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TO STUDY PORTAL HAEMODYNAMICS AS A PREDICTOR OF OESOPHAGEAL VARICES IN CIRRHOTIC PATIENTS IN TAMILNADU

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ABSTRACT

To evaluate the relationship of Doppler parameters of hepatic and portal vasculature, hepatic vein wave forms with presence and size of oesophageal varices in cirrhotic patients. A cohort of cirrhotic patients identified by clinical, laboratory and radiological parameters were evaluated. They were investigated for oesophageal varices by oesophagoduodenoscopy and by Doppler ultrasound. The relation between the presence and size of oesophageal varices and Doppler parameters were studied. Fifty two patients were enrolled in this prospective study. There were 44 male and 8 female patients. 23 patients were in Child Pugh Class C , 16 in Child Pugh Class B and 13 in Child Pugh Class A. Small oesophageal varices were associated with monophasic wave forms in 19.4%. biphasic wave forms in 38.7%, triphasic wave forms in 41.9%. Large oesophageal varices were associated with monophasic wave forms in 42.1%. biphasic wave forms in 52.6%, triphasic wave forms in 6.3%. The p- value was statistically significant with 0.013 [p <0.05]. Spleen size greater than 15.3 was associated with large oesophageal varices which was statistically significant, none of the Doppler parameters were statistically significant for large oesophageal varices. Our study data suggested that monophasic hepatic vein wave forms, splenic artery resistivity index, and spleen size greater than 15. 3 cms were related with presence of large oesophageal varices. These parameters may help in targeted identification of patients with large oesophageal varices and aid in their management.

Key words: Cirrhosis, Doppler ultrasound, Hepatic vein wave forms, Oesophageal varices.

INTRODUCTION

Portal hypertension is the most common and dreaded complication of chronic liver disease. It is responsible for the development of gastroesophageal varices, variceal hemorrhage, ascites, renal dysfunction, portosystemic encephalopathy, hypersplenism, and hepatopulmonary syndrome. Bleeding from ruptured oesophagogastric varices is a major complication of portal hypertension and a frequent cause of death. Only 40% of Child pugh class A patients have varices, while they are present in 85% of Child pugh class C patients [1].

In the cirrhotic patients without varices at first endoscopy, the annual incidence of new varices is at mean of 7%, ranging from 5 to 10% [2]. A hepatic venous pressure gradient over 10 mm Hg is the strong predictor for the development of oesophageal varices. Once developed, varices progress in size from small to large before they eventually rupture and bleed. Studies assessing the progression from small to large varices have showed rates of progression of varices ranging from 5 to 30% per year. [3]

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Changes in hepatic vein pressure gradient (either spontaneous or caused by drug therapy or transjugular intrahepatic porto systemic shunts) are usually accompanied by parallel variations in the size of the oesophageal varices, which is significantly reduced when HVPG decreases below 12 mm Hg. [4]

Oesophageal variceal bleeding related to portal hypertension is the second most common cause of severe upper gastrointestinal bleeding (after peptic ulcer disease). The acute mortality rate with each bleed is approximately 30%, and the long-term survival rate is less than 40% after one year with medical management alone. Despite advances in medical therapy, endoscopic hemostasis and portosystemic shunt procedures overall long-term survival rates have not improved for patients with variceal bleeding. Liver transplantation, however can improve the survival in selected patients. Survival in nontransplanted patients with variceal bleeding is heavily influenced by the severity of underlying liver disease, with poorer survival rates for patients with Child-Pugh class C cirrhosis than for those with Child class A or B cirrhosis.

A combination of beta blockers and variceal band ligation is probably the best treatment option, especially in patients who have bleeding. Patients who rebleed despite combined endoscopic and pharmacologic treatment may be treated by transjugular intraheptic or surgical portosystemic shunting. TIPS is the only option in nonsurgical candidates. All Child–Pugh class C patients should be considered for liver transplantation.

