Research Article

Outcome of routine testing for HCV and HBV in patients attending and admitted in various surgical units of a tertiary care institute

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Abstract

Background: Hepatitis B and C virus remain leading causes of morbidity and mortality. Unfortunately, once inflicted, these infections show poor response to the available treatment modalities. So the focus remains on preventive strategies, to avoid spread of infection. There is lack of routine serological screening prior to surgery which is one of the factors responsible for increased disease transmission. **Material and Methods**: The present study involved retrospective analysis of 9272 routine blood samples from all ages and both sexes who were attending and admitted in different surgical departments. These patients were screened by rapid immunochromatographic assay for qualitative detection of anti- HCV antibodies and HBsAg to know their carrier status prior to any surgical intervention. **Results**: Out of 9272 samples tested, 155 (3.6%) tested positive for anti- HCV antibodies and 162 (3.26%) for HBsAg. Seroprevalence of HCV was 3.77 %(96) and 3.36% (59) in male and female respectively, with preponderance among age group of 41-60 (43.87%) and 21- 40 years (39.35%). HBsAg detection revealed seropositivity of 3.89 %(93) in males; 2.67 %(69) in females, with predominance in young adults of 21-40 (43.83%) followed by 41-60 (24.07%) years. Maximum number of seropositive cases for both HCV and HBV were from General surgery department as 63.23% & 53.09% respectively. **Conclusion:** The study estimated high prevalence of HBV and HCV on routine screening of patients reporting to various surgical departments. Healthcare providers have significantly high risk of infectivity along with further transmission of the disease if pre-operative screening and standard precautions are not followed strictly.

Key words: Anti- HCV antibodies, HBsAg, Seroprevalence, Surgical Units

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Introduction

Hepatitis B virus (HBV) and Hepatitis C virus (HCV) are common causes of liver disease globally. Infection with HBV and HCV is primarily blood borne or parenterally transmitted. Routes of parenteral transmission include contaminated blood and blood products, needle sharing, reuse of contaminated razors by barbers, tattooing devices, haemo-dialysis, acupuncture needles and contaminated medical devices. Other modes of transmission include sexual promiscuity and vertical transmission in the early childhood. The HBV is a major public health challenge due to its worldwide distribution, chronic persistence and complications. Its endemicity ranges from high (≥8%) to moderate (2-7%) and low (<2**%)** [1]. The carrier rate is higher in the tropical than in the temperate regions. In South East Asia, roughly 14-16 million people are infected with hepatitis B virus every year. Prevalence of hepatitis B varies from country to country and depends upon a complex interplay of behavioral, environmental and host factors. In general, it is lowest in countries or area with high standards of living like Australia, North America, North Europe and highest in countries or areas where socio economic level is lower like China, South East Asia, South America [2]**.** HBsAg

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seroprevalence in India is approximately 5 percent, and the major modes of HBV transmission are perinatal, child-related/ horizontal, and health-care-related, particularly unsafe injections [3]. Therefore HBV is an attractive candidate for public health measures aiming at prevention, early diagnosis and treatment. In this context, not only information on the general population but also on selected segment of populations with a potentially higher risk is important [4]. HCV represents a major health problem with approximately 3% of the world population, that is, more than 170 million people infected. While only 20–30% of individuals exposed to HCV recover spontaneously, the remaining 70–80% develops chronic HCV infection. Since the discovery of HCV more than 20 years ago, epidemiological studies have described complex patterns of infection concerning not only the worldwide prevalence of this virus but also its clinical presentation and its therapeutic response [5]. Although HCV is endemic worldwide; there is a large degree of geographic variability in its distribution. Countries with the highest reported prevalence rates are located in Africa and Asia; areas with lower prevalence include the industrialized nations. Because there is no vaccine and no post-exposure prophylaxis for HCV, the focus of primary prevention efforts should be safer blood supply in the developing world, safe injection practices in health care and other settings, and decreasing the number of people who initiate injection drug use. In these ways HCV prevention may form valuable alliances with HIV and HBV prevention programmes. Screening and testing of blood donors and virus inactivation of plasma-derived products have been shown to be extremely successful in preventing new infections, and resources need to be identified to expand these practices to poorer countries [6]**.** Data pertaining to burden of HCV and HBV infection comes primarily from studies on seroprevalence of HCV antibodies and HBsAg. There is vast variability amongst these studies because of difference in selected group of patients like blood donors, antenatal cases, general population etc., ethnicity, methodology of assays for detection of anti-HCV antibodies and HBsAg and geographical distribution of study groups. The present study was undertaken to estimate the burden of HCV and HBV infection in both genders and all age groups of patients reporting to various surgical departments of a tertiary care institute catering to a wide rural population The results of the present study can serve as guidelines in formulating health care strategies to keep a check on steady rise in the incidence of HCV and HBV infection related complications in the coming decades.

Material and Methods

Study design and settings: The present study involved retrospective analysis of 9272 routine blood samples (4303 patients for anti HCV antibodies testing and 4969 patients for HBsAg detection) sent to the Department of Microbiology, BPS GMC for Women, Khanpur Kalan, Haryana, from all ages and both sexes who were attending and admitted in different surgical departments from January 2013 to December 2013. These patients were screened by rapid immunochromatographic assay for qualitative detection of anti- HCV antibodies and HBsAg to find out their carrier status prior to any surgical intervention.

