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To Study the Clinical Profile of Empyema Thoracis in the Patients Admitted in Government Hospital for Chest and Communicable Diseases, Visakhapatnam, A.P.

Medical Science

KEYWORDS : Pyothorax, Pneumonia, Bronchiectasis, Pleural Biopsy

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INTRODUCTION

Empyema thoracis also called pyothorax, is the accumulation of pus within the pleural cavity.The pus is usually thick, creamy, and malodorous. If empyema occurs in the setting of underlying suppurative lung disease, i.e., pneumonia, lung abscess or bronchiectasis, it is referred to as a parapneumonic empyema which is found in of about 60% of cases. Pyothorax is the end stage of pleural infection for any reason. It can occur as a complication of any thoracic operation.It may be associated with pus under the diaphragm. Empyemas are divided into three phases based on their natural history; acute exudative, fibrinopurulent, and chronic organizing.The complications of empyema thoracis are classified in two ways, as acute and chronic.Acute complication are bronchopleural fistula, septicemia, empyema necessitans, and chronic complications are suppurative pericarditis, endocarditis, myocarditis and arthritis, mediastinal abscess, thoracic deformity, calcification in the pleural space, amyloid disease, metastatic cerebral abscess, massive gangrene of chest wall and anemia.

AIM OF THE STUDY: To study the clinical profile of empyema thoracis in the patients admitted in Govt. Hospital for Chest and CD, Visakhapatnam from January 2014 to September 2015.

OBJECTIVES OF THE STUDY

1. To study the modes of presentation,aetiology ,risk factors, modalities adapted for the management of empyema thoracis

MATERIALS AND METHODS:

Study design : Hospital based prospective study

Sample size : 50 patients diagnosed as empyema or pyopnemothorax

Study period : from january2014 to september2015

INCLUSION CRITERIA: Patients aged more than 14 years with clinical evidence of infection on the basis of fever and pleural effusions and who fulfilled the following criteria:

frank pus or purulent appearing fluid on diagnostic aspiration,positive pleural fluid culture,positive fluid gram stain

EXCLUSION CRITERIA:

Empyema secondary to penetrating or blunt trauma, oesophagectomy ,associated with connective tissue disorders

INVESTIGATIONS:

BLOOD: CBP,RBS,LFT,ESR,RFT

SPUTUM

1. Culture and sensitivity for pyogenic organisms.
2. Direct and concentrated smears for AFB Modified Ziehl-Neelsen staining.
3. Trophozoites of Entamoeba histolytica when there is a suspicion of hepato Pleuro-pulmonary ameobiasis.

PLEURAL FLUID: Pleural fluid was aspirated with aseptic precautions and the following investigations were performed.

1. Macroscopic appearance: colour, consistency.
2. Bacteriological Gram's stain and culture sensivity
3. Direct and concentrated smears AFB using ziehl neelsen method.
4. Pleural fliud for TC,DC,protein,sugar.
5. Culture for AFB using solid and liquid cultures
6. For trophozoites of entamoeba histolytica in suspected cases of Hepato-Pleuro-pulmonary amoebiasis.
7. Pleural fluid amylase if necessary.

CHEST X-RAY: Chest x-ray PA view and in selected patients Lateral view were taken

PLEURAL BIOPSY: it is done by using Abram's pleural punch biopsy, only when diagnosis could not be arrived with all other investigations.

ULTRASOUND: done in hepato-Pleuro pulmonary amoebiasis and to detect loculations and in suspected cases of pancreatitis.

CT CHEST AND CT WITH ORAL CONTRAST: if necessary.

ANAEROBIC CULTURES WERE NOT DONE DUE TO LOGISTICS.

STASTICAL ANALYSIS:

Data were transferred from data collection sheets to an Excel spread sheet (Microsoft, Redmond, WA, USA). Simple statistics such as percentages were used to calculate the prevalence.

