



A study on seropositivity of Toxoplasmosis in HIV/AIDS patients attending the Antiretroviral Centre (ART) in a tertiary care hospital in Nagpur city of Maharashtra State

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Abstract:

Introduction- Toxoplasma has been implicated as one of the most common opportunistic infection and has posed many diagnostic and therapeutic challenges for clinicians treating HIV/AIDS patients. Seroprevalence of toxoplasmosis in India in general population ranges from 16.3% to 30.8%. , toxoplasmosis has been implicated as one of the most important opportunistic infections in AIDS patients of which toxoplasmic encephalitis is the most common clinical disease, most frequently causing focal intracerebral lesions in these patients. So the present study was conducted to assess seropositivity status of toxoplasmosis in HIV/AIDS patients attending the antiretroviral centre (ART) in a tertiary care hospital in Nagpur city (Maharashtra). **Material and Methods-** The present Prospective Hospital Based Study was conducted in the Department of Microbiology from Nov 2010 to Oct. 2012 in ART clinic, Medicine-wards of Tertiary Care Hospital of Nagpur city, (Maharashtra) India. 362 HIV positive patients filtered through following criteria, either hospitalized or coming to ART clinic were included in the study. After taking written informed consent, detailed clinical history and relevant investigations of each patient was done and findings were noted as per standard predesigned and pretested the clinical proforma. **Results-** Out of these 362 HIV positive patients, 226 were males (62.43%) and 136 were females (37.57%). Heterosexual route was found to be the most common mode of transmission in 332(91.71%) patients followed by blood transfusion in 3(0.83 %) cases. Antitoxoplasma antibody (IgM and IgG) was found to be significantly higher in test group than control group. (p<0.0001) **Conclusion-** The prevalence of toxoplasmosis in HIV positive patients was 23.48%. Therefore these high risk patients should be screened regularly for HIV & toxoplasmosis.

Key words: Toxoplasmosis, Seropositivity, HIV/AIDS, ART centre, Nagpur city

Introduction:

Toxoplasma gondii is a ubiquitous, intracellular protozoan parasite and causes cosmopolitan zoonotic infection. Human latent toxoplasmosis occurs in about half the world's population though most cases are asymptomatic [1].

Infection in humans usually occurs via oral or transplacental route. Consumption of raw or undercooked meat containing viable cysts, water contaminated with oocysts from cat feces, and unwashed vegetables are the primary routes of oral transmission; improper handling of undercooked meat or contaminated soil also may lead to hand-to-mouth infection [2]. Toxoplasma infection can also be rarely acquired by inoculation in a laboratory accident, by blood or leucocytes transfusion, or from a transplanted organ [3].

Toxoplasma has been implicated as one of the most common opportunistic infection and has posed many diagnostic and therapeutic challenges for clinicians treating HIV/AIDS patients [4]. With the advent of HIV pandemic, toxoplasma encephalitis has become one of the more frequent opportunistic infections and the most common cause of focal brain lesions complicating the course of AIDS.

Seroprevalence of toxoplasmosis vary according to geographic location. The global seroprevalence in general population is reported to be 46.1% [5]. Seroprevalence of toxoplasmosis in India in general population ranges from 16.3% to 30.8% [6]. 10-40% of adults with AIDS are seropositive for toxoplasmosis in US [7].

Since the pandemic of HIV infection has spread throughout the world, toxoplasmosis has been implicated as one of the most important opportunistic

infections in AIDS patients of which toxoplasmic encephalitis is the most common clinical disease, most frequently causing focal intracerebral lesions in these patients [8, 9].

With the above background, the present study was conducted to assess seropositivity status of toxoplasmosis in HIV/AIDS patients attending the antiretroviral centre (ART) in a tertiary care hospital in Nagpur city, Maharashtra.

Material and Methods

The present Prospective Hospital Based Study was conducted in the Department of Microbiology from Nov 2010 to Oct. 2012 in ART clinic, Medicine-wards of Tertiary Care Hospital of Nagpur city, (Maharashtra) India.

