



PREVALENCE OF HEPATITIS B AND HEPATITIS C INFECTION IN PATIENTS UNDERGOING CORONARY ANGIOGRAPHY

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ABSTRACT:

OBJECTIVES: To determine the prevalence of hepatitis B and C in patients undergoing conventional coronary angiography and compare it between patients with and without significant coronary artery disease (CAD).

METHODS: This cross-sectional study was carried out at Mayo Hospital, Lahore from 1st July 2017 to 31st December 2017. All those patients scheduled to have elective coronary angiography within this period were enrolled in the study. Demographic details and detailed clinical history regarding the risk factors of CAD such as smoking, hypertension, diabetes, dyslipidemia or family history of CVD was taken from each patient. Blood sample was drawn in each case for HBV and HCV testing. CAD was defined as $\geq 50\%$ coronary lumen stenosis of any coronary vessel on angiography.

RESULTS: A total of 325 patients took part in the study comprising of 185 males and 140 females. The prevalence of HBV and HCV among patients undergoing angiography was found to be 3.4% and 33.8% respectively. HCV serology was positive in 85 (37.8%) patients in the CAD group whereas 25 (25%) patients were HCV positive in patients having no significant CAD (p value = 0.02). The prevalence of hepatitis B infection was similar into groups (9(4%) vs 2(2%); p value = 0.36).

CONCLUSION: Hepatitis C virus infection was more prevalent than hepatitis B virus infection in patients undergoing coronary angiography. Furthermore, hepatitis C positivity was more in patients with significant CAD as compared to those with no significant CAD. No such difference was observed with hepatitis B positivity.

KEYWORDS: Coronary artery disease (CAD), coronary angiography, Hepatitis C virus (HCV), Hepatitis B virus (HBV)

INTRODUCTION

Viral hepatitis caused by hepatitis B and C virus is a major cause of mortality and morbidity worldwide. According to the global burden of diseases 2013 study, hepatitis B and C together were responsible for 96% of viral hepatitis related mortality.¹ Currently, about 350 to 400 million people are HBsAg positive² whereas chronic HCV carriers are estimated to be just over 170 million.³ Pakistan has the second highest prevalence of hepatitis C in the world estimated to be around

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6.8%.⁴ Moreover, Pakistan is home to about 7-9 million carriers of hepatitis B virus (HBV).⁵ This explains the huge burden of chronic liver disease in Pakistan.

In addition to chronic liver disease, there are several extrahepatic manifestations of hepatitis B and C including high risk of developing coronary artery disease (CAD) secondary to atherosclerosis. Multiple studies in past have established the link between atherosclerosis and Hepatitis C.⁶⁻⁷ However a clear conclusion cannot be drawn when it comes to HBV. Although Ishizaka et al⁸ reported an increased risk of developing CAD with HBV, most of the studies show no such association.⁹⁻¹⁰

Atherosclerosis is an intimal disease characterized by thickening and narrowing of vessels due to plaque deposition. HCV increases the chances of developing atherosclerosis as pointed out earlier. The possible mechanism involves an increase in the number of atherogenic factors being released into the bloodstream.⁶ The burden of CAD is also quite high in Pakistan. This high prevalence is usually attributed to the various risk factors pres-

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ent in our population such as smoking, diabetes, hypertension and high ApoB100/Apo-I ratio.¹¹ However, we can't just ignore the huge burden of hepatitis B and C in our population. These are also high risk patients for developing CAD. Salam et al¹² showed HCV was prevalent in upto 30.3% of patients referred for angiography. They concluded that patients with CAD had more severe coronary lesions relatively. In a similar study conducted on HBV patients, Ghotaslou et al⁹ showed HBV to be prevalent in 3.28% of the patients having CAD versus 2.17% in patients without CAD. However this difference was statistically insignificant and hence they concluded that HBV infection is not associated with coronary atherosclerosis. To date, not a single local study has evaluated this association. We, therefore decided to conduct this study with the aim of determining the prevalence of HBV and HCV in patients undergoing percutaneous coronary intervention and to examine their relationship with CAD, if any.

