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Research Article

Prevalence of Hepatitis B and Hepatitis C Co-infection with Tuberculosis Patients in Khartoum State Sudan

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Abstract

Introduction: Tuberculosis infection is a very serious pulmonary infection, sometimes is co-exist with another infectious disease such as Hepatitis B and C which are very dangerous liver infection and may lead to liver cirrhosis and hepatocellular carcinoma.

Methods: This is a descriptive cross- sectional study. It was conducted at Abu Anja hospital which is one of the biggest hospitals in Khartoum state during a period from February-April 2016.

Result: A total serum specimen of 160 samples was taken from patients with Tuberculosis infection. Aged between 10-80 years (118 males 42 female) were collected. 11 cases (6.9%) were found to be seropositive for Hepatitis B Virus infection). 4 cases (2.5%) were found to be seropositive for Hepatitis C Virus infection. The highest frequency of Hepatitis B Virus seropositivity among age group was observed in the age group 21-40 years. Hepatitis C Virus was found to be highest in the age group 21-40 years also.

Conclusion: Co-infection with viral hepatitis (HBV, HCV) among TB patient increases the risk of hepatotoxicity occurring during the treatment of tuberculosis, therefore, it is important to know the seroprevalence of HBV and HCV among TB patients before starting the treatment. Furthermore, once the patient started the treatment of TB, there must be regular follow up for monitoring the indications of hepatotoxicity and routine evaluation of liver function test must be considered wherever possible.

Keywords: Prevalence; Tuberculosis; Hepatitis C and B

Introduction

Tuberculosis (TB) is a chronic bacterial infection caused by mycobacterium complex, including mycobacterium tuberculosis (MTB) or mycobacterium bovis, characterized histopathology by the formation of granuloma. The most infection are asymptomatic or non-progressive. The most common site of infection is lung (pulmonary Tuberculosis (TB), where TB infection classically causes an asymmetrical pulmonary infiltrate, which undergoes caseation, cavity formation and fibrosis if it progresses [1].

In 2019, there were 10 million new cases of tuberculosis worldwide and 1.2 million deaths, and estimated that there were

206,030 incident cases of multidrug-resistant tuberculosis, caused by organism's resistant to at least isoniazid and rifampin, among patients who were reported to have tuberculosis in 2019. Near to half of these patients were in China, India, the Russian Federation [2].

HBV and HCV are clinical risk factors for drug-induced hepatotoxicity during treatment with anti-tuberculosis drugs. Other factors include old age, malnutrition, alcoholism, genetic susceptibility, and HIV. The hepatotoxicity of the B and C virus spreads rapidly in the general population particularly in TB patients. Viral hepatitis B infection increases the risk of drug-related hepatitis up to 3 times more than TB patients who do not have this viral infection [3].

Rifampicin causes hyperbilirubinemia because it inhibits the major bile salt exporter pump. Ethambutol has been reported to cause liver cholestatic jaundice with unclear circumstances. Fluoroquinolones hepatotoxicity has been reported with ciprofloxacin and norfloxacin. The mechanism of fluoroquinolone hepatotoxicity is believed to be a hypersensitivity reaction as manifested by eosinophilia. The presence of rifampicin in multi drug treatment increase incidence of hepatotoxicity and potentiates their harm effects on the liver [4].

Rationale

Tuberculosis is the common health problem. Sudan is among the countries with the highest prevalence for tuberculosis and hepatitis Virus, hepatitis virus infection.

Co infection with viral hepatitis (HBV, HCV) among TB patient increase the risk of hepatotoxicity occurring during tuberculosis treatment, so it is important to know the seroprevalence of HBV and HCV among TB patients.

The general objective of this study is to determine the prevalence of Hepatitis B and C Co-infection with tuberculosis patients in Khartoum state. And the specific objective; To evaluate HBV with TB patient and to valuate HCV with TB patient.

Materials and Methods

This is a descriptive cross- sectional study. It was conducted at Abu Anja hospital which is one of the biggest hospitals in Khartoum state during a period from February-April 2016. A total of 160 blood samples of pulmonary TB cases were diagnosed based on laboratory findings, clinical symptoms and x-ray. Blood sample was collected from patient and centrifuged to obtain serum. 160 samples were collected from patients with TB to determine if there is hepatitis C or B co-infection.

Materials and equipments used for sampling

ICT for HBV and HCV, Cotton, syringe, EDTA, centrifuge. The data were collected by using direct interviewing of patients, the questionnaire was use to collect data regarding name, age, gender, tribe, residence, ethnic group, educational level and smearing.

