International Journal Dental and Medical Sciences Research
Volume 3, Issue 1, Jan-Feb 2021 pp 1080-1084 www.ijdmsrjournal.com ISSN: 2582-6018

A Retrospective study of Pyopneumothorax in patients presented to a Tertiary care hospital

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Submitted: 02-02-2021 Revised: 18-02-2021 Accepted: 22-02-2021

ABSTRACT: **Background:**Pyopneumothorax is defined as the collection of pus and gas in the pleural cavity.Pyopneumothoraxistreated with antibiotics/antitubercular treatment depending on aetiology and Intercostal tube drainage tube or thoracic surgery

Aim: To study the clinical, microbiological profile, management and treatment outcome of patients with pyopneumothorax.

Materials &Methods: The present study was a retrospective study in 40 patients admitted with the diagnosis of pyopneumothoraxin Department of Pulmonary Medicine, Andhra Medical College, Visakhapatnam from August 2019 to the September 2020. Demographic, clinical, treatment and outcome data were collected from hospital data and analysed.

Results: Among 40 patients included in the study males were 36 and females were 4. About 30% (n=12) were immunocompromised, among which 10 were diabetic & 2 were HIV positive. Pus for culture was pseudomonas in 32%,sterile in 42.5%. Pus for CBNAAT is positive in 37.5 %. All cases were managed intercostal tube drainage with antibiotic coverage /Anti-tubercular treatment. Outcome is complete lung expansion in 50%, partial expansion in 40% and 7.5%referred to thoracic surgery, 2.5% expired. **Conclusion:** Intercostal drainagewith under -water seal was the treatment of choice in most of the patients.Tuberculosis-pyopneumothoraxis associated with poor outcome.

KEYWORDS: Pyopneumothorax, Tuberculosis intercostal tube drainage, anti-tubercular treatment.

I. INTRODUCTION

Pyopneumothorax is defined as the collection of pus & gas in the pleural cavity [(1)]. Bacteria that frequentlycause pyopneumothorax include Pseudomonas aeruginosa, Escherichia coli, Streptococcus, Mycobacterium .tuberculosis, Bacteroidesfragilisetc[(2)].In India, incidence of pyopneumothorax common in young age group is due to tuberculosis [(3)].It develops when an empyema precedes or supersedes pneumothorax.Risk of pyopneumothorax is increased by underlying chronic lung diseases like tuberculosis, chronic suppurative lung diseases (lung abscess) or invasive procedures (previous empyema with an iatrogenic introduction of air). Pyopneumothorax is in particular can be difficult to differentiate from lung abscess , CT scan is often the diagnosis of choice in differentiating thesetwo entities [(4)].Pyopneumothorax is treated with antibiotics / anti tubercular treatment depending on aetiology & intercostal tube drainage or thoracic surgery (lung decortication) [(5)].

AIMS AND OBJECTIVES

To study the clinical, microbiological profile, management and treatment outcome of patients with pyopneumothorax.

II. MATERIALS AND METHODS

This was a retrospective observational study conducted in Government hospital for chest and communicable diseases, Visakhapatnam, Andhra Pradeshfrom August 2019 to the September 2020.A total of 40 patients were included after excluding subjects with age < 18 years and traumatic pyopneumothoraxpatients from the study. Demographic, clinical, treatment and outcome data were collected from hospital records and prepared in excel sheet and statistical analysiswas done using SPSSsoftware.

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III. RESULTS:

The following observations wererecorded in 40 cases of pyopneumothorax.

Table 1: Age distribution

Age in years	No. of patients	%
25-34	15	37.5%
35-44	12	30%
45-54	8	20%
55-64	5	12.5%

In this study, the age group ranged between 25 to 64 years with the peak incidence between 25 -34 age group.

Table 2: Gender distribution

Gender	No. of patients	%
Male	36	90%
Female	4	10%

Higher incidence of pyopneumothorax is seen in the males about 90% compared to 10% in females.

Table 3: Distribution of comorbidities

Comorbidities	No. of patients	%
Diabetic	10	25%
HIV	2	5%
NIL	28	70%

About 25% of the subjects were diabetic,5% were HIV positive and 70%of the subjects had nil comorbidities.

Table 4: Distribution of risk factors

Risk factors	No. of patients	%
Alcoholism	35	87%
Smoking	28	70%

In this study 87% were alcoholics and 70% were smokers(both current and former smokers).

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Table 5: Clinical features at presentation

Symptom	No. Of patients	%
Fever	18	45%
Cough	36	90%
Chest pain	24	60%
Dyspnoea	30	75%

Cough, dyspnoea and fever were presenting clinical features in 90%,75% and 45% respectively.

