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A STUDY ON PULMONARY MANIFESTATIONS IN HIV/AIDS PATIENT'S ATTENDING TERTIARY CARE HOSPITAL HYDERABAD

DR.K.NITHESHKUMAR[*1] , DR.B.KIRANMAI[2] AND DR.A.CHANDRASEKHAR[3]

1Department of Community MedicineDeccan College of Medical Sciences& Research CentreHyderabad
2Department of Community MedicineGandhi Medical CollegeHyderabad
3Dept.Of.CommunityMedicine ,Deccan college Of Medical sciences & Research Centre

ABSTRACT

Advances in our understanding of Human Immunodeficiency virus (HIV) infection have led to Improved care and incremental increases in survival. However, the pulmonary manifestations of HIV/Acquired Immunodeficiency syndrome (AIDS) remain a major cause of morbidity and mortality. Respiratory complaints are most common in patients who are HIV positive. The great majority of lung complications of HIV/AIDS are of infectious etiology but neoplasm, interstitial pneumonias, Kaposi sarcoma and lymphomas add significantly to patient morbidity and mortality. Imaging plays a vital role in the diagnosis and management of lung of complications associated with HIV. Accurate diagnosis is based on an understanding of the pathogenesis of the processes involved and their imaging findings. Imaging also plays an important role in selection of the most appropriate site for tissue sampling, staging of disease and follow-ups. The present study consisted of 100 HIV seropositive with pulmonary manifestations in patients attending chest hospital, yerragadda, Hyderabad with a standardized questionnaire was administered, and clinical databases were analyzed..

KEYWORDS: HIV/AIDS,Pulmonary manifestations,Diagnostic methods, Staging and follow up

DR.K.NITHESHKUMAR
Department of Community MedicineDeccan College of Medical Sciences& Research CentreHyderabad

**Corresponding author*

INTRODUCTION

Acquired immune deficiency syndrome is caused by Human Immune Deficiency Virus.HIV infection is unique in that its impact is felt to intensely not only in medicine and science but also in causing so much panic among the public and government .No other disease has claimed so much attention of the medical fraternity, scientists, governments and the general public as did in HIV/AIDS in the recent times. The HIV epidemic has also been showed by a parallel epidemic in new cases of Tuberculosis including out breaks of multidrug resistant disease. Individuals with HIV infections are also susceptible to bacterial pneumonia. Additionally HIV infected persons are susceptible to a number of neoplastic and inflammatory conditions that affects the lung. The evaluation of respiratory symptoms in HIV-infected patients can be challenging for a number of reasons. Respiratory symptoms are a frequent complaint among HIV-infected individuals and may be caused by a wide spectrum of illnesses. The spectrum of pulmonary illnesses in HIV-infected patients includes both HIV-related and non-HIV-related conditions. The HIV-associated pulmonary conditions include both opportunistic infections and neoplasms. The Opportunistic infections involve bacterial, mycobacterial, fungal, viral, and parasitic pathogens has a characteristic clinical and radiographic presentation. However, there can be considerable variation and overlap in these presentations. Therefore, no constellation of symptoms, physical examination findings, laboratory abnormalities, and chest radiographic findings is pathognomonic or specific for a particular disease. As a result, a definitive microbiologic or pathologic diagnosis is preferable to empiric therapy whenever possible. The prevention, evaluation and treatment of pulmonary disease in an essential part of managing patients with HIV infection

Natural History of HIV Infection

Human Immunodeficiency Virus was discovered by Luc Montagnier and his associates at the Institute Pasteur in Paris in 1983. HIV-2 was first identified among patients in Cameroon in 1985. HIV-2 is more similar to SIV (Simian Immunodeficiency Virus) than is HIV-1 and it is much less virulent HIV is a special type of retrovirus containing RNA. The natural history of HIV infection follows these six stages: Initial Infection (lasting 3–6 weeks), Acute HIV Syndrome (lasting 1 week–3 months), HIV-Specific Immune Response (1–2 weeks), Clinical Latency (10 years, median), AIDS-Defining Illnesses (2 years on average), and Death.After initial infection, 40–70% of patients enter the acute stage and develop flu-like or mononucleosis-like symptoms, which may include fever, headache, sore throat, erythematous rash (looks like sunburn), diarrhea, and generalized lymphadenopathy (severely swollen glands). T4 cell counts, measured in the number of cells per microliter = mL = mm^3, rise at first as the body mounts an immune defense, but then fall. The CD4/CD8 ratio, normally about 2:1, drops to about 0.5 or less. The acute illness usually resolves spontaneously within 2–3 weeks. It is during this initial infection that the disease is most readily transmitted. The human body takes anywhere from a few weeks to several months to mount a humoral immune response to HIV (that's slower than to other pathogens). This time is called the "window period" for the disease. Only after (but not before) the HIV-specific immune response sets in, will most testing show positive results, meaning positive for antibodies to HIV. This transition is called seroconversion, because only then can antibody be detected in the blood. During the clinical latency which follows, there are few, if any, symptoms. The T4 cell count may return to the normal range of 800–1200/mL, or it may stabilize at a lower level, or decline slowly. The number of virions in the body approaches an

