viruses but it resolves by itself or with antibiotics and such patients are usually asymptomatic. Pleural effusion due to tuberculosis may be due to primary disease or reactivation of disease and usually occurs in school going children and adults. Patients with pleural effusion usually present with tachypnea, breathlessness, cough and fever. Other presenting complaints include loss of appetite, vomiting, chest pain and cyanosis occurs when blood oxygen saturation is decreased due to insufficient oxygenation in alveoli. When pleural effusion gets infected may convert to empyema, which require decortication.

Patiens and methods

This is a cross sectional study conducted in a tertiary care hospital Shahida Islam Teaching Hospital in Bahawalpur. This study was completed in duration of seven months. All pediatric patients up to five years of age admitted in study institution due to pleural effusion during study duration were included in this study. These cases were diagnosed with pleural effusion due to different causes. All Cases in this study were admitted in the pediatric ward of the study institution. Their hospital stay was 5-15 days mean hospital stay was 7 days. Those cases in which diagnosis was suspected but not confirmed, they were not included in the study. These cases were belonging to male and female both genders. Proper consent was taken from parents of the children and a written consent was also taken from the Medical superintendent for conducting study. They were admitted in pediatric ward from outpatient-door and emergency department. All relevant data was documented properly such as age, gender, presenting complaints, important points of history taken from parents and important findings on physical examination. All baseline investigations such as CBC, RFTS, LFTS, pleural fluid examination and chest x ray were done from within the study institution. Pleural tap was done in all cases and minimum 5 ml pleural fluid was taken and sent for examination to the hospital laboratory. Proper management gave included antibiotics, intravenous paed's solution and oxygen inhalation. Mechanical ventilation was done in few cases having difficulty in breathing with decreased blood oxygen saturation. Data was analyzed using Microsoft office and SPSS software version 2017. P value was less than 0.05. Results were calculated in the form of frequencies and percentages and expressed in the form of table and graphs.

Results

Total 105 cases were included in this study. Age range was from one month to 5 years with mean age of 2.7 years. There were 17(16.2%) cases below one year age, 30(28.6%) cases between 1-2 years, 19(18%) cases between 2-3 years, 23(21.9%) between 3-4 years and 16(15.2%) cases were between 4-5 years of age. Presenting signs and symptoms were Fever in 102(97%) cases, cough in 90(85.7%) cases, breathlessness in 79(75.2%), tachypnea in 84(80%) cases, Pallor in 65(61.9%), chest pain in 51(48.6%) cases, loss of appetite in 75(71.4%), vomiting in 38(36.2%) and cyanosis was reported in 27(25.7%) cases. This study was completed in duration of seven months. All pediatric patients up to five years of age admitted in study institution due to pleural effusion during study duration were included in this study. These cases were diagnosed with pleural effusion due to different causes. All Cases in this study were admitted in the