Microbiological procedures: As per the standard operating guidelines, blood sample (2-3ml) of each patient was collected and transported to the lab for testing. In case delay was inevitable, serum sample was separated & stored in refrigerator at 2-8°C till further testing. Blood was allowed to clot & after centrifugation, clean clear serum samples were separated in clean test tubes.

Test for detection of anti- HCV antibodies: The sera were analyzed by 4th generation HCV TRI-DOT (Diagnostic Enterprises, H.P, India) that utilizes a unique combination of modified HCV antigens from putative core, NS3, NS4 & NS5 regions of virus to selectively identify all subtypes of Hepatitis C virus in human serum/ plasma with a high degree of sensitivity and specificity. All the sera which were positive for antibodies to HCV were retested second time using same kit and method .Samples which were repeatedly reactive were considered to be positive.

Test for detection of HBsAg : The sera were analyzed by an immunoassay based on the antigen capture or sandwich principle by using one step HBsAg Rapid Card Test , Hepacard (J Mitra & Co. Pvt. Ltd.) for qualitative detection of HBsAg as per the manufacturer's instructions. The kit has sensitivity of 99.8% & specificity >99%.The samples which were positive for HBsAg were further re-tested second time using same kit & method. Samples which were repeatedly reactive for HBsAg were considered positive.

Results

A total of 9272 individuals were tested for the presence of anti HCV antibodies and HBsAg (4303 patients for anti-HCV antibodies testing and 4969 patients for detection of HBsAg respectively), out of which 155 (3.6%) were seropositive for anti- HCV antibodies and 162 (3.26%) tested positive for HBsAg. The seropositivity rate for HCV infection was highest in patients reporting to general surgery (63.23%) followed by otorhinolaryngology (16.13%). Seropositive samples for HBV infection were predominant from general surgery (53.09%) followed by gynecology/obstetrics (25.31%) department [Table-1]. Gender distribution depicted that out of 155 positive cases for anti- HCV antibodies, 96 (3.77%) were males and 59 (3.36%) females. HBsAg detection revealed that out of 162 samples which tested positive 93 (3.89%) were males and 69 (2.67%) females respectively [Table-2]. As regards distribution of seropositive cases of HCV infection among various age groups, preponderance was seen in age group of 41-60 (43.87%) and 21- 40 years (39.35%). In case of HBV infection, seropositive cases remained highest in age group of 21-40 (43.83%) followed by 41-60 (24.07%) [Table-3].

Table 1: Seropositive cases of HCV and HBV in surgical departments

Department	Seropositive for HCV (n=155)	Seropositive for HBV (n=162)
General surgery	98(63.23%)	86 (53.09%)
Orthopedics	14(9.03%)	15(9.26%)
Gynecology/obstetrics	17(10.97%)	41(25.31%)
Ophthalmology	01(0.65%)	01(0.62%)
Otorhinolaryngology	25(16.13%)	18(11.11%)
Total	155 (100%)	162 (100%)

Table 2: Gender distribution of anti HCV antibodies and Hepatitis B surface antigenemia among hospital based population

Gender	Total patients tested	HBsAg positive	Total patients tested	Seropositive for HCV
Male	2391	93 (3.89%)	2548	96 (3.77%)
Female	2588	69 (2.67%)	1755	59 (3.36%)

Table 3: Age-wise distribution of HCV and HBV seropositive patients in surgical departments

Age (years)	Seropositive cases of HCV	Seropositive cases of HBV
0-20	7 (4.52%)	20 (12.35%)
21-40	61 (39.35%)	71 (43.83%)
41-60	68 (43.87%)	39 (24.07%)
61-80	19 (12.26%)	32 (19.75%)
Total	155 (100%)	162 (100%)

Discussion

Most descriptions of HBV and HCV epidemiology rely mainly upon HBsAg and HCV sero-prevalence studies. These studies are typically cross-sectional in design and are done in selected populations e.g. haemo-dialysis patients, blood donors or patients with chronic liver disease which are not representative of the whole community in which they reside. Population-based studies representative of an entire community are far more informative, but this kind of study is not feasible in most parts of the world [6]**.** The present study estimated the overall prevalence of HCV and HBV among patients reporting to various surgical departments as 3.6% and 3.26% respectively. The results reflected moderate prevalence of HBsAg (3.26%) which is comparable with other studies by Osman et al., and Elsheikh et al., who reported seroprevalence of 4.91% and 5.6% for HBsAg in Sudan [1,7] whereas seroprevalence of HBsAg was 7.0% in a study done in Nigeria by Okonko IO et al. [8]. The studies conducted in India by Bhatta CP et al., and Sayed A. Quadri et al., have noted prevalence of HBsAg as 2.5% and 1.63% in hospital based population respectively [9,10]**.** The higher prevalence of HBsAg in current study as compared to other studies can be due to

