Prevalence of HBV and HCV co-infection among tuberculosis patients in a teaching hospital Hyderabad, India.

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Abstract-

Tuberculosis with chronic hepatitis is recently a worldwide health problem. Viral hepatitis, particularly hepatitis B virus (HBV) and hepatitis C virus (HCV), infections and tuberculosis (TB) are creating major health issues leading to higher mortality rate. Co-infection with HBV or HCV among TB patients may potentiate the risk of hepatotoxicity induced by anti-TB drugs. Hence, this study designed to reveal the prevalence rate of HBV and HCV among TB patients. Methods: This was a cross-sectional study conducted at the Malla Reddy Hospital, Hyderabad between March 2015 and April 2019. All documented TB patients were analyzed on the basis of socio-demographic and other characteristics. The informed consent form were taken from all the patients. Thereafter, all patients underwent screening for hepatitis B surface antigen (HBsAg), anti-HCV using enzyme-linked immunosorbent assay (ELISA). The data were procured and analyzed by statistical software 20.0. A p value of <.05 was considered to be statistically significant. Results: 300 TB patients were included in this study, with 192 (64%) males and 108 (36%) females. The mean age of the patients was 41.35 years (±19.3). Of the total number of patients, 8 cases (2.7%) were HBsAg-positive and 2 cases (0.7%) were positive for anti-HCV. Conclusion: The prevalence of HBV and HCV co-infection among TB patients in this study was significantly lower. Further study with large number of samples may provide accurate prevalence rate of HBV and HCV among tuberculosis patients.

Key words- Tuberculosis, Viral hepatitis, Hepatitis B virus, Hepatitis C virus, Co-infection.

Introduction-

Tuberculosis (TB) and viral hepatitis mainly hepatitis B virus (HBV) and hepatitis C virus infections are common in developing countries of south-east Asia, including India. Anti-tuberculosis therapy (ATT) can be hepatotoxic in around 10% of the patients, which may be a management issue that is difficult in the presence of already compromised liver functions due to HBV and HCV. Viral hepatitis, particularly hepatitis B virus (HBV) and hepatitis C virus (HCV) infections, are a global public health concern because they are the leading cause of chronic hepatitis, liver cirrhosis, and hepatocellular carcinoma. HBV infects around one-third of the world population, with 400 million patients that are chronically infected (RB Singh et al. 2005). Chronic HCV infection also affects approximately 170 million individuals, that is, 2.5% of the world population (A.S. Lok et al. 2007). India is a country with high prevalence and incidence of TB. The estimated burden of TB in India is around 8.5 million. In the Indian series, the risk of ATT-hepatotoxicity is calculated to be 11.5% from four prospective series, as compared to 4.28% in a meta-analysis of 14 studies from the west (Parthasarthy R et al. 1986, Durand F et al. 1995, SD Purohit et al. 1983, Taneja DP et al. 1990, S Mehta, 1990). High incidence of hepatotoxicity in a developing country is thought to be due to viral hepatitis infections, indiscriminate use of drugs, malnutrition, and more advanced TB. The World Health Organization reports a prevalence of HBV and HCV infections in the eastern Mediterranean region of 2–4% and 1–4.6%, respectively (European Association for Study of Liver, 2014). According to a recent report by

the World Health Organization, Iraq is a relatively high- TB-burden country in the eastern Mediterranean region, with an estimated incidence rate of 43/100,000 and a casedetection rate of 54% (WHO, 2016). Drug-induced hepatotoxicity is a recognized side effect of anti-TB drugs, particularly rifampicin, isoniazid, and pyrazinamide. TB patients with HBV and HCV co-infections have increased susceptibility to the potential hepatotoxic effects of first-line anti-TB drugs and thus may require discontinuation of their treatment (WHO, 2016, AK Chakraborty, 2004). Therefore, chronic liver disease in patients with TB makes TB treatment challenging. Therefore, the present cross-sectional study was done to know the prevalence of HBV and HCV infections in tuberculosis patients.

Materials and methods-

The study was conducted at the Malla Reddy Hospital, Hyderabad from March 2015 to April 2019. All documented pulmonary and extrapulmonary TB patients, who were confirmed by standard protocol using acid-fast-bacilli smear microscopy, GenXpert molecular assay, radiological examination, and/or biopsy, were included in the study. Patients were included in the study after obtaining written informed consent. Information on socio-demographic and other patient characteristics was collected by using a standard questionnaire. All patients underwent screening for hepatitis B surface antigen (HBsAg), anti-HCV, and anti-HIV using enzyme-linked immunosorbent assay (ELISA). 5-mL samples of blood for detection of HBV and HCV markers were taken from each participant. Serum specimens were tested for HBsAg and anti-HCV by ELISA (J. Mitra & Co Pvt. Ltd.) according to manufacturer instructions. Statistical analysis software 20.0 was performed to analyze the procured data. A p value of <.05 was considered to be statistically significant

Results and Discussion-

A total of 300 patients with TB attending the TB services at the RNTCP center Malla Reddy Hospital were enrolled in this study. Among all patients, 192 (64%) were males and 108 were (36%) females. The mean age of the patients was 41.35 years (±19.3). Among 300 tuberculosis patients, 8 cases (2.7%) were HBsAg-positive and 2 cases (0.7%) were positive for anti-HCV. Of the total patients, 205 (68.33%) were new TB cases and 95 (31.7%) were previously treated patients. The majority of TB patients had pulmonary manifestation 278 (92.7%) and 22 were extrapulmonary cases (7.33%).