MATERIALS AND METHODS:

This descriptive cross-sectional study was carried out at Mayo Hospital Lahore from 1st July 2017 to 31st December 2017. The sample size was calculated using openepi calculator with the statistical assumptions of 5% alpha error and 95% confidence interval taking prevalence of HBV to be 3.28% and that of HCV to be 30.3% and comes out to be at least 325 patients for this study. After taking ethical approval from Institutional Review Board, all those patients scheduled to have elective coronary angiography between 1st July to 31st December 2017 were enrolled in the study. All those patients having history of previous PCI, coronary artery stenting or ballooning; previous CABG procedure; dye allergy or any other contraindication to contrast such as renal failure were excluded from the study. Informed consent was taken in each case. Demographic details and detailed clinical history regarding the risk factors of CAD such as smoking, hypertension, diabetes, dyslipidemia or family history of CVD was taken from each patient. Blood sample was drawn in each case for HBV and HCV testing by Enzyme Linked immunosorbent assay (ELISA). CAD was defined as $\geq 50\%$ coronary lumen stenosis of any coronary vessel on angiography.

All the data was recorded on a pre-designed proforma and analyzed by SPSS version 21.0. Mean and standard deviation was calculated for all quantitative variables like age. Frequency and percentage was calculated for all qualitative variables like

risk factors of CAD, prevalence of HBV and HCV etc. Chi square test was applied taking p value of < 0.05 as statistically significant.

RESULTS

A total of 325 patients took part in the study comprising of 185 males and 140 females. Mean age of the patients was 54.64 ± 7.98 years. CAD was present in 69% (225) of the patients (Figure 1). The prevalence of HBV and HCV was found to be 3.4% and 33.8% respectively (Figure 2). Eighty five (37.8%) patients were HCV positive in the CAD group whereas only 25 (25%) patients

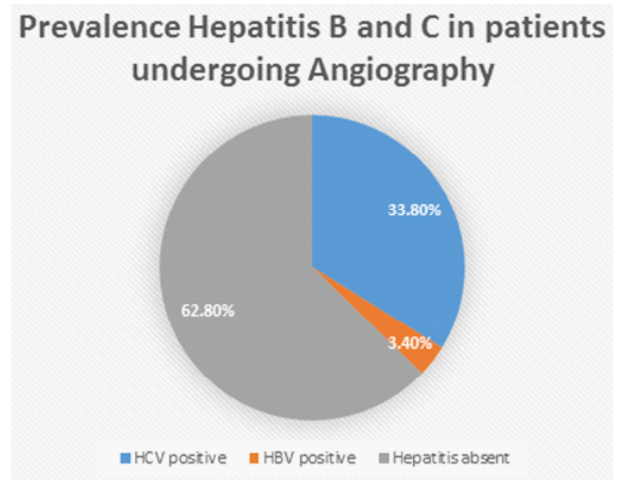
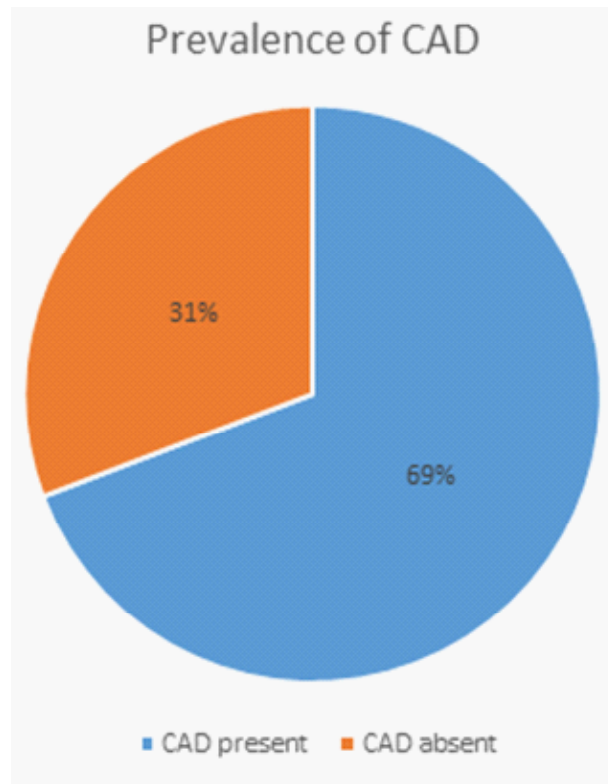




Table 1: Demographic and clinical characteristics of the CAD positive and CAD negative groups.

