PREVALENCE OF HEPATITIS B AND HEPATITIS C AMONG CARDIAC SURGERY PATIENTS IN RELATION TO POST OPERATIVE RECOVERY

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Abstract

Background: Hepatitis B and C are becoming a common occurrence in patients who are admitted for major surgical procedures and associated with significant morbidity and mortality. We evaluated the prevalence of hepatitis B and C admitted for different procedures in the cardiac surgery ward in relation to their post-operative recovery.

Patients and Methods: One hundred and twenty six patients admitted during July to December 2007, 23.8% (n=30) were found to be seropositive. Data of 23 patients were available 65.2% (n=15) were male. The mean age of the subjects was 41 years, 56.5% (n=13) were seropositive for hepatitis B whereas 43.5% (n=10) for hepatitis C.,26%(n=6) had deranged preoperative LFT's. Post operatively 6 patients (26.1%) developed abnormal LFTs. Poor left ventricular function was present in 2(8.7%) patients, hypertension was present in 17.4%(n=4), 1 patient(4.3%) was Diabetic and obese, 2 patients(8.6%) have creatinine level more then 2 mg/dl.

Results: The overall mortality was only 8.7% (n=2). Altogether 60.9%(n=14) patients developed morbidities that comprised of: arrhythmias 13%(n=3), re-exploration 30.4%(n=7), wound dehiscence 4.3%(n=1) and in 10 cases(43.5%), morbidities other than these were seen that included: cardiac tamponade, disorientation, cough with hemetemesis, infective endocarditis, renal failure, raised BP, delayed chest wound healing with persistent fever, bone pain and failure of saphenous graft.

The mean time for bypass; 87 min and time for x-clamp; 58 min, 52% (n=12) patients needed inotropic support postoperatively with mean duration of 15 hrs, mean extubation time was 9.3 hrs whereas mean time for removal of drain was 30.28 hrs. Bleeding recorded at 6hrs was 515 ml, at 24hrs; 903 ml and 422 ml on 2nd POD. The mean duration for ICU stay came out to be 3 days and ward stay was 4 days.

Conclusions:

- **Approximately ¼ of the patients admitted during the 6 months period, came out to be seropositive for hepatitis B and hepatitis C.**
- **The number of affected males was greater than females.**
- **Incidence of hepatitis B was greater than hepatitis C.**
- **Practice of getting shave or hair cut from street barbers and needle prick injuries were popular source of infections particularly for hepatitis B virus, whereas blood transfusion and previous surgery got more response among hepatitis C seropositives.**
- **Morbidity and mortality were high among these patients**
- **Awareness regarding the above among general population and doctors should be created via public mass education.**

INTRODUCTION

Hepatitis B and C are two of major diseases of mankind and are serious global public health problems. Hepatitis B is preventable with safe and effective vaccines that have been available since 1982 however no vaccines protects against hepatitis C or helps to prevent it.

The modes of transmission for hepatitis B are: unprotected sexual contact, blood transfusions, re-use

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of contaminated needles and syringes and vertical transmission (infrequent in HCV) from mother to child, between family members within household possibly by contact of non-intact skin or mucous membranes with secretions or saliva containing HBV, shaving from barbers (esp. in our setting) and accidental occupational exposures. Among 30% cases, no identifiable risk factor could be found.[1-4]

Liver cirrhosis and Hepatocellular carcinoma can ensue from hepatitis B and C.[10]

The prevalence of chronic liver disease is increasing globally because of hepatitis B (HBV) and hepatitis C (HCV). General anesthesia and surgery may lead to complications in a significant proportion of patients with well-compensated or occult cirrhosis, and these complications may result in considerable morbidity and mortality. The reported mortality rates in patients with cirrhosis undergoing various surgical procedures range from 8.3% to 25%, in comparison to 1.1% in non-cirrhotic patients.[2-3]

It is therefore, important to assess the risk before operation.

