Zagazig University Medical Journal
www.zumj.journals.ekb.eg

https://doi.org/10.21608/zumj.2022.123273.2485 Volume 29, Issue 3, May 2023

Manuscript ID ZUMJ-2202-2485 (R2)

DOI **10.21608/ZUMJ.2022.123273.2485**

ORIGINAL ARTICLE

Portal Hypertensive Gastropathy and Severity of Liver Disease in Patients with Liver Cirrhosis

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Submit Date 2022-05-20
Revise Date 2022-09-04
Accept Date 2022-07-22

ABSTRACT

Background: In individuals with liver cirrhosis, portal hypertensive gastropathy (PHG) is a complication of portal hypertension and one of the leading causes of gastrointestinal bleeding.

The modified Child's score (CTP) and the Model for end stage liver disease (MELD) score are used to determine the severity of liver disease in cirrhotic patients.

The goal of this study is to assess if there's a relation between PHG and the severity of liver disease.

METHODS: 300 patients with chronic liver disease were enrolled in the study. The degree of liver disease was determined in all patients using the (CTP) and MELD scores. Varices and PHG were discovered during an upper gastrointestinal endoscopy.

RESULTS: The number of patients evaluated was 300, with 72% of them being men and a mean age of 60 (45-66) years. Child's score revealed that 38% were Child B, 32% Child A, and 30% were Child C, with a median MELD score of 13 (11-18). During an upper endoscopy, it was discovered that 50% of the patients had significant esophageal varices, and 72% had severe PHG. PHG was substantially related to esophageal and fundal varices (P = < 0.001, 0.005), respectively. The presence and severity of PHG were positively correlated with the severity of chronic liver disease, measured by MELD, Child's score (P = < 0.001).

CONCLUSION: PHG were positively correlated with the severity of liver disease assessed by CTP and MELD scores.

Key words: Portal hypertensive gastropathy, Child's score, MELD score.

INTRODUCTION

Due to portal hypertension, one of the most common findings in cirrhotic patients is portal hypertensive gastropathy (PHG), which is defined by aberrant stomach mucosa that appears as a mosaic-like pattern with or without red patches. PHG is one of the etiologies of bleeding and anemia in cirrhotic individuals, with prevalence of anemia ranging from 20 to 98 percent. **[1,2]**. Modified Child's score and Model for end-stage liver disease (MELD) score are used to determine the severity of liver disease in cirrhotic patients. **[3,4]**.The goal of this study was to assess if there was a relation between PHG and the severity of liver disease.

METHODS

Between September and December2020, the study was done on 300 patients with chronic liver disease at Benha University Hospital and Benha Teaching Hospital, after all patients gave their informed consent. The study was approved by the Benha Faculty of Medicine's ethical committee. Clinical, laboratory, and ultrasound examinations were used to diagnose patients with chronic liver disease. HCC, P.V thrombosis, splenic vein thrombosis, and those taking beta blockers, NSAIDs, PPIs, or nitrates were all excluded. The history, clinical examination, and investigations were applied to all patients.

The following investigations were done to all patients:FBS, CBC, aspartate aminotransferase (AST), alanine aminotransferase (ALT), alkaline phosphatase (ALP), serum bilirubin (total, direct), albumin, prothrombin time (P.T), international normalised ratio (INR), and serum creatinine.The Modified Child's Pugh score and the MELD score

were used to determine the severity of liver disease.
- After preparation of the patient, upper gastrointestinal endoscopy was performed utilising a video scope (OLYMPUS Evis EXERA CLV-180, Tokyo, Japan) to look for the following:
* Esophageal varices (E.V.) were categorized as follows:- Grades I and II have been downgraded to small. Grades III and IV were classed as large for this study.
* Presence or absence of gastric varices.
* Portal hypertensive gastropathy (PHG): were reported using the modified grading system proposed by the Baveno III workshop on portal hypertension (Baveno, Italy (2000). **[5]**.

PHG is mild when a pink mosaic-like mucosal pattern with no red signs or black, brown spots.
PHG is severe when the mosaic-like mucosal pattern is red and superimposed by any red sign (red point lesions and/or cherry red spots) or black, brown spots.

