

Prevalence and Importance of Hepatitis B & C Screening in Cases Undergoing Elective Eye Surgery

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Purpose: To determine the sero-prevalence of Hepatitis B & C viral infection in the patients undergoing elective eye surgery.

Material and Method: A total of 1418 subjects undergoing major and minor eye surgery were screened for Hepatitis B, & 1158 patient were screened for Hepatitis C. Screening was done by one step test device that is a rapid chromatography immunoassay for the qualitative detection of antibodies to hepatitis C virus whereas for Hepatitis B the qualitative detection of surface antigen of hepatitis B virus was performed.

Result: Out of 1418 subjects, 1.8% subjects were found to be Hepatitis B positive, out of these 61.5% were males and 38.4% were females. Out of 1158 subjects, 1.2% subjects were found to be Hepatitis C positive, out of these 50% were males and 50% were females.

Conclusion: Screening of blood borne viral infections has great importance in minimizing the transmission of the virus to health patients doctors and paramedical staff through sharp knives, needles and other surgical instruments. The alarming percentage of positive viral infection gives us an idea of the risks involved & how to adopt such practices which ensures the safety from onset of these infections.

Hepatitis B and C is a major disease affecting mankind and a serious global public Health problem. According to WHO studies, out of the 2 billion people who have been infected with the hepatitis B virus (HBV), more than 350 million have chronic (life long) infection. These chronically infected persons are at high risk of death from cirrhosis of the liver and liver cancer¹. In case of HCV infection WHO estimates that about 170 million people, 3% of the world's population are infected with HCV and are at risk of developing liver cirrhosis and or liver cancer. The prevalence of HCV infection in some countries of Africa, the eastern Mediterranean, south-east Asia and

the western pacific is high compared to countries in North America and Europe².

Pakistan is also facing a huge burden of these infections. A large number of symptomatic carriers are present in our country. The carrier rate of hepatitis HBsAg is quoted to be around 10%^{3,4} and seroprevalence of Anti HCV antibodies varies from 4% to 7% in different segment of Pakistani population^{5,6}. In a community-based study in Hafizabad, hepatitis B surface antigen (HBs Ag) was positive in 4.3% of residents and anti-hepatitis C virus antibody was positive in 6.5% of residents⁷. In northern Pakistan

3.3% of healthy blood donors were HBsAg positive, 4.0% were anti-hepatitis C virus positive and 0.007% were anti-human immunodeficiency virus positive⁸. Majority of the population in Pakistan have several misconceptions regarding HCV and HBV infection. One main misconception is that hepatitis C is a vaccine preventable disease. The Eastern Mediterranean health journal quotes that mostly people are not aware that HCV remain asymptomatic for several years⁹. There is lack of understanding that hepatitis B infection is major public health problem in Pakistan, and the transmission risk rate is continuously increasing due to lack of awareness and poverty. Hepatitis B & C is highly endemic in Pakistan & its incidence is increasing since the last decade^{3,10}. In this situation the most effective preventive measure against these two blood-borne pathogens is building awareness and adopting preventive measures to minimize transmission.

This study was carried out to determine the incidence of Hepatitis B and C in our patients undergoing elective eye surgery.

PATIENTS AND METHODS

This analytical study was carried out at the Microbiological and biotech research and diagnostic laboratory of Akhtar Eye Hospital, Karachi, in collaboration with the Surgical unit of Akhtar Eye Hospital, Karachi. To reduce the risk of transmission of blood-borne pathogens, surgeons decided to question patients regarding HBV, HCV and HIV infection. For prevention and safety, it has become mandatory for all patients undergoing minor or major surgery to undergo blood screening for HBV and HCV virus at Akhtar Eye Hospital. Although it was thought to be an additional expense, patients soon realized that its benefits outweigh the cost. Our test proved to be reliable. 'HBsAg' and 'anti-HCV Ab' were screened by rapid chromatography immunoassay. Both of these tests are not as sensitive as ELISA, but they provide rapid and efficient qualitative analysis which is useful to determine the presence of infections.