A 2.5ml of venous blood collected from each individual using disposable syringe from anti cubical veins into labeled container containing sequestered (EDTA).

Results

A total serum specimen of 160 samples aged between 10-80 years (118 males 42 female) was collected. 11 cases (6.9%) were found to be seropositive for HBV infection (Figure 1). 4 cases (2.5%) were found to be seropositive for HCV infection (Figure 2). Out of 118 males, 8 were found seropositive (5%) and out of 42 females 3 were found seropositive (1.9%) for HBV. Out of118 males two 2 were found seropositive (1.3%) and out of 42 females, 2 were found seropositive (1.3%) for HCV. The highest frequency of HBV seropositivity among age group was observed in the age group 21-40 years (Figure 3). HCV was found to be highest in the age group 21-40 years also (Figure 4).

Figure 1: HBV positive result.

Figure 2: HCV positive result.

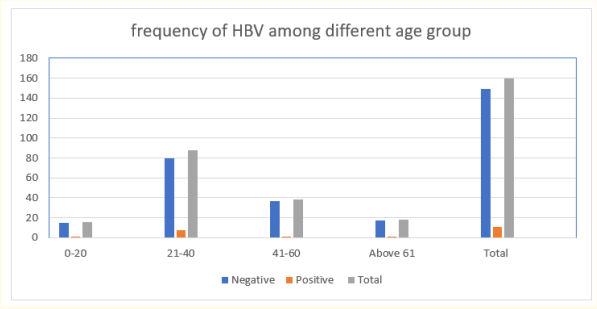

Figure 3: Shows the frequency of HBV among different age group.

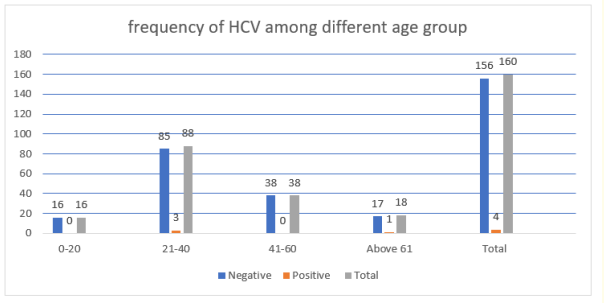

Figure 4: Shows the frequency of HCV among different age group.

Discussion

TB is one of the major public health problems worldwide in this decade. Both, developed and developing countries, have experienced a starting increase in the incidence of TB as several factors contributed to this upsurge. This work was performed to find out the seroprevalence of HBV and HCV infection in patients suffering from TB.

In this study we found that out that of 160 known TB patients, eleven were seropositive for HBV (6.9%); most of them (8=72.2%) were in the age group between 21-40 years, and four were seropositive for HCV (2.5%); most of them (3=75%) in the age group 21-40 years.

Positive HBV cases in our study were 6.9% which is relatively lower than it in the study conducted by Nail., *et al*. in the period from December 2010 to October 2011 in tuberculosis center at Tropical Diseases Teaching Hospital (TDH) - Sudan. It was conducted among 200 adult tuberculosis patients (age 19 years and above) which found that (9.5%) and (3.5%) for seroprevalence of HBV and HCV respectively [5]. It is also lower than 2 studies, one in Sudan at Kassala teaching hospital, eastern Sudan, between June and December 2014 which was (15.3%) for HBV [6]. And the other one reported from Thailand (9%) but it was higher than other reports from Georgia (4.3%) and Pakistan (5.5%) [7-9]. all of which measured HBV seropositivity. Additionally, the seroprevalence of HBV in our study is lower than a study done in India which showed that the seroprevalence of HBV among pulmonary tuberculosis patients is 15% despite the relatively low seroprevalence of HBV in that country (4%) [10,11].

An interesting finding is that, the prevalence of HBV among Sudanese general population was reported as 6.8% in central Sudan which is quite similar to our study and 8.2% in eastern Sudan respectively [12,13]. In this study the seroprevalence of hepatitis B virus was 6.9% and it was higher than the seroprevalence among blood donors in Sudan (5.6%) [14].

To get a prospective about the prevalence of HBV and HCV among general population in Sudan, a retrospective study conducted at Almokhtabar Moamena Kamel Medical Laboratories in Sudan, found that a total of 2109 different patients were infected with HBV during the study period. 1641 (77.81%) were males and 468 (22.19%) were females. Out of 2109 reported hepatitis B

cases, 1351 (64%) were between 20-39 years These findings are consistent with results we found in this study. With regard to viral hepatitis C infection in the same study, 133 were positive among which 70 were males and 63 were females. Preponderance of the age group 41 - 60 years was observed as 68 patients out of 133 (51%) followed by 20 - 39 years as 31 patients (23%) [15].