RESULTS AND OBSERVATIONS

TABLE 1:AGE DISTRIBUTION

AGE IN YEARS	CASES
14-20	3 (6%)
21-30	12(24%)

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31-40	10(20%)
41-50	8(16%)
51-60	13(26%)
>60	4(8%)

GRAPH 1:AGE DISTRIBUTION

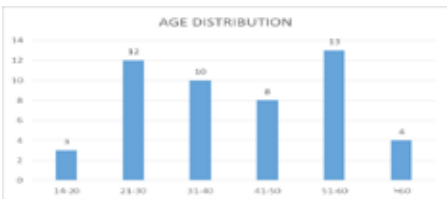

TABLE 2: SEX DISTRIBUTION

SEX	CASES
MALE	42 (84%)
FEMALE	8 (16%)

GRAPH 2 : SEX DISTRIBUTION

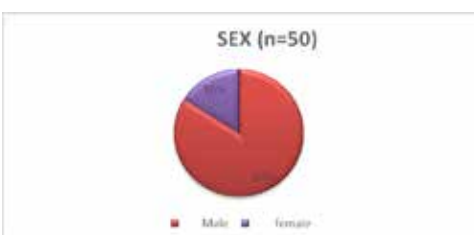

TABLE 3 : SYMPTOMS OF EMPYEMA THORACIS:

SYMPTOMS	CASES
COUGH	48 (96%)
EXPECTORATION	42 (84%)
DYSPNOEA	36 (72%)
CHEST PAIN	47 (94%)
FEVER	47 (94%)
CONSTITUTIONAL SYMPTOMS	33 (66%)

GRAPH 3 : SYMPTOMS \s

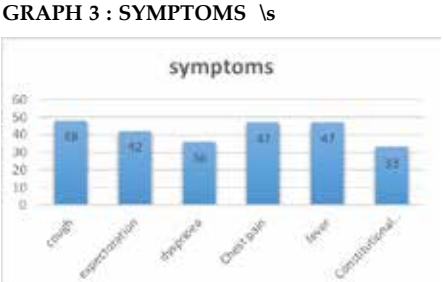

TABLE 4 : DURATION OF ILLNESS

DURATION OF ILLNESS IN DAYS	CASES
<10 DAYS	17 (34%)
11DAYS - 20 DAYS	19 (38%)
21DAYS – 30DAYS	4 (8%)
31DAYS – 40DAYS	4(8%)
>40DAYS	6(12%)

GRAPH 4 : DURATION OF ILLNESS

TABLE 5 : RISK FACTORS ASSOCIATED WITH EMPYEMA THORACIS

RISK FACTORS	CASES
DIABETES MELLITUS	9(18%)
HIV	5(10%)
PAST H/O TUBERCULOSIS	22 (44%)
ALCOHOL ABUSE	34 (68%)
SMOKING	36 (72%)

GRAPH 5 : RISK FACTORS ASSOCIATED WITH EMPYEMA THORACIS

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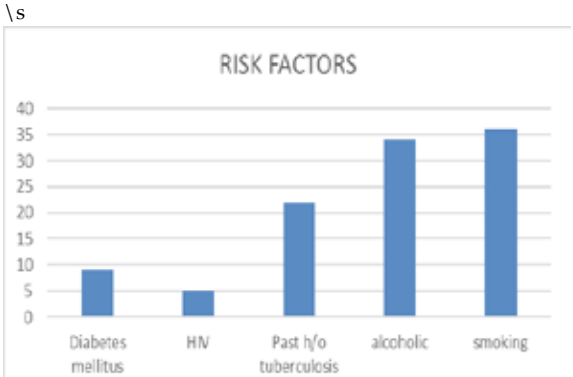

TABLE 6 : COMORBIDITIES

COMORBIDITIES	CASES
DIABETES	9(18%)
HYPERTENSION	20(40%)
COPD	25(50%)
OTHERS (CHF,CKD,MALIGNANCY)	5(10%)

