Pulmonary Involvement in Peoples Living with HIV (PLHIV)

Shubhangi V Dhadke¹, Vithal Dhadke²*, Reshma Kshirsagar³, Manish Dhadke⁴

Abstract

Background: Pulmonary system is most commonly involved system in PLHIV as lungs are continuously exposed to the infection as they are rich in macrophages, dendritic cells, lymphocytes etc. In PLHIV immunity is suppressed, hence lung are prone for infection and non infectious pulmonary diseases. It is most common complication in HIV patient. Pneumonia is most common pulmonary manifestation followed by tuberculosis and pneumocystis jirovecii pneumonia. Other infection like mycobacterium avium complex (MAC), fungal infection, non specific interstitial pneumonitis, kaposis sarcoma (KS), and lymphoma causes pulmonary involvement. Incidence of bacterial pneumonia is 0.8-2 per 100 person year. Encapsulated organism like streptococci, H. influenzae are responsible for most cases of pneumonia. Incidence of pneumonia increase by 6 times in untreated HIV patient. Pneumocystis jirovecii pneumonia is hallmark of AIDS. Incidence range from 2-3 cases per 100 person-years. Pneumocystis jirovecii pneumonia is most commonly seen in patient having CD4 count <200/micro litre. About 1/3 of deaths all AIDS related death are associated with tuberculosis. Tuberculosis is the primary cause of death in 10-12% of HIV infected patients. About 60-80 % HIV infected patient With Tuberculosis have pulmonary disease, Mycobacterium avium complex infection is late complication of HIV infection mostly seen in patient With CD4 count <50.

Aims and Objectives

1. To study pulmonary involvement in people living with HIV diagnosed by ELISA method.
2. To study radiological findings in lungs of PLHIV with pulmonary disease by chest X-ray, High resonance computed tomography, ultrasonography of thorax etc.
3. To study co-relationship between CD4 count and pulmonary disease in PLHIV.

Methods: This is descriptive clinical study with cross sectional design with 100 HIV positive patients to study pulmonary involvement. The study was conducted in Dr. V.M. Government Medical college, Solapur. Present study was carried out on PLHIV with pulmonary involvement. The period was from dec 2012 to Nov. 2014. Present study was conducted after NACO (National AIDS Control Organization) permission.

After pre-test counselling, blood sample were tested for anti –HIV antibodies ELISA method. A detail clinical history and examination was done and information related to each patient was filled in proforma.

After taking written informed consent was taken from patient eligible for this study.

Chi-square/z test has been used to find the significance of study

Results

1. Pulmonary disease maximum in age group of 31-50 yrs of age.
2. In present study male patient to female patient ration was 1.7.
3. In present study prevalence of tuberculosis was maximum in patient followed by bacterial pneumonia and pneumocystis jirovecii pneumonia respectively.
4. Most of the bacterial pneumonia patients had consolidation on chest x-ray PA view.

Conclusion

1. In present study prevalence of bacterial pneumonia was maximum in patient having cd4 count >200cells/micro lit, prevalence of tuberculosis was maximum in patient having cd4 count between 150-500/micro lit, prevalence of Pneumocystis Jirovecii pneumonia maximum in patient having cd4 count <50/micro lit.
2. In pulmonary tuberculosis patient consolidation, pleural effusion, fibro nodular infiltrate, cavity, Pneumothorax, bilateral extensive tuberculosis were common findings on chest X-ray.
3. In pulmonary tuberculosis patient most common radiological findings are consolidation, mediastinal lymphadenopathy, fibro nodular infiltrate, cavity, Pneumothorax on HRCT thorax.

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4. In pneumocystis jiroveci pneumonia maximum patient had ground glass haziness and parahilar opacity. On chest X ray, prevalence of lower zone involvement was maximum followed by upper zone.

5. In pneumocystis jiroveci pneumonia prevalence of ground glass haziness and cystic lesion was maximum on HRCT thorax.

Introduction

Pulmonary system is most commonly involved system in PLHIV. In PLHIV immunity is suppressed, hence lungs are prone for infectious and non infectious pulmonary disease. Pneumonia is most common pulmonary manifestation followed by tuberculosis and pneumocystis jiroveci pneumonia.

