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## Epidemiology of HIV, Hepatitis B and C virus in emergency and elective surgical patients: Our experience of 275 patients in a single surgical ward

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### Abstract

Human immunodeficiency, hepatitis B and hepatitis C virus are major health problems throughout the world. All over the world surgeons have the highest risk for exposure to blood and its products during performing their procedures. Human immunodeficiency, hepatitis B and hepatitis C affecting more than three billion people worldwide and hepatitis B and hepatitis C virus is the single most important factor of chronic liver disease and hepato-cellular carcinoma in India and abroad. Universally preoperative testing of these blood born virus HIV, HBV, HCV has been a accepted strategy to reduce the risk of virus transmission. This study was designed to analyse the magnitude of these infections as a global health problem, affecting millions of population throughout globe. This study also describe the prevalence of Human Immunodeficiency Virus, Hepatitis B and Hepatitis C virus in surgical patients undergoing elective and emergency surgeries.

**Material and Methods:** This is a retrospective study done on 275 patients who were admitted for general surgical care between July 2016 and May 2020 in single surgical ward and were positive for HBsAg, anti-HCV, and anti-HIV antibodies.

**Results:** Patients included in the study were between 16-18 years of age and included both male as well as female. There were 182 male and 93 female with male: female ratio 1: 0.51. Out of 275 patients 33.45% patients were positive for HBsAg, 34.54% were positive for anti-HCV, and 29.09% were positive for anti-HIV.

**Conclusions:** Education of all healthcare workers including doctors along with routine preoperative testing of all patients undergoing elective and emergency surgeries are highly important to enhance the awareness of these infection in order to reduce the transmission of disease. As the common message is 'Prevention is better than cure' It is highly important to prevent further spread of these infections by screening of every patient before any surgery whether elective or emergency and also counselling should be done of all patients. All the doctors and paramedical staff must follow the proper ethical practice to ensuring the use of sterile disposables in all these patients where indicated and also protecting themselves from these viral infections.

**Keywords:** HIV, Hepatitis-B, Hepatitis-C, screening, surgical patients

### Introduction

Hepatitis B virus (HBV), Hepatitis C virus (HCV) and Human Immunodeficiency Virus (HIV) are the prime causes of morbidity among the viral infections which may lead to mortality also. These virus can be transmitted through a common route and hence can be transmitted simultaneously <sup>[1, 2]</sup>. Prevalence of HBV, HCV and HIV can be estimated by Serological surveys which may help to develop long term strategies for improving the public health standards. The HBV infection is a worldwide issue, and 66 per cent global population resides in the areas with higher prevalence of infections. Surgeons are prone to HBV infection with the annual incidence 50 times more than that of general population and twice that of physicians <sup>[3]</sup> Hepatitis C is a contagious liver disease caused by HCV. Every year 3-4 million people are infected with the hepatitis C <sup>[4]</sup>. Causative agent of acquired immunodeficiency deficiency syndrome (AIDS) is human immunodeficiency virus (HIV) which is a retrovirus. HIV makes the host vulnerable to lethal opportunistic infections for life long. According to the data provided by WHO in 2015, 86,300 new HIV infections were detected and total 2.1 million people were having HIV infections in India. The prevalence of HIV in India (2015) in 15-49 years was 0.26 percent with 0.30 percent in males and 0.22 percent in females <sup>[5]</sup>.

Healthcare workers have risk of acquiring blood borne infections and surgeons are more prone as compared to other health care workers due to increased exposure to blood and percutaneous injuries [6, 7]. In 2000 as a result of percutaneous injuries 16,000 HCV; 66,000 HBV and 1000 HIV infections were developed in healthcare workers. 8 Selecting good screening tests taking adequate precautions and proper disposal of biomedical waste can help in reducing transmission of these viral infections.

**Material and Methods:** This is a retrospective study done on 275 patients who were admitted for general surgical care between July 2016 and May 2020 in single surgical ward positive for HBsAg, anti-HCV, and anti-HIV antibodies. The study includes all the general surgical patients who were admitted for emergency, elective surgery or for conservative management through accident and emergency and from outdoor clinics. In all patients preoperative blood samples were sent for testing for these three virus to microbiology department. Detail history was recorded for all patient, like age, sex, type of surgery needed, weather elective or emergency surgery and other relevant blood investigations including pre-anaesthetic check-up for operative patients. Patients having seropositivity for HIV, HBV and HCV are referred to physician for counselling and further management For HIV and AIDS patients were referred to ART centre of our institute, for confirmation, counselling.

