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Original Research Article

Clinico- Bacteriological Profile of Pleural Effusion among Children in a Teaching Hospital of West Bengal

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Abstract

Introduction: Pleural effusion is a commonly encountered entity in paediatric practice in our country. It continues to be an important cause of morbidity in children despite immense advancement in modern medicine.

Aims and Objective: The study was carried out among hospitalized children to determine the clinical features and aetiology of pleural effusion and to find out antibiotic sensitivity pattern of the isolated bacteria from pleural fluid.

Materials and Methods: The present study was a single centred hospital based cross-sectional observational study, conducted in the paediatric inpatient department and PICU of Burdwan Medical College Hospital, Burdwan, West Bengal over a period of 1 year from May 2018 to April 2019. The study was conducted among hospitalized children of age group 1month to 12 years who achieved the inclusion and exclusion criteria.

Result: A total of 61 children with pleural effusion were included in the study. In the present study, pleural effusion was most commonly seen in the age group of ≥1year to < 5years (57.38%). Mean age of children with pleural effusion was 4.7± 2.8 years. Most common clinical feature of pleural effusion in this study was cough (98.36%) followed by fever (95.08%) and shortness of breath (68.85%). Among 61 patients 57.38% children had pallor at the time of admission. All patients with pleural effusion had dullness on percussion and diminished air entry on the affected side. Tachypnoea was present in 68.85% cases. Most frequent etiology of pleural effusion was found to be nontuberculous parapneumonic effusion (73.77%) followed by tuberculous pleural effusion (14.75%). Pleural effusion was associated with nephrotic syndrome in 6.56% cases and Dengue in 3.28% cases. Only 1 case of malignant pleural effusion (Non-Hodgkin lymphoma) was found. So, in 91.8% cases of pleural effusion infective etiology was revealed. Parapneumonic effusion was more common in right side (57.78%) than left one (42.22%). Bilateral involvement was encountered in pleural effusion with dengue and nephrotic syndrome. Among 45 cases of parapneumonic effusion, bacterial growth was detected in 17.78% of pleural fluid and in 15.56 % of blood culture. Distribution of organism in pleural fluid showed that *Staphylococcus aureus* was the predominant isolate followed by *Streptococcus pneumoniae*, *Klebsiella pneumoniae* and *Pseudomonas aeruginosa*. *Staphylococcus aureus* was the predominant (57.15%) isolate in blood culture also. All the *Staphylococcus aureus* strains were sensitive to both Vancomycin and Linezolid. One isolate in pleural fluid and 2 isolates in blood culture was found to be methicillin resistant strains. One isolate of *Streptococcus pneumoniae* showed resistance to penicillin as well as Amikacin and Ciprofloxacin. Other strains were sensitive to all the antibiotics tested. Single isolate of *Klebsiella pneumoniae* and *Pseudomonas aeruginosa* in pleural fluid, was found to be sensitive to Piperacillin-Tazobactum, Meropenem, Netilmycin and Levofloxacin (100%).

Conclusion: Thorough clinical examinations, early diagnostic thoracocentesis to isolate bacteriological agent from pleural fluid and blood are of immense help for appropriate diagnosis and management of children with pleural effusion.

Keywords: Pleural fluid, Paediatric population, Parapneumonic effusion.

Introduction

Pleural effusion and its complications are important causes of morbidity in children worldwide. Diagnosis and treatment of pleural effusion still remain a great challenge for the paediatricians. Part of the problem is due to the lack of evidences from paediatric trials. Most of the guidelines about pleural effusion are based on evidences from adult studies. But there are differences between paediatric and adult pleural effusions. Presentation and aetiology of paediatric pleural effusion differ significantly from adults due to prevailing co- morbid conditions in adults and so it is not appropriate simply to extrapolate adult data to children [1].

Pleural effusion in children has various aetiologies such as infections, congestive heart failure, nephrotic syndrome, malignancy etc, infectious aetiology being the most common one [2]. The incidence of parapneumonic effusion and empyema is 3.3/ lakh children and occur in 0.7% of children suffering from pneumonia [3].Recent studies reveal a rising trend in paediatric pleural effusion [3,4].

