ORIGINAL ARTICLE

Frequency of HIV in Patients with Central Nervous System Tuberculosis

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ABSTRACT

Background: Tuberculosis (TB) is the most widely recognized reason for death in patients of acquired immune deficiency syndrome (AIDS). Human Immunodeficiency virus (HIV) and AIDS continue to be on an increase in Pakistan. This study aimed to assess the magnitude of HIV among patients with Central nervous system (CNS) tuberculosis as its progression to AIDS significantly influences mortality in these patients. The main objective of the study was to determine the frequency of HIV among patients with CNS tuberculosis.

Methods: This Cross-Sectional study was conducted at Medicine Wards of Civil Hospital, Karachi from 7th October 2016 to 7th April 2017. A total of 140 newly diagnosed Central Nervous System tuberculosis patients were included. Blood sample collected for HIV test (ELISA) was interpreted as either: Reactive for HIV or Non-reactive for HIV. HIV infection was considered as HIV positive by using 3 Rapid Diagnostic testing kits according to guidelines of World Health Organization (WHO). All the patient data were collected through a pre-designed proforma. Data were analyzed using SPSS v.23.0. Chi-square test was applied post stratification with p- value≤0.05 taken as statistically significant.

Results: Sixteen patients (11.43%) of CNS tuberculosis were found to have HIV positive results. Out of total 140 patients, 50(35.71%) were female and 90(64.29%) were male. The average age of the patients was 39.37±12.8 years.

Conclusion: CNS tuberculosis can be the primary clinical manifestation of HIV positive patients. Early recognizable proof of HIV in patients with CNS tuberculosis may warrant early inception of anti-HIV treatment.

Keywords: Human Immunodeficiency Virus; Tuberculosis; Meningitis; Mycobacterium Tb.

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INTRODUCTION

The increasing incidence of human immunodeficiency virus infection and drug resistant strains has resulted in an increased incidence of tuberculosis (TB) worldwide. As many as 9 million cases of TB are detected worldwide everyyear[1-3] . HIV disease has added to a critical expanding weight of TB and overall 15% of patients suffering from TB have co-infection with HIV[4]. Information on HIV sero-prevalence among Tuberculosis patients has likewise been gathered. Individuals suffering from HIV represented 1.1 million (13%) of the 8.7 million assessed individuals all around who were diagnosed with TB in 2012[5]. The current sentinel reconnaissance framework has shown the commonness of HIV among Tuberculosis patients to be 0.4% in the year 2013[6].

In a study it was found to have three times higher HIV predominance in Tuberculosis patients when contrasted with overall public and it was noticed that proportion was more in additional pulmonary Tuberculosis[7]. In HIV-contaminated patients, Tuberculosis is bound to develop meningitis. In an investigation on patients with Tuberculosis, 10% of

HIV-positive patients had Tuberculous meningitis in contrast with just 2% of patients without HIV disease[8].

Tuberculous meningitis is regarded as the 5th commonest form of extra pulmonary TB. It constitutes around 5.2% of all the cases of extra pulmonary disease[9]. An examination directed in North of India in youngsters revealed the recurrence of HIV in scattered Tuberculosis with TB Meningitis in around 5.12 percent of patients. No single case with disconnected TB meningitis was found to be positive for HIV[10].

World Health Organization (WHO) is providing HIV testing to all patients who present with signs or side effects of Mycobacterium tuberculosis (MTB) regardless of whether Tuberculosis is associated or not confirmed[11]. Relationship with Tuberculosis and AIDS is particularly remarkable among people with a high danger of both TB and HIV contaminations, e.g., intravenous-drug users and wellbeing experts[12].

The Tuberculosis hazard increments not long after disease with HIV and typically multiply amid the main year after HIV sero-conversion[13]. Regardless of successful resistant reconstitution with Anti-retroviral treatment (ART), the danger of Tuberculosis for the most part stays raised in HIV-tainted patients over the foundation hazard of the overall public, even those at high CD4 cell counts[14,15]. Thus, HIV screening in CNS tuberculosis can also point out otherwise asymptomatic and un-diagnosed patients and subsequently lessen the burden of silent transmission. The aim of the study was to determine the frequency of HIV among patients with Central nervous system (CNS) tuberculosis.