### Results

Two hundred seventy five (275) patients were admitted in General Surgical ward during a period of four years for elective

and emergency operations including patients for conservative management positive for HIV, HEPATITIS B and HEPATITIS C. Out of 275 patients 182 (66.18%) were males and 93(33.81%) were females as shown in table 1.

**Table 1:** Sex Distribution of Patients

Male (n=275)	Female (n=275)
183 (66.18%)	93 (33.81%)

The male to female ratio was 1:0.51. The age of these patients was between 15 to 86 years. Fifteen year female was the youngest patient admitted after multiple injuries. The oldest patient was 86 year male operated for peptic perforation.

**Table 2:** Age Group distribution of both male and female patients

Age in years	Male	Female	Total (n=275)	% Age
≤ 20	6	2	8	02.90
21-30	39	19	58	21.09
31-40	48	17	65	23.66
41-50	42	22	64	23.27
51-60	28	21	49	17.81
≥ 60	19	12	31	11.27

As per table 2 least number of patients were in age group of up to twenty years 8(2.90%). Maximum patients were in age group of 31-40 years 65 patients (23.66%). Male patients were also highest in this age group. Female patients were highest in age group of 41-50 years.

**Table 3:** Positivity for HBsAg, anti-HCV, and anti-HIV.

Male	Female	Total	% Age(n=275)	
HBsAg	63	29	92	33.45
HCV	57	38	95	34.54
HIV	56	24	80	29.09
HIV +HBsAg	5	1	6	02.18
HIV +HCV	1	1	2	00.72

The preoperative prevalence of HBV, HCV and HIV in the present study was significantly higher in males 63, 57, 56 respectively than in females 29, 38, 24 respectively. In total HCV has highest prevalence seen in (34.54%) patients. Five male patients were positive both for HIV and HBV and one patient was positive for HIV and HCV. One each female patient was positive for HIV and HBV and another for HIV and HCV.

### Discussion

Infection caused by HIV, HBV and HCV present throughout the world. On the basis of several published thresholds prevalence rates may be defined as > Intermediate HBV and HCV prevalence: HBsAg seroprevalence or HCV antibody seroprevalence is between 2% and 5% in general population and High HBV and HCV prevalence is ≥5% [9]. The prevalence for HIV is high when it exceeds 1% in general population [10]. Several targets have been identified by World Health Organization and UNAIDS to eliminate viral hepatitis and HIV as public health threats by 2030. These targets include diagnosing the viral diseases as early as possible, scaling up treatment and minimizing the mortality due to these diseases [11, 12].

Sequel to HBV and HCV infections can be acute and chronic hepatitis, cirrhosis, hepatocellular carcinoma and death. 4.7 million people are estimated to be chronically infected with HBV and 3.9 million people are infected with HCV. 13 Population including migrants from various countries with higher disease

prevalence, people having HIV and haemodialysis recipients form the major disease burden are at higher risk of having HBV as reported in European countries. [14]. Population groups like people in prison, haemodialysis recipients, people living with HIV, blood transfusion recipients, tissue recipients and diabetics are considered at increased risk or having higher burden of HCV [14].

A certain group of people have increased exposure making them vulnerable to increased risk or increased burden of HBV or HCV. These groups of people include tattoo recipients, sex workers, undergoing medical intervention, waste workers, using anabolic steroids, involved in high risk sexual behaviour, having sexually transmitted disease, using intranasal drugs, travellers, homeless and public safety workers [14].

Early diagnosis of HBV, HCV and HIV not only provides benefits to people infected but also contributes to better public health. It allows the infected people to have early access to the treatment. Treatment has to be continued lifelong for Hepatitis B which suppresses the viral replication in 70 to 80% of recipients. It also reduces the progression of cirrhosis and development of hepatocellular carcinoma. Treatment of HCV is continued for 8 to 12-24 weeks achieving cure in more than 90% of the cases [15, 16]. Antiretroviral therapy suppresses the virus in 97 to 98% of people having HIV leading to decreased rate of co-morbid illness and lower chances of opportunistic infections in future [17, 18].

Various diagnostic options are available for diagnosing of HBV,

HCV and HIV. Detailed description of these diagnostic options can be seen in WHO testing guidelines [9, 19]. The recommended threshold in general population for the strategy are based on the intermediate prevalence of HBV/ HCV and the high prevalence of HBV/HCV/HIV. These thresholds as described earlier are defined as 2% and 5% for HBsAg seropositivity for HBV and HCV antibody seropositivity for HCV [8] and 1% positivity for HIV [9].

Guidelines of National Institute of Clinical Excellence (NICE) in the United Kingdom has expanded the HIV testing beyond antenatal and sexual health settings. Now it also includes everyone in the areas of high and very high prevalence on hospital attendance and on registration with general practice. [20]. But no evidence of such approach is being followed for HBV and HCV testing is there. Testing strategies may be developed targeting population having intermediate (>2%) and high prevalence (>5%) for HBV and HCV [9].

