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A Study on Pre-Surgical Screening of Hepatitis B Surface Antigen in a Tertiary Care Hospital in South India

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A B S T R A C T

In India, HBsAg prevalence among the general population ranges from 2 to 8%, which places India in an intermediate HBV endemicity zone. HBV is transmitted through several routes. The route that is important in health care setting is, exposure of health care personnel to HBV-positive blood or other body fluids while providing investigative & therapeutic care to HBV infected patients. It remains a significant risk in developing countries reflecting the higher prevalence of CHB, limited access to HBV vaccination and PEP and a lack of adherence to standard infection control precautions. To know the seroprevalence of HBV among pre-surgical patients. The present study was conducted between January 2015 and December 2015. Presurgical cases of all age groups, were included in the study. Serum was collected and HBsAg detection was done by immunochromatographic method. A total of 4977 cases (Males-43.46%; Females-56.54%) were screened for HBsAg with age ranging from 1 yr to 92 yrs years. More number of cases were from ophthalmology (1825/4977) followed by general surgery (1241/4977) and gynecology (1202/2814). In males 27.60% of cases were from >60yrs age group with 3.68% seropositivity. Whereas in females highest number of cases were from 21-30yrs age group (21.53%) with 2.97% of seropositivity. The overall seropositivity for HBsAg was 2.45%. But seropositivity was highest in >60yrs (3.03%) followed by in 31- 40 yrs age group (2.97%). The seropositivity among males was more (2.96%) when compared to females (2.06%). It concludeds 1. Seropositivity of HBsAg in pre surgical cases was 2.45%, 2. Seropositivity was more in males (2.96%) than in females (2.06%), 3. Seropositivity was highest in >60yrs (3.03%) followed by 31-40 yrs age group (2.97%), 4. With 2.45% of seroprevalence among pre-surgical cases, routine pre-surgical screening is necessary to prevent occupational exposure to HCPs.

Introduction

Infection with the hepatitis B virus (HBV) occurs worldwide and constitutes a major public health problem (Andreas *et al*., 2014; Sharavanan *et al*., 2014; Utoo, 2013). In India, HBsAg prevalence among the general population ranges from 2 to 8%, which places India in an intermediate HBV endemicity zone, and India with 50 million cases is also the second largest global pool of chronic HBV infections (Varsha *et al*., 2009). HBV infection causes acute hepatitis, chronic hepatitis, fulminate hepatitis with

enormous liver necrosis, and the backdrop for Hepatitis D infection (Musa Nima Mezher, 2016) and carrier state in infants, children and immunodeficient persons.

HBV is transmitted through several routes: drug use-related injections; exposure to HBV-positive blood or other body fluids; sexual contact (heterosexual or homosexual); from mother to infant (vertically); and between children in a household (horizontally) (Özgür Günal *et al*., 2011). The route that is important in health care setting is, exposure of health care perssonel to HBV-positive blood or other body fluids while providing investigative & therapeutic care to HBV infected patients. Moreover HBV can remain stable and infectious on environmental surfaces for at least 7 days, transmission may occur indirectly via contaminated surfaces and other objects (Colin *et al*., 2006; Raminder Sandhu *et al*., 2014).

Transmission of HBV in the health care setting has become an increasingly rare event in developed nations. However, it remains a significant risk in developing countries reflecting the higher prevalence of CHB, limited access to HBV vaccination and PEP and a lack of adherence to standard infection control precautions. Health care workers are at an increased risk to develop infection through needle stick injury or direct transfer of the virus through broken skin (Nafees *et al*., 2008). Contaminated needles and equipments can transmit infection even after months being soiled by virus (Zubia Masood *et al*., 2005).

Though universal health care guidelines are being followed while performing invasive procedures like surgeries to patients, it would be possible to take extra precautions if the status of HBV, HIV, HCV, HDV etc of patients those are transmitted by needle pricks or contact with blood and body fluids. HBV is highly infectious as even minute amounts, as little as 0.00001ml of blood or other material can be infectious (Ananthanarayan *et al*., 2013). Infectivity of HBV is eight times greater than HIV. So we made an attempt to screen the individuals who are posted for surgery for HBsAg marker to know their HBV status and to prevent occupational exposure to HCPs.

The main of this study to know the seroprevalence of HBV among pre surgical patients.