Clinical manifestations in children are variable depending on the underlying disease, size, and location of the effusion. Children may present with fever, cough, shortness of breath, chest pain, abdominal pain etc. Nonspecific symptoms like malaise, loss of appetite, weight loss may also be the clinical presentations. Physical findings like decreased vocal fremitus, dullness on percussion, and reduced breath sound over the affected area are very important features, but these signs may be difficult to appreciate in infants and small children, especially if the effusion is small. Therefore, radiological confirmation of pleural effusion by chest X ray and ultrasonography followed by diagnostic thoracocentesis and laboratory evaluation of pleural fluid as well as blood are essential for determination of aetiology and definitive management of the children [1].

Several studies revealed that microbial etiology of pleural effusion has changed over the past few decades with increasing incidence of methicillin resistant Staphylococcus [5] and penicillin resistant Streptococcus pneumoniae [6]. Prevalence of drug-resistant strains limit the choice of antibiotic therapy in paediatric population. In addition to that optimal management in children is often controversial, especially the duration of parenteral antibiotics and the role of surgery [1]. Current treatment of pleural effusion in children is highly variable because of the differences of providers' experience as well as the availability of newer therapeutic modalities in the concerned institution.

Newer therapies like fibrinolysis and Video Assisted Thoracoscopic Surgery have made the issue even more complex [7,8]. In this context, the study was carried out to reveal clinical presentation, to search out the aetiology and to explore microbiological agents responsible for pleural effusion along with their antibiotic sensitivity pattern. These would guide us to use appropriate antibiotics and to formulate further management strategies.

Materials and Methods

Hospital based single centred cross-sectional observational study was done in Department of Paediatrics, Burdwan Medical College and Hospital, Burdwan, West Bengal over a period of 1 year, May 2018-April 2019. The study was conducted on clinically suspected and Radiologically (Chest X Ray /USG) confirmed cases of pleural effusion among children of 1 month to 12 years age group admitted in Paediatric indoor ward and Paediatric Intensive Care Unit (PICU) of Department of Pediatrics. Hospitalized children, who had presented with the clinical sign (s) of pleural effusion (diminished chest excursion on the affected side, fullness of the intercostal spaces, shifting of mediastinum to the contralateral side, dullness on percussion, diminished breath sounds on auscultation) along with chest X ray PA view finding (obliteration of the costophrenic angle, homogeneous opacification of the lung field with or without mediastinal shift to the contralateral side, a rim of fluid ascending the lateral chest wall (meniscus sign)/ USG finding (presence of excess fluid in the pleural space) suggestive of pleural effusion were included in the study. Traumatic thoracocentesis, small /inadequate amount of pleural fluid in which all the parameters could not be studied, were excluded from the study.

After admission, a detailed history was taken and patients were examined clinically. All the clinically suspected cases were confirmed by chest X-Ray PA view and lateral decubitus chest X-Ray (if required) and ultrasonography. Those having pleural fluid thickness more than 10mm in lateral decubitus chest X-Ray or USG chest were accepted for USG guided diagnostic thoracocentesis [9]. Pleural aspiration was carried out in a clean area using full aseptic technique after getting written consent from parents/guardian. Approximately 20 -50 ml of pleural fluid was aspirated slowly using 21G needle.

Aspirated pleural fluid was sent to different laboratories at earliest (within 2 hours) for evaluation. To search for the microbiological aetiology of pleural effusion, pleural fluid was processed in Microbiology Laboratory as per standard protocol and antibiotic sensitivity was done on Muller Hinton media following Kirby Bauer Disc Diffusion methods in accordance with the CLSI guideline. For detection of Mycobacterium tuberculosis, pleural fluid along with sputum sample

was sent for ZN stain and CBNAAT.

Blood culture and antibiogram were done following same procedure as pleural fluid.

Statistical Analysis Plan

The data were compiled, tabulated in Microsoft excel 2007 and analyzed by InStat Graph Pad version 3.10 statistical software. Categorical data were compared by Chi –square test, and numerical data with normal distribution were compared by ANOVA, data not showing normal distribution were compared with Mann Whitney U test or Kruskal Wallis test as indicated. p value <0.05 was considered as statistically significant. Alpha error of 5% and Beta error 20% were taken with a confidence level of 95%.