362 HIV positive patients filtered through following criteria, either hospitalized or coming to ART clinic were included in the study.

INCLUSION CRITERIA

- 1) Willingness of patient.
- 2) Informed consent of patient.
- 3) Confirmed cases of HIV/AIDS.
- 4) Patients with CNS signs and symptoms suggestive of toxoplasmosis.

EXCLUSION CRITERIA

- 1) Non-willing patient.
- 2) Immunocompromised patients other than HIV positive patients.

To maintain the strict confidentiality and to conceal the identity of the patient, coding system for samples was followed which was known only to investigating person.

After taking written informed consent, detailed clinical history and relevant investigations of each patient was done and findings were noted as per standard predesigned and pretested the clinical proforma.

Specimens of blood to provide the sera for ELISA test were taken by venupuncture. At least 5ml of blood was obtained to ensure that there will be enough serum for the test. Immediately blood was transferred from the syringe into dry stoppered sterile tube and allowed to clot. When the serum has separated, it was pipette off into a sterile tube [10].

Serum samples were then subjected to ELISA test for detecting anti-toxoplasma IgM and IgG antibodies as per the manufacturer's instructions. Process was performed as per standard protocol [11].

Data was compiled in MS Excel and checked for its completeness and correctness. Then it was analyzed using online statistical calculator and chi square test were applied with value of < 0.05 was considered statistically significant for interpretation of finding.

Results

Table No 1: Age and sex distribution in study subjects

Age- Group (years)	HIV-Positive (362) (%)		Control group (healthy-individuals) (100) (%)		HIV & Toxoplasma-coinfected Patients (n=85) (%)	
	Male	Female	Male	Female	Male	Female
15-24	2(0.89)	21(15.44)	08(8)	02(2)	00(00)	02(10)
25-34	96(42.48)	75(55.15)	15(15)	15(15)	30(46.15)	09(45)
35-44	101(44.70)	31(22.80)	25(25)	18(18)	26(40)	08(40)
45-54	23(10.18)	08(5.87)	10(10)	03(3)	07(10.77)	00(00)
>54	04(1.75)	01(0.74)	02(2)	02(2)	02(03.08)	01(05)
Total	226(62.43%)	136(37.57%)	60(60)	40(40)	65(76.47)	20(23.53)

Out of these 362 HIV positive patients, 226 were males (62.43%) and 136 were females (37.57%). Male to female ratio was found to be 1.66:1. Out of 100 patients in the control group, 10 were between the age group of 15-24years. Out of 85 HIV and toxoplasma co infected patients, 65 (76.47%) were male and 20 (23.53%) patients

were female. Male to female ratio found to be 3.25:1. Maximum no. of these co infected patients 73 (85.88%) were in the age group 25-44 years. (Table-1)

Table No 2: Marital status among study subjects

Marital Status	HIV-Positive (%)	Co-Infected Patients (%)
Married	350 (96.69)	83(97.65)
Unmarried	012(3.31)	02(2.35)
Total	362(1000)	85(100)

Out of these 362 HIV positive patients, 350 (96.69%) were married and 12(3.31%) were unmarried whereas 83(97.65%) of co infected patients were married and 2(2.35%) were unmarried. (Table 2)

TABLE No 3: Area wise distribution among study subjects

Area	HIV-Positive (%)	Co-Infected Patients (%)
Urban	297 (82.04)	74(87.06)
Rural	65 (17.96)	11(12.94)
Total	362 (100)	85(100)

Majority of HIV positive patients 297(82.04%) were from urban area and 65(17.96%) were from rural area whereas in HIV-toxoplasma co infected group, 74(87.06%) cases were from the urban area and 11(12.94%) cases were from rural area. (Table- 3)

TABLE No 4: Occupation wise distribution among study subjects

Occupation	HIV-Positive (%)	Co-Infected Patients (%)
Laborers	145(40.06)	29(34.12)
Housewives	73(20.17)	14(16.47)
Job	54(14.92)	11(12.94)
Drivers	50(13.81)	17(20)
Miscellaneous *	29(8.01)	13(15.29)
Farmers	11(3.03)	01(01.18)
Total	362(100)	85(100)

*Salesman, Painter, Electrician, Welder, Carpenter, Police Shopkeeper, Barber, Students etc.

