

## Correlation of Severity of Portal Hypertensive Gastropathy with Child Pugh Class and Diabetes in Cirrhotic patients

KHURRAM SALEEM<sup>1</sup>, MUNAZZA JAVEID<sup>2</sup>, FAISAL AMIN BAIG<sup>3</sup>, MAHWISH NIDA<sup>4</sup>, NAJAM ARIF<sup>5</sup>.

### ABSTRACT

**Background** As burden of Diabetes and HCV/ HBV infection is on the rise so are their related complications. Portal hypertensive gastropathy (PHG) is one of these complications and its severity is thought to increase with increasing Child class and by presence of diabetes.

**Aim:** To find the Correlation between severity of portal hypertensive gastropathy with Child class and assess the difference in cirrhotic diabetics versus non diabetic cirrhotics.

**Methods:** An Observational cross sectional study of 180 hepatitis B and C patients having portal hypertension with or without diabetes. These patients underwent upper gastrointestinal endoscopy and fasting blood sugar (FBS) examination.

**Results:** 180 patients (95 male and 85 female) had different stages of gastropathy and were either diabetics or non diabetics. The mean age of patients was 55.6 years. Grades of Child class and severity of PHG were correlated as well as with diabetic status which showed significant correlation (p-value: 0.006 and 0.008), no significant correlation between Child class and diabetic status (p-value 0.062).

**Conclusion:** Worsening of PHG from mild to severe is seen in higher grades of Child Class and PHG is more severe in diabetic cirrhotics as compared to their non diabetic counterparts.

**Keywords:** Portal hypertension (PHTN), Portal hypertensive gastropathy (PHG), Child class, Diabetes

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### INTRODUCTION

Hepatitis C virus (HCV) is a global health problem affecting almost three percent of the world's population<sup>1</sup>. It is a major cause of chronic hepatitis, cirrhosis and hepatocellular carcinoma. Upper gastrointestinal bleeding is one of the leading causes of mortality in cirrhosis. Apart from gastro-esophageal varices, these patients can also bleed from portal hypertensive gastropathy (PHG)<sup>2,3</sup>. Depending upon the duration of disease about 80% of cirrhotics have been found to have PHG<sup>4</sup>. In a study by Gupta et al 61% of 230 patients with cirrhosis and esophageal varices had concomitant portal hypertensive gastropathy<sup>5</sup>. The characteristic endoscopic findings to diagnose PHG include small polygonal areas of variable erythema surrounded by a pale, reticular border in a mosaic pattern in the gastric fundus/body in patients with cirrhotic or non-cirrhotic portal hypertension<sup>6</sup>. PHG is influenced by many factors out of which portal hypertension is of vital importance i.e., higher the degree of portal hypertension more severe is the PHG<sup>4,6</sup>. Several other factors like advanced liver disease, longer duration of liver disease, presence of esophageal varices, and

endoscopic variceal obliteration have also been linked to the increase in severity of PHG<sup>7,8,9</sup>.

About 10% of Pakistani population more than 30 years of age suffers from diabetes<sup>10,11</sup>. About 25% population suffering from HCV and 12% suffering from HBV have concomitant DM<sup>12</sup>. Presence of diabetes is thought to have adverse effects on the progression of liver disease and PHG in cirrhotic patients<sup>13</sup>.

To the authors' knowledge, there was very limited international and local data on the effects of diabetes on PHG and Child class. The objective of this study was to find firstly, the correlation between severity of portal hypertensive gastropathy with Child class and secondly to assess the difference in severity of PHG in cirrhotic diabetics versus non diabetic cirrhotics.

### MATERIAL AND METHOD

Patients having chronic liver disease due to hepatitis B and C with or without diabetes were enrolled at Punjab Employee's Social Security Institute affiliated with University of Lahore. Non-probability specific sampling technique was used in this study. Informed consent was taken. Upper gastrointestinal endoscopy was performed in each patient by a senior member of faculty. Observational cross-sectional study design was employed. The duration of this study was six months.

