Original Article

Seroprevalence of hepatitis B and C viruses among tuberculosis patients

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ABSTRACT

BACKGROUND: Tuberculosis is a common health problem in the world. Sudan is among the countries with the highest prevalence for tuberculosis andHBV, HCV infections.
Co infection with viral hepatitis (HBV, HCV) among tuberculosis patients increases the risk of hepatotoxicity occurring during tuberculosis treatment, so itis important to know the sero-prevalence of hepatitis B and Cviruses among tuberculosis patients.

OBJECTIVES: To investigate seroprevalence of HBV and HCV among adult tuberculosis patients in tuberculosis center at Tropical Diseases Teaching Hospital (TDH).

METHODOLOGY: This is a prospective cross sectional study, conducted in the period from December 2010 to October 2011 in tuberculosis center in TDH- Sudan. 200 adult tuberculosis patients (age 19years and above) were enrolled in this study, data were collected by using questionnaire. All patients' blood samples were tested for HBsAg and hepatitis C virus antibodies. Results were analyzed by using SPSS16 (Statistical package for social science16)

RESULTS: A total number of 200 confirmed tuberculosis patients were studied. 127 patients (63.5%) were males. The seroprevalence of HBV and HCV in this study were9.5% and 3.5% respectively.Two patients (1%) were infected with both infections. The HBV vaccination among the study group was 6%.

CONCLUSION: The HBV andHCV infectionsare common among tuberculosis patients with seroprevalence of 9.5%and 3.5% for HBV and HCV respectively. Our study also showed that there are multiple risk factors for contracting HBV and HCV infections in our patients, so screening for these virusesshould be included in the national TB control program.

Keywords: mycobacterium, East Mediterranean, hepatotoxicity.

Tuberculosis is one of the most important health problems in the world caused by mycobacterium tuberculosis complex[1].Two billion of people are affected worldwide[2], its global incidence is 219/100.000 and its death rate is 25/100.000[3].
Sudan is among the highest prevalence countries for TB in the East Mediterranean region and shouldering 11-15% of the TB burden in this region[3]. The estimated prevalence of the diseasein Sudan is209 cases per 100.000 populations and the majority of patientsare in their productive ages.

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The overall estimated death rate related to TBin Sudan is 24 per 100.000 populations[3].
There are 345 TB centers in Sudan[3], 74 percent of them in Khartoum state[4] all are well equipped with aids for diagnosis and treatment[3].
TB producesits lethal affect through the disease itself or by hepatotoxicity occurring during treatment.
There are several factors that increase this hepatotoxicity of anti-tuberculosis therapy one of them is viral hepatitis namely HBV and HCV.
HBV affect more than two billion people worldwide and 350 million people are chronic carrier[5]. Sudan is among countries with high endemicity of more than 8%[5] and the seroprevalence of HBV is 5.1 and 5.6% among blood donors in northern and central Sudan respectively[6]. The HCV worldwide affects 170 million[7]and the seroprevalence in

Sudan equals 2.2 % - 4.8 %[5] with predominance of genotype4[8].

The presence of concomitant infection of tuberculosis and viral hepatitis namely HBV and HCV during treatment of tuberculosis increases the risk of hepatotoxicity as many studies reveal[9] and even may lead to death. This reflects the importance of screening of HBV and HCV among tuberculosis patients[10] to decrease death and comorbidities among tuberculosis patients.

Methodology:

This is a prospective cross sectional hospital-based study. The study populations were 200 confirmed TB patients and were on antituberculous treatment and managed in TB center during the period 2010-2011, atTDH in the capital Khartoum. TB center iswell equipped with aids for diagnosis and treatment supervised by Sudan National TB programand is run by trained medical personnel who verify the documentation and transfer of patient data from the hospital medical records into an electronic software system.

TDH is a referral Ministry of Health hospital, Sudan. This hospital was founded in 1974 for research, service, and training on tropical and infectious diseases, mainly visceral leishmaniasis, malaria, TB and schistosomiasis.

