http://jmscr.igmpublication.org/home/
ISSN (e)-2347-176x ISSN (p) 2455-0450
crossref DOI: https://dx.doi.org/10.18535/jmscr/v7i10.21

IGM Publication
Journal Of Medical Science And Clinical Research
An Official Publication Of IGM Publication

The Splenic Size (Antero-Posterior Diameter) & Portal Vein Diameter as Noninvasive Tool: For Identification Size of Oesophageal Varices in Cirrhosis of Liver

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Abstract
Objective: *In this study our main goal is to evaluate the splenic size (antero-posterior diameter) & portal vein diameter as noninvasive tool: for identification size of oesophageal varices in cirrhosis of liver.*
Methodology: *This Cross-sectional comparative study conducted at the Department of Hepatology Bangabhandhu Sheikh Mujib Medical University (BSMMU) from Jan 2010 to Dec 2011 where 50 Patients with cirrhosis of liver attending the department of Hepatology, BSMMU were included as a population in this study.*
All the data was checked and edited after collection. It was expressed as Mean and SD. Data has been analyzed by ANOVA. p value of less than 0.05 was considered statistically significant. Statistical analysis was done by using SPSS-15 (Statistical package for social sciences) win version 15 software programme.
Results: *During the study, where the highest frequency of cirrhosis patients was found at Child-Pugh Class C (Frequency 22). Where mean of portal vein diameter was 11.7200 mm in diameter. Also, one-way ANOVA test to asses relation of portal vein diameter with different grades of Oesophageal varices (Bonferoni) was done but the results were not significant (P values were >0.05).*
Conclusion: *from our result we can conclude that, if ultrasonographically measured portal vein diameter and antero-posterior splenic measurement can predict the size of oesophageal varices in patients with cirrhosis in our population and could be used as a predictor of large size varices. Analysis showed that there was no significant difference between mean portal vein diameter of different grades of oesophageal varices as well as with different mean of splenic anteroposterior measurement of different sizes of OV.*
Keywords: *Oesophageal varices, Portal vein diameter, Splenic length (antero-posterior).*

Introduction

Portal hypertension (PHT) is responsible for the more severe and often lethal complications of cirrhosis such as bleeding oesophageal varices, ascites, renal dysfunction and hepatic encephalopathy. Because of the combined impact

of these complications, PHT remains the most important cause of morbidity and mortality in patients with cirrhosis.

Portal hypertension (PHT) is characterized by an increase in portal vein pressure as a result of impediment to portal flow. Depending on the level of impediment, PHT is classified as prehepatic, intrahepatic or post hepatic. Intrahepatic PHT is most often caused by cirrhosis.

According to Ohm's law ($\Delta P=Q \times R$), changes in portal venous pressure are proportional to alterations in blood flow and resistance. In the normal liver, intrahepatic resistance changes with variations in portal blood flow, thereby keeping portal pressure within normal limits. In cirrhosis, however, both intrahepatic resistance and splanchnic blood flow are increased. The initiating factor is an increase in intrahepatic vascular resistance (IHVR), whereas the increase in splanchnic blood flow is a secondary phenomenon that maintains or worsens the increased portal pressure and gives rise to the hyperdynamic systemic state, characterized by an increased heart rate, cardiac output, plasma volume and a low overall vascular resistance. [1][2][3]

In this study our main goal is to evaluate the splenic size (antero-posterior diameter) & portal vein diameter as noninvasive tool: for identification size of oesophageal varices in cirrhosis of liver.

Objective

General Objective

- To assess the splenic size (antero-posterior diameter) & portal vein diameter as noninvasive tool: for identification size of oesophageal varices in cirrhosis of liver.

Specific Objective

- To detect Child-Pugh class among the study population
- To identify frequency of Portal vein diameter and Splenic length.