GRAPH 6 : COMORBIDITIES

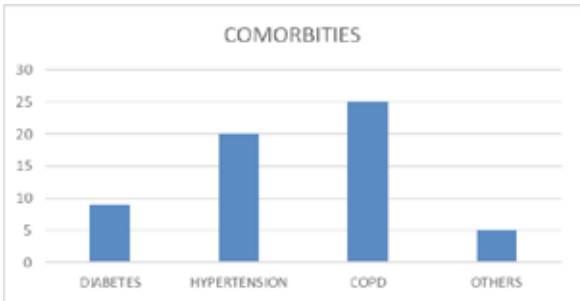

TABLE 7 : GENERAL PHYSICAL EXAMINATION FINDINGS

SIGNS	CASES
PALLOR	20 (40%)
TACHYPNOEA	40 (80%)
TACHYCARDIA	26 (52%))
PEDAL EDEMA	3 (6%)
CLUBBING	10 (20%)

GRAPH 7 :

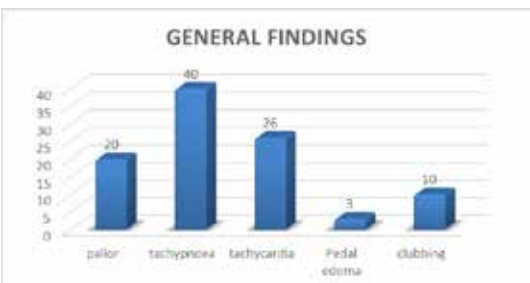

TABLE 8 : HAEMATOLOGICAL INVESTIGATIONS

PARAMETER	MEAN	RANGE
HB (gm%)	9.5±2.53	4.6-14
TC	8856.8±4856.5	1400-29500
RBS	143.54±93.34	24-514
SERUM CREATININE	0.928±0.24	0.3-1.8
SERUM BILIRUBIN	0.7±0.28	0.1-1
BLOOD UREA	23±8.64	12-60

RADIOLOGICAL FINDINGS TABLE 9 : SIDE OF LESION

LOCATION	CASES
RIGHT	31 (62%)
LEFT	19(38%)

GRAPH 8 : SIDE OF LESION

TABLE 10 : RADIOLOGICAL PATTERNS

RADIOLOGICAL PATTERN	CASES
PLEURAL EFFUSION	27 (54%)
HYDRO PNEUMOTHORAX	18 (36%)
LOCULATED EFFUSION	5 (10%)

GRAPH 9 : RADIOLOGICAL PATTERN

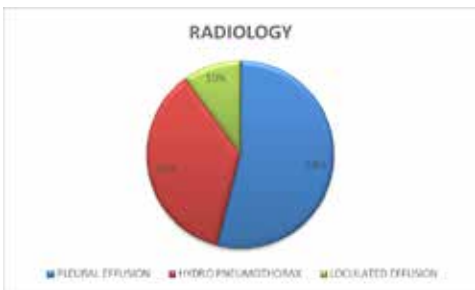

TABLE 11 : INVESTIGATIONS DONE TO ESTABLISH THE DIAGNOSIS

INVESTIGATIONS	NO. OF CASES SUBJECTED TO PROCEDURE	DIAGNOSED CASES
SPUTUM FOR AFB	50	9
SPUTUM FOR GRAM STAIN AND C/S	50	8
PLEURAL FLUID FOR AFB	50	3
PLEURAL FLUID FOR GRAM STAIN AND C/S	50	39
PLEURAL AMYLASE	4	4
PLEURAL BIOPSY	3	1
U/S ABOMEN	2	2
CT THORAX	20	20
CT THORAX WITH ORAL CONTRAST	2	2