A meta-analysis reported that Khartoum State was the most endemic state in Sudan with HBV and HCV seroprevalence of (12.69%) and (6.78%), respectively. These results are much higher than what we found here in this TB subpopulation [16].

Another systematic review and meta-analysis done to assess country-specific population-level HCV prevalence in four countries in the Middle East and North Africa (MENA) region: Djibouti, Somalia, Sudan, and Yemen. They identified 101 prevalence estimates. Pooled HCV antibody prevalence in the general population in Somalia, Sudan and Yemen was 0.9% (95% confidence interval [95%CI]: 0.3%-1.9%), 1.0% (95%CI: 0.3%-1.9%) and 1.9% (95%CI: 1.4%-2.6%), respectively [17].

Also, out of 118 males included here, 8 we found seropositive (5%) for HBV and out of 42 females 3 were found seropositive (1.9%) for HBV which indicate that the proportion of HBV/TB co-infection was found to be higher in male than female and this finding is similar to other reports [5,18,19]. The prevalence of HCV in the present study was (2.5%) which is different with that reported by Nail., *et al*. (3.3%) and the prevalence of HCV (2.2%) among general population in Sudan (20). However, it is much lower than previous studies done in Brazil (7.5%), in Georgia (22%), in Egypt (17%), Khalili., *et al*. (27.45%) [21-24]. High rates of HBV infection among male gender might be related to the gender exposure difference between males and females. Interestingly, a male preponderance was documented in many studies that have been discussed in the paper.

The prevalence of HCV in the present study was (2.5%) which is different with that reported by Nail., *et al*. (3.3%) and the prevalence of HCV (2.2%) among general population in Sudan [20]. However it is much lower than previous studies done in Brazil (7.5%), in Georgia (22%), in Egypt (17%), Khalili., *et al*. (27.45%) [21-24].

The difference between the prevalence of HBV and HCV in the current study and other results may be attributed to use of different diagnostic techniques such as PCR, ELISA, and ICT. The sample size may also be responsible. we used ICT, and with no doubt ELISA is more sensitive and specific as compared to the rapid test (ICT). Recently Hussain., *et al*. have confirmed superiority of ELISA over ICT for diagnosis of HB and HC viruses [25] and should be backed by superior methods like ELISA and PCR where possible [26,27].

Conclusion and Recommendation

We conclude that (ICT) technique play important role in identify patients for HBV and HCV seropositivity. Other confirmatory tests must be done to confirm the seropositivity of HBV and HCV in TB patients (Elisa, viral load by PCR).

Co-infection with viral hepatitis (HBV, HCV) among TB patient increases the risk of hepatotoxicity occurring during the treatment of tuberculosis, therefore, it is important to know the seroprevalence of HBV and HCV among TB patients before starting the treatment. Furthermore, once the patient started the treatment of TB, there must be regular follow up for monitoring the indications of hepatotoxicity and routine evaluation of liver function test must be considered wherever possible.

Ethical Clearance

Each patient in this study was told about study objective and oral consent was taken from each patient.

Conflict of Interest

Authors report no conflict of interest.

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Bibliography

1. World Health Organization. "Global tuberculosis report" (2020).
2. Wong WM., *et al*. "Antituberculosis drug-related liver dysfunction in chronic hepatitis B infection". *Hepatology* 31.1 (2000): 201-206.
3. Saukkonen JJ., *et al*. "Hepatotoxicity of Antituberculosis Therapy Subcommittee".

4. Jussi J Saukkonen., *et al*. "An official ATS statement: hepatotoxicity of antituberculosis therapy". *American Journal of Respiratory and Critical Care Medicine* 174.8 (2006): 935-952.

5. Nail AM., *et al*. "Seroprevalence of hepatitis B and C viruses among tuberculosis patients". *Sudan Journal of Medical science* 8 (2013): 17-22.

6. Abdallah TM., *et al*. "Sero-Prevalence of Hepatitis B and Hepatitis C Viruses among Tuberculosis Patients in Kassala, Eastern Sudan". *Global Journal of Infectious Diseases and Clinical Research* 1.1 (2015): 001-003.