The test device is a lateral flow immunoassay used for the qualitative detection of HBsAg in serum or plasma. The membrane is pre-coated with anti-HBsAg antibodies on the test line region of the device. During testing, the serum or plasma specimen reacts with the particle coated with anti-HBsAg antibody. The mixture migrates upwards on the membrane chromatographically by capillary action to react with anti-HBsAg antibodies on the membrane and

generates a color line in the test region indicating positive results, while its absence indicates negative result.

In case of HCV a one step test device is used. A membrane is coated with recombinant HCV antigen on the test line region of the device. During testing, serum or plasma specimen reacts with the protein A coated particles. The mixture migrates upward on the membrane chromatographically by capillary action to react with recombinant HCV antigen on the membrane. This reaction generates a colored line, indicating a positive result, while its absence indicates a negative result.

In both devices, a colored line will always appear at the control line region indicating that proper volume of specimen has been added and membrane wicking has occurred.

RESULTS

During study period, out of 1418 patients (in which 740 were male and 678 were female patients), 26 (1.8%) patients were found to be HBV positive. In these 26 patients 16 (61.5%) were males & 10 (38.4%) were females (Table 1).

In case of HCV screening 1158 patient was screened (in which 611 were male and 547 were female patients). After screening 14 (1.2%) patients were found to be HCV positive out of these 14 patients 7 (50%) were male and 7 (50%) were females (Table 1).

DISCUSSION

The alarming situation of both HBV and HCV infection require that preoperative screening is necessary to avoid the transmission of blood-borne pathogens. This early detection can help in better management of patients and reduction in patient to Health care workers (HCW) transmission, of HCV and HBV infection in surgical units. Patients should be encouraged to participate in routine and voluntary testing for blood-borne pathogens. In case of corneal transplantation, the eye bank association of America has recommended screening of all potential corneal donors for HIV and as well as HBV (Memorandum Dated Nov.7, 1986)¹¹. Wilson SE et al quoted that 'some problems in eye for example corneal ulceration is directly associated due to viremia like Mooren-type Hepatitis C'¹². In these cases transmission of virus during surgery are likely to be more possible than other cases.

Implementation of criteria to manage the risk of transmission should be applied on cases that show symptoms of jaundice, but majority of patients with chronic HCV and HBV are undiagnosed and asymptomatic. An American based studies shows that

75% of acute HCV infected cases have no symptoms or only mild, non specific complaints¹³. This further strengthens the argument that screening of blood for HBV and HCV is indispensable.

Table 1:

Month	HBV					HCV				
	Male		Female		Positive n (%)	Male		Female		Positive n (%)
	No	Positive n (%)	No	Positive n (%)		No	Positive n (%)	No	Positive n (%)	
January	49	1 (2.04)	43	0 (0.00)	1 (1.08)	33	0 (0.00)	30	0 (0.00)	0 (0.00)
February	52	1 (1.92)	52	1 (1.92)	2 (1.92)	30	0 (0.00)	30	1 (0.33)	1 (1.66)
March	85	2 (2.35)	75	1 (1.33)	3 (1.87)	58	1 (1.72)	48	0 (0.00)	1 (0.94)
April	76	3 (3.94)	56	0 (0.00)	3 (2.27)	52	1 (1.92)	36	0 (0.00)	1 (1.13)
May	57	1 (1.75)	62	2 (3.22)	3 (2.52)	38	0 (0.00)	43	0 (0.00)	1 (0.00)
June	48	2 (4.16)	44	0 (0.00)	2 (2.17)	41	0 (0.00)	33	0 (0.00)	0 (0.00)
July	46	0 (0.00)	56	0 (0.00)	0 (0.00)	40	1 (2.50)	41	0 (0.00)	1 (1.20)
August	57	2 (3.50)	44	0 (0.00)	2 (1.98)	51	0 (0.00)	40	1 (0.00)	0 (0.00)
September	56	0 (0.00)	51	1 (1.96)	1 (0.93)	55	0 (0.00)	51	1 (1.96)	1 (0.90)
October	34	1 (2.94)	20	0 (0.00)	1 (1.85)	33	0 (0.00)	20	0 (0.00)	0 (0.00)
November	57	0 (0.00)	55	0 (0.00)	0 (0.00)	57	2 (3.50)	55	3 (4.46)	5 (4.46)
December	72	0 (0.00)	78	3 (3.84)	3 (2.00)	72	2 (2.77)	78	1 (2.00)	3 (2.00)
January,06	51	3 (5.88)	42	2 (4.76)	5 (5.37)	51	0(0.00)	42	0 (0.00)	0 (0.00)
Total	740	16 (2.16)	678	10 (1.47)	26 (1.83)	611	7(1.14)	547	7 (1.27)	14 (1.20)