The morbidity and mortality risks are highest in patients undergoing cardiac and open abdominal surgeries5. Despite an increased cardiac output, perfusion may be impaired due to shunting of blood, and in addition, anesthetic agents may also reduce hepatic blood flow and decrease oxygen uptake by the liver and splanchnic organs. Hypotension, hypoxemia, hemorrhage and use of vasoactive drugs may further reduce hepatic oxygenation. Hepatic blood flow and liver function may be further compromised by catecholamine release and other neurohormonal responses.[5]

Patients with cirrhosis(HBV, HCV) showed higher blood transfusion requirements, longer length of hospital stay, and a higher number of complications than controls. The mortality rate was 16.3% in cirrhotics and 3.5% in controls. The outcomes of patients with cirrhosis who undergo surgery coyuld be improved by optimizing premorbid conditions.[5, 6]

The purpose of the present study was to examine the prevalence of hepatitis B and C seropositive patients with both documented and non documented cirrhosis(without discrimination) , in relationship of their recovery. We also tried to evaluate the possible cause of the disease among the patients. The study was conducted on patients admitted for elective cardiac surgery within a 6 month period.

PATIENTS AND METHODS

We prospectively investigated 126 patients admitted to our ward during the 6-month period from July 2007 to December 2007 for elective cardiac surgical procedures. Sixty five had undergone CABG, 34; MVR, 6;AVR, 2;DVR, 10;PDA, 5;ASD, 2;MCOM, 1;VSD and 1 CBC. Thirty patients during this period were found to be seropositive for Hepatitis B and Hepatitis C through the preoperative biochemical analysis of their blood samples. Data was available in 23 patients , 13 seropositive for hepatitis B while 10 were HCV seropositives. The mean age of the patients was 41 yrs, 15 were male. Preoperative and post operative venous blood samples were send for bio-chemical analysis for hepatobiliary functions. Surgical factors investigated from operation details were: Pocedure performed, use of arterial graft in case of CABG, X-clamp time, Bypass time and number of vessels or valves replaced.

Post-operatively patient was followed for requirement of inototropic supportalong with its duration, extubation and drain removal time, bleeding recorded after 6hrs, 24 hrs and on 2nd POD. The number of days patient remained in ICU and in the ward were also recorded. Development of arrhythmias, need for re-exploration, occurrence of wound dehiscence along with other non specific but significant complications during hospital stay post-operatively and within 1 week of discharge were registered.

In an attempt to identify the possible sources of infection, patients were questioned regarding history of blood transfusion, needle prick injuries, previous surgical history, hair cutting or shaving from street barbers and other non-specific but significant sources.

STATISTICAL ANALYSIS

Data are expressed as mean ± standard deviation and by frequency distribution. Simple comparison of

mortality and morbidity was made using the frequency distribution, all the data was interpreted using SPSS 12.0 software.

RESULTS

The pie chart in the figure 1, shows the procedures performed on the seropositive patients with highest proportion of CABG and MVR.

Table 1 shows the demographic characteristics of seropositive patients along with most prevalent blood group, pre-operative LFT results and post operative analysis of liver functions.

Table 1

	mean	*gender*		*prevalent*	*Pre-op LFTs*			*Post-op LFTs*		
	age	M	F	Blood gp	jaundice	SGPT	ALP	jaundice	SGPT	ALP
Overall	41.22*	(15)	(8)	O+ve	(1)	(7)	(12)	(2)	(1)	(6)
	yrs	65.2%	34.8%	39.1%	4.3%	30.4%	52.2%	8.7%	4.3%	26.1%
Hep B	42.46*	(11)	(2)	O+ve	(1)	(3)	(6)	(1)	(3)	(3)
	yrs	84.6%	15.4%	38.5%	7.7%	23.1%	46.2%	7.7%	23.1%	23.1%
Hep C	39.6*	(4)	(6)	O+ve	none	(3)	(6)	(1)	(1)	(3)
	yrs	40%	60%	40%		30%	60%	10%	10%	30%

Except for the male : female ratio, there is no significant difference among the patients belonging to the two groups i.e. Hepatitis B is more prevalent among males.

Two patients (8.7%) were categorized as having poor left ventricular functions.

Table 2 shows the operative data and also post-operative evaluation of patients in terms of extubation time, bleeding recorded in 6 hrs, 24 hrs and on 2nd post operative day followed by time after which drain was removed. Comparing these figures, no significant difference was found between the two groups. Cumulatively mean time for cross-clamp and bypass was : 57.72and 87.11 hrs respectively. Mean time after which patients were extubated was recorded 9.31 hrs, post-operative bleeding in first 6 hrs; 515 ml, in 24 hrs; 903 ml, on 2nd post-operative day; 422 ml (please note that these values give the mean figure ± std. deviation, in some patients no bleeding was noted on 2nd post operative day). Mean time for the removal of drain was 30.30 hrs.