Result

A total of 61 children with pleural effusion were included in the present study following total enumeration method.

Table 1: Age distribution of children with pleural effusion (N=61)

Age	Number of patients	Percentage %	95% CI	Mean age = 4.7 ± 2.8 Years
>1month - <1 year	6	9.84	3.7-20.2	
≥1year – < 5years	35	57.38	44.1-70.0	
≥5 years – <10 Years	16	26.23	15.8-39.1	
≥10years - 12years	4	6.55	1.8-15.9	
Total	61	100.00		

In the current study, pleural effusion was most commonly seen in the age group of ≥1year to < 5years (35/61=57.38%) (Table 1). Mean age of children with pleural effusion was 4.7 ± 2.8 years.

Table 2: Comparison of Clinical Feature on admission

Clinical presentation	Kosar A et al [16] 2008	Gomez Go GD et al [17] 2005-2009	Das I et al [14] 2011-2013	Kargar Maher et al [18] 2004-2014	Present Study 2018- 2019
Fever	87%	90%	90%	53.19%	95.08%
Cough	79%	69%	66%	40.42%	98.36%
Shortness of breath	58%	67%	96%	60.63%	68.85%
Chest pain	46%	26.4%	32%	19.14%	31.15%
Abdominal pain	24%	9.4%	--	19.14%	8.20%

Most common clinical feature of pleural effusion in this study was cough (98.36%) followed by fever (95.08%) and shortness of breath (68.85%). Chest pain and abdominal pain were present in 31.15% and 8.2 % cases respectively (Table 2).

Table 3: Clinical Presentation at General Physical Examination

General Physical Examination	Number of patients N=61	Percentage %	95% CI
Pallor	35	57.38	44.1-70.0
Cyanosis	0	0.00	00- 0.059*
Icterus	2	3.26	0.4 -11.3
Clubbing	1	1.64	00- 8.8
Oedema	8	13.11	5.8-24.2
Shock	1	1.64	00- 8.8
Hypertension	1	1.64	00- 8.8

***One sided 97.5% CI**

Among 61 patients 35 children (57.38%) had pallor at the time of admission, 8 children (13.11%) had oedema, 2 children (3.26%) had icterus. Clubbing, shock and hypertension were found in 1.64% of children with pleural effusion. Shock was detected in a child of Dengue shock syndrome and hypertension was documented in a child of steroid resistant nephrotic syndrome. No children had cyanosis on admission (Table 3).

In the present study, all patients with pleural effusion had dullness on percussion and diminished air entry on the affected side. Tachypnoea was present in 68.85% cases. Mediastinal shift to contralateral side and chest wall retraction were observed in 29.51% and 21.31% cases respectively. Bronchial breath sound at the upper border of pleural effusion was present in 13.11% cases only (Table 4).

Table 4: Respiratory findings of pleural effusion in children

Respiratory Findings		Number	Percentage
Tachypnoea		42	68.85
Chest wall Retraction		13	21.31
Mediastenal shift to contralateral side		18	29.51
Dullness on percussion	Right	33	54.1
	Left	23	37.7
	Bilateral	5	8.2
Reduced Air entry	Right	33	54.1
	Left	23	37.7
	Bilateral	5	8.2
Bronchial breath sound		8	13.11

