



INCIDENCE OF HEPATITIS B SURFACE ANTIGEN SEROCONVERSION IN PATIENTS UNDERGOING CARDIAC SURGERY AT A TERTIARY CARE CARDIAC INSTITUTE

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ABSTRACT

OBJECTIVE: To determine the incidence of Hepatitis B surface antigen (HBs-Ag) in patients undergoing cardiac

METHODS: One hundred consecutive patients admitted for cardiac surgery at Cardiac Surgery department, Punjab Institute of Cardiology, Lahore. All patients testing negative for HBs-Ag preoperatively were selected. They were called 04-06 months after surgery to re-assess the HBs-Ag status.

RESULTS: Out of the 100 followed, 3(3%) patients tested positive for HBs-Ag, 04-06 months after cardiac surgery procedure.

CONCLUSION: Cardiac surgery is a safe procedure as far as risk of HBs-Ag seroconversion is concerned; 3% of the patients got HBs-Ag seroconversion. More stringent diagnostic and precautionary measures for further reduction in spread of Hepatitis B virus infection are mandated.

KEYWORDS: Hepatitis B virus infection, HBs-Ag seroconversion, cardiac surgery

INTRODUCTION

Two billion people worldwide have been infected with Hepatitis B virus (HBV) and about 600 000 people die every year due to the consequences of hepatitis B infection, and 400 million among them are suffering from chronic HBV infection.¹ Pakistan is highly endemic for HBV infection; about nine million people are infected with HBV and its infection rate is on a steady rise.² The reason may be the lack of proper health facilities, poor economic status and less public awareness about the transmission of major communicable diseases including HBV, HCV and HIV.

Hepatitis B is a potentially life-threatening liver infection caused by hepatitis B virus. It can cause chronic liver disease and put people at high risk of death from cirrhosis of the liver. The incubation period of hepatitis B is 4 – 20 weeks.³ The virus is transmitted by exposure to infectious blood or body fluids such as semen and vaginal fluids, while viral DNA has been detected in the saliva, tears, and urine of chronic carriers.

In most cases, these transmissions result from noncompliance with recommended infection control practices designed to prevent cross-contamination of medical equipments and devices. A number of blood tests are available to diagnose

(J Cardiovasc Dis 2013;11(2):37 -39)

and monitor people with hepatitis B. They can be used to distinguish acute and chronic infections.³ Laboratory diagnosis of hepatitis B infection centres on the detection of the hepatitis B surface antigen (HBs-Ag).

Cardiac surgery is a delicate and, at times, lifesaving procedure and many patients undergoing cardiac surgery require blood transfusions. Any carelessness may render the patient susceptible to one or more of the blood born infections. Hepatitis B virus infection is the one which can be acquired if proper screening of blood is not carried out. The aim of this study was to detect HBs-Ag seroconversion using an enzyme-linked immunosorbent assay (ELISA) technique in such patients four to six months after cardiac surgery at Punjab Institute of Cardiology Lahore to check the quality control of blood screening and sterilization of operation theatre equipment.

MATERIAL & METHODS:

This observational study included 100 consecutive patients undergoing cardiac surgery from September 2012 to December 2012 at Department of Surgery, Punjab Institute of Cardiology Lahore. Both male and female patients from all age groups who were admitted for any kind of cardiac surgery requiring cardiopulmonary bypass were enrolled. Patients having any evidence of HBV infection (laboratory data or history), evidence of body piercing, tattoo mark, major / minor surgery or any recent blood transfusion were excluded. Intravenous drug users and patients who had received hepatitis B

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vaccination were also excluded.

The data was collected through a questionnaire that included demographic information and information about the disease risk factors. The patients in the pre-operative ward were sampled for serum just before going to Operation Theatre for cardiac surgery. Clinical information was obtained from all patients by reviewing medical record. Patients with incomplete data were excluded. Serum was tested for HBs-Ag in the laboratory of Punjab Institute of Cardiology (an ISO certified laboratory). All patients were called 4-6 months later for follow up sample collection. They were again questioned about body piercing or any blood transfusion during post operative period and excluded if they affirmed any of these. Serum HBs-Ag was checked by ELISA technique (third generation) according to manufacturer's instructions.

ELISA:

This is a double antibody "sandwiched" immunoassay, which employs specific anti-HBs-Ag antibody; monoclonal antibody to HBs-Ag immobilized at the bottom of the micro-titre wells, and polyclonal antibodies to HBs-Ag coupled with horseradish peroxidase as the conjugate solution. During the assay existing HBs-Ag in the specimen reacts with these antibodies to form an "antibody-HBs-Ag-antibody-HRP" immuno-complex. After the unbound material is washed off during the assay procedure, substrate is applied to indicate the result. The appearance of blue colour in micro-titre wells indicates HBs-Ag reactive result. The absence of colour indicates non-reactive results in the specimen.

STATISTICAL ANALYSIS:

Data was analysed using SPSS version 16.0. All the qualitative variables were presented as frequencies and percentages.

Results: Out of the 100 patients in study group, 3(3%) became HBs-Ag positive at 4- 6 months post cardiac surgery.

DISCUSSION :

Hepatitis B virus (HBV) infection is a major public health problem and a cause of mortality attributable to infectious diseases worldwide. Approximately 2 billion people, one third of the world's population have serologic evidence of past or present HBV infection and 350 million people are chronically infected.

This study was conducted to evaluate the incidence of HBV in post-operative cardiac patients at Punjab Institute of Cardiology Lahore. After cardiac

surgery 3% of the patients were found to be positive for HBs-Ag at 4- 6 months of follow up. The possible factors important in the transmission of HBV during cardiac surgery include the low quality of sterilization, disinfection procedures and less than ideal way of screening of blood which is transfused to the patients during cardiac surgery.

A study of inflammatory bowel disease (IBD) patients revealed that these patients had no significant risk for HBV infection transmission when they needed surgical treatment for complications of IBD.⁵ A study was conducted at Gastroenterology department Military hospital, Rawalpindi, to assess the risk of upper gastrointestinal endoscopic procedure for transmitting Hepatitis B and C virus infection and 2% incidence of HBs-Ag seroconversion was reported; out of these two patients, 1 had an unscreened blood transfusion after endoscopy.⁶ A study in United States about 2 decades ago showed that infection control practices while performing gastrointestinal endoscopy were not up to the required standards.⁷ Different studies of patients undergoing surgery have shown 7.397% \pm 2.012% HBV prevalence rates.^{4,8-10}

The likely risk factor in surgical patients includes reuse of contaminated syringes, contaminated surgical instruments and blood products.⁴ A study from Nawabshah, Sindh has reported lack of knowledge and poor attitude towards screening for HBV and HCV infection ¹¹.

The possible source of infection during cardiac surgery may be a HBV positive surgeon, a heart lung machine, blood transfusion and steel sutures for the closure of sternum. Health care workers in Pakistan are not routinely tested for blood borne viruses. Patients do need blood transfusion during cardiac surgery. Routine screening in blood banks in Pakistan is based on ICT kit method but ICT kit method is not an absolutely reliable screening method because sometimes it gives false positive as well as false negative results. Our study showed 3% incidence of HBV infection in post-operative cardiac patients. Effort should be made to further minimize the risk of transmission of such infections as much as possible. To reduce the incidence of HBV infection, we suggest screening method in blood banks should be based on new ELISA technology, sterilization processes of surgical instruments and operation theatres should be improved and health care workers should be screened for HBV infection at regular intervals.



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