The role of non invasive markers in prediction of oesophageal varices in patients with cirrhosis was evaluated in various studies [5]. However, the usefulness of these markers in clinical use is still unclear. Doppler ultrasonography allows us to examine haemodynamics of abdominal vessels including the hepatic and portal system. Thus, many investigators have attempted to confirm the usefulness of Doppler ultrasound in assessing portal hypertension in cirrhotic patients. In particular, it would be highly desirable to have any Doppler parameter be a suitable substitute for the invasive current gold standard of measuring hepatic venous pressure gradient for assessing portal hypertension.

Predicting the grade of varices by noninvasive methods at the time of diagnosis is likely to predict the need for prophylactic beta blockers and band ligation as treatment for the varices. Therefore the present study has been undertaken to determine the appropriateness of Doppler parameters of portal vasculature and hepatic vein wave forms in predicting the existence and grading of the oesophageal varices.

Aim and Objectives of the Study

To evaluate the relationship of Doppler parameters of hepatic and portal vasculature, hepatic vein wave forms with presence and size of oesophageal varices in cirrhotic patients.

MATERIALS AND METHODS

The study included consecutive patients with liver cirrhosis admitted in our institution Department of General Surgery , Bhaarath Medical College and Hospital, Chennai, which is a major tertiary care centre for liver diseases .

Patients were included in this study after their willingness to undergo necessary investigations. Informed written consent was taken before the enrollment in this study. The period of study is from September 2011 to February 2012.

Ethical committee approval was obtained for the study purpose.

Inclusion Criteria

Patients aged between 18 and 80 years with clinical, laboratory and radiological features of cirrhosis and portal hypertension

Exclusion criteria

- Patients on diuretics, beta blockers.
- Previous surgical interventions for portal hypertension.
- Previous Endoscopic sclerotherapy/ Endoscopic variceal band ligation therapy / TIPS.
- Presence of portal vein thrombosis.
- Presence of hepatocellular carcinoma.
- Active gastrointestinal bleed on admission.
- Advanced comorbidity for endoscopy.

Clinical evaluation

In the study group, diagnosis of cirrhosis was done on the basis of clinical, laboratory and radiological parameters. The grading of ascites was done as mild, moderate and severe and the grading of hepatic encephalopathy was done by applying West Haven criteria.

Laboratory Investigations

Haematological investigations like haemoglobin, WBC count, platelet count, prothrombin time , bilirubin (total , direct, indirect), total protein albumin and globulin , alanine aminotransferase , aspartate aminotransferase, HBsAg and Anti HCV were performed for all patients. Tests for autoimmune liver disease, haemochromatosis and Wilson disease were done only if clinical situation warranted the study. Ascitic fluid analysis was done for estimation of serum ascites albumin gradient. Child pugh score was calculated using the clinical and laboratory parameters.

Doppler Ultrasound

The patients in the study group were kept under overnight fasting . The Doppler ultrasound was done with the patient in the supine position during quiet respiration. The following Doppler factors were recorded by the same

equipment (with a 3 - 5 MHz curvilinear linear - array transducer) and by the same operator for all patients.

- Portal vein flow velocity as time average maximal velocity in cm/s [6]
- (2)Portal vein diameter
- Portal vein cross sectional area
- (4)Hepatic artery resistance index (systolic velocity - end diastolic velocity)/systolic velocity];
- (5) Splenic artery RI measured (systolic velocity - end diastolic velocity)/systolic velocity
- (6) Hepatic artery pulsatility index - (systolic velocity - end diastolic velocity)/ mean systolic velocity[7]
- (7) spleen size as length in its longest axis

The following indices were calculated:

(1) Liver vascular index as the ratio of portal venous velocity to hepatic
arterial pulsatility index[8]

(2) Congestion index (CI) of the portal vein was calculated by dividing portal vein cross-sectional area by mean portal vein velocity[9]. Mean velocity was calculated as the time-averaged maximal velocity multiplied by 0.57.

The hepatic vein wave forms were measured in the right hepatic vein (RHV) since it drains into inferior venacava in about 85% cases[10]. Doppler waveforms were divided into three types namely triphasic, biphasic and monophasic.

Ascites

Presence of ascites was determined clinically as well as by ultrasound.