Pneumocystis jiroveci pneumonia is hallmark of AIDS. Incidence ranges from 2-3 cases per 100 person-years. Pneumocystis jiroveci pneumonia most commonly seen in patient having CD4 count <200/micro litre.

About 1/3 of death all AIDS related death associated with tuberculosis. Tuberculosis is the primary cause of death in10-12% HIV infection. About 60-80% HIV infected patient With Tuberculosis have pulmonary disease, 30-40% have extra pulmonary involvement.

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1. To study pulmonary involvement in peoples living with HIV diagnosed by ELISA method.
2. To study radiological findings in lungs of PLHIV with pulmonary disease by chest x ray, High resonance computed tomography, ultrasonography of thorax etc.
3. To study co-relationship between CD4 count and pulmonary disease in PLHIV.

Material and Methods

Methodology

This is descriptive clinical study with cross sectional design with 100 HIV positive patients to study pulmonary involvement in peoples with HIV (PLHIV) patient.

Source of Data

The study was conducted in Dr. V.M. Government Medical college, Solapur, Maharashtra, India, Present study was carried out on PLHIV with pulmonary involvement. The period is from Dec. 2012 to Nov. 2014. Present study was conducted after NACO (National AIDS Control Organization) permission.

Inclusion Criteria

1. Age >13 yrs
2. HIV positive patient diagnosed by ELISA method
3. Patient having pulmonary symptoms

Exclusion Criteria

1. Age <13
2. HIV negative patient
3. PLHIV with only upper respiratory tract infection
4. PLHIV not willing to give consent
5. PLHIV immunity is suppressed, hence lungs are prone for infectious and non infectious pulmonary disease

Material and Methods

Methodology

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significant.

In this study HRCT thorax was done in suspected cases whose chest X-ray was normal, to rule out pleural effusion, pulmonary involvement, suspected pneumocystis jiroveci pneumonia patient. In this study HRCT was done for 56 patients. Consolidation seen in 46.42% patient. Out of 7 patients of pneumocystis jiroveci pneumonia, HRCT thorax showed ground glass Haziness in 100% patient who was suspected for pneumocystis jiroveci pneumonia.

HRCT thorax showed mediastinal lymphadenopathy (46.42%), fibro nodular infiltrate (41.07%), consolidation (46.4%), cavitatory lesion (8.9%), Pneumothorax (8.9%). Statistically this is highly significant (p<0.01).

These findings are similar to the study conducted by Asmita A. Mehata et al. In which 72% patient had tuberculosis, 22% patient had bacterial pneumonia, 6% patient had pneumocystis jiroveci pneumonia, 2% patient had cryptocogenic meningitis with pulmonary infiltrates.

Table 1: Disease wise distribution of study population

<table>
<thead>
<tr>
<th>Disease</th>
<th>No. of patient</th>
<th>percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>pneumonia</td>
<td>22</td>
<td>22%</td>
</tr>
<tr>
<td>tuberculosis</td>
<td>71</td>
<td>71%</td>
</tr>
<tr>
<td>Mycobacterium avium complex</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Pneumocystis jiroveci pneumonia</td>
<td>7</td>
<td>7%</td>
</tr>
<tr>
<td>malignancy</td>
<td>0</td>
<td>0%</td>
</tr>
</tbody>
</table>

(x²=67.22, DF=2, p<0.01)

In present study HRCT was done only in patient who was suspected for pneumocystis jiroveci pneumonia, cases of pleural effusion and patient who was clinically suspected to have pulmonary involvement but chest x-ray was normal.

Table 1 disease wise distribution of patient (Table 1).

In present study incidence of tuberculosis were maximum 71%, followed by bacterial pneumonia 22%, followed by pneumocystis jiroveci pneumonia 7%. Mycobacterial avium complex infection is rare now days because of use of HAART. Statistically this is highly significant (p<0.01)

Discussion

Pulmonary system is most common system involved in PLHIV. In HIV patient decrease immunity make patient prone for infection. Low CD4 count as responsible for opportunistic infection in PLHIV.