GRAPH 10 : INVESTIGATIONS DONE TO ESTABLISH THE DIAGNOSIS

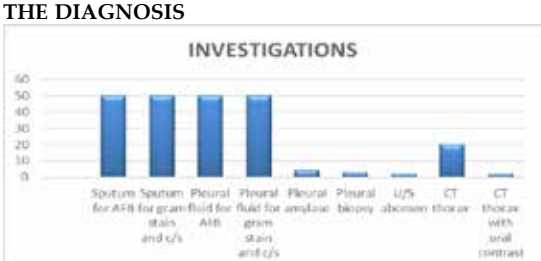

TABLE 12: PLEURAL FLUID ANALYSIS

PLEURAL FLUID ANALYSIS	MEAN	RANGE
PLEURAL FLUID TC	5677.80 ± 10181.88	700 – 67400
PLEURAL FLUID NEUTROPHILLS	4791.40± 9698.58	440 -64030
PLEURAL FLUID LYMPHOCYTES	742.48 ± 645 .99	78 – 3370
PLEURAL PROTEIN	4.2 ±0.64	3.2 – 5.5
PLEURAL SUGARS	55.0 ±30.1	28 – 189

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TABLE 13 : PLEURAL FLUID FOR GRAM STAIN AND C/S, ZN staining and AFB culture

ORGANISM	CASES
STAPHYLOCOCCUS	4 (8%)
STREPTOCOCCUS PNEUMONIA	2 (4%)
PROTEUS	1(2%)
ACINETOBACTER	1(2%)
MYCOBACTERIUM TUBERCULOSIS (MTB)	3(6%)
E.COLI	3(6%)
KLEBSIELLA	16(32%)
PSEUDOMONAS	12(24%)
STERILE	8(16%)

GRAPH 11 : PLEURAL FLUID FOR GRAM STAIN AND C/S

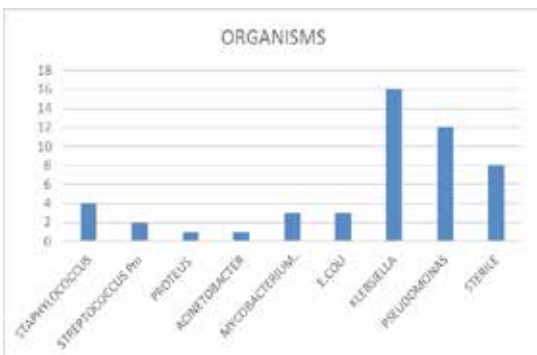


TABLE 14 : ETIOLOGY OF EMPYEMA THORACIS

ETIOLOGY	CASES
PNEUMONIA	30 (60%)
LUNG ABSCESS	5(10%)
TUBERCULOSIS	4(8%)
ESOPHAGEAL PLEURAL FISTULA	2(4%)
PANCREATITIS	2(4%)
AMEBIC LIVER ABSCESS	2(4%)
UNKNOWN	5(10%)

GRAPH 12 : ETIOLOGY OF EMPYEMA THORACIS

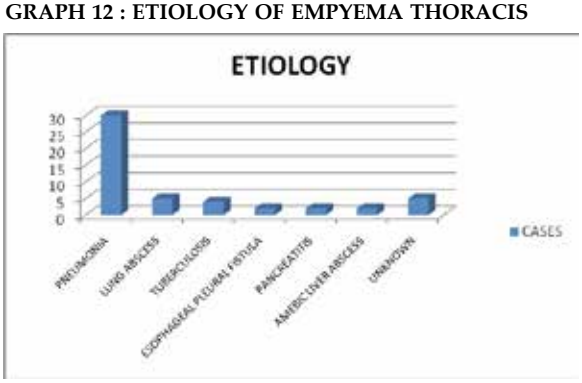


TABLE 15 : MANAGEMENT GIVEN

MANAGEMENT	PRESENT STUDY (N=50)
ANTIBIOTICS ONLY	0
THORACOCENTESIS ONLY	0
ICTD WITH ANTIBIOTICS	50(100%)
ICTD WITH ATT and ANTIBIOTICS	10(20%)
ICTD WITH ATT,ART and ANTIBIOTICS	3(6%)
ICTD WITH ART and ANTIBIOTICS	5(10%)
AGGRESSIVE TREATMENT (DECORITICATION,BPF CLOSURE)	7(14%)