Endoscopic features

All the patients were subjected to oesophagoduodenoscopy after an overnight fasting. Oesophageal varices were graded as small if they are less than 5 mm and large if they are greater than 5 mm[1]. Red signs if present were noted over the oesophageal varices.

Gastric varices if present, were typed according to their position and graded as small if less than 10 mm, medium if size is between 10 to 20 mm and large if greater than 20 mm. Portal hypertensive gastropathy was graded as mild and severe.

STATISTICAL ANALYSIS

Data were analyzed with SPSS version 15. Descriptive statistics including means, standard deviations, and frequencies were analysed. The chi square test was used to compare differences. Values were considered significant if $P < 0.05$ (95% CI). Presence and grade of oesophageal varices was predicted using the logistic regression equation

RESULTS

A total number of fifty two (52) patients were included in the study. Of those, 44(84.6%) were male and 8 (15.4%) were female. The preponderance of male in this study group was attributed to the etiology of the cirrhosis the most common being ethanol induced.

The symptom duration in the patients varies between 15 to 90 days. Ascites was clinically present in 41 of patients and jaundice was present in 30 of patients. About 37 patients had hepatic encephalopathy at presentation.

The majority of the patients were Child Pugh class C 23 (44.2%). Patients with Child Pugh A were 13 (25%) and Child Pugh B constituted 16 (30.8%) the rest of the study group.

Oesophageal varices were present in 50 patients of which 31 had small varices (59.6%) and 19 (36.5%) had large varices . Gastric varices was present only in 3 (5.8%)patients.

34 patients had portal hypertensive gastropathy, among which 4(7.7%) had severe and the rest of 30(57.7%) had mild grade.The majority of patients in this study were belong to alcoholic cirrhosis which constitutes of about 63.4%, Hepatitis B - 19.2%, Hepatitis C - 1.9% .

Small oesophageal varices were associated with monophasic wave forms in 19.4%. biphasic wave forms in 38.7%, triphasic wave forms in 41.9%. Large oesophageal varices were associated with monophasic wave forms in 42.1%. biphasic wave forms in 52.6%, triphasic wave forms in 6.3%. The p- value was statistically significant with 0.013 [p <0.05] Table -1.

Correlation of hepatic vein wave forms with gastric varices:

Gastric varices absent were associated with monophasic wave forms in 26.1%. biphasic wave forms in 42.9%triphasic wave forms in 30.6%.Gastric varices present were associated with all the three forms are equal (33.3%).p-value was not significant for gastric varices and portal hypertensive gastropathy.

Correlation of Hepatic Vein Wave Forms with Portal Hypertensive Gastropathy:

Mild Portal Hypertensive Gastropathy was associated with monophasic wave forms in 33.3%. biphasic wave forms in 40%, triphasic wave forms in 26.7%. Severe Portal Hypertensive Gastropathy was associated with monophasic wave forms in 50%. Biphasic wave forms in 25%, triphasic wave forms in 25%.

Correlation of Hepatic Vein Wave Forms With Child Pugh Score

CTP-A were associated with monophasic wave forms in 21.4%. biphasic wave forms in 13.6%, triphasic wave forms in 43.8%. CTP-B were associated with monophasic wave forms in 35.7%. biphasic wave forms in 27.3%, triphasic wave forms in 31.3%. CTP-C were associated with monophasic wave forms in 42.9%. biphasic wave forms in 59.1%, triphasic wave forms in 25%. Spleen size greater than 15.3 was associated with

large oesophageal varices which was statistically significant P<0.05.

