



ISSN NO. 2320-5407

Journal Homepage: - www.journalijar.com

INTERNATIONAL JOURNAL OF ADVANCED RESEARCH (IJAR)

Article DOI: 10.21474/IJAR01/7529
DOI URL: <http://dx.doi.org/10.21474/IJAR01/7529>



RESEARCH ARTICLE

THE STUDY OF PREVALENCE OF TUBERCULOSIS IN HIV INFECTED AND AIDS PATIENTS AND ITS CORRELATION WITH CD₄ COUNT.

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Manuscript Info

Manuscript History

Received: 10 June 2018
Final Accepted: 12 July 2018
Published: August 2018

Keywords:-

TB, HIV, AIDS, CD₄, CSF, FNAC, Lymphadenitis, Immunodeficiency, Mycobacterium.

Abstract

This study was conducted at Regional Institute of Medical Sciences, Imphal on 50 number of HIV/AIDS patients. Male comprised the majority of the cases (80%) and maximum number of patients were in the age group between 31 – 40 years of age (44%) with an average age of 33.72 years. The most common route of transmission was intravenous drug use (54%) followed by heterosexual contact (34%). The most clinical features observed were fever > 1 month (68%), weight loss > 10%, body weight (56%), cough (36%), headache (28%), oral thrush and neck stiffness (24%) each and altered sensorium (20%). Co-infection with tuberculosis (TB) was recorded in 52% cases and it was more in patients with lower CD₄ cell counts. In cerebrospinal Fluid (CSF) analysis protein was raised in 44% cases and reduced level of sugar was seen in 89% cases. In all the cases increased cell count with lymphocytic predominance was noted. Cryptococcus was detected in 56% cases but no Acid-Fast-Bacilli (AFB) was detected. Histopathological examination of fine needle cytology (FNAC) lymph node showed tubercular lymphadenitis in majority of the cases with positive AFB in few cases. An Extrapulmonary (61%) manifestation of tuberculosis was more than the pulmonary (27%) manifestations and the difference was more with lower CD₄ cell counts (≤ 50 cells/cumm). However, the different clinical pattern of tuberculosis in relation to CD₄ cell count was insignificant ($p > 0.05$).

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Introduction:-

Human Immunodeficiency Virus (HIV), the causative agent for Acquired Immunodeficiency syndrome (AIDS) is believed to have originated from simian viruses. The HIV-I and HIV-II are both cytopathic viruses belonging to the family of human retroviruses and the retroviridae lentiviridae⁽¹⁾. Structurally, HIV possesses an outer glycoprotein coats and inner “core” proteins and genes. The HIV has nine genes. The three structural genes- gag, pol and env encodes for core protein p19, p24; the enzymes- protease, reverse transcriptase and integrase; envelope glycoprotein's- gp120 and gp41 respectively. The major regulatory genes, tat and rev encode proteins which are not assembled into the virus but are essential for replication of the virus in the cells. The four assessor genes nef, vif, vpr

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and vpu genes also codes for protein involved in different functions. HIV-II differs from HIV I as it contain VPx gene in place of VPu gene and it does not incorporate the cellular cyclophilin-A⁽⁷⁾.

Tuberculosis occurs after the inhalation of infective droplet nuclei containing Mycobacterium tuberculosis. The clinical manifestations of tuberculosis in HIV infected patients are quite varied and generally show different patterns depending on the level of the CD₄ and T cell count. World Health Organization (WHO) estimates that one third of the world's population; 2 billion people are infected with M. tuberculosis. Infection rates are highest in Southeast Asia, China, India, Africa and Latin America⁽²⁾. HIV infects CD₄ T-lymphocytes predominantly. Depletion of CD₄ T-lymphocytes results in immunodeficiency. The term AIDS refers to the last stage of HIV infection⁽³⁾. Tuberculosis is the commonest opportunistic infection in HIV infected patients in developing countries including India. The sero prevalence of HIV among tuberculosis patients in various parts of India has been increasing steadily⁽⁸⁾. Prevalence of M. tuberculosis and HIV co-infection worldwide was 18%. The global burden of tuberculosis remains enormous⁽⁴⁾. The deadly partnership between HIV and tuberculosis is mutually reinforcing since active tuberculosis seems to enhance viral replication and accelerate the progression of AIDS via increased production of TNF, which is known to facilitate HIV replication in infected lymphocytes⁽⁹⁾.