Present study was conducted in Dr. V.M. Government Medical College, Solapur, Maharashtra, India. In this study 100 HIV positive Patient who diagnosed by ELISA method who had respiratory complains were involved. All relevant laboratory investigation including chest x-ray, HRCT, ultrasonography (thorax), pleural fluid study, sputum for AFB, sputum for gram staining (Figure 1), Sputum for GCM stain for pneumocystis jiroveci infection, sputum for PAS, sputum for culture sensitivity, FNAC of lymph node, complete blood count, liver function test, renal function test, erythrocyte sedimentation rate were performed.

In present study HRCT thorax was done in patient who was suspected for pneumocystis jiroveci pneumonia, cases of pleural effusion and patient who was clinically suspected to have pulmonary involvement but chest x-ray was normal.

Table 2 co-relation between cd4 count and incidence of disease.

In present study in bacterial pneumonia cases 22.76% patient had CD4 count >500 cells/micro lit, 40.9% patient had CD4 count 201-500 cells/micro lit, 13.63% patient had CD4 count 151-200 cells/micro lit, 4.54% patient had CD4 count 101-150 cells/micro lit, 0% patient had CD4 51-100 cells/micro lit, 18.18% patient had CD4 count <50 cell/micro lit, 2.7% patient had CD4 count >500 micro lit, 36.61% patient had CD4 count 201-500 cells/micro lit, 19.71% patient had CD4 count 151-200 cells/micro lit, 14.08% patient had CD4 count 101-150 cells/micro lit, 16.09% patient had CD4 count 51-100 cells/micro lit, 11.26% patient had CD4 count <50. chi square test applied. p<0.01 indicates it is highly significant.

This findings similar to the study conducted by Halgarkar et al. except instead of getting maximum number of tuberculosis seen in patient having CD4 count 201-500 cell/micro lit they get in patient having CD4 count 151-199 cells/micro lit. In this study 19.35% patient had CD4 count 201-500 cell/micro lit, 48.38% patient had CD4 count 151-200 cell/micro lit, 17.74% patient had CD4 count 101-150 cell/micro lit, 11.29% patient had CD4 count 51-100 cell/micro lit, 3.22% patient had CD4 count <50 cells/micro lit.

As immunity decreases incidence of tuberculosis also increases. CD4 T lymphocyte counts an epitíc biomarker that provides assessment immune system status of HIV infected patient while pneumocystis jiroveci pneumonia is most common complications of AIDS.

In present study in Pneumocystis jirovecii pneumonia 0% patient had CD4 count >150 cells/micro lit, 14% patient had CD4 count 101-150 cell/micro lit, 14% patient had CD4 count 51-100 cell/micro lit, 71.8% patient had CD4 count <50 cell/micro lit.

This findings similar to the study conducted by Pu-xuan Lu et al. in this study 80% patient had CD4 count <50 cells micro lit, 8% had CD4 count 50-99 cell/micro lit, 6% had CD4 count 101-200 cell/micro lit, 6% in >200 cells/micro lit.

Table 3 co-relation between chest X-ray finding and pulmonary tuberculosis.

In present study prevalence of consolidations is maximum (33.80%) followed by pleural effusion (23.94%), cavitatory lesion (16.90%), fibro nodular infiltrate (16.90%), milliary tuberculosis (14.08%) less frequently. Pneumothorax (8%), chi square test applied p=0.02, indicate this finding are highly specific.

Similar findings seen in study conducted by A. Ahidjo et al. in which consolidation in 25% patient, pleural effusion in 16.7% patient, 20% patient had milliary tuberculosis. Upper zone
Table 2: Co-relation between CD4 count and pulmonary disease

<table>
<thead>
<tr>
<th>C4 count</th>
<th>No. of bacterial pneumonia patient</th>
<th>No. of tuberculosis patient</th>
<th>No. of PJ P patient</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt;500</td>
<td>5</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>201-500</td>
<td>9</td>
<td>26</td>
<td>0</td>
</tr>
<tr>
<td>151-200</td>
<td>3</td>
<td>14</td>
<td>0</td>
</tr>
<tr>
<td>101-150</td>
<td>1</td>
<td>10</td>
<td>1</td>
</tr>
<tr>
<td>50-100</td>
<td>0</td>
<td>12</td>
<td>1</td>
</tr>
<tr>
<td>&lt;50</td>
<td>4</td>
<td>8</td>
<td>5</td>
</tr>
</tbody>
</table>