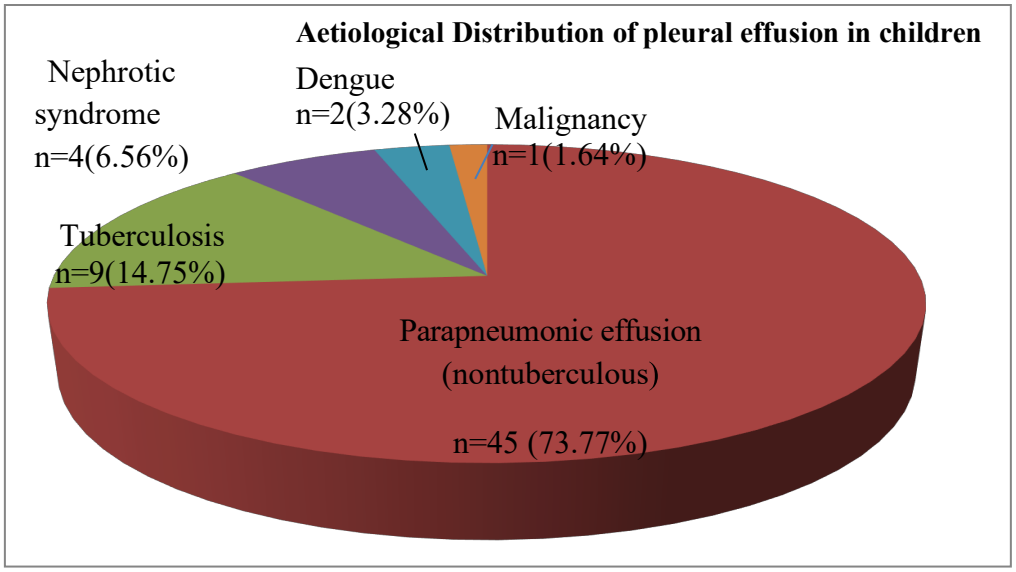

Figure 1: Aetiological Distribution of pleural effusion in children

In the current study most common etiology of pleural effusion was found to be nontuberculous parapneumonic effusion (45/61=73.77%) followed by Tuberculous pleural effusion (9/61=14.75%). Pleural effusion was associated with nephrotic syndrome in 6.56% cases and Dengue in 3.28% cases. Only 1 case of malignant pleural effusion (Non Hodgkin lymphoma) was found (Fig1). Infective etiology was revealed in 56/61(91.8%) of pleural effusion.

Table 5: Anatomical distribution of pleural effusion according to etiology

Aetiology	Right sided pleural effusion	Left sided pleural effusion	Bilateral pleural effusion
Parapneumonic (nontuberculous) n=45	26	19	0
Tuberculosis n=9	5	4	0
Nephrotic syndrome n=4	0	0	4
Dengue n=2	1	0	1
Malignancy n=1	1	0	0
Total N=61	33	23	5

Parapneumonic effusion was more common in right side (26/45=57.78%) than left one (19/45=42.22%). Right preponderance was seen in all the etiologies except pleural effusion due to nephrotic syndrome where bilateral involvement were seen in all the cases. Among the 2 cases of pleural effusion due to dengue one showed bilateral involvement (Table 5).

Among tuberculous pleural effusion Acid Fast Bacilli was not detected in any of the pleural fluid sample whereas sputum microscopy showed Acid Fast Bacilli in 22.22% (2/9) cases of tuberculous effusion.

Microbial agents were detected in 11.11% cases of parapneumonic pleural effusion by Gram stain. Three Gram Positive cocci and two Gram negative Bacilli were identified in Gram stain. Among 45 cases of parapneumonic effusion, bacterial growth was detected in 8 samples (17.78%) of pleural fluid sent for culture sensitivity (Table 6).

Table 6: Yield of Gram staining in pleural fluid aspirates among Parapneumonic pleural effusion (N=45)

Pleural Fluid	Number	Percentage (%)
Gram Stain positive	5	11.11
Gram Stain Negative	40	88.89
Total	45	100

Distribution of organism in pleural fluid shows that *Staphylococcus aureus* was the predominant isolate (4/8=50%) followed by *Streptococcus pneumoniae* (25%), *Klebsiella pneumoniae* and *Pseudomonas aeruginosa* (12.5% each) (Fig 2).