The demographic and clinical data werecollected via questionnaires adopted for the study.Blood samples drawn under aseptic conditions from patients diagnosed with tuberculosis were tested for HBsAg, and HCV antibodies. SD BIOLINE HBsAg test, which is an in-vitro immunochromatographic, one step assay designed for qualitative determination of HBsAg in human serum or plasma was used for detection of HBV. This test has relativesensitivity of 100 percent, and relative specificity of 100 percent. On the other hand, the SDBIOLINE HCV test,

Table1: Demographic features of 200 pulmonary TB study population

		Frequency	Percent	Valid percent
Sex	Male	127	63.5	63.5
	Female	73	36.5	36.5
Age	<40years	140	70	70
	≥40years	60	30	30
Marital status	Single	84	58	58
	Married	116	42	42
Residence	Urban	29	14.5	14.5
	Rural	171	85.5	85.5
Occupation	Employed	115	57.5	57.5
	Unemployed	85	42.5	42.5
Education	Educated	135	67.5	67.5
	Illiterate	65	32.5	32.5

which is an immune chromatographic test for qualitative detection of antibodies specific to HCV, in human serum plasma or whole blood was used for detection of HCV. It has sensitivity of 100 percent and specificity of 99.4 percent. All tests were done in a well-equipped laboratory by well expertise personnel in TDH. Computer assisted analysis, using statistical program for social sciences (SPSS) version 16, was employed.

The study was approved by the Research and Ethics Committee of tropical Diseases Hospital, Sudan. Written consent was taken from selected subjects prior to questionnaire filling and blood sampling. Patient's

confidentiality, privacy and dignity were guaranteed; also the information obtained remained strictly protected. This was achieved through the safe keeping of the completed forms and the entry of personaldata on computer only as a code and sending blood samples to the laboratory as codes numbers.

Results:

The demographic features of 200 pulmonary TB study patients were illustrated in Table 1. 140 (70%) patients were found in the age group less than 40years and 127 (63.5%) patients were males, 171(85.5%) patients were from rural areas. 116 (58%) patientsweremarried, 65(32.5%) patients were illiterate. Only 24 (12%) patients have governmental jobs.

History of blood transfusion, jaundice, vaccination against HBV was found in 19(9.5%) , 49 (24.5%) and 12(6%) of patient srespectively.

Table 2: Risk factors for HBV and HCV infection in all patients with TB

		Frequency	Percent	Valid percent
Blood transfusion	Yes	19	9.5	9.5
	No	181	90.5	90.5
Jaundice	Yes	49	24.5	24.5
	No	151	75.5	75.5
HBV vaccination	Yes	12	6	6
	No	188	94	94
I.V drug abuse	Yes	0	0.00	0.00
	No	200	100	100

Table3: Demographic features and risk factors ofpatients with HBV positive screen

		Frequency	Percent	Valid percent
Sex	Male	16	84.2	84.2
	Female	3	15.8	15.8
Age	<40years	12	63.2	63.2
	≥40years	7	36.8	36.8
Marital status	Single	10	52.3	52.3
	Married	9	47.7	47.7
Residence	Urban	12	63.2	63.2
	Rural	7	36.8	36.8
Occupation	Employed	12	63.2	63.2
	Unemployed	7	36.8	36.8
Education	Educated	12	63.2	63.2
	Illiterate	7	36.8	36.8
Blood transfusion	Yes	0	0.00	0.00
	No	19	100	100
Jaundice	Yes	3	15.8	15.8
	No	16	84.2	84.2
HBV vaccination	Yes	0	0.00	0.00
	No	19	100	100
I.V drug abuse	Yes	0	0.00	0.00
	No	19	100	100

On the other hand none of them gave history of intravenous drug abuseTable2.

The seroprevalence of HBV in the study was 9.5% (19 patients), 16(84.2%) of them were males and15(78.9%) were in the age group less than 40 years. All patients with positive screening test were not vaccinated against HBV (Table 3).

Table 4 shows demographic features and risk factors of patients with HCV positive screen.Two patients (1%) were infected with both infections. The HBV vaccination among the study group was (6%).

Discussion:

The present study represents- to the best of our knowledge-the first studyin Sudan about the seroprevalence of hepatitis B and C virus among TB patients. Our study is the first to indicate that infection with HBV and HCV is a significant problem among patients with tuberculosis in Sudan. Although it is a common problem in Sudan, hepatitis B and C viruses screen was not done as routine as HIV test among patients with TB, this may be due to limited resources.