Table 3: Chest X-ray findings in pulmonary tuberculosis patient

<table>
<thead>
<tr>
<th>CXR finding</th>
<th>No. of tubercular patient (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>consolidation</td>
<td>24 (33.8)</td>
</tr>
<tr>
<td>Pleural effusion</td>
<td>17 (24)</td>
</tr>
<tr>
<td>pneumothorax</td>
<td>6 (8)</td>
</tr>
<tr>
<td>Bilateral extensive tuberculosis</td>
<td>10 (14.1)</td>
</tr>
<tr>
<td>Fibro nodular infiltrate</td>
<td>12 (16.9)</td>
</tr>
<tr>
<td>Mediary tuberculosis</td>
<td>10 (14.1)</td>
</tr>
<tr>
<td>Cavitatory lesions</td>
<td>12 (16.9)</td>
</tr>
</tbody>
</table>

Involvement in 15% patient, lower or middle zone involvement in 11.7% patient, lymphadenopathy in 8.3% patient, nodular infiltrates in 3.3% patient.

Table 4: Chest X-ray findings in Pneumocystis jiroveci pneumonia

<table>
<thead>
<tr>
<th>CXR finding</th>
<th>No. of pts (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ground glass haziness</td>
<td>6 (95.5)</td>
</tr>
<tr>
<td>1 Zone</td>
<td>2 (33.4)</td>
</tr>
<tr>
<td>&gt;1 Zone</td>
<td>4 (66.7)</td>
</tr>
<tr>
<td>Upper zone</td>
<td>1 (16.7)</td>
</tr>
<tr>
<td>Lower zone</td>
<td>5 (83.3)</td>
</tr>
<tr>
<td>Middle zone</td>
<td>0</td>
</tr>
<tr>
<td>B/L lower zone</td>
<td>4 (66.7)</td>
</tr>
<tr>
<td>B/L parahilar opacity</td>
<td>5 (71.4)</td>
</tr>
<tr>
<td>Ground glass haziness + B/L parahilar opacity</td>
<td>5 (71.4)</td>
</tr>
</tbody>
</table>

These findings similar to the studies conducted by Ying Xuancha et al. in which 56% patient had ground glass haziness, consolidations in 12% patient, 20% patient had lung cyst, mixed lesion in 6% patient.

In present study prevalence of consolidation, mediastinal lymphadenopathy, fibro nodular infiltrate, cavitatory lesion, Pneumothorax in tuberculosis patient are 53%, 53%, 46.93%, 10.2%, 10.2% respectively. Chi square test applied. These findings are highly significant. (p<0.01).

Similar findings present in study conducted by A. Ahidjo et al. In which consolidation in 25% patient, pleural effusion in 16.7% patient, 20% patient had mediary tuberculosis. Upper zone involvement in 15% patient, lower or middle zone involvement in 11.7% patient, lymphadenopathy in 8.3% patient, nodular infiltrates in 3.3%.

Summary and Conclusion

Present study is descriptive, clinical study with cross sectional design with 100 HIV positive patient admitted in hospital ward during period of 2012-2014. This is done to study pulmonary involvement in PL HIV.

Following observation were noted and conclusions were drown.

1. In present study prevalence of tuberculosis was maximum in patient followed by bacterial pneumonia and pneumocystis jiroveci pneumonia respectively.

2. In present study prevalence of bacterial pneumonia was maximum in patient having CD4 count >200cells/ micro liter. Prevalence of tuberculosis is maximum in patient having CD4 count between 150-500/micro liter, prevalence of pneumocystis jiroveci pneumonia is maximum in patient having CD4 count <50/micro liter.

3. In pulmonary tuberculosis patient consolidation, pleural effusion, fibro nodular infiltrate, cavity, Pneumothorax, bilateral extensive tuberculosis were common findings on chest X-ray.

4. In pulmonary tuberculosis patient most common radiological findings were consolidation, mediastinal lymphadenopathy, fibro nodular infiltrate, cavity, Pneumothorax on HRCT.

5. In pneumocystis jiroveci pneumonia maximum patient had ground glass haziness and parahilar opacity. On chest X-ray, Prevalence of lower zone involvement was maximum followed by upper zone.

6. In pneumocystis jiroveci pneumonia prevalence of ground glass haziness and cystic lesion was maximum on HRCT thorax.

References