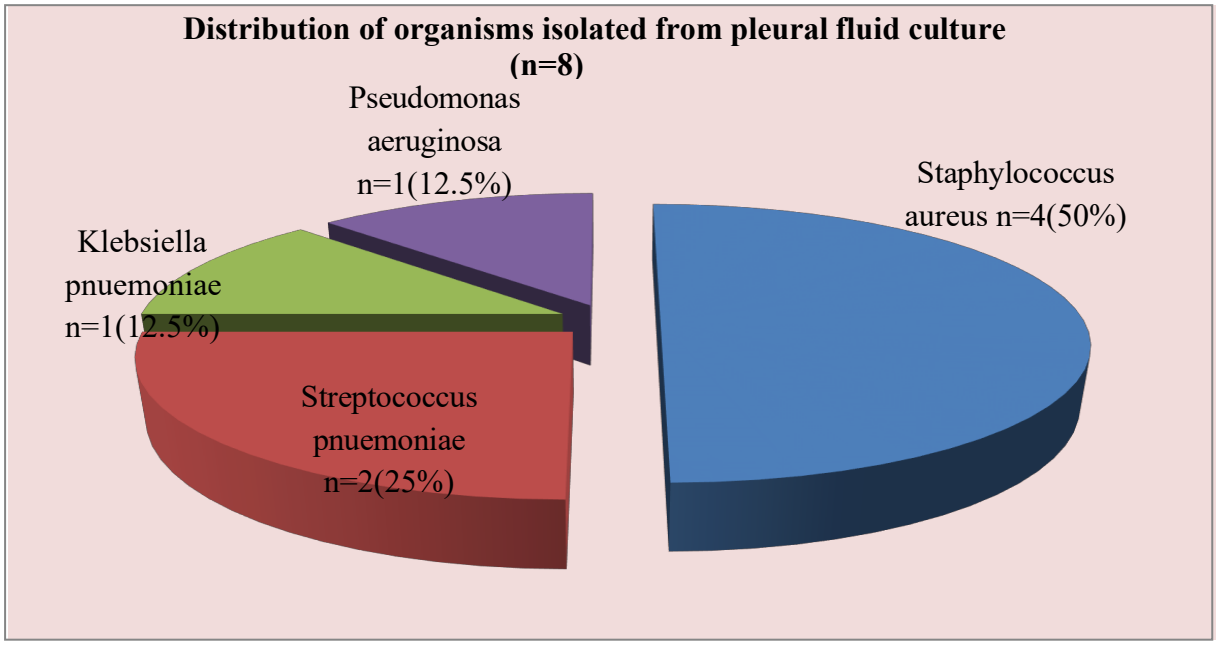

Figure 2: Distribution of organisms isolated from pleural fluid culture (n=8)

Among 45 cases of Parapneumonic effusion, blood culture was positive in 7 patients (15.56%). *Staphylococcus auerus* was the most common organism isolated from blood (4/7=57.15 %%) followed by *Klebsiella pneumoniae* (28.57%), and *Streptococcus pneumoniae* (14.28%) (Fig 3).

