



Original Article

Clinical and Diagnostic findings of Pleural Involvement in Patients having Human Immunodeficiency Virus (HIV) Infection from Western part of India

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ABSTRACT

Background: Pleural effusions are not uncommon in patients with HIV infection, however; there is paucity of data on type and description of pleural involvement in HIV infected patients from countries like India where the disease is highly rampant.

Objectives/aims: Present study describes the clinical, radiological, pathological and bacteriological profile of pleural involvement in HIV infected patients.

Methods: Patients with HIV infection having pleural effusion and/or pneumothorax were subjected to detailed clinical evaluation followed by in depth diagnostic workup including radiological assessment, sputum examination, pleurocentesis, pleural fluid biochemistry, cytology, smear and/or culture for bacteria, mycobacteria, fungi, pleural biopsy, tuberculin skin testing etc.

Results: Pleural involvement occurred in 34 out of 150 (22.6%) patients with HIV infection. Pleural effusion was seen in 32 (94.1%) cases and pneumothorax in two cases. All pleural effusions were exudates in nature. In 20(58.8%) cases, underlying pulmonary parenchymal disease was evident. Pleural involvement was more common on left side (47%). Tuberculosis was the underlying cause of pleural involvement in 28(82.3%) cases. Four (11.7%) cases had empyema thoracis.

Conclusion: Tuberculosis is the most common cause of pleural effusion in patients having HIV infection followed by bacterial pneumonia from this part of country.

Key words: HIV infection, pleural effusion, pneumothorax.

Introduction:

Pulmonary diseases are common cause of morbidity in patients infected with human immunodeficiency virus (HIV) infection. Respiratory problems accounts for up to 70% of acquired immunodeficiency syndrome (AIDS) defining illnesses and are the cause of death in at least one third of all AIDS patients¹. Given the multiple impairments in host defense that occur during HIV infection, patients with AIDS are at risk for a variety of pleural infection and neoplasms². Causes of HIV related pleural diseases differ markedly in the

developed and developing world³⁻⁶. In India only few studies has mention pleural involvement in HIV/AIDS⁷⁻⁹. In this regard this study highlights the types of pleural involvement in HIV infected patients for the first time from western part of the country.

Material & Methods:

Patients of respiratory diseases with high suspicion of HIV/AIDS were subjected to HIV serology after taking informed consent. One hundred and fifty of them were found to be reactive for HIV serology using different Elisa kits. Thirty four among them having pleural

involvement constituted the final study group. All such patients were assessed clinically for their presenting symptoms and sign apart from other parameters. All these were subjected to following investigations- skiagram chest, computerized tomographic scan in selected cases, tuberculin skin testing, diagnostic and/or therapeutic pleurocentesis, pleural fluid analysis, pleural biopsy using Abram's pleural punch biopsy forceps etc. Other investigations conducted were sputum for acid fast bacilli (AFB) by smear/concentration method, culture for organisms, mycobacterium and fungus examination etc.

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Pulmonary tuberculosis was diagnosed if clinical features were strongly suggestive of tuberculosis; sputum/pleural fluid smear for acid fast bacilli/ culture for mycobacterium tuberculosis become positive, radiological features on chest roentgenogram were compatible with tuberculosis or FNAC/biopsy showing caseating epithelioid granulomas and/or AFB.

Results:

Pleural involvement was seen in 34 out of 150 patients that were subjected to testing for HIV infection, giving an overall incidence of 22.6%. There were 26 males and 8 females; the mean age of patients was 30.7 years. In 28 (82.3%) patients history of extra marital sex was present. Four patients gave history of blood transfusion and two patients had history of having drug abuse. 28 out of 34 (82.3%) patients were belonging to lower socioeconomic group.

On clinical assessment, 16 (47%) patients were suffering from illness for not more than 3 months. In 14 (41.1%) patients the average duration of illness was between 4 to 6 months. Fever (47%) and weight loss (41.1%) were the commonest general symptoms followed by night sweat

and joint pain (11.7%). Among the respiratory symptoms cough (76%), chest pain (52.9%) and shortness of breath (52.9%) were commonly seen.

Pleural fluid smear and/ culture for AFB/ Mycobacterium tuberculosis were positive in 14(41.1%) cases and in 20(58.8%) cases these were negative. Pleural biopsy was performed in 20(58.8%) cases that on histological examination showed features consistent of tuberculosis in 14(70%) and non specific inflammatory reaction in 6 (30%) cases. In 14 cases, pleural biopsy could not be performed in view of minimal pleural effusion or lack of consent.

On radiological assessment, pleural effusion was evident in 32(94.1%) and pneumothorax in two cases. Among two cases of pneumothorax, one patient had sequential bilateral pneumothorax, first on right side and then on left while another one had pneumothorax on right side with underlying COPD. Pleural effusion was left sided in 16(47%) patients, right sided in 10(29.4%) and bilateral in six (17.6%). Of the 16 cases of left sided pleural effusion, in 4 cases it was massive empyema thoracis. In one case of bilateral pleural effusion also, there was a moderate empyema thoracis on right side and pleural effusion with refilling on left side. Pericardial effusion with cardiomegaly was also seen in two cases of bilateral pleural effusion.

Underlying pulmonary parenchymal disease was evident in 20(58.8%) cases. Among them, patchy infiltrates were seen in 10(29.4%) cases, cavitory lesions in 6(17.6%), and miliary shadows in 4(11.7%). In 14(41.1%) cases no underlying parenchymal disease could be detected on chest x-ray. Tuberculosis was the underlying cause of pleural involvement in 28(82.3%) patients. Non tubercular empyema thoracis was observed in four (11.7%) cases that on further investigations were found to be due to Klebsiella, Citrobacter species and streptococcus faecalis in one case each. In one case, no definite organism could be identified.