the reason that our tertiary care institute is catering to economically underprivileged rural subjects who lack awareness of HBV risk factors. The present study estimated high number of HBsAg seropositive cases from general surgery 86(53.09%) and gynecology/obstetrics 41(25.31%) departments. Surgery and dental care may be a source of infection; transfusion-related infections have currently become very rare in developed countries thanks to the improved serology and advances in molecular blood screening but can be an important source of infection in the poorest countries. The prevalence of the infection in HCWs, a high risk group for acquiring infection with blood borne pathogens due to occupational contact with infected body fluids, depends upon HBV prevalence in the general population. In India, an intermediate endemic zone where the estimated prevalence rate of HBV in the healthy general population is around 4.7%, a recent study showed 5% HBsAg positivity in HCWs, but a highest seropositivity of around 40% among laboratory technicians [11]. HBV is a major cause of chronic hepatitis, cirrhosis, and hepatocellular carcinoma (HCC). Approximately 5.0% of the world's population was reportedly seropositive for hepatitis B surface antigen (HBsAg). The latter is one of HBV antigens found in blood of infected humans; which serves as a veritable marker of HBV infection. Using this marker, studies have estimated that approximately 2 billion people had HBV Infection [12]. The prevalence of HBsAg in current study is higher in males 93 (3.89%) as compared to females 69 (2.67%).The observation of present study is in concordance with Dutta S et al., (males 35.3%; females 19.3%) and Sood S et al., (males 1.04% ; females 0.58%) who also showed male dominance [13,14]. This may be because of a high immune response in females which helps to clear HBV more rapidly and efficiently as compared to males [15]**.** Mehmet et al., reported higher prevalence rate of HBsAg in males than females in both rural and urban areas with observation that male sex was an important risk factor for HBsAg positivity [16]. The reason for the high infection rate among the males may be due to habits such as multiple sexual partnership and polygamy which may be higher among the males [17]**.**The present study reports high seropositivity of HBsAg in young adults of 21-40 (43.83%) followed by 41-60 years (24.07%) which is in agreement with study of Easow JM et al., and Chander et al., who documented highest seropositivity for HBsAg in age group of 21-30 years and 15 -45 years respectively [18,19]**.** Routine screening of blood samples received from patients of various surgical departments' depicted seropositivity of 3.6% (155) for anti-HCV antibodies. The results of current study are in concordance with Kaur et al., who recorded the seropositivity of IgM anti HCV in 306 patients with acute viral hepatitis as 3.3% [20]**.**The prevalence of anti-HCV antibodies remained higher in our study in comparison to that of Berry V et al., who estimated the overall prevalence of 2.31% for HCV antibodies in hospital based population [21]. Seroprevalence remained lower in current study as compared to another study conducted in Delhi by Rajani M et al., who documented seroprevalence rate of HCV as 5.5% [22]. Most of the HCV seropositive cases were from General surgery (63.23%), Otorhinolaryngology (16.13%) and gynecology/obstetrics (10.97%).Health care workers are at a higher risk for acquiring hepatitis C infection as they come in contact with potentially infected patients. Prevalence of hepatitis C have been found to range from 0- 4% in this population .Certain professions have been noted to have a greater risk for HCV infection [23]. The variations in prevalence rates of anti- HCV antibodies could be due to regional differences, socioeconomic status, difference in study groups, burden of migrant population, different genomes of the virus and access to health information and quality health care. The prevalence was high for HCV infection in 41-60 year age group (43.87%) followed by 21-40 (39.35%) years**.** Similar results have been reported by other workers [24,25]. The high prevalence rate seen in young adults (15-40 years) is due to cumulative risk of exposure in these age groups. HCV is one of the major etiological agents of parenterally acquired hepatitis and is responsible for most cases of transfusion associated hepatitis. HCV is usually transmitted by sharing infected needles, unsafe transfusion practices and accidental exposures. Some people acquire infection through sexual transmission. All blood donations are still not compulsorily screened for HCV in India. Adults are at higher exposure risk due to unsafe practices. Tattooing could be an added risk factor [22]. Most of the cases of acute hepatitis C are asymptomatic with patients unaware of the underlying infection. Symptomatic acute hepatitis with jaundice is seen in only 25% of patients. The worrying aspect of acute hepatitis C infection is that spontaneous viral clearance is unusual with nearly 54%-86% of the infected individuals progressing to chronic hepatitis. Approximately a fifth of the patients with chronic hepatitis C progress to cirrhosis over a time spanning nearly a decade [23]**.**

Conclusion

The prevalence of HCV and HBsAg in study population remained towards higher end as detected on routine screening before any surgical intervention. Hospital based seroprevalence studies can serve as useful tool when community based studies are difficult to conduct. Screening and testing of patients reporting to surgical departments prior to any surgical intervention can be extremely successful in preventing new infections of HBV and HCV by testing undiagnosed cases and reducing concerns of occupational transmission .Moreover people with known HBV and HCV infection should be counseled regarding ways to minimize the risk of transmission to others .As a part of secondary prevention against these hepatitis viruses, HBV and HCV infected people should be referred for further medical evaluation and antiviral treatment considerations.

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