equilibrium value, called the set point, at which the immune system is able to keep the virus from replicating completely out of control. Despite the apparent lack of symptoms during this period, the virus is active in the lymphoid system, where it is replicating like mad and destroying T cells like there's no tomorrow—as many as ten billion killed per day. The body continues to fight the good fight until it has exhausted its resources and the T4 cell count continues to fall.[1] Once the T4 cell count drops below about 400, constitutional symptoms appear, such as fever, weight loss, fatigue, night sweats (strong smelling and profuse), diarrhea, and persistent generalized lymphadenopathy. Then infections set in, such as oral and Vaginal Candidiasis, oral Hairy leukoplakia, Herpes zoster (shingles), Herpes Simplex, and listerosis. As the T4 cell count continues to fall below 200, other opportunistic infections (*Pneumocystis carinii* pneumonia, Kaposi's sarcoma, candidiasis, coccidioidomycosis, cryptosporidiosis, cytomegaloviral infections, toxoplasmosis of the brain, HIV encephalopathy, etc.) ravage the body until one or more they cause death. HIV does not kill the patient. For the most part the opportunistic infections are the villains. More specifically, 90% of AIDS patients die of opportunistic infections, 7% die of cancers, and the remainder die of other causes.[2] A clinical marker for infection is, ideally, a measure (a) whose increase/decrease is highly correlated with progression of the disease, (b) whose decrease/increase is associated with remission of the disease, (c) which mirrors the effects of successful treatment, and (d) is (relatively easily) measurable. CD4 counts were the initial clinical markers on which all clinical decisions were based. Unfortunately, CD4 counts are highly variable. They can vary from lab to lab, change during the course of a day, and vary as someone smokes or doesn't before testing. The best currentclinical marker for the development of AIDS is the viral load; lower viral load is better and higher is not good. Viral load or viremia is measured in copies of viral RNA per milliliter = mL. Typical high values of the viral load are in the tens of thousands to as many as millions, while low values are below 2000 copies per mL. From the onset of infection, HIV is reproducing at an extraordinary rate. In the early to intermediate stages, the immune system can mount a defense that keeps the virus in check at its set point. The virus's replication rate is higher in the lymph nodes than in the plasma. In fact, only 2% of the virus is in the circulating blood and the rest is in lymphoid organs. After years of battling, the immune system starts to deteriorate and the body moves into the downward spiral of the disease.

HIV is transmitted by exchange of bodily fluids via sharing contaminated syringes, vertical transmission from infected mother to the child, and sexual contact. The main modes of transmission via blood or bodily fluids are

1. Transfusion of infected blood or non-artificial infected blood products,
2. Needle sharing among infected injection drug users,
3. Sexual transmission involving the exchange of blood, semen, seminal fluid, or vaginal fluids
4. Needle sticks and open cuts exposed to infected fluids,
5. Piercing the skin with contaminated instruments in ear-piercing, tattooing, and acupuncture,
6. Injection with contaminated unsterilized syringes.
7. Vertical transmission can occur during birth and as a result of breast-feeding.

2 Major signs and 1 Minor sign --- diagnostic of AIDS

Major signs

1. Weight. Loss> 10% of body weight
2. Chronic Diarrhea >1 month, diarrhea due to opportunistic organisms.
3. Fever > 1 month, intermittent or constant.

In the absence of known cause of immune suppression.

Minor signs

1. Persistent cough > 1 month

2. Generalized pruritic dermatitis
3. Recurrent herpes zoster
4.Oropharyngeal candidiasis
5. Chronic Progressive and disseminated herpes simplex
6. Generalized lymphadenopathy
7.Disseminated Kaposi's sarcoma or cyptococcal meningitis.

Lungs are the most frequently affected organs in HIV-infected patients. They suffer from many different opportunistic infections; among them, twoaremostfrequentlyobserved:*Pneumocystis c arinii* pneumonia (PCP) and pulmonary tuberculosis Persistence or worsening of cough and/or chest pain and/or dyspnoea make the clinician suspect of an opportunistic respiratory manifestation. Etiology includes infections (bacterial, fungal, viral and parasitic), malignancies and other typical manifestations.