Table 1: Characterization of 300 tuberculosis cases.

Data		Percentage (%)	P value
Male		64%	0.0032
Female		36%	0.0045
Type of cases	New TB cases	68.33%	0.0035
	Previous TB treatment	31.7%	0.0046
Type of TB	Pulmonary	92.7%	0.0013
	Extra pulmonary	7.33%	0.0021

Out of the 214 TB patients recruited in the study, 8 cases (2.7%) were HBsAg-positive and 2 cases (0.7%) were positive for anti-HCV. None of the TB patients had HBV and HCV coinfection (Table 2).

Table 2: Prevalence rate of HBV and HCV co-infection in tuberculosis patients (n= 300)

Variable	Percentage (%)	P value
HBV (HBsAg)	2.7%	0.93
HCV (Anti HCV)	0.7%	0.97

HBV and HCV co-infection among TB patients undergoing anti-TB treatment may increase the risk of drug-induced hepatotoxicity. Hence, we conducted this study to identify the frequency of HBV and HCV infection among TB patients. In this study, 8 TB cases (2.7%) were found to be coinfected with HBV, and 2 cases (0.7%) were with HCV. The prevalence of HBV infection in this study was lower than that reported in most previous studies. Reported prevalence rates are 26.8% in Rio de Janeiro, Brazil (CA Lal et al. 2005), and 19.8% in Argentina (MA Pando et al. 2008). Studies in Georgia (M.H. Kuniholm et al. 2008) and Taiwan (J.Y. Wan et al. 2011). showed prevalence rates of 13% and 11.7%, respectively. It is noteworthy that a substantial number of TB patients with HBV infection had concomitant HIV infection in the

aforementioned studies. An explanation for the low rate of HBV observed in our study is the adherence to universal infection-control measures, including HBV vaccination. This study also revealed a low HCV sero-prevalence among TB patients. There are wide variations in the prevalence of HCV among HCV co-infected TB patients reported in studies from different countries: An HCV frequency as high as 31% was reported in Thailand (C. Sirinak et al. 2008). The reported prevalence is 7.5% in Central Brazil (N.R. Reis et al. 2011) and 22% in Georgia and Pakistan (D.C. Richards et al. 2006, M. Ul-Haq et al. 2013) . Kuniholm et al. (2008), Wan et al. (2011), and H Khalili et al. (2009) found prevalence rates of 12%, 6.7%, and 27.45%, respectively. A study by M Badawy et al. (2011) that involved 135 TB patients revealed an HCV co-infection rate of 6.4%. These variations may reflect regional differences in the prevalence of hepatitis C infection, the differential use of diagnostic modalities [ELISA, polymerase chain reaction (PCR), recombinant immunoblot assay (RIBA)], or both. The low HCV sero-prevalence in our study could be explained by the fact that our study population had no history of injection drug use and that only a small number of patients had received a blood transfusion. In general, patients in our study are young, which is in agreement with other studies and confirms that TB is a disease of economically productive age groups (R. Bahl et al. 2007). In the present study, TB clinical manifestations were typical of TB cases for the majority of pulmonary cases (278, 92.7%). The frequency of extrapulmonary TB in this study was lower than that in other studies (H.M. Peto et al. 2009). Of particular concern are rifampicin, isoniazid, and pyrazinamide, which are among the first-line drugs. These are hepatotoxic drugs, which should be discontinued by patients with deteriorated liver function due to liver disease (J.Y. Wan et al. 2011). Such patients remain infectious and are more likely to experience treatment failure and relapse, which may eventually threaten the TB control program. Therefore, screening TB patients for hepatotropic viruses that induce chronic liver disease may be a valuable measure for reducing the side effects of hepatotoxic anti-TB drugs. The main limitation in this study was the small sample size; furthermore, we did not determine whether patients were in an active hepatitis state. The presence of significant liver abnormality can result in deferred treatment and, subsequently, to poor treatment outcome. Another limitation was the exclusion of HBV DNA and HCV RNA tests for patients included in the study. This may affect the study results, as it would allow early diagnosis of hepatitis infections, particularly in cases of occult hepatitis and, furthermore, in cases before HBsAg or anti-HCV antibodies were detectable in blood. In conclusion, the prevalence of HBVand HCV co-infection among TB patients in this study was low. Further prospective studies with larger sample size are needed to ascertain the need for routine screening for HBsAg and anti-HCV in TB patients.

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