The most possible reason for the asymptomatic situation and sometime undiagnosed HCV infection is mutability of genome of HCV which is related to high propensity (80%) of inducing chronic infection². Serum antibodies to HCV become detectable 4 to 10 weeks after exposure. Percutaneous injuries may occur at a rate approximating 1 to 3 per 100 operative procedure performed, the frequency varying by the type of surgery, length, and emergent nature¹³.

In 2000 the international journal of STD aids estimated that contaminated injection caused 21 million (40%) HBV infection, two million (32%) HCV infection and 260'000(5%) HIV infection through out the world¹⁴.

Transmission of HBV and HCV is a well-documented occupational hazard for health care workers (HCWs). In health care settings, transmission of these viruses have been reported from patient to HCW, from HCW to patient, and from patient to patient. Although these viruses are blood-borne and share a common route of transmission, the epidemiology of transmission differs based on the virus involved and circumstances of the exposure. HBV is more efficiently transmitted than HCV or HIV, because of the high volume of Hepatitis B viruses in the blood of infected people compared to the lower viral load in people infected with HIV or Hepatitis C¹⁵. The international journal of STD Aids estimate that HCV while less infectious than HBV, is six times more likely than HIV to be transmitted after a percutaneous

exposure¹⁴. The transmission risk of HIV after exposure is 0.3%, HCV in 3% and HBV is transmitted in 30% of exposure¹⁶.

Our retrospective review of HBV and HCV in elective eye surgery is very alarming. Fig. 1 shows that monthly prevalence average rate of HBV is 0.14% and HCV is 0.09%.

The results shows that rate of HBV infection in patients is high as compare to HCV. This is comparable with the other study carried out in Karachi^{18,17,24} and in Lahore²⁵. But our study is contradictory with the studies carried out in NWFP and Punjab, where studies shows high prevalence of HCV as compared to HBV^{20,27,22,26,19,21}.

The results shows that sero prevalence of HBV & HCV is high in males as compared to female patients. Fig. 2. This is similar in comparison to the other studies carried out in Karachi^{17,18} and other parts of the country¹⁹⁻²¹ but this is contradictory to the results from the study carried out in NWFP region of Pakistan^{22,23}.

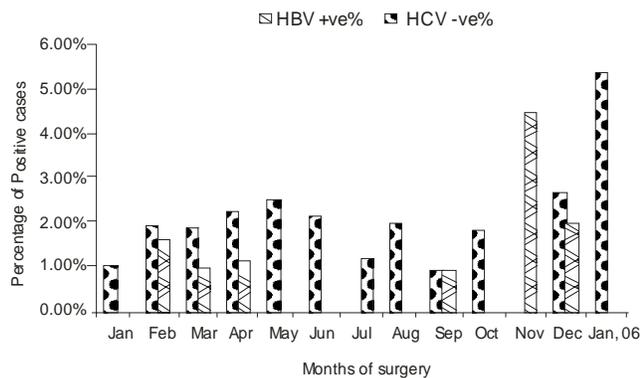


Fig 1: Prevalence (%) of Hepatitis B and C according to months.