Discussion

Although progressive depletion of CD4 lymphocytes is an immunogenic hallmark of HIV infection, multiple impairment in host defense occur in the lungs of HIV

infected individuals, making them susceptible to a variety of infectious and neoplastic processes¹⁰. As expected the incidence of pleural disease in HIV infected individuals closely follows the incidence of underlying pulmonary infections and neoplasm's and series reported from developed countries differ markedly from those from developing countries³⁻⁶.

In this series, the incidence of pleural effusion was 21.3% while this has been reported to be 27% at United States³, 24% at Harare¹¹, 18.7% at Madras⁹, 14.6% at Florida¹², 13.7% at Pondicherry⁷, 8% at Vienna⁴ and 4.6% at Bombay⁸.

Pleural effusion in HIV infected individuals is caused by a variety of pleural infections and neoplasm. Of the infectious causes, bacterial parapneumonic effusions, empyema and tuberculosis pleuritis occurs more frequently than the effusions caused by *Pneumocystis carinii*². Rarely these can be due to Cryptococcal infection¹³, histoplasmosis¹⁴, disseminated candidiasis⁷ etc. Malignant pleural effusions in HIV infection are frequently associated with Kaposi's sarcoma followed by non Hodgkin's lymphoma. Other causes of pleural effusions in HIV co infected individuals are hypoalbuminemia causing transudative pleural effusion³, HIV related dilated cardiomyopathy with left ventricular failure and renal failure^{15, 16}. In one series pancreatitis was the fifth leading cause of pleural effusion in patients with AIDS¹². In our series, 82% cases were due to underlying tuberculosis similar to the reports from Rawanda⁶ and Pondicherry⁷. Whereas tuberculosis contributed 8% cases in United States³, 15% in French series⁵ and 21% from Vienna⁴, reflecting the high case rate of tuberculosis in the developing countries. We could not find any case due to neoplastic process or heart failure in this study.

Tuberculosis pleural effusions are usually immune phenomenon. The entry of small numbers of *Mycobacterium tuberculosis* organisms from sub pleural pulmonary parenchymal foci results in an inflammatory reaction in the pleural space of a previously sensitized host¹⁷. This might be the reason that HIV infected individuals with CD4 counts greater

than 200/mm³ are more likely to present with tubercular pleurisy, reflecting that pleurisy requires intact immunity¹⁸. In our series also 2/3rd of the patients were having normal CD4 counts.

Pleural fluid characteristics of tubercular pleural effusion in HIV infected individuals include turbid or serosanguinous appearance, exudative chemistries and mean WBC counts of about 4000 cell/ μ l¹⁹. About 2/3 of such effusions are lymphocytes predominant and a third are neutrophil predominant. Pleural fluid culture are positive in more than 90% of cases with smears positive in only a few percent; however pleural biopsy tissue show positivity in up to 75% of reported cases²⁰. In the present study all effusions were found to be exudates on fluid biochemistry. AFB were demonstrable in pleural fluid smear and /or culture in 41% cases similar to 40% cases in Spain²¹ and slightly less compares to 53% cases from New York²⁰. Pleural biopsy showed features suggestive of tuberculosis in 70% cases where it was performed while it was reported in 88% cases in New York²⁰ and only 42% in Spain²¹. The granulomas on pleural biopsy are less well formed in some patients with HIV-positive with numerous AFB reflecting the degree of immunosuppression²².

HIV infected individuals have more frequent development of parapneumonic effusions or empyema. *Staphylococcus aureus*, *Streptococcus pneumoniae* and gram negative bacilli including *Pseudomonas*^{23, 24} are common pathogen compared to other less reported pathogens such as *Rhodococcus aquii*²⁵ etc. We observed four such cases; however the identified pathogens among three were *Klebsiella*, *Citrobacter* and *Streptococcus faecalis*. Although the distribution of organisms responsible for parapneumonic effusion in HIV infected individuals is similar to those without HIV, the empyema in HIV with less CD4 count in more complex and often requires open decortications and drainage²⁶.

Pneumothorax in HIV infected individuals is reported to be seen in 2 to 9% cases. *Pneumocystis carinii* is the most common cause of pneumothorax in such patients²⁷. In a multivariate analysis found underlying pulmonary tuberculosis in such patients although the

number was small²⁸. Recent reports also mention bacterial pneumonias as an emerging rising factor for pneumothorax in these patients²⁹. Rarely *Cryptococcus neoformis* has also been reported to cause pneumothorax in HIV patients³⁰. In our series, one case developed sequential pneumothorax first on right side and then on left side due to underlying pulmonary tuberculosis. The second case developed right sided pneumothorax due to underlying COPD. It is interesting to know that HIV infection itself has emerged as an independent risk factor for COPD changes and bullous emphysema in recent time³¹ and that is a well known risk factor for pneumothorax.

In conclusion, this study highlights pleural involvement in 1/5th of cases having pulmonary disease with HIV infection/AIDS. Tuberculosis pleural effusion and pleurisy are the most common type of pleural involvement in such patients even in the absence of marked immune suppression. Like in Rwanda⁶, pleural effusion should be considered as a marker of tuberculosis as well as HIV infection in our country that is also facing this lethal association at an alarming speed.

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