Table 1: Correlation of hepatic vein wave forms with o. Varices

ESOVARIX		HEP.VEIN WAVEFORMS			Total
		Mono	Bi	Tri	
NO VARIX	Count	0	0	2	2
	% within ESO VARIX	.0%	.0%	100.0%	100.0%
	% within HEP.VEIN WAVEFORMS	.0%	.0%	12.5%	3.8%
SMALL VARIX	Count	6	12	13	31
	% within ESO VARIX	19.4%	38.7%	41.9%	100.0%
	% within HEP.VEIN WAVEFORMS	42.9%	54.5%	81.3%	59.6%
LARGE VARIX	Count	8	10	1	19
	% within ESO VARIX	42.1%	52.6%	5.3%	100.0%
	% within HEP.VEIN WAVEFORMS	57.1%	45.5%	6.3%	36.5%
TOTAL	Count	14	22	16	52
	% within ESO VARIX	26.9%	42.3%	30.8%	100.0%
	% within HEP.VEIN WAVEFORMS	100.0%	100.0%	100.0%	100.0%

Table 2: Association between depression and duration of dialysis, co-morbidities

Demographic variable	**categories**	**Total patients(n=75)**	**Depression (n=57)**	**p value**
Duration of dialysis	<28months >28 months	35(46.6) 40(46.6)	27(47.3%) 30(52.6)	0.562
Diabetes mellitus	Present absent	70(93.3) 5(6.6)	55(96.4) 2(3.5)	0.001*
Hypertension	Present Absent	55(73.3) 20(26.6)	47(82.4) 10(17.5)	0.061
Hepatitis B virus	Present Absent	10(13.3) 65(86.6)	9(15.7) 48(84.2)	0.020
Hepatitis C virus	Present Absent	5(6.6) 70(93.3)	7(12.2) 50(87.7%)	0.524
HIV	Present Absent	0 75(100)	0 57(100)	

DISCUSSION

The observed significant association between age and depression indicates that individuals aged over 50 years are more prone to depressive symptoms. This finding is consistent with existing literature that highlights the heightened vulnerability of older individuals to mental health challenges in the context of chronic illnesses [14].

The absence of a significant association between sex and depression suggests that, within this patient cohort, gender may not be a major determinant of depressive symptoms. This finding contrasts with some studies that indicate varying prevalence rates between males and females in the general population (Areán et al., 2005).

The lack of a significant association between marital status and depression is intriguing, as it suggests that being married or unmarried may not be a decisive factor in the development of depressive symptoms in individuals undergoing maintenance hemodialysis. This nuanced understanding challenges certain stereotypes and warrants further exploration [15-16].

The overwhelming association between unemployment and depression is a noteworthy observation. This highlights the potential impact of employment status on mental health, emphasizing the need for interventions targeting unemployed individuals in this patient population.

The non-significant association between education and depression indicates that, within this cohort, the level of education may not be a prominent factor influencing the occurrence of depressive symptoms. This finding differs from some studies that suggest a potential link between lower education levels and increased susceptibility to depression.

The lack of a significant association between the mode of expense and depression suggests that the source of financial support for dialysis may not be a determining factor in the prevalence of depressive symptoms. However, the non-significant p-value warrants further investigation, considering the potential impact of financial stress on mental health.

The non-significant association between the duration of dialysis and depression implies that, within the observed range, the length of time undergoing hemodialysis may not be a significant factor contributing to depressive symptoms.

This finding contradicts some literature suggesting a potential increase in mental health challenges with prolonged treatment duration. Previous studies suggested the significant association between diabetes mellitus and depression is a critical finding. It aligns with existing evidence highlighting the intricate relationship between diabetes and mental health challenges, emphasizing the need for integrated care strategies for patients with both conditions. The non-significant associations between hypertension, hepatitis B, hepatitis C, and HIV with depression suggest that these specific co-morbidities may not be major contributors to the prevalence of depressive symptoms in this patient population.

CONCLUSION

This study provides a comprehensive examination of the socio-demographic and clinical factors associated with depressive symptoms among patients undergoing maintenance hemodialysis. The findings underscore the nuanced nature of these associations and highlight the significance of factors such as age, employment, and diabetes mellitus in influencing mental health outcomes.

These insights have implications for tailored interventions aimed at addressing the unique mental health needs of this vulnerable patient population. The non-uniform impact of socio-demographic and clinical factors on depression emphasizes the importance of personalized care strategies in the management of individuals undergoing maintenance hemodialysis. Further research is warranted to explore additional factors and longitudinal trends, ultimately contributing to the refinement of holistic care approaches for this patient cohort.

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