METHODS

This Cross-Sectional study was conducted at Medicine Wards of Civil Hospital, Karachi from 7th October 2016 to 7th April 2017. As per our inclusion criteria, we included a total of 140 newly diagnosed Central Nervous System (CNS) tuberculosis patients between 20-70 years of age. The exclusion criteria were known cases of HIV and known cases of Lymphomas or Tumor. All patients who fulfilled our inclusion criteria underwent investigation and examination after a written informed consent. Patients testing were carried out at HIV Centre of Civil Hospital, Karachi. The study was conducted in conformity with the declaration of Helsinki and the ethical approval was sought from institutional review board. Ethical review was obtained from IRB (IRB-114/DUHS-17).

Using a blood collection tube, blood samples were collected by venepuncture. For testing, plasma samples were produced. Three Rapid Diagnostic testing (RDT) immuno-chromatographic kits were used in sequence. HIV Infection was considered as HIV positive by using 3 Rapid Diagnostic testing kits according to guidelines of World Health Organization (WHO). All the patient data were collected through a pre-designed proforma.

Data were analyzed using software SPSS v.23.0. Mean±S.D was calculated for quantitative variable. The Qualitative variables were calculated in frequencies and percentages like educational, marital and socio-economic status. Furthermore, gender, residence, occupation, multiple sex partners, blood transfusion history, intraveneous (IV) drug abuser and HIV statuses were obtained. Stratification of age, gender, marital status, education, socioeconomic status, residence, occupation, multiple sex partners, blood transfusion history and IV drug abuser was done to observe their effect on the outcome. Chi-Square test was used post-stratification and p-value ≤0.05 was considered as significant.

RESULTS

A total of 140 newly diagnosed CNS patients were included in this study. The mean age of the patients was 39.37±12.8 years. There were 64.29% male and 35.71% female. About 58.57% belonged to urban areas whereas 41.43% were from rural areas. Most of the patients were married (67.14%). Regarding education, 40% had primary or secondary education, 36.4% were matric or intermediate, 8.6% were graduate while 15% were uneducated. About 25.71% patients were laborers, 37.86% were private or government employee, 19.29% were jobless and 17.14% of the female were homemakers.

According to economic status, it was observed that 52.14% of patients belonged to poor class, 40% to middle class and only 7.86% were from high class. Regarding multiple sex partners, there were only 4.29% of patients who disclosed this information. History of blood transfusion was present in 35.7% cases and 38.57% were I/V drug abusers. HIV infection among patients with CNSTB was observed in 11.43% patients as shown in Table 1.

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Table 1: Frequency distribution of demographic and other variables.

Variables	Frequency	%
Gender		
Male	90	64.29%
Female	50	35.71%
Residence		
Urban	82	58.57%
Rural	58	41.43%
Marital Status		
Married	94	67.14%
Unmarried	46	32.86%
Socio Economic Status		
Poor	73	52.14%
Middle	56	40.00%
High	11	7.86%
Education Status		
Illiterate	21	15.00%
Primary	29	20.70%
Secondary	27	19.30%
Metric	28	20.00%
Intermediate	23	16.40%
Graduate	12	8.60%
Occupation		
Government Job	36	25.71%
Private Job	30	21.43%
House Wife	23	16.43%
Worker	24	17.14%
No Job	27	19.29%
Promiscuity	6	4.29%
Blood Transfusion	50	35.71%
IV Drug Abuser	54	38.57%

Most of the patients were in the age group of 31 years to 40 years, (Figure 1). Stratification was used to reduce the effect of confounding variables.