Co infection with hepatitis B or C Viruses among tuberculosis patients potentiate the risk of antituberculous therapy induced hepatotoxicity[11],so we should exercise caution and carefully monitor our patients for drugs associated hepatotoxicity.

In this study the seroprevalence of hepatitis B virus was 9.5% and it was higher than the seroprevalence among general population and blood donors in Sudan (6.8%)[5] (5.6%)[6]respectively and lower than seroprevalence of HBV in Brazil which showed seroprevalence of 14.6% among patients with tuberculosis[12].This may be due to thehigh prevalence (14%) of HBV in that country[13].Also the seroprevalence of HBV in our study is lower than in India which showed seroprevalence of HBV among pulmonary tuberculosis patients of 15%[14]despite the relatively low seroprevalence of HBV in that country(4%)[15].

The majority (78.9%) of our patients who were positive forHBV wasyoung (< 40 years). The seroprevalence of HBV was staticthereafter indicating that being young-< 40years-is possibly a risk factor for contracting HBV infection which is compatible with the literature.Going with reports, 12(57.8%) patients positiveforHBV

Table4: Demographic features and risk factors of patients withHCV positive screen.

		Frequency	Percent	Valid percent
Sex	Male	6	85.7	85.7
	Female	1	14.3	14.3
Age	<40years	4	57.1	57.1
	≥40years	3	42.9	42.9
Marital status	Single	3	42.9	42.9
	Married	4	57.1	57.1
Residence	Urban	2	28.6	28.6
	Rural	5	71.4	71.4
Occupation	Employed	6	85.7	85.7
	Unemployed	1	14.3	14.3
Education	Educated	3	42.9	42.9
	Illiterate	4	57.1	57.1
Blood transfusion	Yes	1	14.3	14.3
	No	6	85.7	85.7
Jaundice	Yes	0	0.00	0.00
	No	7	100	100
I.V drug abuse	Yes	0	0.00	0.00
	No	7	100	100

in this study were from rural areas with low socioeconomic status.

Similar to a previous study in Eastern Sudan[6], the majority (84.2%) of our HBV positive patients were males, accusinggender as a risk factor for HBV infection.

Our study also showed none of HBV positive patients have history of blood transfusion and this may reflect the effectiveness of themeasures taken byour blood banks and thisis consistent with a study done in Sudan in general population which showed no association with blood transfusion and HBV infection[5].

The majority (84.2%) of our HBV positive patients have no history of jaundice, and this reflect the fact that the disease commonly occurs in subclinical asymptomatic pattern as mentioned in literature.

Vaccination rate against HBV was very low (6%)among the population studied and none of HBV positive patients was vaccinated.This highlights the need forintensifying thevaccination program in our community.

In this study the seroprevalence of HCV among tuberculosis patients was 3.5%and this was higher than that among general population in Gezira area (2.2%)[(8)] and lower than that among tuberculosis patients (19.4%) reported inhigh epidemic country in which it was attributed to high risk factors such as intravenous drug abuse[16].

Our results showed there are four patients (52.1%) among HCV positive patients in age group less than 40years, and one patient (14.3%) in age group 40-60years and two patients (28.6%) in age group more than 60years, and this differ from the literature which showed that the infection was common in age from40-49years.Our figures are small so it is difficult to draw conclusions. Further studies may be needed in the future to determine the others risk factors among our patients such as intravenous drug abuse.

Our results showed that six (85.7%) patients with HCV were males and this is consistent with literature[16].History of jaundice among HCV positive patientswas lacking, and this is consistent with reports from elsewhere. This highlights the importance of screening for HCV and doing liver function test among patients with high risk for infection such as TB patients so as to discover the occult infection early.Before drawing conclusions we have to admit that the numbers in this study were very small, so larger studies are highly recommended to support or disprove our results.

Conclusion:

The present study showed that hepatitis B and Cviruses' infection is common among tuberculosis patients.Infection with HBV or HCV may occur without any history of jaundice. Male gender, age less than 40years and low socioeconomic status are main risk factors for HBV and HCV infection which are shared with TB. No role for blood transfusion in transmission of HBV or HCV infection in this study.

There is low coverage of HBV Vaccination among the study group. Our study also showed that are multiple risk factors for contracting TB and (HBV, HCV) infections, so screening for these virusesshould be included in the national TB control programbefore and during anti tuberculosis treatment.

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