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<sup>1</sup>Associate Professor of Medicine, University College of Medicine, University of Lahore

<sup>2,3,4</sup>Assistant Professor University College of Medicine, University of Lahore, Lahore Pakistan.

Correspondence to Dr K Saleem Email: khurram.saleem@hotmail.com Cell: 00923064354221

One hundred and eighty patients were enrolled in the study after approval of study by the ethics committee. The cirrhotic patients were divided into two groups those with diabetes and those without diabetes. Ascites, prothrombin time, Albumin, hepatic encephalopathy and bilirubin were considered for calculating Child's class/grade. Gastropathy was classified into four categories which are mild, moderate and severe by Tanoue classification<sup>14</sup> if no PHG then classified as none. In none category the gastric antrum and fundus were normal, mild comprised of mild reddening in absence of mosaic pattern, moderate comprised of fine red speckling with mosaic pattern, severe comprised of diffuse red mosaic with point bleeding. Diabetes was diagnosed according to the ADA criterion of fasting blood glucose of more than 126mg/dl<sup>15</sup>.

**Inclusion criterion**

All patients with hepatitis B and C with portal hypertension and no Diabetes

All patients with hepatitis B and C with portal hypertension and diabetes

**Exclusion criterion**

Patients with chronic liver disease due to :

Alcoholic liver disease

Portal venous thrombosis

Budd Chiari syndrome

Genetic diseases (Wilson's, Haemochromatosis, Cystic Fibrosis, Alpha 1 antitrypsin deficiency)

Auto immune hepatitis, primary biliary cirrhosis

Drugs

Cross sectional study design was employed to collect the demographic information and also results of laboratory reports. Data was recorded on questionnaire in first phase then entered into SPSS version 21 for statistical analysis. The data contained both qualitative categorical variables and quantitative variables. Mean and standard deviation were presented for quantitative variables and percentages for qualitative variables. Chi-square test was applied on categorical variables to assess the correlation between severity of portal hypertensive gastropathy in cirrhotic diabetic versus non-diabetic cirrhotic patients.

**RESULTS**

One hundred and eighty hepatitis B and C patients participated in this study. Out of which ninety five were male and eighty five were female. The minimum age of patients was recorded as 40 years and maximum 70 years Mean  $\pm$  SD 55.61  $\pm$  7.12.

One hundred and seventy five (97.2%) patients were suffering from hepatitis C, out of which 52.2% were male, 45% were female and five (2.8%) patients had both hepatitis B and hepatitis C.

The above table shows that 140(78%) patients were non diabetics while the remaining 40(22%) had diabetes. 27 patients in Child class A, 12 patients in Child class B and 1 patient in Child class C had diabetes respectively. About 67%, 30%, and 3% of the cirrhotic diabetic patients were in Child class A, B and C respectively. When diabetes and Child class were correlated p-value was 0.062 which is statistically insignificant and shows that Child class score is not affected by diabetic status.

Table 3 shows that out of the 120 patients in Child class A 22% had moderate PHG and 67% had severe gastropathy. Out of the 50 patients in Child class B 40% had moderate and 52% has severe PHG. Out of the 10 patients in child class C 30% had moderate and 40% had severe PHG respectively. Chi-square was employed for assessing the correlation among Grade of Child class and severity of portal hypertension gastropathy the p-value was 0.006 which is statistically significant and depicts that different stages of portal hypertension gastropathy are seen in different stages of Child class and that worsening of portal hypertensive gastropathy is associated with higher grade of Child class.

When PHG, Child Class and diabetes were correlated, in Child class A 33% and 55% had moderate and severe PHG respectively. In Child class B 75% and 16% had moderate and severe PHG respectively. In Child class C 100% had moderate PHG. The p-value of Child class in cirrhotic diabetic and non-diabetic patients with severity of portal hypertensive gastropathy is 0.008 which is statistically significant and depicts that the severity of portal hypertensive gastropathy in diabetic cirrhotics is different i.e., more severe when compared with non diabetic cirrhotics of the same Child Class. Thus, portal hypertensive gastropathy is affected by both diabetes and the score of Child class.