Inclusion criteria: Persons who are posted for surgery with no medical problems.

Exclusion criteria: Persons with present or past history of jaundice.

Materials and Methods

The present study was conducted between January 2015 and December 2015. Patients of all age groups, who were posted for surgeries by general surgery, orthopedics, ENT, ophthalmology and dental departments were included in the study. 2ml of venous blood was collected from each individual under aseptic conditions. After separation of serum from blood, HBsAg detection was done by immunochromatographic method in Microbiology clinical laboratory, RIMS, Kadapa. Standard operative test procedure was followed all the time.

Statistical analysis: Data was entered in Microsoft Excel for analysis.

Results and Discussion

A total of 4977 cases were screened for HBsAg with age ranging from to years. The mean age among pre surgical cases was 44.76±17.57 yrs (47.91±17.99 yrs in males and 42.29 ±16.88yrs in females). More

number of cases were from ophthalmology (1825/4977) followed by general surgery (1241/4977) and gynecology (1202/2814). Among the female cases, majority were from gynecology (1202/2814) as shown in table 1.

Among total cases males comprised 43.46% and females, 56.54% of cases. In males 27.60% of cases were from >60yrs age group, which showed 3.68% HBsAg seropositivity. Whereas in females highest number of cases were from 21-30yrs age group (21.53%) and showed 2.97% of HBsAg seropositivity. The overall seropositivity for HBsAg was 2.45%. But seropositivity was highest in >60yrs (3.03%) followed by in 31- 40 yrs age group (2.97%) as shown in table 2.

The seropositivity among males was more (2.96%) when compared to females (2.06%). Though the screened cases for HBsAg were more from females (56.54%) than males (43.46%), but coming to seropositivity reverse was observed at 52.46% seropositivity from males and 47.54% from females among total seropositive cases as shown in table 3.

The mean age and median age for seropositive cases were 47.77 ± 15.07yrs and 50yrs respectively as shown in table 4. Hepatitis is endemic throughout the world, especially in tropical and developing countries. HBV disease comes under biological factors of occupational disease according to WHO. Healthcare professionals (HCPs) who are likely to come into contact with blood and body fluids of infected persons are at greater risk of getting infection (WHO, 2001). Throughout the world, millions of HCPs work in health institutions and it is estimated that 600,000 to 800,000 cut and puncture injuries occur among them per year, of which approximately 50% are not registered (Luiz *et al*., 2005).

Healthcare workers operate in an environment that is considered to be one of the most hazardous occupational settings. Percutaneous exposure to HBV containing transmission risk is about 2% for HBeAg-negative and about 30% for HBeAg-positive blood. Screening for HIV, HBV and HCV as a part of routine pre-operative investigations is a common practice in many centres and done to prevent transmission from patient to healthcare workers and to take adequate precautions in the form of enhanced personal protective equipments (PPE) during surgical procedures (Ahmed *et al*., 2013). Efforts are to be made, for proper training and education of medical staff concerning the hazards, and the precautions necessary to avoid the spread of infection of HBV (Ahmed *et al*., 2013).

The seropositivity among males in present study was 2.96% which is almost comparable to a study by Jahangir *et al.*, (2.85%) whereas it is more when compared to Nafees *et al.*, study (1.69%) and less to Gunal *et al.*, study (4.9%). The high seropositivity (4.19%) was observed among males in 41- 50 yrs age group in our study. In the present study 2.06% of females were seropositive for HBsAg which is near to a study by Gunal *et al.*, (2.41%) but it is more to a study by Jahangir *et al*., (1.4%)

The seropositivity of HBsAg was high (3.03%) in > 60 yrs and low (0.55%) in 11-20 yrs age group in our study and also in a study by Gunal *et al.*, (5.2% in > 60 yrs and 0.4% in <29 yrs).

The seropositivity of HBsAg was more in males (2.96%) than in females (2.06%) in present study and several studies also showed the same results (Gunal *et al*,- 4.9% & 2.41%, Nafees *et al.*, – 1.69% & 0.95% & Jahangir *et al.*, - 2.8% & 1.4%).

