

“A STUDY OF CLINICO RADIOLOGICAL AND BRONCHOALVEOLAR LAVAGE FLUID PROFILE OF PEOPLE LIVING WITH ACQUIRED IMMUNO DEFICIENCY SYNDROME WITH LOWER RESPIRATORY TRACT INFECTIONS (LRTI).”

General Medicine

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ABSTRACT

BACKGROUND AND SIGNIFICANCE: Infection with HIV results in progressive immunodeficiency and renders the infected person become increasingly vulnerable to wide range of pathogens, referred to as Opportunistic Infections. Expert clinical assessment with early diagnosis and aggressive treatment are required for a positive outcome. Hence this study was planned. **AIMS AND OBJECTIVES:** To study the clinical, radiological, BAL fluid profile and common organisms responsible for lower respiratory tract infections (LRTI) in PLHIV/AIDS who are sputum CBNAAT negative and have LRTI. **MATERIALS AND METHODS:** Patients admitted to Respiratory Medicine Department, Sir T Hospital, Bhavnagar, from August 2019 to July 2020, were recruited based on the inclusion and exclusion criteria. **INCLUSION CRITERIA:** Sputum CBNAAT negative PLHA patients aged >18 years with 4S symptoms positive (cough, fever, weight loss, night sweats) with abnormal chest X-ray. **EXCLUSION CRITERIA:** Drowsy or comatose patients, pregnant females, severely hypoxic patients, patients requiring ICU admissions for cardiac, hepatic or renal disease. Detailed history taking, general and clinical examination was carried out and routine laboratory investigations were sent. Chest X-ray, CT Thorax and bronchoscopy were done. BAL fluid was sent for staining, CBNAAT, bacterial and fungal culture. **RESULTS:** Male preponderance is seen with cough (92%) as the most common presenting complaint, tachypnea (69%) and crepitations (77%) as most consistent signs. Most common X-ray and CT finding was consolidation (65%) with bilateral lower lobe preponderance (35%). Most common etiology was bacterial pneumonia (23%) and most common organism was pseudomonas (23%). Bacterial pneumonia and tuberculosis were more prevalent when CD4 count >350 cells/ cumm; Fungal pneumonia and PCP when CD4 count <350 cells/ cumm. **CONCLUSION:** Bacterial pneumonia is most common etiology with Pseudomonas aeruginosa being the most common etiological agent. The susceptibility for LRTI increases when CD4 count falls below 500 cells/ cumm.

KEYWORDS

BAL, HIV, LRTI.

INTRODUCTION

Lower respiratory tract infection (LRTI) refers to a syndrome caused by acute infection characterized by clinical and/ or radiographic signs of consolidation of a part or parts of one or both lungs^[1]. Infection with HIV results in progressive immunodeficiency and renders the infected person become increasingly vulnerable to wide range of pathogens. Infections with these organisms are referred to as Opportunistic Infections (OI). Opportunistic lung infections are a major cause of morbidity and mortality for patients immunocompromised because of HIV infection. Expert clinical assessment with early diagnosis and aggressive treatment are required for a positive outcome. Hence this study was planned to assess the clinicroadiological and BAL fluid profile of PLHA patients who were sputum CBNAAT negative.

AIMS AND OBJECTIVES

- To study the clinical, chest x-ray and BAL fluid profile of PLHIV/AIDS who are sputum CBNAAT negative and have lower respiratory tract infections.
- To study the common organisms responsible for LRTI in BAL fluid of sputum CBNAAT negative PLHA patient.

MATERIALS AND METHODS

- STUDY TYPE:** Interventional
- STUDY DESIGN:** Prospective study
- STUDY SITE:** Government Medical College, Bhavnagar
- SAMPLE SIZE:** 28
- The study was conducted after obtaining approval from Institutional Review Board, Government Medical College, Bhavnagar, Gujarat, India.
- Patients admitted to Respiratory Medicine Department, Sir T Hospital, Bhavnagar, from August 2019 to July 2020, were recruited based on the inclusion and exclusion criteria.
- Detailed history was taken, detailed general examination and clinical examination was carried out and routine laboratory investigations were sent for all the study participants. Chest X-ray, CT Thorax and bronchoscopy were done. BAL fluid was sent for staining, CBNAAT, bacterial and fungal culture.

Inclusion criteria

- Sputum CBNAAT negative PLHA patients aged >18 years with 4S symptoms positive (cough, fever, weight loss, night sweats) with abnormal chest X-ray.

