

Comparison of demographic and virological profiles between diabetic and non-diabetic patients with cirrhosis of liver

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Abstract

Background: Cirrhosis of liver is the most common cause of liver disease in our country. It is an important cause of mortality and morbidity. Hepatitis B and Hepatitis C virus infection are the important causes of liver disease in our country. Many people present to us with established cirrhosis of liver. The aim of our study is to compare the demographic and virological profiles between diabetic and non-diabetic patients with cirrhosis of liver.

Methods: This cross-sectional study was carried out from July 2018 to December 2018 in Bangladesh Institute of Research and Rehabilitation in Diabetes, Endocrine and Metabolic Disorders (BIRDEM) General Hospital and in Supreme Medical Services, Jatrabari, Dhaka. Cirrhosis of liver was diagnosed with the help of ultrasonography of whole abdomen, endoscopy of upper gastro-intestinal tract (GIT), fibroscan of liver and liver biopsy where indicated.

Results: Total 465 cases were enrolled in this study. Of them 272 patients were diabetic and 193 patients were non-diabetic. The study reached its various findings from the view point in our country. Most diabetic patients were between the age 51 to 60 (57.4%) and in non-diabetic patients between the age 41 to 50 (31.1%) ($p < .001$). Cirrhosis of liver was more common in non-diabetic, male (69.4%) patients but it was more common in female (48.2%), diabetic patient ($p < .001$). Female patients were mostly house wife in both diabetic (45.2%) and non-diabetic group (24.9%) ($p < .001$). Male patients were mostly in service in both diabetic (20.6%) and in non-diabetic group (32.6%) ($p < .001$). Most of the people live in urban area in both diabetic (70.6%) and non-diabetic group (53.9%) ($p < .001$). Hepatitis B virus infection was significantly higher in cirrhotic, non-diabetic than diabetic group (49.7% vs 21.3%) ($p < 0.001$) but Hepatitis C virus infection was significantly higher in cirrhotic diabetic group than non-diabetic group (14.3% vs 8.8%) ($p < 0.001$).

Conclusion: Hepatitis B virus is the leading cause of cirrhosis of liver in male, non-diabetic patient and Hepatitis C virus is the leading cause of cirrhosis of liver in female, diabetic patient.

Key words: Virological profiles, Cirrhosis of liver, Diabetes.

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Introduction

Cirrhosis of liver is defined anatomically as a diffuse process with fibrosis and nodule formation. It is the end result of the fibrogenesis that occurs with chronic liver injury.¹ Although the causes are many, without successful treatment or removal of the agent responsible, the end result of fibrogenesis is the same. Compensated cirrhotic patients have a 50% 10-year survival as compared to 50% survival at 18 months for decompensated patients.² Cirrhosis is usually believed to be irreversible. In western countries the prevalence of alcoholic cirrhosis, non-alcoholic steatohepatitis (NASH) and viral cirrhosis, in particular hepatitis C, are all increasing. In developing countries, the predominant causes are hepatitis B and C viruses, but alcohol and autoimmune conditions may be increasing. The presence of hepatitis B virus surface antigen (HBsAg) establishes the diagnosis of hepatitis B.

Hepatitis C virus (HCV) infection is one of the main causes of chronic liver disease worldwide.³ The long-term natural history of HCV infection is highly variable. There are approximately 71 million chronically infected individuals worldwide.^{3,4} Many of whom are unaware of their infection, with important variations according to the geographical area. Cirrhosis where the aetiology cannot be determined is termed cryptogenic. In some forms of liver disease there is a single cause, for example in hepatitis B and C, primary biliary cirrhosis and primary sclerosing cholangitis. However, in many cases co-factors may be important. Suggested co-factors include age, sex, obesity, alcohol, iron intake and other genetic factors as yet to be known. Similarly, many subjects drink excessive quantities of alcohol but only a small proportion ever develop cirrhosis. Progressive disease is more likely in patients with hepatitis B or C who drink excess alcohol. The risk of developing cirrhosis may also depend on the age and sex of the patient, duration of the disease and immunological status. Patients with a history of chronic liver disease with gastroesophageal varices, ascites or hepatic encephalopathy are likely to have cirrhosis and liver biopsy is not essential in such cases for confirming cirrhosis.⁵ A small nodular liver with splenomegaly and intra-abdominal collaterals and the presence of ascites on abdominal US (or other cross-sectional imaging study) suggests cirrhosis. Where available, transient elastography (or fibroelastography), acoustic radiation force impulse (ARFI) elastography (another form of ultrasound elastography) or magnetic resonance elastography (MRE) can help confirm a diagnosis of cirrhosis. On transient elastography, a liver stiffness measurement (measured in kilopascals) of greater than 14 kPa suggests cirrhosis, with values greater than 21 kPa associated with portal hypertension and its complications.⁵