Clinically, the useful way to classify HIV infection is based on the management implication of the patients with CD₄ cell count of the patients. Grade-I included those patients with CD₄ cell counts greater than or equal to 500/cumm of blood, Gr.-II are those with CD₄ counts between 200 and 500/cumm, and Gr.-III are those with CD₄ counts of less than 200/cumm. It was described that the suppressed immunity is the cause of developing opportunistic infections, malignancies among HIV/AIDS, the prime cause of mortality and morbidity. However, early detection and medical intervention retarded the disease progression and improved survival⁽¹⁰⁾. Generally, the CD₄ cells in blood falls gradually and progressively so that there is a long period of clinical latency before the development of AIDS which may be around 10 years in case of HIV-I infection or even longer in HIV-II infection⁽⁵⁾.

Aims And Objectives:-

- To find out the prevalence of tuberculosis in patients with HIV infected and AIDS.
- To rule out the clinical features of tuberculosis in HIV infected and AIDS positive tuberculosis patients.
- To find out CD₄ count in correlation with tuberculosis in AIDS patients.

Materials And Methods:-

The study was carried out in the department of Medicine in collaboration with the department of Microbiology, Regional Institute of Medical Sciences (RIMS), Imphal, Manipur during the period of September 2003 to August 2005. Fifty cases of HIV infected and AIDS admitted to the Medicine ward were taken as study group. In order to diagnose pulmonary tuberculosis 3 early morning sputum sample were collected for 3 consecutive days and were sent to Microbiology department for detection of Acid Fast Bacilli in the stained smear⁽¹¹⁾. On the other hand, for diagnosis of HIV infection and AIDS, patients were referred to National Reference Laboratory, department of Microbiology, RIMS, Imphal. Accordingly, pretest counseling as well as patient's consent was taken. Then 05 ml blood was drawn aseptically from the patient following standard operative procedure. The blood was tested as to find out HIV antibodies by ELISA/Rapid/Simple test. Post test counseling was also done to those patients who were found to be HIV seropositive/AIDS patients⁽¹²⁾.

In case of CD₄ count, 3 ml of blood was collected in an EDTA vial (K₃ EDTA Vacutainer vial) and CD₄ count of the sample was carried out in the department of Microbiology, RIMS by Fluorescence Activated Cell Sorter⁽⁶⁾.

Results And Observations:-

Fifty number of HIV/AIDS patients who were admitted in Medicine ward of RIMS, Imphal were included in this study and the work was carried out during the period between September 2003 and August 2005.

Table No. 1:- Age and Sex Distribution of cases (Study Group n=50)

Age group in years	Number of patients		Total	Percentage (%)
	Male	Female		
13-20	0	1	1	2
21-30	14	3	17	37
31-40	19	3	22	44

41-50	7	3	10	20
Total	40	10	50	100

In our study, it was revealed that out of total 50 HIV seropositive/AIDS cases (belonging to 13 to 50 years of age), 80% were males and 20% were females. The most commonly affected age group was found to be 31 to 40 years of age group (44%) with an average age of 33.72 years (Table No.1).

Table No.2:- Showing Distribution of Risk Behaviors (Study Group n=50)

Source of Infection	No. of Cases		Percentage (%)	p
	Male	Female		
IDUs	27	0	54	0.01
Heterosexual	10	7	34	
Homosexual	1	0	2	
Blood transfusion	2	3	10	

It was observed that the most common route of transmission of HIV infection was intravenous drug use (IUD) which constituted 27 (54%) patients and heterosexual contact carries the second most common route of transmission constituting 17 patients(34%) when n=50 (Table No.2).

