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A STUDY OF CLINIC- ETIOLOGICAL PROFILE IN CHILDREN WITH PLEURAL EFFUSION

Medical Science

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KEYWORDS

INTRODUCTION

Pleural effusion primarily occurs because of imbalance in hydrostatic and oncotic pressure, increased capillary permeability and impaired lymphatic drainage.

Classifying pleural fluids into exudates and transudates is important as it indicates underlying pathophysiological process involved, allowing appropriate investigations to be instigated enabling better patient management.2 Light et al has established criteria for demonstrating high degree of diagnostic accuracy for differentiating transudates and exudates.3 Most common cause of Pleural effusion in children is bacterial pneumonia, other causes are tuberculosis, dengue, heart failure, nephrotic syndrome, diaphragmatic abscess, rheumatic and rheumatoid diseases, uremia and pancreatitis..

METHODS

A prospective cross sectional study of 34 patients diagnosed provisionally as pleural effusion and admitted in the department of pediatrics was carried out from December 2016 to November 2017.

A written consent was obtained and the study was approved by the college ethical committee. Patients of age from 1 year to 17 years of age of either sex were included in the study in whom thoracocentesis can yield minimum amount of pleural fluid required for diagnosis and culture. Detailed history, general physical, systemic examination and investigations were performed. Patients were explained about the procedure in detail. With all aseptic precautions ultrasonography guided pleural fluid aspiration was done with a 20 c.c. syringe, care was taken to protect neuro-vascular bundle and for any complication that could occur.

Punctured site was sealed after procedure and patients were observed for vitals and any complications for further four hours. Investigations such as hemoglobin, total and differential counts, ESR, Blood culture, SGOT, SGPT, Serum Proteins, Blood urea and creatinine, Serum LDH (Lactic dehydrogenase), X-ray chest, Ultrasonography of thorax, Mountoux test and other investigations as required were performed. Aspirated Pleural fluid was examined for physical appearance, and was sent to institutional laboratory for microscopic examination gram staining, AFB staining, biochemical analysis such as LDH, ADA and CBNAAT (Cartridge based nucleic acid amplification test), culture and sensitivity. Data were statistically analyzed using SPSS 20 and open EPI software, p value <0.05 was taken as test for significance, student t-test for comparison of two groups and ANOVA for comparison of more than two groups.

RESULTS

Total 34 patients were included in the study. Male (56%) to female (44%) ratio was 1.26:1. Age group comprised of 6-10 years (32%) followed by 11-15years (26.5%) and 1-5 years (23.5%) and >15 (18%). Out of 34 patients of pleural effusion, parapneumonic (13), empyema (9), tubercular (8), dengue fever (2), pancreatitis (1) and undiagnosed (1) (Table 1).

Table 1. etiological diagnosis of pleural effusion

Diagnosis	Male	Female	Total	Percentage
Tuberculosis	4	4	8	
Parapneumonic	8	5	13	
Empyema	3	6	9	
Dengue Fever	2	0	2	
Panceatitis	1	0	1	
undiagnosed	1	0	1	

Maximum no. of patients had parapneumonic effusion (38.23%) followed by empyema (26.47%) and tubercular (23.50%). On comparing mean age in tubercular and non-tubercular pleural effusion it was statistically insignificant (p>0.05).

Table 2. camparision of trasudate and exudate in various etiology.

Diagnosis (no. of cases)	Transudate	Exudate
Tuberculosis(8)	0	8
Parapneumonic (13)	0	13
Empyema (9)	0	9
Dengue fever (2)	2	0
Pancreatitis (1)	0	1
Undiagnosed (1)	1	0
Total	3	31
Percentage	8.8%	91.2 %

Pleural fluid was exudative in origin in (91.2%) and transudative in (8.8%) patients (Table 2).

Exudate were observed in majority of cases (82.35%), it was (100%) in tubercular and empyema, whereas (77%) in parapneumonic effusion.

Table 3. Comparision of biochemical parameters in different types of pleural effusion

Diagnosis	Pleural fluid protein/serum protein		Pleural fluid LDH/serum LDH		Pleural fluid glucose (mg/dl)		Pleural fluid ADA I.U /L	
	<0.5	>0.5	<0.6	>0.6	<60	>60	<40	>40
Tuberculosis	0	8	1	7	5	3	1	7
Parapneumonic	1	12	1	12	5	8	10	3
Empyema	0	9	0	9	9	0	0	9
Dengue fever	2	0	2	0	0	2	2	0
Pancreatitis	0	1	0	1	1	0	1	0
Undiagnosed	1	0	1	0	1	0	1	0

Exudates were observed in majority of cases (82.35%), it was (100%) in tubercular and empyema, whereas (77%) in parapneumonic effusion. Pleural fluid protein / serum protein ratio was >0.5 in 88.23% of all patients, it was 100% in tubercular effusion and empyema and 92.3% in parapneumonic effusion whereas, it was <0.5 in dengue and an undiagnose patient.

Pleural fluid LDH /Serum LDH ratio was >0.6 in 85.29% of patients and 100% in empyema 87.5% tubercular effusion and 92.3% in

parapneumonic effusion. Thus, in majority of patients Lights criteria for exudates were satisfied. The sensitivity of pleural fluid/serum protein ratio, pleural fluid / serum LDH, pleural fluid LDH and was 96.77%, 93.54% and 96.77% respectively whereas Specificity was 100% in all Table 3.

Positive predictive value was 100% in all three parameters, negative predictive value was 75% in pleural fluid/Serum protein and pleural fluid LDH, whereas it was 60% in pleural fluid /Serum LDH. In 61.76% of patients pleural fluid glucose was<60mg/dl of which maximum number of patients were of tuberculosis (62.5%).

In 55.88% of patients pleural fluid ADA was >40 I.U. majority of patients in this category was of tuberculosis (87.5%). The sensitivity, specificity, positive predictive value and negative predictive value of ADA (>40 I.U.) in tuberculosis were 87.50% ,82.35, 70% and 93.33% respectively.

DISCUSSION

Pediatric pleural effusion is most commonly seen in males and younger children.4 Male patients were more than females and most common age group in this study was also 6 to 10 years (32%) followed by 11 to 15 years (26.5%) whereas in Hasan et al 65% of patients were within 4 years and in Memon et al median age was 5-8 years.5,6 Males were (56%) and females (44%) male predominance was also seen in Hasan et al and Memon et al study.6 On comparing different types of pleural effusion in this study parapneumonic effusion (38.23%) was more common than tubercular pleural effusion (23.50%) a similar finding as in Maher et al study.7 Mean age for tubercular effusion was 11.62 years which is comparable to Merino et al having mean age of 13.52 years.8 Mean age for parapneumonic effusion was 9.76 years while it was 9 years in Devota et al.9

Majority of the patients satisfied Lights criteria for transudate and exudates in this study. Sensitivity and specificity of various parameters (ratios) were tested to differentiate between transudate and exudates it was found that ratios of Pleural fluid and serum protein, pleural fluid and serum LDH and pleural fluid LDH were sensitive (97%, 93% and 97% respectively). Total number of patients in this study was 34, studies with more number of patients may be more conclusive and beneficial.

CONCLUSION

Pleural effusion was most common in younger age. Parapneumonic effusion was most common cause among all types of effusionMajority of effusion were exudative in origin than transudates and satisfied light's criteria.

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