Out of these 362 HIV- positive patients, 145 (40.06%) were laborers by occupation followed by 73(20.17%) housewives. 54 (14.92%) were engaged in various jobs whereas 50 (13.81%) patients were drivers by occupation. Out of these 85 HIV-toxoplasma co infected patients, 29 (34.12%) were laborers followed by drivers 17(20%). 14(16.47%) were housewives followed by miscellaneous group of 13 (15.29%) patients and 1(1.18%) was farmer. (Table-4)

Table No 5: Mode of transmission of HIV among study subjects

Mode of transmission	No. of patients	Percentage (%)
Heterosexual	332	91.71
Route unknown/ Route not revealed	27	7.46
Blood transfusion	3	0.83
Homosexual	0	0
Tattoo	0	0

IV drug abuse	0	0
Needle stick injury	0	0
Total	362	100

Heterosexual route was found to be the most common mode of transmission in 332(91.71%) patients followed by blood transfusion in 3(0.83 %) cases. (Table-5)

Table No 6: Results of ELISA for IgM and IgG Antitoxoplasma antibody in test and control group

Toxoplasmosis	No. of cases positive (%)	Toxoplasmosis in the control group (%)
IgM	13(3.59)	00(00)
IgG	72(19.88)	02(02)
Total	85(23.48)	02(100)

Table No 6 Shows the results of ELISA for IgM and IgG Antitoxoplasma Antibody in 362 HIV positive patients. Out of 362 patients, 13(3.59%) were IgM positive and 72(19.88%) were IgG positive. Thus, 85(23.48%) patients out of 362 were positive for antitoxoplasma IgM/IgG antibodies. ELISA for antitoxoplasma IgM antibody was absent in all control group whereas IgG antitoxoplasma antibody was found to be positive in 2(2%) subjects of the total control.

Table No 7: Results of ELISA for IgM and IgG Antitoxoplasma antibody In Test And Control Group

Results of ELISA for Toxoplasmosis	Test-group (No and %)	Control-group (No and %)	Chi square test, d.f., p value
Positive (IgM/ IgG)	85(23.48)	02(2)	x ² =23.653, d.f.=1, p<0.0001
Negative	277(76.52)	98(98)	
Total	362(100)	100(100)	

Antitoxoplasma antibody (IgM and IgG) was found to be significantly higher in test group than control group. (p<0.0001)

Table No 8: Association between Toxoplasmosis and risk-factors (n=85)

Risk-Factors	No of toxoplasma patients	%	P value
Ingestion of meat	66	77.64	0.006
Contact with pets	43	50.58	0.823
Past H/O Toxoplasmosis	04	04.71	0.137

Out of 85 HIV-toxoplasma co infected patients, 66(77.64%) cases had history of ingestion of meat. 43(50.58%) patients had history of contact with pets like cats, dogs etc. Past h/o toxoplasmosis was present in 4(4.71%) patients. Other risk factors like lab-accidents and H/O organ-transplantation were not present in any of the 85 HIV & toxoplasma co infected patients. History of ingestion of meat was statistically found to be significant. (Table-8)

Discussion

In the current study, out of 362 patients, 226 (62.43%) of patients were males as compared to 136 (37.57%) females. Male to Female ratio was 1.66:1. The male preponderance might have been due to the fact that in the existing social milieu, females do not seek medical care fearing ostracism and loss of family support. Similar findings were reported in other studies, and the findings were comparable with the present study [12, 13]. Male preponderance as well as high prevalence in sexually active age group was also found in other studies [14, 15].