Table: 1 Demographic profile

Characteristics	Category	Gender	Frequency	Percentage	P-Value
Ascites	None	Male	75	41.7	0.001
		Female	65	36.1	
	Slight	Male	10	5.6	
		Female	20	11.1	
	Moderate to severe	Male	10	5.6	
Female		0	0.0		
ProthrombinTime	1-3	Male	57	31.7	0.528
		Female	53	29.4	
	4-6	Male	28	15.6	
		Female	27	15	
	>6	Male	10	5.6	
		Female	5	2.8	
Albumin	>3.5	Male	70	38.9	0.007
		Female	45	25	
	2.8-3.5	Male	15	8.3	
		Female	30	16.7	
	<2.8	Male	10	5.6	
		Female	10	5.6	
Bilirubin	<2.0	Male	85	47.2	0.168
		Female	70	38.9	
	2.0-3.0	Male	10	5.6	
		Female	15	8.3	
Child Class	Class A	Male	75	41.7	0.000
		Female	45	25	
	Class B	Male	10	5.6	
		Female	40	22.2	
	Class C	Male	10	5.6	
		Female	0	0.00	

Table: 2

Child Class	Diabetes		Total
	Yes	No	
A	93	27	120
B	38	12	50
C	9	1	10

P value: 0.062

Table 3:

Severity of hypertensive gastropathy	Portal	Diabetes	
		No	Yes
<b>Class A</b>			
None		3	0
Mild		7	3
Moderate		18	9
Severe		65	15
<b>Class B</b>			
None		0	0
Mild		3	1
Moderate		11	9
Severe		24	2
<b>Class C</b>			
None		2	0
Mild		1	0
Moderate		2	1
Severe		4	0

P value; 0.008

## DISCUSSION

Upper GI Bleeding is one of the dreadful complications of cirrhosis. Esophageal varices and PHG were found to be the main pathologies behind upper GI bleed. Several factors have been thought to increase the severity of PHG. Our study demonstrated that higher Child Class is associated with increasing severity of PHG which is similar to study conducted by Kumar et al.<sup>8</sup> They conducted a hospital based study and included 244 cirrhotic patient. PHG was seen in 140 patients, they found out that different variable like ascites, high bilirubin, deranged prothrombintime, higher variceal grade, high Child-Pugh score, and high hepatic venous pressure gradient increase the incidence and severity of PHG. Similar results have been described by Merliet al<sup>6</sup> who showed that the natural progression of PHG is significantly influenced by the severity of liver disease and progression of PHG from mild to severe is seen more in Child-Pugh class B and C. Georgievskiet al<sup>4</sup> and Zardiet al<sup>7</sup> have described that the severity of PHG is associated with advanced phase of cirrhosis.

Results of our study are in contradiction to study of Merkel c et al<sup>16</sup>. According to them, derangements in liver functions and severity of liver disease do not

affect the occurrence or progression of PHG. According to them PHG is related to PHTN but PHTN is not the sole determinant of PHG. Similarly Curvelo et al<sup>17</sup> in their cross sectional study of cirrhotic patients have also concluded that there is no correlation between severity of PHG and Child Pugh class or the systemic hemodynamics according to them, local gastric mucosal factors are responsible for PHG.

About one fourth of the population suffering from HCV has concomitant diabetes. Diabetes is thought to have adverse effects on the progression of liver disease, which has been described by Elkrief<sup>18</sup> according to them diabetes is an independent risk factor for development of complications of chronic liver disease and hepatocellular carcinoma. On the contrary to the above study our study demonstrated that presence of diabetes has no effect on the severity of the Child Class.

As diabetes is thought to have a significant influence on the progression of liver disease, it also influences the progression of PHG adversely. This adverse effect of diabetes on PHG in cirrhotics has been demonstrated in our study. Similar results to our study have been demonstrated by Fontana RJ et al<sup>13</sup> their study was a follow up study of 514 cirrhotic patients and it demonstrated that PHG was a frequent occurrence in diabetic cirrhotics and severity of PHG was dependent upon progression of liver disease and presence of diabetes.