Methods

This cross-sectional study was done in the department of Gastrointestinal, Hepatobiliary and Pancreatic Disorders (GHPD), BIRDEM General Hospital, Dhaka and Supreme Medical Services Ltd (SMSL), Jatrabari, Dhaka, Bangladesh from July 2018 to December 2018. Sample size was calculated at 5% level of significance and 95% confidence level. Adult patients age between 18 and 60 years who were suffering from cirrhosis of liver, either compensated or decompensated, irrespective of cause were included in this study. Those who have severe co-morbid disease, known case of hematological malignancy, age <18 years and >60 years,

non-cirrhotic portal hypertension, acute hepatitis B and C virus infection, HBsAg and HCV carrier and pregnancy were excluded from this study. Sample was being selected through non-probability sampling method from patients who present with cirrhosis of liver. Detailed history of each patient was taken and recorded. A questionnaire was used for data collection. Data were collected by face to face interview, observation and medical records were reviewed for diagnosed cirrhosis of liver. Data like presence and duration of diabetes or not, ultrasonographic features like coarse hepatic parenchyma, splenomegaly, nodular liver, ascites etc. were used for the diagnosis of cirrhosis of liver. Endoscopic findings in favour of cirrhosis of liver like oesophageal varices, fundal varices, congestive gastropathy, vascular ectasias etc. also guided for the diagnosis of cirrhosis of liver. In selected cases fibrosacn of liver and liver biopsy were done for diagnosis of cirrhosis of liver. Laboratory data like presence of HBsAg, anti HCV were noted. Prior to commencement of the study, the research protocol was approved by the proper Ethical Review Committee. All ethical issues were maintained throughout the study. After collection of information these data were checked, verified for consistency and edited for finalized result.

After editing and coding, the coded data were entered into the computer by using the SPSS (Statistical Package for Social Sciences) version-16.0 software. Data cleaning, validation and analysis was performed using the SPSS software. Statistical analyses were done by using appropriate statistical tools like chi-square test, unpaired student t-test. The results were presented in tables in mean, standard deviation (SD) and percentages. Statistical significance was set at 0.05 level and confidence interval at 95% level.

Results

Total 465 cases were included during 6 months study period. Among them 272 patients were diabetic and 193 patients were non-diabetic. Diabetic patients with cirrhosis of liver were older than non-diabetic group. Other baseline demographics are presented in Table I.

Table II showed diabetic patients were obese (36.8%) but having normal body weight in non-diabetic patient (42.5%). Table III showed H/O alcohol ingestion was more in diabetic than non-diabetic patient. Most of the patients had features of compensated cirrhosis of liver which was 60.7% in diabetic group and 62.2% in non-diabetic group (Table IV). Different viral causes for the development of cirrhosis of liver were presented in Table V.