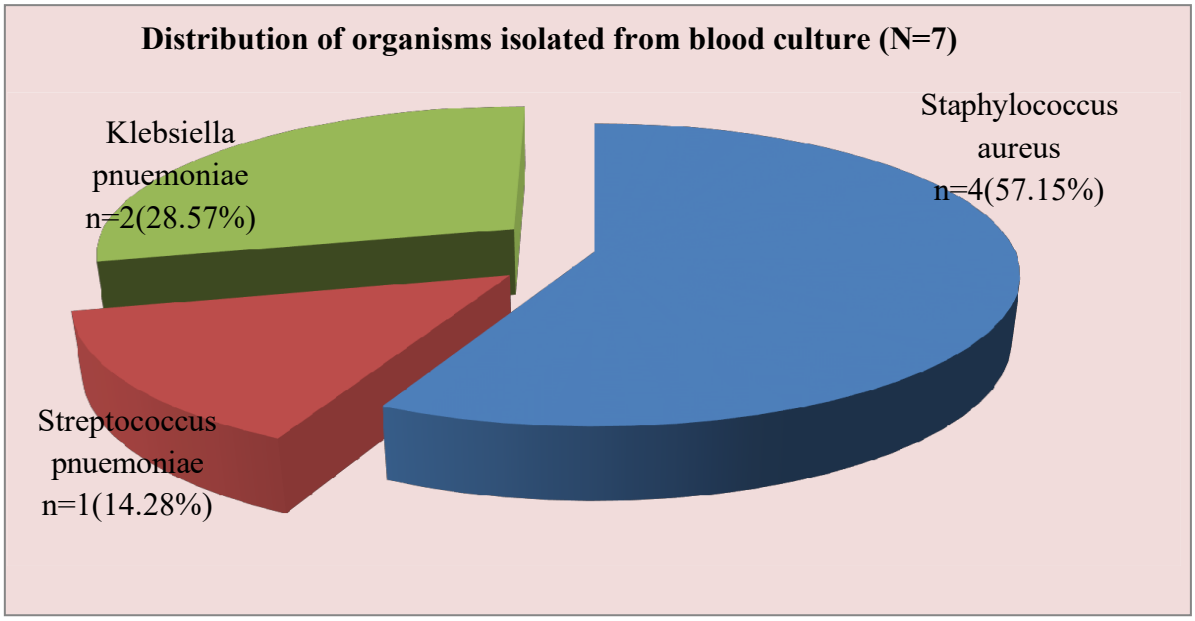

Figure 3: Distribution of organisms isolated from blood culture (N=7)

In two children with pleural effusion, similar organisms (Staphylococcus aureus) were isolated both from pleural fluid as well as blood culture. Other five cases where blood culture were positive, pleural fluid were found to be sterile.

Staphylococcus aureus isolated from pleural fluid and blood showed 100% sensitivity to Linezolid and vancomycin. 75% sensitivity to Netilmycin and Cloxacillin. Low sensitivity was found to Ampicillin, 3rd generation cephalosporins and cotrimoxazole. Two isolates of *Staphylococcus aureus* from blood were identified as Methicillin resistant strains (MRSA).

Streptococcus pneumoniae was found 100% sensitive to Co-amoxyclav, Piperacillin-Tazobactum, Meropenem, Cephalosporines, Levofloxacin, Cotrimoxazole, Cloxacillin, Vancomycin and Linezolid. One isolate of *Streptococcus pneumoniae* showed resistance to Ampicillin, Amikacin and Ciprofloxacin.

Isolates of *Klebsiella pneumoniae* both from Pleural fluid and blood, was found sensitive to Piperacillin-Tazobactum, Meropenem, Cefepime, Netilmycin and Levofloxacin.(100%) but both the isolates were resistant to Ampicillin, Co amoxyclav, Ceftazidime, Ceftriaxone, Cotrimoxazole and Ciprofloxacin. Pseudomonas aeruginosa was found sensitive to Piperacillin-Tazobactum, Meropenem, Ceftazidime, Netilmycin and Levofloxacin. (100%).

Discussion

Pleural effusion is a quite commonly encountered entity in paediatric practice in India. It is an important cause of morbidity in children despite immense advances in modern medicine.

In the current study, pleural effusion was most commonly seen in the age group of ≥1year to < 5years (35/61=57.38%). Mean age of children with pleural effusion was 4.7 ±2.8 years. Lingayat AM et al [10] Pikle A S et al [11], Kumar P et al [12] and Baranwal AK et al [13] reported similar age distribution. But in a study by Das I et al [14] in Kolkata Mean age was found 6.36 years ±3.61 whereas in a study of Canada, mean age was observed to be 7.2 years [15]. The higher incidence of pleural effusion in children aged 1 to 5 years can partly be explained by the higher incidence of Staphylococcal and Streptococcal pneumonia in this age group and infection being the most common cause of pediatric pleural effusion throughout the world [Table1].

Most common clinical feature of pleural effusion in this study was cough (98.36%) followed by fever (95.08%) and shortness of breath (68.85%). Kosar A et al [16] Kumar P et al [12] and Gomez Go GD et al [17] reported fever as the most common clinical symptom followed by cough. But Das I et al [14] and Kargar Maher et al [18] observed shortness of breath as the most common clinical feature followed by fever. Prior medication and variation in the underlying etiology may be the cause of differences in the presenting clinical features among different study group [Table 2].

Among 61 patients 35 children (57.38%) had pallor at the time of admission. Eight children (13.11%) had oedema, 2 children (3.26%) had icterus. Das I et al [14] in Kolkata reported both anemia and oedema in 10% cases among children with pleural effusion. Higher incidence of anemia in the present study may be due to difference in underlying etiology, nutritional and socioeconomic status in this study population [Table 3].