GRAPH 13 : MANAGEMENT GIVEN

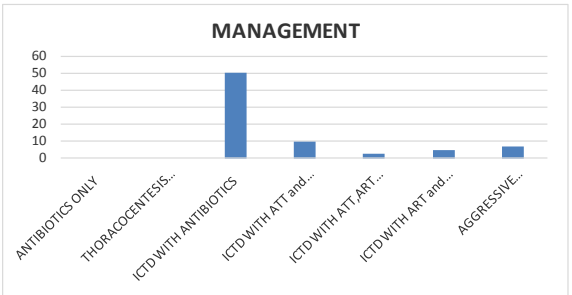


Table 16 : COMPLICATIONS

COMPLICATIONS	CASES
BRONCHO PLEURAL FISTULA	10 (20%)
TRAPPED LUNG	5(10%)
MODS	1 (2%)
RESPIRATORY FAILURE	2(4%)
EMPYEMA NECESSITANS	1(2%)
SUBCUTANEOUS EMPHYSEMA	3 (6%)

GRAPH 14 : COMPLICATIONS

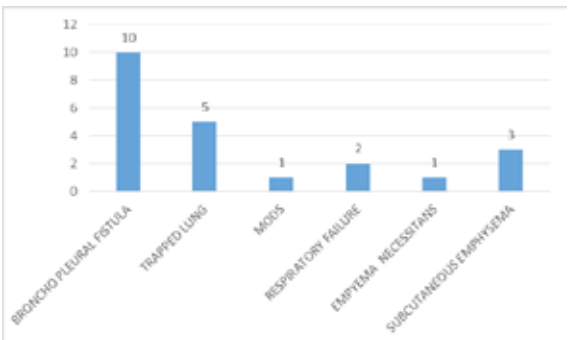


TABLE 17 : HOSPITAL STAY

HOSPITAL STAY	CASES
<10days	19 (38%)
10days -20days	17(34%)
20days-30days	8(16%)
30days-40days	3(6%)
>40days	8(16%)

GRAPH 15 : HOSPITAL STAY

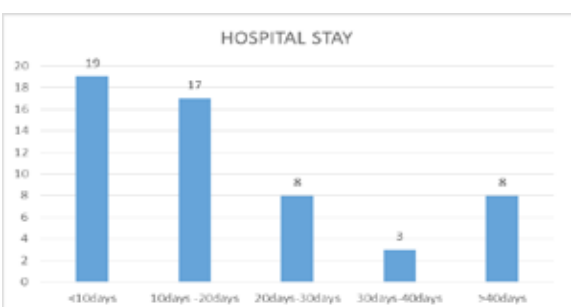
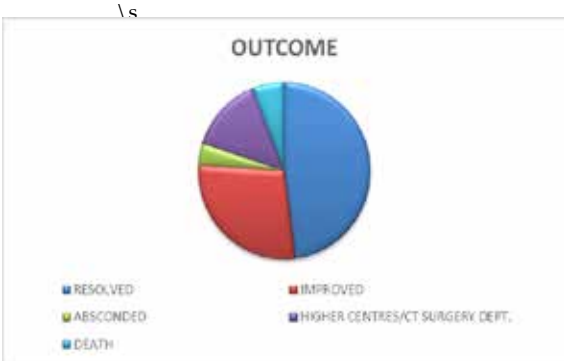


TABLE 16 : OUTCOME

OUTCOME	CASES
RESOLVED	24(48%)
IMPROVED	14(28%)
ABSCONDED	02(4%)
HIGHER CENTRES/CT SURGERY DEPT.	07(14%)
DEATH	03(6%)