Table No. 3:- Distribution of Signs and Symptoms (Study Group n=50)

Signs and Symptoms	No. of cases	Percentage (%)
Headache	14	28
Fever	34	68
Vomiting	8	16
Convulsion	2	4
Cough	18	36
Diarrhea	3	12
Neck stiffness	12	24
Oral thrush	12	24
Weight loss	28	56
Altered sensorium/coma	10	20
Lymphadenopathy	4	8
Para umbilical lump	3	6
Jaundice	4	8
Hemiplegia	2	4
Distension of abdomen	4	8
Haemoptysis	4	8
Breathlessness	9	18
Irregular menstruation	1	2

The most common clinical features observed among the patients in the present study were fever in 34 (68%) patients followed by weight loss in 28 (56%) patients. Cough was complained by 18 (36%) patients and headache by 14 (28%) patients. However, out of 10 female patients, only one gave the history of irregular menstruation (Table No.3).

Table No. 4:- Showing CSF Findings (Study Group n=18)

Sample	Range	No. of cases	Percentage (%)	p
Protein(mg/dl)	≤20	2	11	>0.05
	21-40	8	44	
	≥41	8	44	
Sugar(mg/dl)	≤40	16	89	<0.01
	41-80	2	11	
	≥81	0	0	

TLC(cells/mm ³)	5-100	12	67	<0.01
	100-300	4	22	
	>300 cells	2	11	
DLC(cells/mm ³)	Lymphocyte			<0.001
	>90%	15	83	
	<90%	3	17	
	Polymorphs			>0.05
>10%	6	33		
<10%	12	67		
Cryptococcus	Positive	10	56	>0.05
	Negative	8	44	
Acid Fast bacilli	Positive	0	0	----
	Negative	18	100	

In Cerebrospinal fluid (CSF) finding of the patients, protein is found to be raised; it is in the range of 21 – 40 mg/dl in 08 (44%) patients, ≥ 41 mg/dl in 08(44%) patients and ≤ 20 mg/dl in 2 (11%) patients. Sugar is below 40 mg/dl in 16(89%) patients and 2 (11%) patients are in the range of 41-80 mg/dl. Total leukocyte count was in the range of 5-100 cells/mm³ in 12(67%) patients, 100-300 cells/mm³ in 4(22%) patients and more than 300 cells/mm³ in 2(11%) patients. 15 (83%) patients had lymphocyte count more than 90% and 3 (17%) patients had lymphocyte count less than 90%. Polymorphonuclear leukocyte was more than 10% in 6 (33%) cases and less than 10% in 12 (67%) cases. Cryptococcus was detected in 10 (56%) patients and Acid Fast Bacilli was not at all detected in CSF (Table No. 4).

Table No. 5:- Showing FNAC Findings of Lymph Nodes According to Pathology (n=14)

HPE/FNAC Findings	No. of patients	Percentage (%)	p
TB Lymphadenitis with positive AFB	5	36	>0.05
TB Lymphadenitis with negative AFB	4	29	
Reactive hyperplasia	2	14	
Non-specific features	3	21	

In Table No. 5 shows histopathological examination of FNAC report of lymph node examination where tubercular lymphadenitis positive AFB was detected in 5 patients (36%).

TB lymphadenitis and negative AFB was found in 4 patients (29%). Reactive hyperplasia and non specific features were more found in 2 and 3 patients respectively where P >0.05.

Table No. 6:- Showing clinical pattern of tuberculosis in relation to CD₄ count

CD ₄ count (cells/cumm)	Pulmonary TB (Nos./percentage)	Extrapulmonary TB (Nos./percentage)	Pulmonary and extrapulmonary TB (Nos./percentage)	p
01-50	03 (11)	10 (38)	1 (3)	>0.5
51-100	01 (3)	01 (3)	1 (3)	
101-200	01 (3)	05 (19)	1 (3)	
201-300	01 (3)	00 (0)	0 (0)	
≥ 301	01 (3)	00 (0)	0 (0)	
Total	07 (27)	16 (61)	3 (12)	