Table I Comparison of age, sex, educational level, occupation, family income and area of residence between DM and non-DM study subjects with cirrhosis of liver (N=465)

Demographic characteristics	DM (n=272) n(%)	Non-DM (n=193) n(%)	p value
Age group (years)#			
<30	7(2.6)	34(17.6)	
31-40	27(9.9)	47(24.4)	
41-50	82(30.1)	60(31.1)	
51-60	156(57.4)	52(26.9)	
Total	272(100.0)	193(100.0)	
Mean±SD	51.3±7.87	43.17±11.05	<0.001 ^s
Range	(27-60) yrs.	(21-60) yrs.	
Sex*			
Male	141(51.8)	134(69.4)	<0.001 ^s
Female	131(48.2)	59(30.6)	
Educational level*			
Below Secondary School Certificate (SSC)	156(57.4)	115(59.6)	0.426 ^{ns}
SSC	48(17.6)	33(17.1)	
Higher School Certificate (HSC)	23(8.5)	22(11.4)	
Graduate and above	45(16.5)	23(11.9)	
Occupation*			
Business	50(18.4)	48(24.9)	<0.001 ^s
Service	56(20.6)	63(32.6)	
Housewife	123(45.2)	48(24.9)	
Others	29(10.7)	21(10.9)	
Unemployed	14(5.1)	13(6.7)	
Family income (Taka/month)*			
Up to 15000	56(20.6)	40(20.7)	0.891 ^{ns}
15001-30000	167(61.4)	115(59.6)	
> 30000	49(18.0)	38(19.7)	
Residence*			
Urban	192(70.6)	104(53.9)	<0.001 ^s
Rural	80(29.4)	89(46.1)	

#Unpaired student t-test, *Chi-square test, s=significant, ns= not significant

Table II Association of body mass index (BMI) (kg/m²)¹⁵ between DM and non-DM study subjects (N=465)

Variables	DM (n=272) n(%)	Non-DM (n=193) n(%)	p- value
BMI (kg/m²)			
Underweight (<18.5 kg/m ²)	28(10.3)	14(7.3)	
Normal (18.5-22.9 kg/m ²)	86(31.6)	82(42.5)	
Overweight (23.-24.9 kg/m ²)	58(21.3)	32(16.6)	0.694 ^{ns}
Obese (>25 kg/m ²)	100(36.8)	65(33.7)	
Mean±SD of BMI	24.1±4.43	23.9±4.5	

Unpaired Student t-test, ns=not significant

Table III Status of alcohol intake between diabetic and non-diabetic cirrhotic patients (N=465)

Variables	DM (n=272) n(%)	Non-DM (n=193) n(%)	p- value
Alcohol			
Yes	27(9.9)	16(8.3)	0.548 ^{ns}
No	245(90.1)	177(91.7)	

Chi-square test, ns=not significant

Table IV Status of cirrhosis between DM and non-DM study subjects (N=465)

Variables	DM (n=272) n(%)	Non-DM (n=193) n(%)	p- value
Type of cirrhosis			
Compensated	165(60.7)	120(62.2)	0.741 ^{ns}
Decompensated	107(39.3)	73(37.8)	

Chi-square test, ns = not significant

Table V Association of viral profile between DM and non-DM study subjects (n=465)

Viral profile	DM (n=272) No. (%)	Non-DM (n=193) No. (%)	p- value
HbsAg +ve	58(21.3%)	96(49.7%)	<0.001*
AntiHCV +ve	39(14.3%)	17(8.8%)	
Both HbsAg & AntiHCV –ve	173(63.7%)	80(41.5%)	
Both HBsAg & AntiHCV +ve	2(0.7)	0(0.0%)	
Total	272(100%)	193(100%)	

Chi-square test, *significant

Discussion

Cirrhosis of liver is a lifelong serious and irreversible disease. It is one of the important causes of morbidity and mortality in our country and throughout the world. Many patients were unaware about hepatitis B and hepatitis C virus infection, their natural history and outcome. Considerable number of patients present to medical care with established cirrhosis of liver. This study was undertaken to compare the demographic and virological profiles in patients who have cirrhosis of liver between diabetic and non-diabetic patients. For demography we included age, sex, educational status, occupation, BMI, alcoholic status and area of residency. For virological profile we see whether the patient have hepatitis B or hepatitis C positive, both virus positive or not. After collection of data we compare the data of demographic and virological profiles between diabetic and non-diabetic patients who have established cirrhosis of liver.