In the present study, all patients with pleural effusion had dullness on percussion and diminished air entry on the affected side. Tachypnoea was present in 68.85% cases. Bronchial breath sound was present in 13.11% cases only. Variability of clinical features can be explained by the difference in age of the patient, immune status of the patient, underlying etiology, amount of accumulated pleural fluid, prior treatment etc[Table 4].

In current study parapneumonic effusion was more common in right side (26/45=57.78%) than left one (19/45=42.22%). Right preponderance was seen in all the etiologies except pleural effusion due to nephrotic syndrome where bilateral involvement was seen in all the cases. Among the 2 cases of pleural effusion due to dengue, one showed bilateral involvement [Table 5]. Kosar A et al [16], Mangete et al [19] and Kumar P et al [12] also reported right preponderance of pleural effusion in their study.

In the present study most common etiology of pleural effusion was found to be parapneumonic effusion (45/61=73.77%) followed by Tuberculous pleural effusion (9/61=14.75%). This finding corroborated closely with the result of Das I et al [14] in Kolkata where empyema (52%), followed by tuberculous pleural effusion (26%) were the leading causes of childhood pleural effusion. Prevalence of tuberculosis in the study region may affect the incidence of tuberculous pleural effusion. Saliya MP et al in Gujrat [20], Lingayat A.M et al [10] in Maharastra and Alkrinawi Set al [15] in Canada also found papapneumonic effusion to be the most common cause of pleural effusion in children. Studies in Kolkata[14] and Gujrat[20] documented Dengue fever complicated with pleural effusion 8% and 5.88% respectively. Though very few, but malignancy has also been reported as an etiology of pleural effusion in different studies in India and abroad [14,15,20] [Fig1].

In current study parapneumonic effusion was most commonly (68.89%) seen in the age group of ≥1 - <5 years (Mean age was 3.6 ±1.7 yrs). In infancy parapnuemonic effusion was the only cause found for pleural effusion. This was in accordance with the study in Brazil where mean age of 2.7 ±2.4 years was observed in the parapneumonic effusion cases [21]. All the cases of Tuberculous pleural effusion were seen in ≥5 years of age (Mean age was 9.57 ±1.42 years) in the current study while mean age of

tubercular pleural effusion was 11.62 years in the study by Saliya M P et al [20]. Munoz-Almagro C et al [22] showed that tuberculous pleural effusion generally develops in adolescents and are unusual in the preschool-aged child. There is significant correlation among age and etiology (p value <0.0001) of pleural effusion in the present study which corroborates the finding in the study done by Das I et al [14].

Among 61 patients, presented with pleural effusion 58 (95.08%) were treated with either oral or parenteral antibiotic prior to admission. This might contribute to lesser detection of Microbial agents from pleural fluid as well as blood. Tuberculous pleural effusion occurs mainly due to delayed hypersensitivity reaction to tubercular protein and this may be one explanation of poor yield of ZN stain [23].

In the present study, bacterial growth was detected in 8 samples (17.78%) of pleural fluid among 45 cases of parapneumonic effusion. A study by Das I et al [14] in Kolkata reported 48.27% (14/29) and another study by Pawan Kumar et al [12]in Imphal stated 56.7% culture positivity in pleural fluid which is much higher than the yield of the current study. Pleural fluid culture positivity in different studies varied widely from 8-76% [24,25,26]. Lower yield of pleural fluid culture in this study might be due to prior use of antibiotics before admission and delay in referral to the concerned teaching hospital from the remote peripheral health care facility. Persistent presence of bacteria may not be necessary to sustain the ongoing inflammatory response after the initial bacterial invasion and this could be another explanation of the lower rate of isolation of bacteria from pleural fluid [14]. Among the isolates, *Staphylococcus aureus* was the predominant one (4/8=50%) followed by *Streptococcus pneumoniae* (25%), *Klebsiella pneumoniae* and *Pseudomonas aeruginosa* (12.5% each). Result of the current study was in concordance with the findings of the study by Das I et al [14] in Kolkata and Pawan Kumar et al [12] in Imphal where, *Staphylococcus aureus* was reported to be the most common organism isolated. In another Indian study by Kumar L et al [27], *S. aureus* was found to be the most common organism followed by *S. pneumoniae*, *Klebsiella* sp and *S. faecalis*. But in a study in Rajshahi Bangladesh [28], *Streptococcus pneumoniae* was identified as the main causative organism of pleural effusion and *Haemophilus influezae* Type B was recognized as the most common organism followed by *Staphylococcus aureus* in a study in Canada [15]. A study in Pakistan reported the higher frequency of tuberculous effusion than parapneumonic effusion in their set up [29]. In developing countries over all rate of tuberculous pleural effusion is more than the developed countries. Poverty, overcrowding, decreased accessibility to health care facility and poor compliance to anti-tuberculous drugs may contribute to higher incidence of tuberculous pleural effusion in developing countries [29] [Fig 2].