Exclusion criteria

- Drowsy or comatose patients, pregnant females, severely hypoxic patients, patients requiring ICU admissions for cardiac, hepatic or renal disease.

OBSERVATION AND RESULTS

Out of 28 patients included in the study two patients gave negative consent for bronchoscopy, so for the purpose of data analysis 26 patients were included. Comparison was made based on following parameters:

1. Age and sex distribution

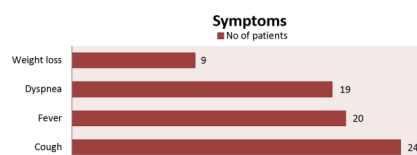
Most of the patients belonged to younger and middle age group, with prevalence above 60 years being only 8%. Male preponderance was seen with male female ratio being 3.3:1.

Table 1 shows age and sex distribution

Incidence of LRTI among different groups				
Age Groups (n=26)	Male	Female	Total	Percentage
18-40 years	9	6	15	58%
41-60 years	9	0	9	34%
>60 years	2	0	2	8%
Total	20	6	26	100%

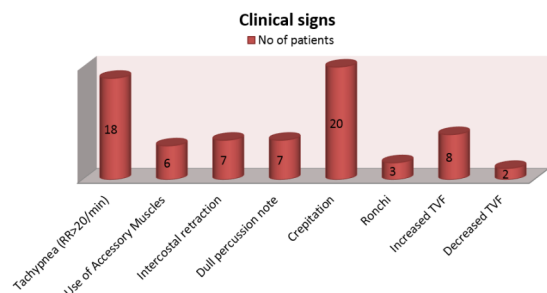
2. Signs and symptoms

Out of 26 patients, 24 patients had complaint of cough, of which 3 patients had dry cough (12%), 11 patients had white expectoration (46%) and 12 patients had yellow expectoration (42%); 20 patients had complaint of fever of which 19 had intermittent fever (95%) and 1 patients had evening rise fever (5%); 19 patients had complaint of dyspnea of which 1 patients had dyspnea mMRC grade 1 (5%), 12 patients had dyspnea mMRC grade 2 (63%), 4 patients had dyspnea mMRC grade 3 (21%) and 2 patients had dyspnea mMRC grade 4 (11%).



Graph 1 shows frequency of different presenting symptoms

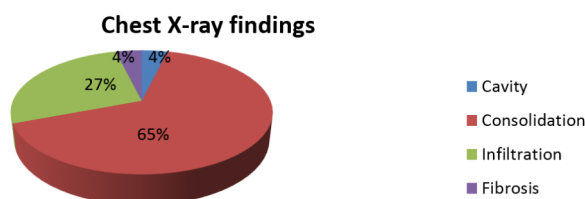
Out of 26 patients, 18 patients had tachypnea (69%), accessory muscles of respiration were active in 6 patients (23%), 7 patients showed intercostal retraction (27%), 7 patients had dull note on percussion (27%), 20 patients had crepitation on auscultation (77%), 3 patients had expiratory ronchi on auscultation (12%), 8 patients had increased VR locally (31%) and 2 patients had decreased VR locally (8%).



Graph 2 shows different clinical signs

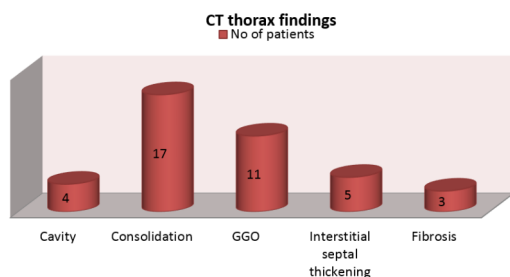
3. Radiological Profile

All the patients were subjected to Chest X-ray PA view. Chest X-ray showed cavity in 1 patient (4%), consolidation in 17 patients (65%), infiltration in 7 patients (27%) and fibrosis in 1 patient (4%).



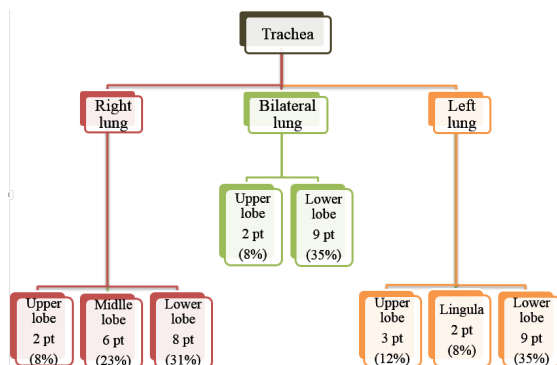
Graph 3 shows different Chest X-ray findings

CT Thorax was done for all the patients. CT findings showed cavity in 4 patients (15%), air bronchogram suggestive of consolidation in 17 patients (65%), ground glass opacity in 11 patients (42%), interstitial septal thickening in 5 patients (19%) and fibrosis in 3 patients (12%).