Table 6: Pus for culture

Organism	No. Of patients	%
Pseudomonas	13	32.5%
Klebsiella pneumonia	6	15%
Staphylococci	2	5%
Streptococci	1	2.5%
Escherichia coli	1	2.5%
Sterile	17	42.5%

Pseudomonas is most common organism in pus for culture in 32.5% cases. Pus for culture is sterile in about 42.5 cases.

Table 7: Sputum and pus for CBNAAT

CBNAAT	Sputum	Pus
Positive	18(45%)	15(37.5%)
Negative	22(55%)	25(62.5%)

In the present study, sputum for CBNAAT is positive in 45% cases and negative in 55% cases. Pus for CBNAAT is positive in 37.5% and negative in 62.5% cases

Table 8: Aetiology and duration of intercostal tube drainage

Aetiology	%of patients	ICT drainage (days) mean
Pyogenic	55% (22)	< 20
Tubercular	45% (18)	> 20

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About 55% cases were pyogenic and 45% cases were tubercular pyopneumothorax. The mean duration of intercostal tube drainage was >20 days in tubercular pyopneumothorax

Table 9: outcome

outcome	no. of patients	%
Complete expansion	20	50 %
Partial expansion	17	40 %
Referred to CT surgery	2	7.5%
Expired	1	2.5 %

In present study Outcome is complete lung expansion in 50%, partial expansion in 40% and 7.5%referred to thoracic surgery, 2.5% expired

IV. DISCUSSION:

- According to the present study,15 cases were in 25-34 age group. It is similar to Anil Gupta etal. study of 50 cases – 19 cases were in the age group of 21-30 years.Incidence of pyopneumothorax in males in various studies are as follows Kamat etal. 88%,R K Tandon et al.75 %, Anil Gupta et al. 86 % & in the present study it was 90%[6,7].The reason for higher incidence in males is due to risk factors like alcoholism , smoking etc.
- The common symptoms at the time of presentation are cough,dyspnoea, fever& chest pain in present study. It is similar in Kamat et al. & Anil Gupta et al studies[6,7].
- Smokers are 70% in present study where as in Anil Gupta et al. study it is 56 %.
- In Anil Gupta et al study pleural fluid negative culture was 46%Sputum for AFB is 34%[6].In the present study, pleural fluid culture was sterile in 42.5%.Sputum CBNAAT positive in 45% andthe pusfor CBNAAT is positive in 37.5%.
- This negative culture report in present study was related to Tubercular-pyopneumothorax.Growth requirements of mycobacteria are such that no growthis observed on primary isolation in simple chemically defined media. They require solid media like Lowenstein-Jensen Media, Loeffler's media and liquid media like BACTEC MGIT 960 etc.
- Tuberculous pleural effusion develops when subpleuralcaseous foci ruptures into pleural cavity and tuberculous protein triggers delayed hypersensitivity reactions[8].Tubercular pyopneumothorax occurs due to rupture of parenchymal nidus or cavity into pleural space and is associated with bronchopleural /pleuro-cutaneous fistula[9].
- In present study all cases were managed intercostal tube drainage with antibiotic coverage /Anti tubercular treatment. Mean duration of intercostal tube was higher in tubercular pyopneumothorax.
- In cases where medical & drainage treatment fails surgical evaluation with Video assisted thoracoscopic surgerywas required for pleural debridement in cases of loculatedpyopnemothorax and for treatment of associated bronchopleural fistulas.
- Complete lung expansion is 63 % in BK Khanna et al,51 % in Anil Gupta et al study.[6]
- In present study Outcome is complete lung expansion in 50%, partial expansion in 40% and 7.5%referred to thoracic surgery, 2.5% expired.

V. CONCLUSION:

- Age group 25- 34 years has highest incidence of pyopneumothorax. Smoking & alcoholism were main risk factors.
- Cough dyspnoea followed by chest pain were common clinical features.
- Intercostal tube drainage with under water sealand antibiotics /anti tubercular treatment was the treatment of choice in the patients.
- Early referral to cardiothoracic surgery department in the caseswith unexpanded lungs

who are fit for surgical intervention will help in restoring lung function.

- Pus was sterile in 17 cases. Out of 18 sputum CBNAAT positive cases only 15 cases were positive for pus for CBNAAT.
- TB pyopneumothorax was associated with bronchopleural/pleuro-cutaneousfistulas & duration of intercostal tube drainage is longer, has a poor treatment outcome.

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