7. Sirinak C., *et al*. "Viral hepatitis and HIV – associated tuberculosis: Risk factors and TB treatment outcomes in Thailand". *BMC Public Health* 8 (2008): 245.

8. Kuniholm MH., *et al*. "Risk factors and algorithms to identify hepatitis C, hepatitis B,and HIV among Georgian tuberculosis patients". *International Journal of Infectious Diseases* 12 (2008): 51-56.

9. Akhtar I., *et al*. "Sero-prevalence of HBV and HCV at tuberculous patients at Sheikh Zayed Hospital Rahim Yar Khan, Pakistan". *Biomedica* 29 (2013): 69-72.

10. Maheshwari N., *et al*. "Hepatitis B virus carrier rate in pulmonarytuberculosis patients". 36.1 (1989): 39-40.

11. Tandon BN., *et al*. "Epidemiology of hepatitis B virus infection in India". *Gut* 38 (1996): S56-S59.

12. Mudawi HM., *et al*. "Prevalence of hepatitis B virus infection in the Gezira state of central Sudan". *Saudi Journal of Gastroenterology* 13 (2007): 81-83.

13. Abdlah TM., *et al*. "Seroprevalence and epidemiological factors of hepatitis B virus (HBV) infection in Eastern Sudan". *International Journal of Medicine and Medical Sciences* 3 (2011): 239-241.

14. Tajeldin M., *et al*. "Seroprevalence and epidemiological factors of hepatitis B virus (HBV) infection in Eastern Sudan". *International Journal of Medicine and Medical Sciences* 3.7 (2011): 239-241.

15. Marwan M., *et al*. "A Diagnostic Laboratory-Based Study on Frequency and Distribution of Viral Hepatitis B and C Among Sudanese". *Open Virology Journal* 11 (2017): 98-107.

16. Badawi MM., *et al*. "Systematic review and meta-analysis of HIV, HBV and HCV infection prevalence in Sudan". *Virology Journal* 148 (2018).

17. Karima Chaabna. "Hepatitis C Virus Epidemiology in Djibouti, Somalia, Sudan, and Yemen: Systematic Review and Meta-Analysis". *PLoS One* 11.2 (2016): e0149966.

18. Blal CA., *et al*. "High prevalence of hepatitis B virus infection among tuberculosis patients with and without HIV in Rio de Janeiro, Brazil". *European Journal of Clinical Microbiology and Infectious Diseases* 24 (2005): 41-43.

19. Aires RS., *et al*. "Prevalence of hepatitis B virus infection among tuberculosis patients with or without HIV in Goiânia City, Brazil". *Journal of Clinical Virology* 54 (2012): 327-331.

20. Mudawi HMY. "Epidemiology of viral hepatitis in Sudan". *Clinical and Experimental Gastroenterology* 1 (2008): 9-13.

21. Reis NR., *et al*. "Hepatitis C virus infection in patients with tuberculosis in Central Brazil". *International Journal of Tuberculosis and Lung Disease* 15: 1397-402.

22. Richards D., *et al*. "High prevalence of hepatitis C virus but not HIV co-infection among patients with tuberculosis in Georgia". *International Journal of Tuberculosis and Lung Disease* 10 (2006): 396-412.

23. Agha MA., *et al*. "Prevalence of hepatitis C virus in patients with tuberculosis and its impact in the incidence of anti-tuberculosis drugs induced hepatotoxicity". *Egyptian Journal of Chest Diseases and Tuberculosis* 64 (2015): 91-96.

24. Khalili H., *et al*. "Anti-tuberculosis drugs related hepatotoxicity; incidence, risk factors, pattern of changes in liver enzymes and outcome". *Journal of Pharmaceutical Sciences* 17 (2009): 163-167.

25. Hussain N., *et al*. "Sensitivity Comparison between Rapid Immuno-Chromatographic Device Test and ELISA in Detection and Sero-Prevalence of HBsAg and Anti-HCV antibodies in Apparently Healthy Blood Donors of Lahore, Pakistan". *World Academy of Science, Engineering and Technology* 60 (2011): 1112-1114.

26. Khan JK. "Evaluation of the Performance of Two Rapid Immunochromatographic Tests for Detection of Hepatitis B Surface Antigen and Anti HCV Antibodies Using Elisa Tested Samples". *Special Edition Annals* 16.1 (2010).

27. Mubashir Nazir. "A Comparative Study of Screening of Hepatitis B by Two Different Immunochromatographic Methods among Patients Attending a Tertiary Care Hospital". *International Journal of Current Microbiology and Applied Sciences (IJCMAS)* (2020).

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