In the present study, out of these 362 patients, 145 (40.06%) were labourers by occupation followed by 73(20.17%) housewives. 50(13.81%) were drivers. The laborers and drivers were also found to be among the high risk group by other studies also [16-20].

The labourer class was found to be more vulnerable which was probably due to the fact that majority of this was a migrating laborers class going to varying places for work. In laborers and drivers, the rate of unprotected sex was also high and hence they were at high risk of acquiring HIV infection.

Akanmu AS et al 2010 [21] found that T. gondii antibody seroprevalence for males, married respondents and rural dwellers were 70.4%, 72.3% and 69% respectively. ($p < 0.0001$) In the present study, mode of transmission was found to be heterosexual in most of these patients followed by transmission by blood transfusion. Thus heterosexual mode of transmission was the most common mode of transmission which is comparable to the other studies also [22-24].

In a present study out of 362 patients, 13(3.59%) and 72(19.88%) patients were IgM and IgG antitoxoplasma antibody positive respectively. Similar findings were reported in other studies and the findings were comparable with the present study [25-27].

Hajsoleimani F et al 2012 carried out a study to find seroprevalence of Toxoplasma gondii in pregnant women and bioassay of IgM Positive cases in Zanjan, Northwest of Iran using ELISA. Blood samples were taken from 500 pregnant women. Anti Toxoplasma IgM and IgG were positive in 1.4% and 37.2% respectively [28].

Many of the studies were carried out to find out seroprevalence of toxoplasmosis and found out to be 8%, 54% and 85.5% respectively [12, 29, 30].

Sarkar MD et al 2012, [31] carried out study to find seropositivity of toxoplasmosis in antenatal women with bad obstetric history in Mamata General Hospital, Khammam, and Andhra Pradesh, India using ELISA. The study subjects included 105 antenatal women with BOH and 105 antenatal women who had previous normal deliveries. The seropositivity for Toxoplasma was 49.52% in the study group compared to 12.38% in the control group. **Esquivel CA et al 2012** found that 11 (8.3%) of 133 patients, and 14 (5.38%) of 266 controls had anti-T. gondii IgG antibodies. Anti-T. gondii IgM antibodies were found in one (0.8%) of the patients and in 6 (2.3%) of the controls [32].

In the present study, 66(77.64%) cases had history of ingestion of meat. 43(50.58%) patients had history of contact with pets like cats, dogs etc. Past H/o toxoplasmosis was present in 4(4.71%) patients. Other risk factors like lab accidents and H/o organ-transplantation were not present in any of the 85 HIV & toxoplasma co infected patients. In present study history of ingestion of meat was statistically found to be significant.

Makian MJ et al 2012[33] study also stated that there is no significant correlation between contact with cat and toxoplasma infection.

In the present study, 66(77.64%) cases had history of ingestion of meat and statistically the correlation between toxoplasma and ingestion of meat was highly significant. Similar type correlation was seen in other study. A study was carried out to find out new and old risk factors for Toxoplasma gondii infection by **Kolbekova et al 2007 [34]**. Similar findings were reported by **Makian MJ et al 2012 [33]**.

Conclusions

We can conclude from findings of this study that HIV infection was found to be more common amongst male genders who were mainly laborers and drivers by occupation. Amongst them, heterosexual route of transmission was the most common route of transmission. Therefore these high risk patients should be screened regularly for HIV & toxoplasmosis. The prevalence of toxoplasmosis in HIV positive patients was 23.48%. Hence, the high prevalence of co infection definitely indicates that early diagnosis, high level of suspicion and effective and aggressive treatment of HIV-toxoplasmosis co-infection according to available guidelines, strong commitment, a focused approach as well as strong

coordination is the need of the hour especially in country like India where the data of HIV/toxoplasma coinfection is fragmentary. Thus, it should be mandatory to screen every HIV/AIDS patient for toxoplasmosis co-infection and vice versa. The findings of the present study will be useful to make more relevant strategies at ground level under National AIDS Control Organization (NACO) in the study area.

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