STATISTICAL ANALYSIS

Software (SPSS, Version 26.0 for Windows) was utilized for statistical analysis. After determining their non-normality using the K-S test (One-Sample Kolmogorov-Smirnov Test), qualitative data was summarized as frequency and percentage, while quantitative data was summarized as median and inter-quartile range (IQR). Non-parametric quantitative variables were analyzed using the Kruskal-Wallis test and the Mann-Whitney U test. To investigate differences in frequency, the Chi square and Fischer exact tests were utilized. P 0.05 was used to determine whether differences were significant.

RESULTS

300 individuals were evaluated, with a median age of 60 (45-66) years and 72 percent of them being men. The majority of them were Child class B (38%) followed by child class A (32%) and, child C (30%). Their MELD score was 13 on average (11-18). An upper endoscopic examination revealed that 50% of the patients had significant esophageal varices, and PHG was discovered in 92 percentage of the patients (20% had mild PHG and 72% had severe PHG). **(Table 1).**
The distribution of PHG groups between male and female was not significantly different (P3=0.23). With aging, the severity of PHG increased, with a highly significant difference between mild and severe PHG. **(Table 2).** PHG was related to anemia, thrombocytopenia, hyperbilirubinemia, hypoalbunemia and increase INR level with statistically significant difference between the PHG groups (P= < 0.001) **(Table 3).**
PHG was highly related with oesophageal varices and fundal varices (P=< 0.001, < 0.005), respectively **(Table 4).** The presence and severity of PHG were positively correlated with the severity of chronic liver disease as assessed by MELD and Child's score (P = < 0.001). **(Table 5,6).**

Table (1): The characteristics of the studied patients:

Variables	N0. (300)	%
Gender		
Male	216	72
Female	84	28
Age (Median)	60 (54-66)	
Child's Score		
- Child A	96	32
- Child B	114	38
- Child C	90	30
MELD Median(IQR)	13 (11-18)	
Upper endoscopy		
Oesophageal varices		
No	66	22
Small	84	28
Large	150	50
Fundal varices	54	18
PHG		
No	24	8
Mild	60	20
Severe	216	72

MELD: Model for end stage liver disease, PHG: Portal hypertensive gastropathy.

Table (2): Characteristics of the studied patients according to PHG:

The study group (300) PHG	No(24)		Mild(60)		Severe (216)			P-value
	No.	%	No.	%	No.	%		
Gender Male Female	12 12	50 50	48 12	80 20	156 60	72.2 27.8	P1=0.006** P2=0.024* P3=0.23 P4=0.012*	0.022*
Age median (IQR)	50.5(50.0-63.75)		58.0 (52.0-63.0)		60.5 (54.25-66.75)		P1= 0.007** P2=<0.001** P3=0.008** P4=<0.001**	<0.001**

P1= no PHG & Mild PHG P2= no PHG & Severe PHG
P3= Mild PHG & Severe PHG P4= no PHG & PHG (Mild+ Severe)
*=sig at p<0.05 **= sig at p<0.01

Table (3): Laboratory investigations of the studied patients according to PHG:

The study group (300) PHG	No(24)		Mild(60)		Severe (216)		P1 P2 P3 P4	P-value
	No.	%	No.	%	No.	%		
HB gm/dl Median (IQR)	9.8 (7.23-12.45)		9.05 (7.6-9.8)		9.35 (8.75-10.28)		P1= 0.15 P2=0.50 P3=0.011* P4=0.38	0.034*
Platelets Median (IQR)	186.5 (120.75-231.25)		78.0(67.0-166.0)		77.5 (55.5-111.75)		P1=<0.001** P2=<0.001** P3=0.015* P4=<0.001**	<0.001**
S.creatinine Median (IQR)	1.0 (0.75-1.55)		1.1 (0.9-1.5)		1.0 (0.9-1.35)		P1= 0.47 P2=0.78 P3=0.32 P4=0.69	0.57
T bilirubin Median (IQR)	0.8 (0.7-0.98)		1.55 (1.2-3.0)		2.1 (1.3-3.38)		P1= <0.001** P2=<0.001** P3=0.08 P4=<0.001**	<0.001**
S. albumin Median (IQR)	3.85(3.63-4.0)		3.0 (2.7-3.2)		3.0 (2.53-3.2)		P1= <0.001** P2=<0.001** P3=0.82 P4=<0.001**	<0.001**
INR Median (IQR)	1.1(1.1-1.33)		1.4 (1.4-1.5)		1.4 (1.2-1.75)		P1= <0.001** P2=<0.001** P3=0.51 P4=<0.001**	<0.001**