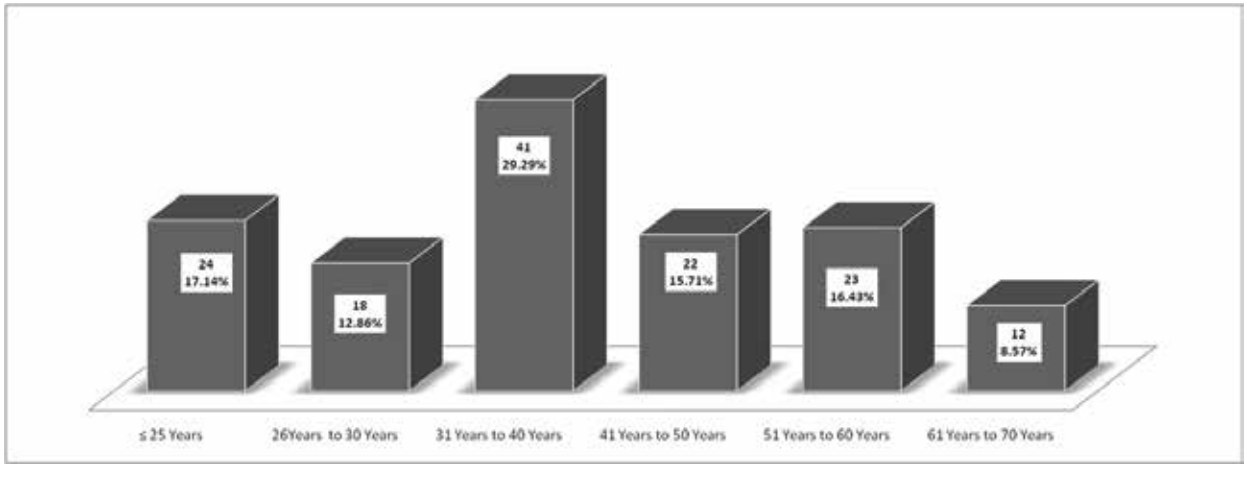

Figure 1: Frequency distribution of age groups.

The rate of HIV was significantly high in lower age groups patients as compared to high age groups (p=0.012). Similarly, frequency of HIV sero-positive was more in single as compared to married subjects (28.3% vs. 3.2%; p=0.0005) while frequency of HIV was not statistically significant between gender and residence. Effect of socio-economic status and education was not statistically significant whereas rate of HIV was significantly high in laborers (p=0.027). In patients with central nervous system tuberculosis the frequency of HIV was significantly high (significant predictors) in those who had multiple sex partners, previous history of blood transfusion and IV drug abuse (Table 2).

Table 2: Stratification of HIV infection with respect to variables.

Variables	HIV In fedion		p-value
	Positive	Negative	
Age Groups			
≤ 25 Years	2(8.3%)	22(91.7%)	
26Years to 30 Years	6(33.3%)	12(66.7%)	
31 Years to 40 Years	6(14.6%)	35(85.4%)	**0.012**
41 Years to 50 Years	2(9.1%)	20(90.9%)	
51 Years to 60 Years	0(0%)	23(100%)	
61 Years to 70 Years	0(0%)	12(100%)	
Gender			
Male	11(12.2%)	79(87.8%)	**0.692**
Female	5(10%)	45(90%)	
Residence			
Urban	11(13.4%)	71(86.6%)	**0.380**
Rural	5(8.6%)	53(91.4%)	
Marital Status			
Married	3(3.2%)	91(96.8%)	**0.0005**
Unmarried	13(28.3%)	33(71.7%)	
Socio Economic Status			
Poor	11(15.1%)	62(84.9%)	**0.257**
Middle	5(8.9%)	51(91.1%)	
High	0(0%)	11(100%)	
Education Status			
Illiterate	1(4.8%)	20(95.2%)	
Primary	2(6.9%)	27(93.1%)	
Secondary	2(7.4%)	25(92.6%)	**0.346**
Metric	5(17.9%)	23(82.1%)	
Intermediate	5(21.7%)	18(78.3%)	
Graduate	1(8.3%)	11(91.7%)	
Occupation			
Government Job	2(6.7%)	28(93.3%)	**0.027**

DISCUSSION

The threat of Tuberculosis increments almost immediately after contamination with HIV and is typically multiplied amid the principal year after HIV sero-conversion[7]. CNS illness brought about by Mycobacterium TB is a phenomenal yet exceptionally crushing sign of TB, which was lethal in the period before anti-TB treatment. CNS TB represents around 1% of all instances of tuberculosis, carries a high mortality and a troubling dimension of neurological dismalness, and excessively burdens kids and HIV-contaminated people. According to an assessment, roughly 10% of all patients suffering from TB have Central Nervous System (CNS) involvement[16]. Worldwide, tuberculosis (TB) and human immunodeficiency virus (HIV) are leading causes of death[17]. Among all forms of TB, central nervous system (CNS) TB accounts for approximately 10% of all cases and carries the highest mortality[18].