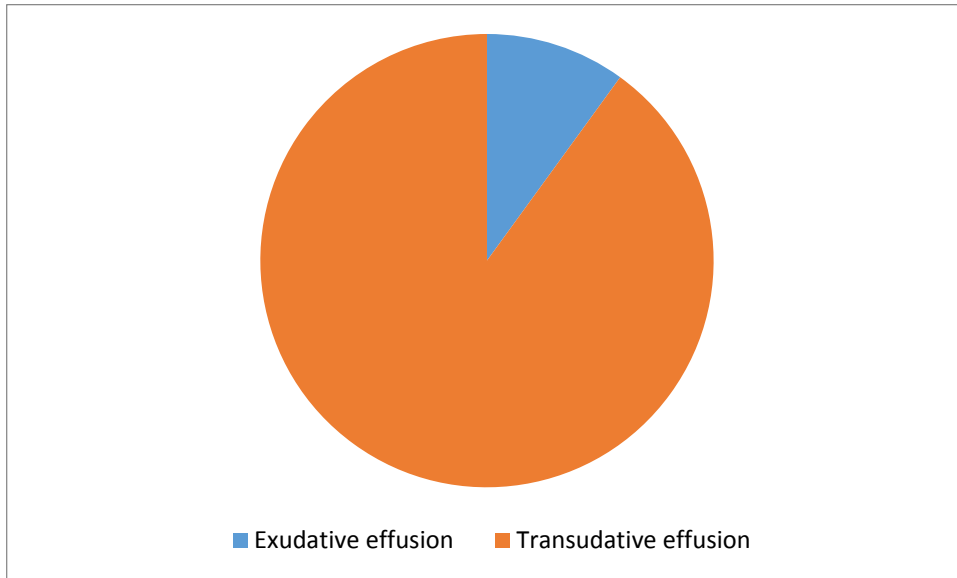


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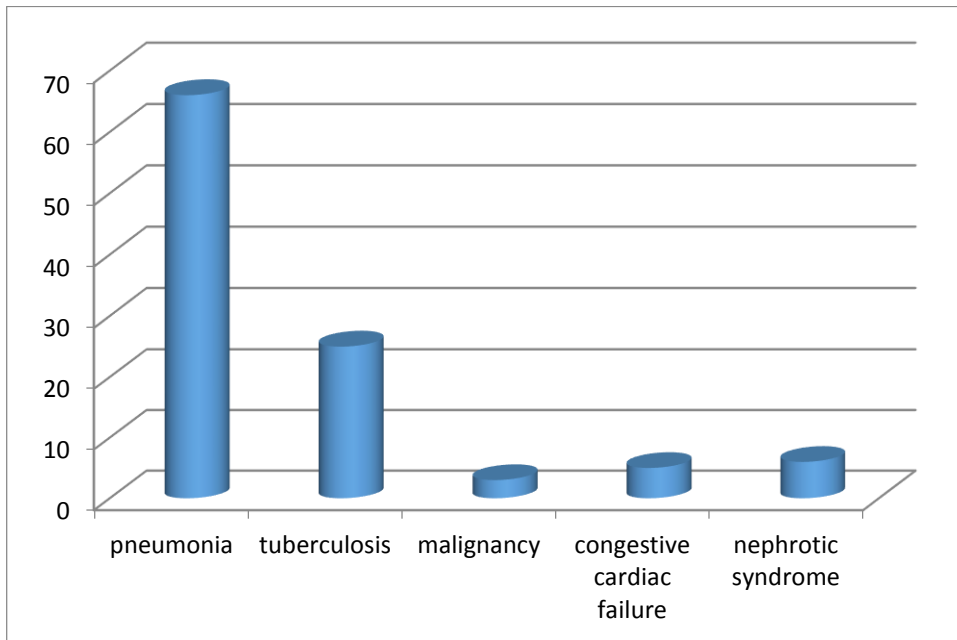
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pediatric ward of the study institution. Their hospital stay was 5-15 days mean hospital stay was 7 days. Those cases in which diagnosis was suspected but not confirmed, they were not included in the study. These cases were belonging to male and female both genders. Causes of pleural effusion found in study cases include pneumonia in majority cases 66(62.8%) followed by other causes such as tuberculosis in 25(23.8%) cases, malignancy in

3(2.8%), congestive cardiac failure in 5(4.8%) and nephritic syndrome in 6(5.7%) cases. There were 33% cases treated with antibiotics alone, 58% treated with antibiotics and chest intubation while in 8.5% cases decortication was done in which did not respond to conservative treatment. In 11(10.5%) cases transudative pleural effusion developed while in 94(89.5%) cases exudative type of effusion was present.



Graph-1. Frequency of both types of pleural effusion in study group



Graph-2. Frequency of pleural effusion risk factors in study group

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Table-1. Frequency of various signs and symptoms at the time of presentation

Presenting Complaints Of cases	Number of patients (n)	%
Fever	102	97
Cough	90	85.7
Breathlessness	79	75.2
Tachypnea	84	80
Pallor	65	61.9
Chest Pain	51	48.6
Loss of appetite	75	71.4
Vomiting	38	36.2
Cyanosis	27	25.7

Table-2. Age distribution of cases among study group

Age of patients	N	%
Below 1 years	17	16.2
1-2 years	30	28.6
2-3 years	19	18.1
3-4 years	23	21.9
4-5 years	16	15.2
Total	105	100

Discussion

In children pleural effusion occurs mainly due to bacterial pneumonia.⁶⁻⁸ This is exudative type of effusion. Total 105 cases were included in this study. Age range was from one month to 5 years with mean age of 2.7 years. This is a cross sectional study conducted in a tertiary care hospital Shahida Islam Teaching Hospital in Bahawalpur. This study was completed in duration of seven months. All pediatric patients up to five years of age admitted in study institution due to pleural effusion during study duration were included in this study. These cases were diagnosed with pleural effusion due to different causes. All Cases in this study were admitted in the pediatric ward of the study institution. Their hospital stay was 5-15 days mean hospital stay was 7 days. in 79(75.2%), tachypnea in 84(80%) cases, Pallor in 65(61.9%), chest pain in 51(48.6%) cases, loss of appetite in 75(71.4%), vomiting in 38(36.2%) and cyanosis was reported in 27(25.7%) cases. Initial treatment of pleural effusion in children is done with antibiotics after culture and sensitivity of pleural fluid.^{9,10} Cases not responding to medical treatment are underwent therapeutic tube thoracostomy in which a drainage tube is inserted into the pleural cavity and it is connected to underwater seal. Most of the cases are cured by antibiotics and chest intubation and very few cases which don't respond to treatment, decortications is done in them. Pleural fluid may be transudative type having low protein content and exudative type with protein content more than. Congestive cardiac failure, nephritic syndrome and liver cirrhosis are causes of transudative pleural

effusion while pneumonia, malignancy and tuberculosis are causes of exudative pleural effusion.¹¹ In exudative pleural effusion ratio of pleural fluid protein to plasma protein is more than 0.5 and in transudative pleural effusion it is vice versa.¹² These cases were belonging to male and female both genders. Proper consent was taken from parents of the children and a written consent was also taken from the Medical superintendant for conducting study. They were admitted in pediatric ward from outpatient-door and emergency department. All relevant data was documented properly such as age, gender, presenting complaints, important points of history taken from parents and important findings on physical examination. All baseline investigations such as CBC, RFTS, LFTS, pleural fluid examination and chest x ray were done from within the study institution. Pleural tap was done in all cases and minimum 5 ml pleural fluid was taken and sent for examination to the hospital laboratory. Proper management gave included antibiotics, intravenous paed's solution and oxygen inhalation. There were 33% cases treated with antibiotics alone, 58% treated with antibiotics and chest intubation while in 8.5% cases decortications was done in which did not respond to conservative treatment. In 11(10.5%) cases transudative pleural effusion developed while in 94(89.5%) cases exudative type of effusion was present. There is much need of doing research work on further causes of pleural effusion on a large population. Previous studies have shown that pleural effusion among paediatric group is equally common in developing



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and well developed countries although in developed countries health system is more developed and that's why there mortality rate among children below 5 years age is less as compared to Pakistan where

health system is not as good as should be. Policies should be made by government to built up children hospitals in all cities and peripheral areas as well. ¹³⁻¹⁵

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