Graph 4 shows CT thorax findings

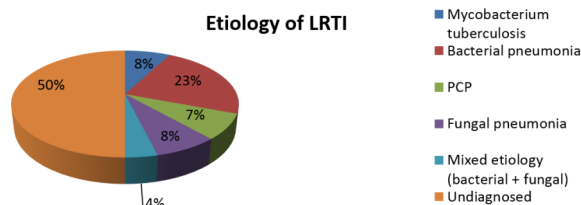
Flowchart 1 shows involvement of different lobes of the lungs with Bilateral lower lobe involvement being most common (9 patients; 35%) and Bilateral upper lobe, Left lingular lobe and Right upper lobe involvement being least common (2 patients; 8%).



Flowchart 1: shows proportion of involvement of different lobes

4. Etiological diagnosis

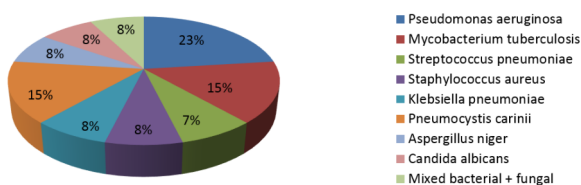
After all Laboratory, Radiological and Bronchoalveolar lavage fluid investigations, 13 patients remained undiagnosed (50%). Out of remaining 13 patients, 6 patients had bacterial pneumonia (23%), 2 patients had fungal pneumonia (8%), 2 patients had pneumocystis carinii pneumonia (7%), 2 patients had mycobacterium tuberculosis infection (8%) and 1 patient's BAL culture showed mixed bacterial and fungal infection (4%).



Graph 4 shows Etiological diagnosis arrived at from BAL fluid culture and staining

Out of 13 patients, 3 patients were infected with *Pseudomonas aeruginosa* (23%), 2 patients with *mycobacterium tuberculosis* (15%), 2 with *pneumocystis carinii* (15%), 1 patient with *Streptococcus pneumoniae*, *Staphylococcus aureus*, *Klebsiella pneumoniae*, *Aspergillus niger*, *Candida albicans* and mixed infection each (8%).

Organisms isolated from BAL fluid



Graph 5 shows different organisms isolated from BAL fluid

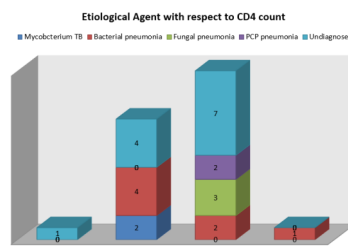
6. Correlation with CD4 count

- CD4 count and causative organism

Out of 26 patients, 1 patient had CD4 count above 500 cells/cumm, 10 patients had CD4 count between 350 to 500 cells /cumm, 14 patients had CD4 count between 150 to 350 and only 1 patient had CD4 count <150 cells/cum. Thus, lower respiratory tract infections are more prevalent in patients with CD4 count in the range of 150 to 350 cells /cumm, 14% of which were bacterial in etiology, 21% were fungal and 14% were *pneumocystis carinii*. Among patients with CD4 count in the range of 350 to 500 cells/cumm, fungal pneumonia were uncommon with 40 % patients having bacterial pneumonia and 20% patients having *mycobacterium tuberculosis* infection. Only 1 patient with CD4 count < 150 cells/cumm and 1 patient with CD4 count > 500 cells/cumm had pneumonia, suggesting pneumonia is uncommon at these CD4 counts.

Table 2 shows correlation between BAL profile and CD4 count

Number Of Patients					
CD-4 Count	BAL Fluid CBNAAT Positive For MTB	BAL Fluid For Bacterial Culture Positive	BAL Fluid For Fungal Culture Positive	BAL Fluid For PCP Stain Positive	Undiagnosed
>500 (n=1)	0	0	0	0	1(100%)
350-500 (n=10)	2 (20%)	4 (40%)	0	0	4 (40%)
150-350 (n=14)	0	2 (14%)	3 (21%)	2 (14%)	7 (50%)
<150 (n=1)	0	1 (100%)	0	0	0



Graph 12 shows prevalence of different etiological agents with respect to CD4 count