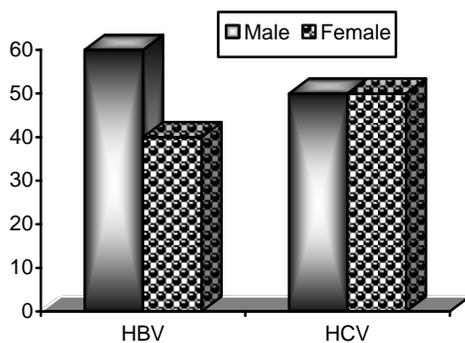


Fig. 2: Prevalence (%) of HBV and HCV in male and female undergoing elective eye surgery during the year January 2005 to January 2006.

Our results are in concordance with the study carried out in different parts of the world such as India, where prevalence of HBV infection is 4.7% and HCV prevalence is 1.9%²⁸. Similarly in Iran HBV infection is 1.1% and HCV infection is 0.6%²⁹. In Istanbul, Turkey HBV infection rate is 6.6% and HCV infection is 2.4%³⁰. In adult German population HBV infection is 0.6%³¹ and HCV infection is 0.6%³². In Athens HBV infection rate is high as compare to HCV infection³³. In Brazilian Army HBV infection rate is 2.6% and HCV infection rate is 1.5%³⁴. In Kuwait HBV infection is 1.1% and HCV infection is 0.8%³⁵. International Journal of Infectious Diseases quotes that prevalence of Hepatitis B among Afghan refugees living in Balochistan, Pakistan is highly endemic³⁶.

The prevalence of HBV infection in male and female patients according to age is shown in (Fig. 3), in both genders a high prevalence rate was observed in the 41-60 years age group.

Similarly prevalence of HCV infection in male and female patients according to age is shown in (Fig. 4), shows high prevalence rate of HCV infection in the 41-60 years age group. While 1-20 years age group shows no infection in both genders.

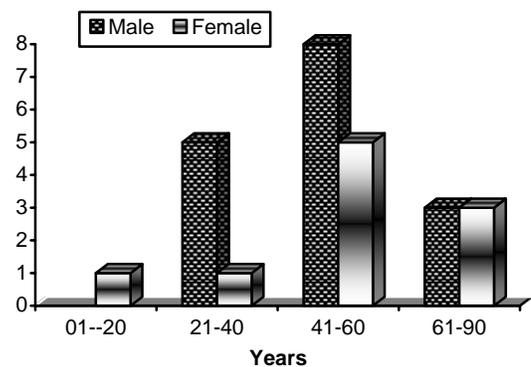


Fig. 3: Prevalence of HBV in male and female undergoing elective eye surgery during the year 2005 and January 2006, according to age.

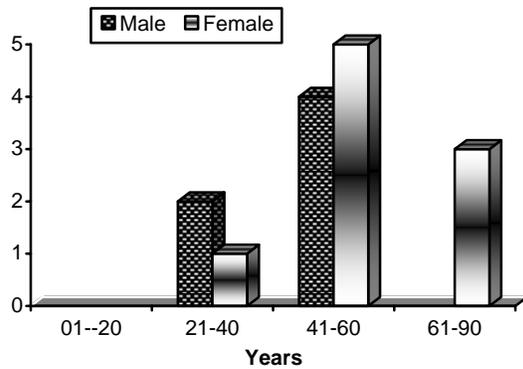


Fig -4: Prevalence of HCV in male and female undergoing elective eye surgery during the year 2005 and January 2006, according to age.

In developing countries like Pakistan the treatment for chronic hepatitis C and B infection is very costly for the common man. Awareness of the facts risks & dangers involved in spread & onset of these infections should cultivate concern and promote behavior required to prevent the spread of these infections.

CONCLUSION

Strict preventive measures and an intensive precautionary environment, promoting mandatory screening of preoperative patient for HBV and HCV viruses is essential to prevent the spread. It is important to educate the patients and to encourage them for screening or other medical treatments to ensure minimal risk of transmission, spread and onset of these diseases.

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