Table 2

	seropositivity	N	Mean	Std. Deviation	Std. Error Mean
xclamptime	hep B	11	60.45	23.598	7.115
	hep C	7	53.43	23.458	8.866
bypasstime	hep B	11	95.45	30.445	9.179
	hep C	7	74.00	26.771	10.118
xtubtime	hep B	13	8.3692	6.22115	1.72544
	hep C	9	10.6867	15.96854	5.32285
Bleeding in 6hrs	hep B	13	603.08	461.544	128.009
	hep C	9	388.89	265.115	88.372
Bleeding in 24hrs	hep B	13	1040.00	757.023	209.960
	hep C	9	705.56	661.629	220.543
Bleeding on 2nd POD	hep B	13	310.00	610.505	169.324
	hep C	9	162.22	302.315	100.772
Drain removal time	hep B	13	28.1000	8.99333	2.49430
	hep C	9	33.4444	20.32923	6.77641

Table 2 : xtubtime_____ time after which endotracheal tube was removed, POD_____ post op day.

The mean value for ICU and ward stay post operatively was 3 days and 4days respectively. Comparatively, again no significance was recorded between HCV & HBV positive patients.

Post-operative development of complications were also compared, the table below evidently shows no significant difference between the two groups except for the need of inotropic support, which in case of hepatitis B positive patients was required for 8, compared to 4 patients who were hepatitis C seropositive.

Table 3

arrhythmias	Re-exploration	Wound dehiscence	others	Inotropic support
HEPATITIS B				
2 15.4%	4 30.8%	none	5 38.5%	8 61.5%
HEPATITIS C				
1 10%	3 30%	1 10%	4 40%	4 40%

Table 3 : others, in case of hepatitis B include: cough & hemetemesis (n=1), disorientation (n=1), new vein graft (n=1), raised BP (n=1) and expiry (n=1) whereas hepatitis C include: cardiac tamponade (n=1), endocarditis & renal failure

(n=1), fever, bone pain & delayed wound healing (n=1) and expiry (n=1).

The overall mortality was 8.7% (n=2), with 1 patient belonging to each group. Figures 2 show the cumulative pattern of occurrence of complications and occurrence of mortality among the two seropositive groups.

In the end let us see the possible source of infection among these two seropositive groups via a graphical reprentation in figure 3. The most popular source cumulatively was shave/hair cutting from street barbers which was found to be more common practice among HBV positive patients whereas previous surgical history gained most response among HCV positive patients.

DISCUSSION

Viral hepatitis is a major public health problem worldwide. Different viruses including hepatitis A, B, C, E and G cause viral infections of human liver. Hepatitis A and E viruses are transmitted orally. Hepatitis B, C and G are transmitted parentally, due to injury with contaminated sharp instruments, sharing of needles or by sexual contact and also through perinatal transmission from mother to child.

Hepatitis B and C virus is a major health issue world wide especially in developing and underdeveloped countries. It is responsible for significant morbidity and mortality in these countries. According to the WHO, 350400 million are chronically infected with HBV 1, 7. The prevalence of hepatitis B is over 10% in the Asia- pacific region and two thirds of the 350 million people in the world who are chronically infected with hepatitis B infection live in this region, In Pakistan this number is estimated around 7 million with a 5% reporting rate 3, 8, 9. 170200 million people according to WHO are infected with HCV 7, 10. The prevalence of chronic hepatitis C in the Asia-pacific region is variable between 4% to 12% 3, 8. Although HBV vaccination and routine screening of donated blood has decreased incidence, the death toll resulting from chronic disease, cirrhosis and HCC is as high as one million per year (WHO, 2002). For HCV related conditions, this number will increase further over the next 10-20 years. Seroprevalence of Anti HCV antibodies vary from 4% to 7% in different segments of Pakistani population [2, 3, 8, 9].

The basic aim of our study was to determine the seroprevalence among the elective cardiac surgery candidates in relation with their postoperative recovery and to identify the possible source of infection among the same.