## CONCLUSION

Severe PHG is seen in higher grades of Child Pugh Class and PHG is more severe in diabetic cirrhotic.

**Limitation:** Limitations in our study is that the diabetic status of the patient before acquisition of the HCV or HBV is not known as Diabetes, insulin resistance and glucose intolerance are thought to be extra hepatic manifestations of hepatitis C virus and further research in this context is required.

## REFERENCES

1. Kaur H, Singh P, Pannu HS et al. To study the prevalence of impaired glucose tolerance in patients with hepatitis C virus related chronic liver disease. *J Clin Diagn Res.* 2015 Mar;9(3):OC16-20
2. Turon F, Casu S, Hernández-Gea V et al. Variceal and other portal hypertension related bleeding. *Best Pract Res Clin Gastroenterol.* 2013 Oct;27(5):649-64.
3. Primignani M, Dell'Era A, Fazzini L et al. Portal hypertensive gastropathy in patients with cirrhosis of the liver. *Recenti Prog Med.* 2001 Dec;92(12):735-40
4. Gjeorgjievski M, Cappell MS. Portal hypertensive gastropathy: A systematic review of the pathophysiology, clinical presentation, natural history and therapy. *World Hepatol.* 2016 Feb 8;8(4):231-62.
5. Gupta R, Saraswat VA, Kumar M. Frequency and factors influencing portal hypertensive gastropathy and duodenopathy in cirrhotic portal hypertension. *J Gastroenterol Hepatol* 1996; 11:728-733.
6. Merli M, Nicolini G, Angeloni S et al. The natural history of portal hypertensive gastropathy in patients with liver cirrhosis and mild portal hypertension. *Am J Gastroenterol.* 2004 Oct;99(10):1959-65.
7. Zardi EM, Ghittoni G, Margiotta D et al. Portal hypertensive gastropathy in cirrhotics without varices: a case-control study. *Eur J Gastroenterol Hepatol.* 2015 Jan;27(1):91-6
8. Kumar A, Mishra SR, Sharma P et al. Clinical, laboratory, and hemodynamic parameters in portal hypertensive gastropathy. *J Clin Gastroenterol.* 2010 Apr;44(4):294-300.
9. Gjeorgjievski M, Cappell MS. Portal hypertensive gastropathy: A systematic review of the pathophysiology, clinical presentation, natural history and therapy. *World J Hepatol.* 2016 Feb 8;8(4):231-62.
10. Mahar PS, Awan MZ, Manzar N. Prevalence of type-II diabetes mellitus and diabetic retinopathy. *J Coll Physicians Surg Pak* 2010; 20(8): 528-32.
11. Rahman S and Irfan Z. Prevalence of microvascular complications among diabetic patients. *Pakistan J Med Res* 2004; 43:163-68
12. Mason AL, Lau JY, Hoang N et al. Association of diabetes mellitus and chronic hepatitis C virus infection. *Hepatology.* 1999; 29:328-33.
13. Fontana RJ, Sanyal AJ, Ghany M et al. Development and progression of portal hypertensive gastropathy in patients with chronic hepatitis C. *Am J Gastroenterol.* 2011 May;106(5):
14. E. Eleftheriadis Portal hypertensive gastropathy a clinically significant puzzle *Annals Of Gastroenterology* 2001, 14(3):196-204.
15. American Diabetes Association. Standards of medical care in diabetes. *Diabetes Care.* 2005;28(suppl 1):s4-s36.
16. Merkel C, Schipilliti M, Bighin R et al. Portal hypertension and portal hypertensive gastropathy in patients with liver cirrhosis: a haemodynamic study *Dig Liver Dis.* 2003 Apr;35(4):269-74.
17. Curvêlo LA, Brabosa W, Rhor R et al. Underlying mechanism of portal hypertensive gastropathy in cirrhosis: A hemodynamic and morphological approach *Journal of gastroenterology and hepatology* 2009 Sep (9) 1541-1546 .
18. Elkrief L, Rautou PE, Sarin S et al. Diabetes mellitus in patients with cirrhosis: clinical implications and management. *Liver Int.* 2016 Jul;36(7):936-48.