The clinical pattern of tuberculosis in relation to CD₄ count shows pulmonary TB 3 (11%), extra pulmonary TB 10 (38%) and pulmonary plus extra pulmonary TB 1 (3%) in the CD₄ cell range of 1-50 cells/cumm. Besides, 01 (3%) pulmonary, 05 (19%) extra pulmonary and 01 (3%) pulmonary plus extra pulmonary cases are noticed in the CD₄ cell range 101 – 200 cells/cumm. On the other hand, only one (3%) pulmonary case was observed in CD₄ cell counts ≥ 301 cells/cumm. Hence, number of pulmonary, extra pulmonary and pulmonary plus extra pulmonary tuberculosis were 7 (27%), 16 (61%) and 3 (12%) respectively (Table No. 6).

Discussion:-

In our study, the highest numbers of HIV seropositive cases were found in the age group of 31-40 years comprising 44% where males are infected predominantly (80%) this could be due to lack of awareness about HIV/AIDS among

the young adults. It implies that age and sex was not a dependable factor for causing HIV infection/AIDS, when it comes to risk behaviors. In our study, affected age group with HIV/AIDS showed more specific than the previous report of Mohanty KC and Basher P.M.M. (1994) where they have reported that more than 90% of cases were in the age group of 15 and 45 years⁽¹³⁾. Intravenous drug users are the most common route of transmission and males are mostly affected with HIV/AIDS. Negligence, behaviors and poor knowledge about the transmission of HIV could probably be the reason of affecting more among males.

Prolonged fever, weight loss, cough etc. were noticed to be the most common comprising of 68%, 56%, and 36% of cases respectively. These could be because of having underlying disorder, opportunistic infections and HIV replications causing low immunity system within the body. However, our result is closely matching with the findings of Sara Chacko and John TJ (1995) where it was reported that 62% of their patients had fever and 31% had significant weight loss in their review of 61 AIDS cases from South India⁽¹⁴⁾.

FNAC report with lymphadenopathy showed tubercular lymphadenitis in 9 (64%) patients with positive AFB in 5 (36%) patients. The variation of number of patients is found to be statistically insignificant ($p > 0.05$). This is almost similar with the findings of Sengupta D and Shivlal (1993)⁽¹⁵⁾.

Previous studies had also revealed that tuberculosis is the commonest life threatening opportunistic infection. In our study too high level of tubercular infection (52%) was recorded. As HIV infection causes immunosuppressant, the tubercular infection become overt disease even in higher CD₄+T-lymphocyte count. Thereby in this study extra pulmonary TB (61%) was more than primary TB (27%) and the difference was more with lower CD₄+T-lymphocyte count. However, clinical pattern of TB in relation to CD₄ cell count was insignificant ($p > 0.05$).

Conclusion:-

Out of 50 numbers of seropositive/AIDS patients, males are predominant and most commonly affected age group was found to be 31 to 40 years (44%) with the average age of 33.72 years. Intravenous drug use was shown as most common route of transmission of HIV infection (54%). Among symptoms and signs fever was noticed to be most common followed by weight loss, cough, headache, neck stiffness and so on. During CSF analysis most importantly, the detection of Cryptococcus was found to be 56% of total cases where no Acid Fast Bacilli was detected. Histopathological examination of FNAC lymph node showed tubercular lymphadenitis in majority of the cases with positive AFB (36%). Co-infection with TB was found in 52% cases and it was more with lower CD₄ cell counts. Extra pulmonary TB was more than the pulmonary TB and this difference was more with lower/decreasing CD₄ cell counts. The different clinical pattern of TB in relation to CD₄ cell count was found to be insignificant.

Larger sample size studies may however be carried out as to find out further information and better understanding in this regard.

Acknowledgement:-

The authors are indebted and grateful to the department of Medicine and Microbiology, RIMS, Imphal for all the logistic supports and cooperation. Special thanks and gratitude also goes to all the patients who have participated in this study, without whom, this venture would never have been completed.

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