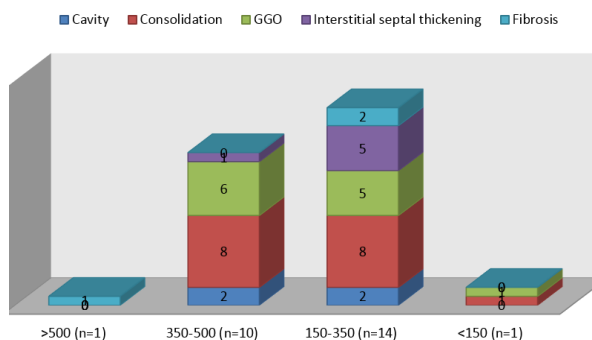
• CD4 with CT findings

Out of 26 patients, 1 patient had CD4 count above 500 cells/cumm, 10 patients had CD4 count between 350 to 500 cells /cumm, 14 patients had CD4 count between 150 to 350 and only 1 patient had CD4 count <150 cells/cumm. In patients with CD4 count >150 cells /cumm, 1 patient showed fibrosis, so CT abnormalities were uncommon in patients with CD4 >150 cells/ cumm. In patients with CD4 count between 350 to 500 cells/cumm, CT findings showed consolidation in 8 patients (80%), GGO in 6 patients (60%), cavity in 2 patients (20%) and interstitial septal thickening in 1 patient (10%). In patients with CD4 count between 150 to 350 cells/cumm, CT findings show consolidation in 8 patients (57%), GGO in 5 patients (36%), Interstitial septal thickening in 5 patients (37%), cavity in 2 patients (14%) and fibrosis in 2 patients (14%). Thus abnormal CT findings are most prevalent in this group of patients. Among patients with CD4 count <150 cells/cumm, CT finding shows consolidation with GGO.

Table 3 shows correlation between CD4 count and CT Thorax findings

CD4 count (cells/ cumm)	Cavity	Consolidation	GGO	Interstitial septal thickening	Fibrosis
>500 (n=1)	0	0	0	0	1
350-500 (n=10)	2	8	6	1	0
150-350 (n=14)	2	8	5	5	2
<150 (n=1)	0	1	1	0	0

CT Thorax findings with reference to CD4 count



Graph 13 shows CT Thorax findings with reference to CD4 counts

CONCLUSION

Male preponderance is seen with cough (92%) as the most common presenting complaint, tachypnea (69%) and crepitations (77%) as most consistent signs. Most common X-ray and CT finding was consolidation (65%) with bilateral lower lobe preponderance (35%). Most common etiology was bacterial pneumonia (23%) and most common organism was pseudomonas (23%). The suspicion of bacterial pneumonia or tuberculosis should be kept in mind when CD4 count >350 cells/ cumm; Fungal pneumonia and PCP should be suspected when CD4 count <350 cells/cumm.

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REFERENCES

1. Douglas Seaton: Pneumonia. Crofton and Douglas' Respiratory Distress, Vol 1, Page 356.
2. Office for National Statistics 1997. Mortality Statistics, Cause. London: The Stationary office, 1998.
3. Gleckman RA, Roth RM. Community acquired bacterial pneumonia in the elderly. Pharmacotherapy 1984;4:81.
4. Kisebo HN, Boon SD, Davis JL, Okello R, Worodria W, Cattamanchi A, Huang L, Kawooya MG. Chest radiographic findings of pulmonary tuberculosis in severely immunocompromised patients with the human immunodeficiency virus. The British journal of radiology. 2012 Jun;85(1014):e130-9.
5. Umar MS, Daniel SV, Suwaid MA, Luntsi G, Yusuf J, Zira JD, Abubakar A, Saade C, Barde M. Chest radiographic findings of pulmonary tuberculosis in human immunodeficiency virus-seropositive patients in a teaching hospital in Kano Northwest, Nigeria. West African Journal of Radiology. 2020 Jan 1;27(1):27.
6. Shailaja V V, Pai L A, Mathur D R, Lakshmi V. Prevalence of bacterial and fungal agents causing lower respiratory tract infections in patients with human immunodeficiency virus infection. Indian J Med Microbiol;2004;22:28-33.
7. Benito N, Moreno A, Miro JM, Torres A. Pulmonary infections in HIV-infected patients: an update in the 21st century. European Respiratory Journal. 2012 Mar 1;39(3):730-45.
8. Worodria W, Okot-Nwang M, Yoo S D, Aisu T. Causes of lower respiratory infection in HIV-infected Ugandan adults who are sputum AFB smear-negative. The International Journal of Tuberculosis and Lung Disease. 2003 Feb 1;7(2):117-23.