Among HBV positive patients, 11(84.6%) patients were male whereas only 2 (15.4%) patients were found to be female, while in the HCV positive group, 4 (40%) patients were male and 6 (60%) were female. These figures of seroprevalence are comparable with the gender wise distribution in most of the previous studies, showing high prevalence of female HCV positive patients [2, 11]. In Pakistan like many other third world countries, more then 80% of deliveries are conducted by traditional birth attendants in unhygienic condition and without proper sterilization, which makes females more vulnerable to HCV and Hepatitis B virus infection.

Preoperatively, presence of liver disease was assessed from:

1) hyperbilirubinemia; which was seen only in 1 patient whereas data was not available incase of 7 patients (30.4%) however 62.5% (n=15) showed normal levels of bilirubin
2) raised levels of liver enzymes without evident jaundice was seen in 56.5% (n=13) patients, particularly ALP (52.2%, n=12). SGPT was raised in 30.4% cases (n=7).

Postoperative LFTs could only be documented for 6 patients (26.1%) with 2 patients (8.7%) presenting with jaundice. The number of patients with raised levels of SGPT was 1 (4.3%) and all 6 patients showed raised ALP. This study shows that most of the seroprevalent patients remain asymptomatic for a long time, leading to their late identification and in some cases delayed treatment. An interesting fact that was found during this study despite of insufficient post operative data for LFTs was that in the 2 patients that showed jaundice postoperatively, the bypass time reached 3 figures and was comparatively higher than the other subjects (102 and 122 min). In the 4 other subjects in whom bypass time was in 3 figure, data was not available for 3 whereas 1 patient showed no signs of jaundice. In one of the study carried out in Japan, time spent in surgery was significantly related

to the occurrence of hyperbilirubinemia.[12]

Altogether 60.9%(n=14) patients developed morbidities that comprised of: arrhythmias 13%(n=3), re-exploration 30.4%(n=7), wound dehiscence 4.3%(n=1).

The present study found that mortality rate among the seropositive patients studied was 8.7% (n=2) with 1 patient belong to each group. Both patients did not show evident symptoms of liver disease preoperatively. In one of the case INR was deranged preoperatively, however in the similar subject no co-morbids were found and ALP was deranged, whereas in the other subject INR was within normal range but ALP values were deranged and there was a history of IHD. In both subjects greater than normal amount of bleeding was recorded and both required prolonged ionotropic support.

Doctors and health care professionals are at high risk of acquiring the hepatitis B and C infection. Health professionals are exposed to this danger while handling the patients, during treatment and investigations procedures in ward, medical ICUs, angiography labs, during surgery, renal dialysis and so on. In operation theater accidental cuts and pricks over the surgeons or their assistants and spillage of blood drops in the eyes are the commonest modes of transmission to them. In United States out of 5.6 million health care workers about 600,000 to 800,000 suffer needle stick injuries that's one out of every seven worker is accidentally stuck by a contaminated needle every year[2, 13]. Careless handling of diagnostic equipment in the diagnostic laboratories due to lack of gloves, gowns and masks, to protect them from the contaminated blood, leads to increased prevalence of hepatitis B and C infection in the health workers.

The most popular source in our study seems to be the trend of shave and hair cut from barbers, followed by needle prick injury, history of previous surgical intervention and blood transfusion. These statistics are comparable with the results in previous studies [2, 3.]

Sexually transmitted disease and unhygienic sexual intercourse may traumatize the organs, leading to blood contamination. The other factors for transmission of blood pathogens in the sexual partner could be sharing of house hold, like tooth brushes, blade for under shave, under garments, hair combs, tooth packs, etc. The other factor for this prevalence, could be, that both partner are exposed to the same risk factors and repeated contact without protection. During our study we found out that most patient were unaware of the serology status of their spouses as many of them for the first time had their serology status checked themselves. Many were hesitant to tell about their sexual life, as there were few cases where there was a doubt regarding extra marital affairs however these cases were very insignificant to quote and uncertainty prevails. The only patient in whom the spouse was also seropositive belong to HCV group and knew about the disease previously.