Difference in the microbiological etiology of pleural effusion may be due to geographical variation of predominant pathogenic organisms. Vaccination policy in different countries, antibiotic administration pattern also contribute to the variability of the causative agents.

In the present study, *Staphylococcus aureus* showed 100% sensitivity to Linezolid and vancomycin. Low sensitivity was found to Ampicillin, 3rd generation cephalosporins and cotrimoxazole. One isolate of *Staphylococcus aureus* was reported as methicillin resistant (MRSA). Some other studies have confirmed the rise of Methicillin Resistant Staphylococcus aureus (MRSA) as the etiology of pediatric pleural effusion [13,17,30].

In the curremt study, among 45 cases of parapneumonic effusion, blood culture was positive in 7 cases (15.56%) only. Blood culture positivity in pleural effusion patients varies from 10% -22% [3,17,31] which was similar to the current study. In a study by Falade et al [31] and Gomez- Go G D et al [17] blood culture was positive in 18% and 18.56% cases respectively with predominance of *Staphylococcus aureus*. Comparable result was observed in the present study, where *Staphylococcus aureus* was the most common isolate (4/7=57.15%) followed by *Klebsiella pneumoniae* and *Streptococcus pneumoniae*. In another study in Brazil [21] *Streptococcus pneumoniae* was isolated from blood culture in most of the cases (73.4%) followed by *Staphylococcus* sp and *Haemophilus influenzae* (13.3% each) [Fig-3].

In the present study, *Staphylococcus aureus* showed 100% sensitivity to Linezolid and vancomycin. Two isolates of *Staphylococcus aureus* were identified as Methicillin resistant strains (MRSA). No incidence of penicillin resistance in *Streptococcus pneumoniae* was observed in the study. *Klebsiella pneumoniae* showed 100% sensitivity to Piperacillin-Tazobactum, Meropenem, Cefepime, and Netilmycin. In a study in Philipines 17 6.25% of total blood culture isolates were found to be MRSA but Penicillin resistance was not detected among *Streptococcus pneumoniae*. Difference in the antibiotic sensitivity pattern among different studies may be due to geographical variation in the prevalent organisms and the extent and inequality of antibiotic use in different set up.

Limitation of the Study

The sample size of the present study was quite small, and it was conducted in a single centre, on a single ethnic group of study population (predominantly Bengali) and there was a lack of some investigation facilities like Tuberculosis culture & viral PCR.

Conclusion

Pleural effusion is a challenging entity commonly encountered in paediatric practices. It significantly differs from adult pleural effusion in terms of clinical presentations, etiology and management. Present cross sectional single centred observational study concluded with the observation that pleural effusion was most commonly seen in the age group of ≥1year to < 5years. Most common clinical feature of pleural effusion was cough, followed by fever. Dullness on percussion and diminished air entry on the affected side were the most common signs in respiratory system. Parapneuminic effusion was the most common etiology of paediatric pleural effusion but yield of bacterial growth from the diagnostic thoracocentesis is quite low.

Staphylococcus aureus was the most common organism and drug resistance was not uncommon among the isolates. With the variability in the clinical presentation and vulnerability of the population early and accurate diagnosis of the pleural effusion in children is the urgent need. Prudent use of pleural fluid analysis provides high diagnostic yield and guide targeted therapy. This study highlights that early recognition and etiology-based intervention render a promising outcome and mitigate prolonged suffering of the children.

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