Variable	CAD +ve (N=225)	CAD -ve (N=100)	P value
Age	54.64 ± 7.98	52.93 ± 9.12	0.09
Male/Female	125(55.6%) / 100(44.4%)	60(60%) / 40(40%)	0.46
Risk Factors			
DM	115 (51.1%)	35 (35%)	0.007
HTN	140 (62.2%)	40 (40%)	0.0002
Dyslipidemia	152 (67.6%)	49 (49%)	0.001
Smokers	100 (44.4%)	35 (35%)	0.11
Positive family history	60 (26.7%)	10(10%)	0.0007
Prevalence of HCV	85 (37.8%)	25 (25%)	0.02
Prevalence of HBV	9 (4.0%)	2 (2%)	0.36

were HCV positive in the CAD negative group. The difference was statistically significant (p value = 0.02). Unlike HCV, the difference in prevalence of HBV amongst the two groups was statistically insignificant (p value = 0.36). The two groups were comparable with respect to the mean age and male to female ratio (p value of 0.09 and 0.46 respectively). Dyslipidemia was the commonest risk factor present in upto 61.8% (201) of the patients. All the risk factors were significantly more frequent in CAD positive group except smoking (p value of 0.11) (Table 1).

DISCUSSION

Hepatitis B and C are primarily chronic inflammatory diseases of the liver associated with an increased risk of cirrhosis and hepatocellular carcinoma in the long run. However, numerous extrahepatic manifestations have been reported over the recent years. These also include an elevated risk of developing coronary artery disease.

We found a prevalence of 3.4% and 33.8% for HBV and HCV respectively. Ghotaslou et al⁹ showed HBV to be prevalent in 3.28% of the patients having CAD which was consistent with our findings. However, Mousavi et al¹³ reported prevalence

of 0.08% for HBV. The findings of Salam et al¹² were consistent with our study as they reported a prevalence of 30.3% for HCV. We showed that HCV was significantly more prevalent in those with CAD than those without CAD (p value = 0.02). This was again in line with the findings of Salam et al¹² who concluded that patients who are HCV Ab positive had more severe coronary lesions.

Our study reported no such association in case of hepatitis B (p value = 0.36). This was in line with the analysis of Wijarnpreecha et al¹⁴ who demonstrated no significant risk of CAD among chronic HBV-infected patients. Mean age in our group of patients was 54.64 ± 7.98 years. Our study subjects were comparable in terms of mean age and male to female ratio. We showed that diabetes mellitus, hypertension, dyslipidemia and positive family history were significantly more prevalent in patients with CAD (Table 1) however the frequency of smoking was comparable among two groups. A similar trend was noticed by Salam et al¹² except that they reported positive family history to be comparable amongst two groups instead of smoking. Dyslipidemia was the commonest risk factor present in upto 61.8% (201) of the patients.

There were certain limitations to our study. Not all the effect modifiers and Confounders e,g age, gender etc were controlled through stratification. Ideally a case control study should have been designed to determine the association between CAD and HBV/ HCV. However we opted for a cross-sectional study design to avoid complexity.

CONCLUSION:

Hepatitis C virus infection was more prevalent than hepatitis B virus infection in patients undergoing coronary angiography. Furthermore, hepatitis C virus infection was more in patients with significant CAD as compared to those with no significant CAD. No such difference was observed with hepatitis B virus infection.

Author's Contribution

SA: Collected the data and conducted the study. SA: Helped in conducting the study. INS & RMHK: Helped in analysis of data. UA: Data analysis and proof reading.

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