Methodology

Type of study	Cross-sectional comparative study.
Place of study	Department of Hepatology Bangabandhu Sheikh Mujib Medical University (BSMMU).
Study period	January 2017 to December 2018
Study population	50 Patients with cirrhosis of liver attending the department of Hepatology, BSMMU were included as a population in this study.
Sampling technique	Non probability convenience sampling technique

Inclusion Criteria

Patients with cirrhosis of liver with presence of varices, irrespective of a etiology, sex and age range between 15-75 years, attending the department of Hepatology, BSMMU:

- Clinical and biochemical features suggestive of chronic liver disease.

Plus

- Ultrasonographic evidence of small / coarse echotexture of liver
- Endoscopic evidence of oesophageal varices.

Exclusion Criteria

- Patients who received EVL therapy.
- Patients who received sclerotherapy.
- Active or recent GI bleeding within two weeks
- Hepatic coma
- Portal vein thrombosis.
- Non-cirrhotic portal hypertension.
- Cirrhosis of liver with any other severe co-morbid conditions.
- Patients getting beta-blocker.
- Severe cardiac failure
- Bronchial asthma

- COPD
- Severe renal insufficiency.
- Who refused to give consent to be included in the study.

Study Procedure

Patients were evaluated by detailed history and all patients were clinically examined and findings were recorded on the clinical information data sheet. Patients suggestive of cirrhosis and patients with prior diagnosis of cirrhosis were provisionally selected for the study. These patients underwent liver function tests- S. bilirubin, Prothrombin Time, Albumin; USG of whole abdomen, endoscopy of upper GIT. USG was done by using 3.5 Mega Hartz Transducer with Mitsubishi-CP77ODW USG Machine. The findings of laboratory investigations, Endoscopy and ultrasound was recorded. For each patient ultrasound examination of abdomen for splenic size, ascites and portal vein diameter was done. Relevant investigations to find out the cause of cirrhosis such as serological marker of HBV, HCV were also done. Previously diagnosed cirrhotic patients were also evaluated thoroughly by relevant physical examinations, investigations and reviewing previous documents. History of any EVL or sclerotherapy for varices was sought in these patients. History of active or recent (within 14 days) GI bleeding was noted in all patients.

Data Analysis

All the data was checked and edited after collection. It was expressed as Mean and SD. Data has been analyzed by ANOVA. p value of less than 0.05 was considered statistically significant. Statistical analysis was done by using SPSS-15 (Statistical package for social sciences) win version 15 software programme.

Results

In figure-1 shows age distribuation of the patients where most of the patients belong to 41-50 years age group, 24% followed by 22% in 31-40 years age group and 51-60 years age group. The following figure is given below in detail:

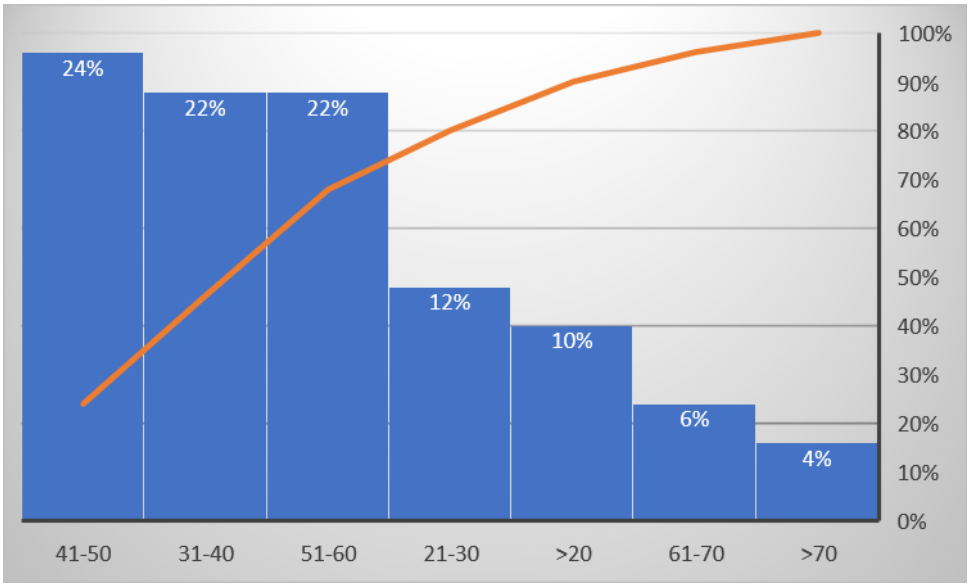

Figure-1: Age distribution of the patients.