Table (4): Endoscopic findings among patients according to PHG:

The study group (300) PHG	No(24)		Mild(60)		Severe (216)		P1 P2 P3 P4	P-value
	No.	%	N0.	%	No.	%		
Oesophageal varices No Small Large	18 0 6	90 0 10	18 12 30	30 20 75	30 72 114	13.9 33.3 52.8	P1=<0.001** P2=<0.001** P3=0.007** P4=<0.001**	<0.001**
Fundal varices	0	0	6	10	48	22.2	P1=0.18 P2=0.006** P3=0.035* P4=0.011*	0.005**

Table (5) PHG according to Child's score and MELD score among patients:

The study group (300) PHG	No(24)		Mild(60)		Severe (216)		P1 P2 P3 P4	P-value
	No.	%	N0.	%	No.	%		
Child's score A B C	24 0 0	100 0 0	18 36 6	30 60 10	54 78 84	25 36.1 38.9	P1=<0.001** P2=<0.001** P3=<0.001** P4=<0.001**	<0.001**
MELD Median (IQR)	9.0 (7.5-12.0)		14.0 (10.0-18.0)		13.0 (11.0-20.75)		P1=<0.001** P2=<0.001** P3=0.67 P4=<0.001**	<0.001**

Table (6): Correlation between PHG, MELD and child score:

PHG	Correlation coefficient	P value
MELD	0.754	<0.001**
Child score	0.237	<0.001**

DISCUSSION

portal hypertensive gastropathy(PHG) is a common endoscopic finding in cirrhotic individuals due to an imbalance between mucosal protective systems and harmful factors caused by portal hypertension. Furthermore, inflammatory response, liver functions impairment, local vascular tone, endotoxins, and stomach mucosal permeability may all play a role in the development of PHG. PHG has been related to the severity of liver disease or portal hypertension in several studies [6,7]. The goal of this study was to assess if there was a relation between PHG and the severity of liver disease.

PHG was found in 92 percent of the patients in this study, with 20 percent having mild PHG and 72 percent having severe PHG. Many studies, including **Cavelo et al., 2009[8], Kim et al., 2010[9], and Bang et al., 2016[10],** reported that PHG was identified in 93.4%, 90.1%, and 91.5% of the patients respectively.

PHG was related to anemia with a significant difference between PHG groups (P3=< 0.001), which was consistent with **Bang et al., 2016[10], Simbrunner et al., 2020[2]**, who found that the degree of anemia increased with the severity of PHG. Also, There was a significant relation between PHG and thrombocytopenia, hyperbilirubinemia, hypoalbunemia and increase INR level (P= < 0.001) these results were consistent with **Nishino et al., 2022[11]**.

PHG was substantially related to the frequency and severity of esophageal and fundal varices. **Bayraktar et al., 1996[12]**, and **Primignani et al., 2000[13]** observed similar findings. On contrary **Gupta et al.,1996[14]** and **Dong et al., 2003[15]** found that no relation between PHG and the grade of varices but these studies applied on small groups

of patients. This study found that PHG occurrence and severity are related to the severity of liver disease as assessed by modified Child-Pugh (CTP) and MELD scores (p=< 0.001), which supports the findings of **Bang et al., 2016[10] and Kim et al., 2010[9],** who suggested that PHG could be used as a prognostic indicator. Furthermore, higher CTP score was an independent risk factor for severe PHG, according to **Simbrunner et al., 2020[2] and Tiwari et al., 2019[16].**

CONCLUSION

PHG were positively correlated with the severity of liver disease assessed by the Child-Pugh (CTP) and MELD scores.

Acknowledgment: We would like to thank all colleagues who helped us in conducting this work.
Funding: None

Conflict of interest: None

Author contribution: All authors shared in conception of the idea, searching the literature, drafting the manuscript and all of them approved the final manuscript.

Ethical Approval: A written informed consent was taken from all included patients, and the study was approved by the Ethical Committee of our institution.

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To Cite:
Youssef, M., rashad, G., Portal Hypertensive Gastropathy and Severity of Liver Disease in Patients with Liver Cirrhosis. *Zagazig University Medical Journal*, 2023; (949-953): -.doi: 10.21608/ZUMJ.2022.123273.2485.