Infections
PneumocystisCariniiPneumonia Tuberculosis Nontubercular mycobacteriosis Pyogenic bac teria Nocardiosis Fungalinfections(Cryptococc osis, Histoplasmosis,Aspergillosis, Coccidioido mycosis) Cytomegalovirus

Malignancies
Kaposi's sarcoma
Non-Hodgkin lymphoma
Other
Lymphoid interstitial pneumonitis

Pneumocystis carinii pneumonia (PCP)
Insomeareasoftheworld, Pneumocystis carinii p neumonia ranks as the most common opportunistic infection in AIDS. It is less frequent in developing countries where tuberculosis and fungal infections are more common opportunistic infections. Clinical characteristics productive cough, dyspnea ,tachypnea,hypoxemia,respiratory acidosis and fever A negative chest radiograph is quite commonbutabilateraldiffuse reticulonodular infil trate, involving the entire lung can be seen at different stages of evolution.[3] The chest radiograph shows bilateral diffuse lesions. These lesions may be asymmetric in distribution Specimens from the lung are obtained by inducing sputum using hypertonicsalineby nebulization or bronchoalve olar lavage (BAL). Many staining methods may be used:
a) WrightGiemsa stains showingtheorganisms.
b) Appearance on Toluidine blue stain

Tuberculosis
The incidence of pulmonary[4]and extra pulmonary tuberculosis is increased in people with HIV infection. A clinical contest of fever, cough and/or haemoptysis, and any signs on a chest radiograph should raise the suspicion of pulmonary tuberculosis and sputum smear should be done immediately.A chest radiograph shows opacity in the region of lingula with enlarged hilar lymph nodes. These findings are suggestive of tuberculosis. Ziehl-Neelsen staining of the sputum revealed Mycobacterium tuberculosis.

Miliary pattern
Miliary and reticulonodular patternsindicate hae matogenous spreadofopportunisticinfection. Tu berculosis and systemic mycosis commonly present like this.This chest radiograph shows reticulonodular shadowing.

MATERIALS & METHODS

The present study consisted of 100 HIV seropositive with pulmonary manifestations in patients attending toRespiratory and Chest diseaseshospital, Yerragadda, Hyderabad. The detailed history was taken and clinical examinations and relevant investigations were done for these patients during the period of three months from January 2012 to March 2012. The onset ,type and duration of symptoms are useful in differentiating the possible causes of pulmonary symptoms.Abrupt onset of symptoms suggest bacterial infections, whereas sub acute or chronic symptoms are more prone consistent with Pneumocystis carinii and fungal or tuberculosis pneumonia. Purulent sputum is

exceedingly rare in PCP but is typical of bacterial pneumonia.Haemoptysis usually suggests cavitary tuberculosis.Diagnostic tests include cultures from sputum and blood and from respiratory specimens obtained by invasive procedures such as bronchoscopy, thoracocentesis, computed tomography (CT)-guided transthoracic needle aspiration, thoracoscopy, mediastinoscopy, and open-lung biopsy.The collected data was analyzed using software Epiinfo 2003.

RESULTS & DISCUSSION

In this study cough was the main presenting symptom among 76% of patients, loss of appetite and loss of weight among 71% of cases[5]..Breathlessness was presenting symptoms in 58% of patients and Fever in 36%[6]of patients, chest pain 26% and haemoptysis13%..The predominant mode of transmission of HIV/AIDS was through sexual contact96%[7], blood transfusion and drug abuse have accounted for 2% each cases in the present study[8].No cases have been found with needle prick injury. The chest physical signs in 100 cases of HIV positive with pulmonary manifestations.Most of the cases were found with Cavity36%,pleural effusion was seen in 18%, pneumonic consolidation has been accounted for 6% only9,on sputum examination AFB positive in 42cases[10], Gram positive Pneumococci and Streptococci were present in 69% and 5.2% respectively[11].No malignant cells after sputum cytology. Raised ESR[12] was observed among all patients. Chest Xray[13] showed consolidation of lungs10%,cavity36%,Fibrosis12%,Hilar lymphadenopathy 7%, Miliary mottling 6%,pleural Effusion 18%,interstitial infiltrates 8%[14] and normal chest Xray were seen in 3%.Extra pulmonary manifestations showed lymphadenitis62%,TB meningitis2%(82), TB peritonitis 1% and other TB osteomyelitis and TB skin were not reported. The Opportunistic infections were plumonaryTB59%,Oropharyngeal candidiosis28%,pneumocystis carinii13%,Bacterial pneumonia 7%,Varicella zoster virus6%,cytomegalo virus retinitis3%[15]and MycobacteriumAvium complex was not reported in the study. Associated STD among HIV positive patients with pulmonary disease finding were Genital herpis[16]was reported among 14% chancroid in6%, primar chancre and Granuloma were not reported[17].vaginal discharge16%,inguinal bubo12%,genital warts around 18% and 21% on Molluscum bodies were reported among these patients.

Table1
Respiratory Symptoms.