GRAPH 16 : OUTCOME



DISCUSSION

Empyema remains a common clinical problem in India. This study included 50 cases in 2 year interval, some of which were multi-center studies carried out over much longer periods of time. Pulmonary infections including community-acquired pneumonia, aspiration pneumonia as well as suppurative lung diseases like bronchiectasis and lung abscess . Surgical trauma ranks as the second most frequent cause.In contrast most studies from India reveal that tuberculosis accounts for a large number of empyemas tuberculosis was the commonest aetiology of thoracic empyema in India. However more recent studies including the present one indicate that tuberculosis now ranks second to bacterial pneumonia as a cause for empyema. This may be due to the wider availability of anti-tubercular drugs and an increasingly effective tuberculosis control programme. Appropriate antibiotic therapy must be administered in adequate dosage as soon as the diagnosis of empyema has been established. Initial antibiotic therapy is based on the findings of the gram-stained smear of the pus and on the organism most probable in the special circumstances of the case. Necessary changes can be made once the cultures and antibiotic sensitivity tests are available. Adequate drainage of the pleural space is an essential complement of antibiotic administration. A number of the sterile empyemas in the present series probably resulted from the administration of antibiotic therapy without drainage. Complete evacuation of pus from the pleural space should be carried out promptly after the initial diagnostic aspiration;this may be done with a needle or by immediate institution of closed drainage.

SUMMARY

In the present study of empyema thoracis the mean age of the patients was 42.88years (±15.41 years). Patients age ranged from 15 – 80 in the study. Maximum no. of patients were in the age group of 51-60yrs (26%).12(24%) were between 21-30yrs, 10(20%) were between 31-40yrs, 8(16%) were between 41-50yrs, 4(8%) were >60yrs and 3(6%) were <20yrs. Males (84%) were more affected than females (16%). Most common symptoms were cough (96%) followed by fever and chest pain (94%), shortness of breath (72%) and constitutional symptoms 33(66%}In the present study, the mean duration of illness was 12±10 days with 72% of the cases having symptoms less than 20 days.The most common risk factor was smoking (72%).The most common associated comorbidity was COPD.

The most common finding is tachypnoea (80%), followed by tachycardia (52%), then pallor(40%), clubbing(20%) and pedal edema(6%).The mean haemoglobin was 9.5±2.53. Right sided lesions accounted for 62% of cases, left side accounted to 38%.The mean of pleural fluid TC was 5677 ± 10181.88(range 700 – 67400), the mean of pleural fluid protein is 4.4 ± 0.64(range 3.2 – 5.5) and the mean of pleural fluid sugars was 55 ± 30.1(range 28 – 189).In pleural fluid organisms were isolated in 84% of the cases and 16% were sterile. Out of which klebsiella 16(32%) is the most common isolated organism followed by pseudomonas 12(24%), S.aureus 4(8%), E.coli 3(6%), S.pneumonia 2(4%), proteus 1(2%) and Acinetobacter 1(2%). Mycobacterium tuberculosis isolated in 3(6%) of patients.The most common etiology is pneumonia which accounts to 60% (30 cases).In the present study none of the case cured with only antibiotics or only thoracocentesis. ICTD was done in all the 50 cases. ATT was given in 13 patients and ART was given in 5 cases. ATT and ART given was given 3 cases. Aggressive treatment was given in 7 cases.In the present study complications occurred in 34% of the cases of which BPF is the most common complication accounts for 20%.The mean hospital stay is 23 ± 16.57 days.In the present study after 3months of follow up 48% showed complete resolution, 28% improved, 14% referred to CT surgery dept., 6% died and 4% absconded.

CONCLUSION

To conclude Empyema thoracis is difficult to manage but still presents as a challenge at referral tertiary care hospitals. Co-morbid factors such as diabetes and immunosuppressive retroviral diseases may be implicated as the etiological reasons for the resurgence of empyema in the present era of new and effective antibiotics. High index of suspicion with careful monitoring and pleural fluid aspiration of non-responding parapneumonic effusions cases helps to identify cases of pyothorax at the earliest possible time. Culture sensitivity based antibiotics and repeat culture tests will offer the best antibiotic choice. ICT Drainage with underwater seal is the best and most effective method of management for its simplicity and specificity. Major procedures of rib resections and open thoracotomies have been reduced due to minimally invasive thoracoscopic approach with improved rates in morbidity and mortality.

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