In our study from 465 patients we find that cirrhosis of liver was more common in later age group (51-60 years) in diabetic patient than in non-diabetic patient (41-50 years). Muhammad et al¹⁰ showed advancing age ≥ 40 years in HCV seropositive patients was significantly associated with type 2 diabetes mellitus. Our study showed its relation was more common in >51 years. It also agreed with another study which was conducted on Mexican population.¹¹ Male patient was more sufferer with cirrhosis of liver in non-diabetic group than diabetic group and female patient were more sufferer with cirrhosis of liver in diabetic group. This gender

difference showed significant association with cirrhosis of liver ($p < .001$). Most of the male patients were in service in both diabetic and non-diabetic group. Female patients were mostly housewife in both group. This finding also showed significant association with cirrhosis of liver ($p < .001$). Cirrhosis of liver was more common in urban people in both diabetic and non-diabetic population. This finding showed significant association ($p < .001$) with cirrhosis of liver.

Hepatitis B virus was more common in patient with cirrhosis of liver in non-diabetic group than diabetic group ($p < .001$). Das DC et al¹⁴ showed hepatitis B virus is the leading cause of cirrhosis of liver in Bangladesh. Our study also showed almost close association between cirrhosis of liver and hepatitis B virus infection. In our study we found that Hepatitis C virus was more common in diabetic patient than non-diabetic patient ($p < .001$). Mohammed J Saeed et al⁶ and Lonardo et al⁷ showed almost similar association between hepatitis C virus infection and cirrhosis of liver in diabetic patient. Memon MS et al⁸ a southeast Asian study and Elhawary EI et al⁹ an Egyptian case-control study also showed HCV infection was more common in diabetic patient with cirrhosis of liver. We found that both hepatitis B and C virus dually positive more in diabetic group than in non-diabetic group ($p < .001$). Mamun Al Mahtab et al^{12,13} showed seroprevalence rate for HCV infection is .88% and for HBV is 5.5% in our country. Our study in cirrhotic patient we find that HBV was positive 21.3% in diabetic patient and 49.7% in non-diabetic patient, HCV was positive 14.3% in diabetic patient, 8.8% in non-diabetic patient. In our country as the prevalence rate of HBV is much higher than HCV^{12,13} the comparison between the prevalence ratio between HBV and HCV (HBsAg: Anti HCV 6.25:1) in our country and our study in cirrhotic diabetic group (HBsAg: Anti HCV 1.49:1), in non-diabetic group (HBsAg: Anti HCV 5.65:1) we make a conclusion that the HBV infection is the predominant cause of cirrhosis of liver in non-diabetic patient which almost corresponds to the prevalence rate of our country than HCV infection but HCV infection is the predominant cause of cirrhosis of liver in diabetic than non-diabetic patient. This higher association between HCV infection and cirrhosis of liver in diabetic patient does not match with the prevalence rate of our country. So in diabetic population HCV infection is more common for the development of

cirrhosis of liver than HBV infection. From our data we found that in non-diabetic population HBV is 2.33 times more common cause of cirrhosis of liver than diabetic patient and HCV is 1.63 times more common cause of cirrhosis of liver in diabetic than non-diabetic population.

Our limitation in this study was that the data were small, time duration was short and sample was collected in two centers only. Our findings help us further research why urban people are more likely develop cirrhosis of liver, HBV infection is more in non-diabetic patient, HCV infection is more in diabetic patient and it also requires the great need for programs aimed at preventing HBV and HCV transmission in future generation which help our people for preventing the devastating complications of liver, like cirrhosis of liver, hepatocellular carcinoma etc.

Conclusion

Cirrhosis of liver is more common at an earlier age (50 years and below) in male, non-diabetic patient than diabetic patient but it is more common in later age (51 years and above), in female, diabetic population. Female are mostly housewife but male is mostly in service in both diabetic and non-diabetic group. Most of the people in both diabetic and non-diabetic group are live in urban area. Hepatitis B virus is the most common cause of cirrhosis of liver in non-diabetic population. Hepatitis C virus is the leading cause of cirrhosis of liver in diabetic population.

Conflict of interest: Nothing to declare.

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