S.No	Symptoms	Total cases	Positive cases	%of positive cases
1	Cough	100	76	76
2	Breathlessness	100	58	58
3	Chest pain	100	26	26
4	Fever	100	36	36
5	Loss of weight	100	71	71
6	Haemoptysis	100	13	13

Table-1 shows cough, breathlessness & loss of weight present in 50-75% of the patients. Fever chest pain in 20-35% and haemoptysis in 13%.

Table2
Modes of Transmission of HIV.

S no	Mode of transmission	Total	Positive cases	%
1	Sexual	100	96	96
2	Blood transfusion	100	2	2
3	Needle prick	100	0	0
4	IV drug abuse	100	2	2

Table 2 shows that, mode of HIV transmission in majority(96%) of cases is by sexual transmission.Blood transfusion and IV drug abuse is 2%.

Table3
Chest Signs in HIV positive patients.

S.No	Signs	Total	Positivecases	%
1	Pleural effusion	100	18	18
2	Cavitatory	100	36	36
3	Pneumonic consolidation	100	6	6

According to the study, cavitatory and pleural effusion signs are present in 18-36% of the patients and pneumonic consolidation in 6% of the cases.

Table4
Laboratory Findings in HIV patients.

Sno	Tests	Total	Positive	%	Negative	%
1	1sputum for Gram Stain	58	4	6.9	54	93.1
		58	3	5.2	55	94.8
	AFB	100	42	42	58	58
		13	NIL	0	13	100
	Cytology for Malignant cell					
2	Raised ESR	100	100	100	NIL	0

Lab findings show that 42% of the patients are AFB positive. All the patients have raised ESR and Test negative for Cytology for malignant cell. 6.9% of the patients tested positive for gram stain.

Table5
Chest X Ray findings in HIV patients

s.no	Findings	Total	Positive	%	negative	%
1	Consolidation		10	10	90	90
2	Cavity		36	36	64	64
3	Fibrosis		12	12	88	88
4	Miliarymottling		6	6	94	94
5	Hilarlymphadenopathy		7	7	93	93
6	Pleural effusion		18	18	82	82
7	Interstitial infiltrate		8	8	92	92
8	Normal X ray		3	3	97	97

Chest x-rays show that cavity is present in 36% of the cases and pleural effusion in 18% of the cases. Fibrosis is present in 12% of the cases. Only 3% of the cases have normal x-rays.

Table6
Extrapulmonary Tuberculosis in HIV patients

S.No	ExtrapulmonaryTB	Positive	%	Negative	%
1	Lymphadenitis	62	62	38	38
2	TB meningitis	2	2	98	98
3	TB.peritonitis	1	1	99	99
4	TB.osteomyelitis	0	0	100	100
5	TB skin	0	0	100	100

62% of the cases suffer from lymphadenitis, 2% from TB meningitis and 1% from peritonitis.

Table7
Opportunistic Infections in HIV patients

S.No	Opportunistic infections	positive	%	Negative	%
1	Tuberculosis	59	59	41	41
2	Oralcandidiosis	28	28	72	72
3	Pneumocystiscarinii	13	13	87	87
4	Bacterial pneumonia	7	7	93	93
5	Varicellazooster	6	6	94	94
6	Cytomegalovirus retinitis	3	3	97	97
7	Mycobacterium avium complex	Nil	Nil	100	100

Tuberculosis is the most commonly seen opportunistic infection (59%). Oral Candidiasis in seen in 28% of the cases .

Table8
Associated STD among HIV Positive.

Sno	Findings	Total HIV cases	Positive	%	Negative	%
1	Genital ulcer Primary chancre	100	nil	0	100	100
	Genitalherpis	100	14	14	86	86
	Chanchroid	100	6	6	94	94
	Granuloma venerium	100	0	0	100	100
2	Urethral discharge	100	Nil	0	100	100
3	Vaginal discharge	100	16	32	34	34
4	Inguinal bubo	100	12	12	88	88
5	Genital warts	100	18	18	82	82
6	Molluscumbodies	100	21	21	79	79

Commonly seen STDs among HIV patients are Genitalherpis(14%), Molluscum bodies(21%), genital warts(18%), vaginal discharge(16%) and inguinal bubo(12%).

CONCLUSION

The most common opportunistic infections among HIV/AIDS patients in developing countries are systemic bacterial infections.The respiratory tops among the other systemic opportunistic infections.TB is the most common Opportunistic infection followed by bacterial pneumonia and next pneumocystis carinii.fungal infections are less common opportunistic infections of respiratory system. Hence all the patients of HIV/AIDS should be subjected to clinical examination of respiratory system; chestx-rayand sputum examination for screening of bacterial, fungal and protozoal opportunistic infections.Viral serology may be done to evaluate viral infections. This helps early diagnosis and treatment of opportunistic infections and helps in limiting the disease progression and finally HIV/AIDS.

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