The increased prevalence of HCV via blood transfusions is comparable with previous studies [2, 3, 14, 15]. Sole patient found to have seropositive spouse was HCV positive while no evidence of seropositivity was found in HBV groups, in contrast to previous studies showing higher prevalence of HBV through sexual contacts 11, 14-16. Here I must remind again that most of the patients belonging to HCV group were female.

Surgeons and other health care professionals are prone to get these infections while handling them in out patients department, causality, wards and in Operation Theater. So certain guideline must be followed when dealing with the patients.

(a) In elective cases Hepatitis B and C screening should be done on routine bases

(b) In Hepatitis B and C cases surgeons and health care professional should protect themselves before handling these patients like double scrubbing time, protective mask, eye protection spectacles and use of double gloves.

(c) During emergency surgery, where the lab reports are not available before surgery, patients should be labeled as high risk; all protective measures should be adopted and carrier status should be checked as soon as possible

(d) Paramedical staff in the theatre, ICU, Cath-labs and in the wards should be informed about the seropositive patients or carriers and told to take precautionary measures.

(e) The Seropositive patients should be properly counseled and their files and beds should carry label mentioning the disease for safety of health professionals, patients, attendants and visitors.

(f) Any new case identified should be informed about to the health department.

In addition to that awareness regarding Hepatitis B and C infection should be created among the common people and health professionals through electronic media, newspapers, workshops and awareness programs on major scale. Government sectors and private sector should join hand to hand against this program. All possible steps should be taken to cut the spread of the disease in the community.

APPENDIX

Figure 1: Procedures performed on seropositive patients

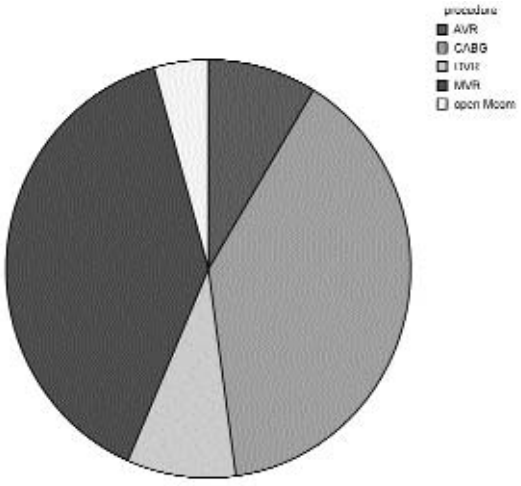


Figure 2: Post operative complications

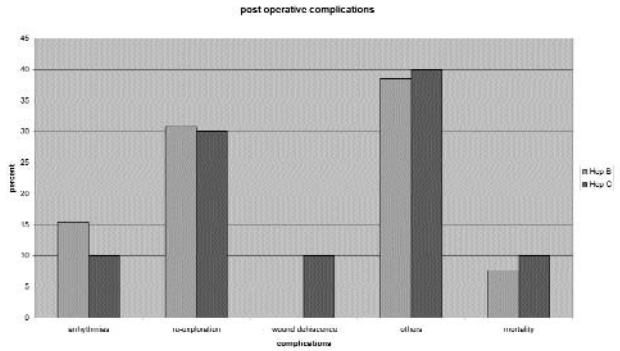
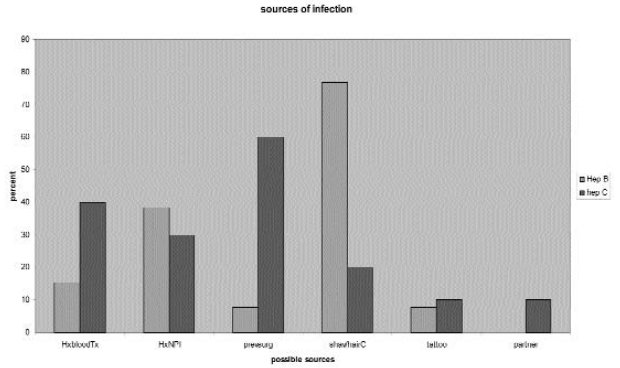


Figure 3: Sources of infection (HxbloodTx;blood transfusion, NPI; needle prick injury)



REFERENCES

1. Guidelines provided by WHO regarding Hepatitis B, present on www.who.int

2. Chaudry IA, Khan SA & Samiullah Should We Do Hepatitis B And C Screening On Each Patient Before Surgery:Analysis of 142 cases. Pakistan journal of medical sciences,july-esptember2005,volume 21, No. 3 278-280