As per guidelines by EACS (European AIDS Clinical Society) and EASL (European Association for the Study of the Liver), all the patients diagnosed with either of the three virus infection in hospital settings need to be tested for the other two [21, 22]. In our institute for surgical patients, we are testing for all the three virus simultaneously. After surgical problem is over we referred these patients for further management to hepatitis clinic/ ART centre. Any patient showing clinical symptoms or laboratory tests suggestive of acute or chronic hepatitis need to be tested for HBV and HCV according to national and international guidelines. Also any patient presenting with any condition indicative of HIV, patient should to be referred for HIV testing [23].

In the present study of 275 patients males (66.18%) have higher preoperative prevalence of these virus as compared to females (33.81%). In the study conducted by Mashud I, males (4%) have higher preoperative prevalence as compared to females (2%). It may be due to greater social mobility and independence among males than females in developing countries especially in the rural areas which makes males are more prone to contract the infection as compared to females. [24] However, in some other studies from developing countries females have higher rates of infection than males [25].

Due to higher prevalence of these viruses in the developing countries, preoperative testing may make the entire surgical team more vigilant to take more precautions during the surgery. Preoperative serological testing makes the patients aware of their seropositivity and also helps in early detection of the infection and the associated diseases which would otherwise have gone undetected, hence limiting the spread of virus in the community. Patients in the present study were encouraged to take precautions and also referred for further investigations hence limiting the spread of virus to other individuals. Occupational acquired viral infections are more in the developing countries as compared to the developed countries as health care workers are exposed to a population with higher prevalence of blood borne virus infections in the developing countries like Turkey [26].

There are not many studies to assess the prevalence of HBV, HCV and HIV in the surgical patients. Our study includes 275 patients to study the clinical profile and epidemiology of HIV, HBV and HCV infection. Weis *et al* conducted a study at John Hopkins and reported the prevalence of HCV (35%) and HBV (4%). Ratio of males was more as compared to females. They reported 2.3% males and 1.3% females in HBV while 7.44% males and 5.36% females in HCV [27].

The results corroborated with the study conducted by Merik *et al*. 28 Hepatitis B and C are transmitted mainly by parenteral route which includes contaminated blood transfusion or needle stick

injury. Other routes of transmission include sexual contact or vertical transmission from mother to child [29].

In the developing countries most of the deliveries are conducted in the unhygienic conditions by the traditional birth attendants making the females more prone to contract HBV and HCV infection. Many quacks and dental practitioners use the same instrument or syringe in more than one patient without proper sterilization making the patients vulnerable to contract the HBV and HCV infection. Three main factors are significant for the prevalence of the disease (1) intravenous drug abuse (2) blood transfusion (3) low socioeconomic status [30, 31, 32].

Prevalence of HIV, HBV and HCV is common and it is defined as proportion of a population with specific disease at a certain point of time. After taking different circumstances like local epidemiology into account, testing strategies may be guided to classify HCV, HBV and HIV into low, intermediate and high prevalence rates. Prevention and counselling are the mainstay responses to prevent Hepatitis to become an epidemic. Risks, sequel, modes of transmission should be known to both patient as well as health care workers. Surgical team including surgeon, theatre staff nurse and other health care workers are at higher risk of contracting these infections. However as this study is conducted in a single surgical ward its results cannot be generalized over the general population regarding the frequencies of HBV and HCV. The frequency of the viral infections is higher in our study as compared to those reported in the epidemiological studies. However it indicates the increased risk of HCV and suggests implementing measures to reduce the exposure to healthcare workers.

## Conclusion

As higher prevalence of HBsAg and anti HCV was found in preoperative patients, screening of every patient and counselling of the patients should be done. As prevention is better than cure, doctors and other healthcare workers should follow proper ethical practice and take adequate precautions and thereby protecting themselves and patients from contracting these viral infections.

In our study, Hepatitis B virus infection was more prevalent among the study group followed by Hepatitis C virus infection, Co-infections and HIV. Most affected age group was 21-50years, in both sexes. 07/70(10%) of affected age group was less than 20 years. Awareness campaign, vaccination of family members of seropositive patients may be a preventive measure. To increase the awareness among general population active participation of government and media is required. People should be told about safe sexual practices, use of blood and blood products from registered blood banks only and routes of transmission of viruses. Use of disposable medical consumables and proper disposal of bio-medical waste should be ensured in the medical practice. Post-Exposure prophylaxis as per recommendation will be preventive for surgeons, anaesthetists, assistants, nursing staff and all team in health care system.

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