In figure-2 shows gender distribution of the patients where only 18% patients were female. The following figure is given below in detail:

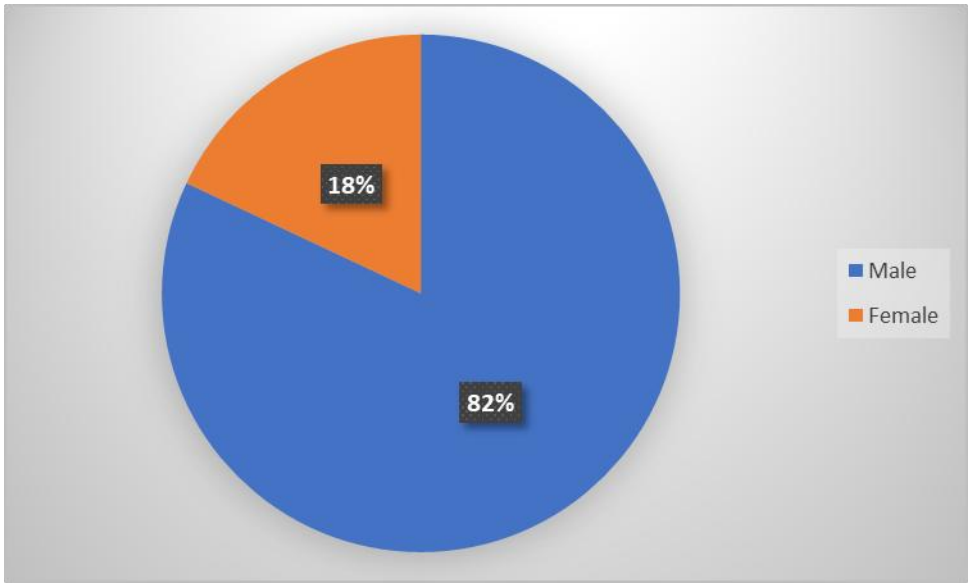

Figure-2: Gender distribution of the patients.

In figure-3 shows distribution of Child-Pugh class among the study population where the highest frequency of cirrhosis patients was found at Child-Pugh Class C (Frequency 22). The following table is given below in detail:

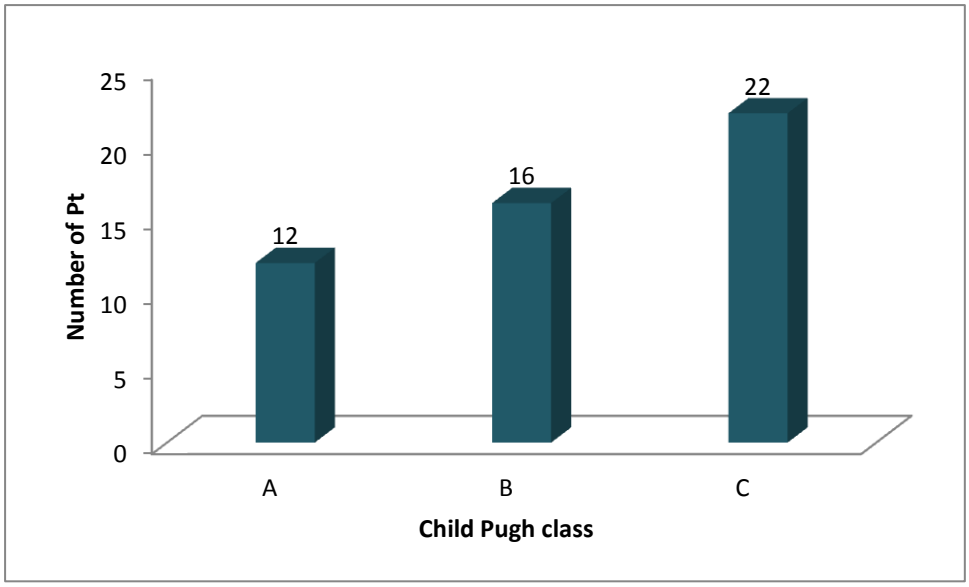

Fig-3: Distribution of Child-Pugh class among the study population

In table-1 shows frequency of Portal vein diameter and Splenic length where mean of portal vein diameter was 11.7200 mm in diameter. The following table is given below in detail:

Table -1: Frequency of Portal vein diameter and Splenic length

variable	portalvein diameter in mm	splenic length in cm
Mean	11.7200	13.3780
Median	11.2500	13.0000
Mode	12.00	13.00
Std. Deviation	2.75962	2.02266
Minimum	6.60	9.50
Maximum	18.00	18.30

In table-2 shows one-way ANOVA test to asses relation of portal vein diameter with different grades of Oesophageal varices (Bonferoni) but the results were not significant (P values were >0.05). the following table is given below in detail:

Table -2: One-way ANOVA (Bonferroni) test to asses relationship between Portal vein diameter with different grades of Oesophageal varices.

Oesophageal varices	Number of Patient	Mean portal vein diameter	Oesophageal varices	Number of Patient	Mean portal vein diameter	P value
Grade-1	n = 11	10.62±1.85	Grade-2	n =13	10.74±2.40	1.000
			Grade-3	n = 26	12.67±2.97	0.106
Grade-2	n =13	10.74±2.40	Grade-3	n =26	12.67±2.97	0.105

P <0.05 cosidered as significant.

Discussion

In current study, the splenic size & portal vein diameter was assessed as noninvasive marker for predicting size of oesophageal varices in 50 cirrhotic patients. Patients attended at OPD and indoor of department of Hepatology, BSMMU, Dhaka during study period. Several similar studies to predict oesophageal varies have been conducted abroad. Researchers used different inclusion and exclusion criteria, but they analyzed nearly similar parameters.[6][7]

Based on Child Classification, Child A were 12 patients(24%),Child B 16 patients(32%),Child C 22 patients(44%), while another study was reported that, Child A 22%,Child B 48%, Child C 30%. Here, highest frequency among Child C, because people used to get admission in hospital only after more severe disease.[7]

One way ANOVA test to asses relation of Portal vein diameter with different grades of Oesophageal varices(Bonferoni) was done but the results were not significant (P values were >0.05).

Traditionally, enlargement of the PV has been considered a sign of portal hypertension. However studies have shown that threshold PV diameter of greater than 13 or 15 mm have sensitivity for diagnosing portal hypertension of 40 and 12.5% respectively.[6] In fact, it has been noted angiographic ally that the diameter of the portal vein does not increase with the porto-hepatic venous pressure gradient and may even tend to decrease depending on the severity of the hypertension.

Furthermore, with the development of reversed portal vein flow (hepato fugal flow) and or portosystemic shunts the portal vein may not be a reliable indicator of portal hypertension. However, BMI may influence portal vein diameter, spleen size and liver size. Another study found significant correlation between clinical and ultrasound evaluation of the liver size according to body mass index (BMI).[5][6]

In some studies they found significant relation between dilated portal vein and splenic length with oesophageas varices. Another was found portal vein diameter at cut off value 13mm, sensitivity and specificity was respectively 77.2% and 86.22%. Johana prihatini et al 2005 found portal vein diameter at cut off value 11.5 mm, the sensitivity and specificity was 75% and 54.5% respectively. At cut off value of anteroposterior splenic measurement 10.3 cm, the sensitivity and specificity was 83.3% and 63.3% respectively. [7][8]

Conclusion

From our result we can conclude that, if ultrasonographically measured portal vein diameter and antero-posterior splenic measurement can predict the size of oesophageal varices in patients with cirrhosis in our population and could be used as a predictor of large size varices. Analysis showed that there was no

significant difference between mean portal vein diameter of different grades of oesophageal varices as well as with different mean of splenic anteroposterior measurement of different sizes of OV.

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