3. Farid Ullah Shah, Mohammad Salih, Iftikhar Ahmed Malik, Iftikhar Hussain, Federal Government Services Hospital, Islamabad. Increasing prevalence of chronic hepatitis and associated risk factors. Pakistan J. Med. Res.Vol. 41 No.2, 2002

4. Donahue JG, Nelson KE, Muñoz A, Vlahov D, Rennie LL, Taylor EL, Saah AJ, Cohn S, Odaka NJ, Farzadegan H. Department of Epidemiology, Johns Hopkins University School of Hygiene and Public Health, Baltimore, MD. Antibody to

hepatitis C virus among cardiac surgery patients, homosexual men, and intravenous drug users in Baltimore, Maryland. Am J Epidemiol. 1991 Nov 15;134(10):1206-11.

5. Farida Millwala, Geoffrey C Nguyen, Paul J Thuluvath, Outcomes of patients with cirrhosis undergoing non-hepatic surgery: Risk assessment and management; www.wjgnet.com. World Journal of Gastroenterology, August 14 2007.

6. Juan A. del Olmo, Blas Flor-Lorente, Blas Flor-Civera, Felicidad Rodriguez, Miguel A. Serra, Amparo Escudero, Salvador LledÃ and JosÃ M. Rodrigo, Risk Factors for Nonhepatic Surgery in Patients with Cirrhosis; World journal of surgery, vol 27, number 6 / june 2003, DOI 10.1007 / s00268-003-6794-1:647-652.

7. Alam MM, Zaidi SZ, Malik SA, Shaukat S, Naeem A, Sharif S, Angez M, Butt JA. . Department of Virology, National Institute ofIslamabad, Pakistan, Molecular epidemiology of Hepatitis B virus genotypes in Pakistan. BMC Infect Dis. 2007 Oct 8;7:115. ursmasroor@yahoo.com

8. Ishtiaq Ahmed Chaudhary, Shah Sattar Khan, Muhammad Ashraf Majrooh, Ahsan Ahmed Alvi, Seroprevalence of hepatitis-B and C among the patients reporting in surgical OPD at Fauji Foundation Hospital, Rawalpindi: Review of 5 year literature. Pakistan Journal of Medical Sciences, July-Sep 2003;vol 21,no.4, 514-517.

9. Shamim Mumtaz, Mehmood Ur Rehman, Muhammad Muzaffar, Masood ul Hassan, Wasim Iqbal, Islamic International Medical College, Rawalpindi Frequency of seropositive blood donors for hepatitis B, C and HIV viruses in railway hospital Rawalpindi., Pakistan J. Med. Research,Vol.41, No.2, 2002

10. Guidelines provided by WHO on Hepatitis C; its mode of transmission and complications, present on www.who.int

11. Dr. BaruchBlumberg;Does Hepatitis B Affect Human Gender Ratios, an interview for Astrobiology Magazine Moffett Field CA (SPX) Jun 02, 2006, available online at NASA website.

12. Kikumi K Hosotsubo, Masaji Nishimura and Shinya Nishimura,Osaka University Hospital, Suita, Japan, Hyperbilirubinaemia after major thoracic surgery: comparison between open-heart surgery and oesophagectomy. CRITICAL CARE 2000, issue, vol4:180-187.

13. Alam M. Needle stick injuries in health care workers. J Coll Phys Surg Pak 2002;12(9):567-71.

14. Pahuja S, Sharma M, Baitha B, Jain M. 2007 Nov;Department of Pathology, Lady Hardinge Medical College, New Delhi, India. sangeeta.sindhwani@gmail.comPrevalence and trends of markers of hepatitis C virus, hepatitis B virus and human immunodeficiency virus in Delhi blood donors: a hospital based study. Jpn J Infect Dis. 2007 Nov;60(6):389-91.

15. Chowdhury A, Santra A, Chaudhuri S, Dhali GK, Chaudhury S, Maity SG, et al. Hepatitis C virus infection in general population: A community based study in west Bengal India. Hepatology 2003;37:802-9.

16. Screening for chronic hepatitis B among Asian/Pacific Islander population------New York 2005 CDC,www.cdc.com.