Central nervous system (CNS) infections are a major cause of morbidity and mortality among people living with human immunodeficiency virus (HIV). Symptomatic neurological diseases happened in about 40–70% of HIV/AIDS patients during the course of their illness, and about 10-20% HIV/AIDS patients have neurologic symptoms as an initial manifestation[19]. The CNS TB is one of the most devastating clinical manifestations of TB and is associated with a high mortality. It occurs in 1–5% of all patients with TB and in 10% of those with AIDS-related TB[20]. The rate of Central Nervous System TB is legitimately corresponding to the predominance of TB contamination by and large. In developing countries, Central Nervous System TB is a malady of more youthful age gathering, normally adolescence[21]. In our study a total of 140 newly diagnosed CNS TB patients were included, age ranging from 20 to 70 years. HIV infection frequency among patients with CNSTB was observed in 11.43% patients. In contrast to this, HIV infection in 12,000 identified Tuberculosis cases was reported between 0.1% to 0.34% in a study conducted locally on Pakistani population[7].

There were 64.29% male and 35.71% female; this high prevalence of male gender was also reported by other studies. A study done in India by Mukherjee et al., also confirmed similar distribution pattern between the two sexes with a relatively higher prevalence in males[22]. Bhattacharya et al reported cases with CNS TB with more prevalence in males (53.4%) and a ratio of 1.15:1[23].

Pakistan as of now positions as the fifth biggest contributor of the worldwide Tuberculosis load with recorded 0.33 to 0.48 million cases in a populace of 187.3 million people[24]. In the United States, TB has been on the rise since 1986 with an expansion in additional pulmonary indications as well[21,23]. It is an established link that the in contrast to HIV negative subjects, the HIV positive patients is multiple times prone to have central nervous system inclusions such as meningitis[15]. Another study conducted in local hospital reported 0.24% had positive HIV at baseline and just one case identified as HIV positive

from 9% tested for human immunodeficiency virus[25]. Two international studies showed approximately 30% cases had HIV sero-positive with TB[26,27]. CNSTB occurred in 2-5% of cases with tuberculosis[7] while 10% with AIDS-related TB[28].

Current study tested exclusive group of both genders linked to elevated HIV frequency. The frequency of HIV was significantly high in younger age groups patients as compared to older patient; seropositive HIV was high in unmarried cases as compared to married cases. A study found similar results with considerably high HIV frequency between genders, widowed or divorced compared with those currently married. HIV was significantly high in males married to younger wives. In those aged 30-54 years, lower rate of HIV seropositivity was seen in married individuals as compared to unmarried individuals. Findings of this study were consistent with those reported from rural areas of Uganda[29]. In our study regarding promiscuity, there were only 6(4.29%) patients who disclosed this fact. According to several studies, having more than two simultaneous sexual partners was observed as a rise in hazard of transmitting AIDS infection[30,31]. The relationship between AIDS and intravenous abusers is well established. According to current investigation, intravenous tranquilizer abusers represented 38.5%. Transmission of HIV and other infections may occur due to transfusion of contaminated blood/blood products obtained from an infected person[32,33].

Since the first case report in late 1982, HIV infection resulting from blood transfusion has been documented repeatedly[32-35]. In our study, Blood transfusion history was observed in 35.7% (50/140) cases. In the US, majority of cases had history of blood transfusion before 1985, when HIV antibody identification was not available for screening of donated blood. In 2001, an estimated 14,262 persons were identified as AIDS cases because of receiving contaminated blood[35].

CONCLUSION

The involvement of Central Nervous System may be the first manifestation of the disease in an otherwise asymptomatic HIV positive TB patient. Early detection of HIV in patients suffering from CNS TB will call for early initiation of anti HIV therapy, preventing its progression to AIDS and significantly reducing mortality in these patients. HIV screening in CNS tuberculosis can also point out otherwise asymptomatic and undiagnosed patients and subsequently lessen the burden of silent transmission.

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CONFLICT OF INTEREST

The authors declare there was no conflict of interest.

ETHICS APPROVAL

Ethical review was obtained from IRB (IRB-114/DUHS-17).

PATIENT CONSENT

Written Patient/attendant consent was taken.

AUTHORS' CONTRIBUTIONS

LS presented the conception and design, did the acquisition of data and reviewed the manuscript. WS performed the data collection and interpretation of data. AQ also performed the data collection and literature search. S did the data entry, statistical analysis, RQ performed the manuscript writing and AA performed the critical analysis, manuscript writing and proof reading.

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