Table.1 Showing Age, Gender and Department vise distribution of cases

Age group in years	Gynecology	General surgery		Orthopedics		ENT		Ophthalmology		Dental		Total	
	Female	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male
<10	-	7	35	3	4	8	6	1	2	-	-	19	47
11-20	118	33	88	6	4	51	39	9	6	4	5	221	142
21-30	392	81	175	27	22	70	55	25	11	11	12	606	275
31-40	356	81	176	25	35	36	33	48	36	4	9	550	289
41-50	240	68	183	33	35	30	13	191	125	1	2	563	358
51-60	59	41	120	27	28	7	08	359	297	3	2	496	455
>60	37	28	125	14	20	4	10	273	438	3	4	359	597
	1202	339	902	135	148	206	164	906	915	26	34	2814	2163
Total	1202	1241		280		370		1825		60		4977	

Table.2 Age and Gender vise distribution of cases and HBsAg seropositives

Age group in years	Males		Females		Total	
	No. of cases	No. of positives	No. of cases	No. of positives	No. of Cases	No. of positives
<10	47	-	19	-	66	-
11-20	142	-	221	2(0.90%)	363	2(0.55%)
21-30	275	3(1.09)%	606	18(2.97%)	881	21(2.38%)
31-40	289	12(4.15%)	550	13(2.36%)	839	25(2.97%)
41-50	358	15(4.19%)	563	10(1.77%)	921	25(2.71%)
51-60	455	12(2.64%)	496	8(1.61%)	951	20(2.10%)
>60	597	22(3.68%)	359	7(1.95%)	956	29(3.03%)
Total	2163(43.46%)	64(2.96%)	2814(56.54%)	58(2.06%)	4977	122(2.45%)

Table.3 Gender vise distribution of cases and HBsAg seropositives

	Males	Females	Total
No. of cases	2163 (43.46%)	2814 (56.54%)	4977
No. of seropositives	64 (52.46%)	58(47.54%)	122
% of seropositivity	2.96%	2.06%	2.45%

Table.4 Mean, Median & Standard deviation of cases & Seropositives

	Males		Females		Total	
	All cases	seropositives	All cases	seropositives	All cases	seropositives
Mean (in yrs)	47.91	53.18	42.29	41.79	44.76	47.77
Median (in yrs)	50	55	40	40	45	50
Standard deviation	17.99	13.20	16.88	14.83	17.57	15.07

But in a study by Shams *et al.,* the seropositivity was more in females (9%) than in males (3%). Among all seropositives 52.46% and 47.54% of cases were from males and females respectively in our study whereas it was 61.5% & 38.4% in a study by Khan *et al.,* & 67.44%, 32.55% in a study by Nafees *et al.,* and 75%, 25% in a study by Naeem *et al.,* for males and females respectively. The mean age of all cases in present study was 44.76±17.57 yrs and it was 39±14 yrs in a study by Shams *et al*., (2014).

Seropositivity of HBsAg was 2.45% among all pre surgical cases and it was 3.4% in Gunal *et al.,* study, 2.02% in Jahangir *et al.,* study, 1.8% in Khan *et al* study and 2.1% in Naeem *et al.,* study. Among all the pre surgical cases, 36.59% of cases were from ophthalmology in which the seropositivity was 2.74% whereas it was 1.77% in a previous study by Venkatiah *et al.,* from ophthalmology in our hospital.

Weber *et al.,* opined that from an economic point of view the low detection rate (0.4%) in their study is a strong argument infavour of omitting routine preoperative screening and suggested screening those patients with risk factors may be as safe as screening every patient and that would reduce costs. But as the prevalence rate in our study was at higher rate (2.45%) we recommend screening of all individuals before surgery, for the sake of individual by counseling them if they are HBsAg positive and to reduce occupational hazard to HCPs. By following strict preventive measures, providing an intensive precautionary environment and promoting mandatory screening of preoperative patient for infections that would spread through blood and body fluids like HBV, HCV, HDV and HIV viruses, health care system could prevent the spread of these infections to HCPs.

In conclusion, Seropositivity of HBsAg in pre surgical cases was 2.45%. Seropositivity was more in males (2.96%) than in females (2.06%). Seropositivity was highest in >60yrs (3.03%) followed by 31- 40 yrs age group (2.97%). With 2.45% of seroprevalence among pre surgical cases, routine pre surgical screening is essential to prevent occupational exposure to health care personnel.

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