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Assessment of Portal Vein Diameter (PVD) for Predicting Esophageal Varices (EV) in Cirrhotic Patients

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ABSTRACT

Objective: To assess the diameter of the portal vein for predicting esophageal varices (EV) in a group of cirrhotic patients. **Study Design:** Cross sectional study. **Place and Duration of Study:** Study was conducted in Medical Department of Services Hospital from December 2008 to June 2009. **Material and Methods:** One hundred and eighty cirrhotic patients with age range 20-60 years were admitted in Medical Department of Services, Lahore, to analyse, assess and document, the diameter of portal vein as a non invasive parameters taken by ultrasonography to predict esophageal varies in cirrhotic patients. It was confirmed by endoscopy taken as gold standard. **Results:** Portal vein diameter (PVD) has mean sensitivity of 98.5%, specificity of 90.2%, diagnostic accuracy of 96.6%, positive predictive value of 97.1% and negative predictive value of 94.8% in detecting EV. Positive percentage of EV via endoscopy was 78.3%. On the other hand positive percentages of EV via PVD was 76.1%. **Conclusion:** It is therefore concluded that patients of chronic liver disease of any etiology can be screened for esophageal varices using PVD as a non invasive parameters.

Key Words: Portal vein diameter, esophageal varices, cirrhosis.

INTRODUCTION

Esophageal varices (EV) are the most significant complications of cirrhosis accounting to 20%[1,2]. Bleeding of EV is a major complication of portal hypertension. Cirrhosis results from chronic liver disease with damage to hepatocytes and resulting in irreversible fibrosis. It gradually leads to liver failure and portal hypertension. Portal hypertension is hallmarked of cirrhosis defined as portal pressure greater than 5 mmHg[3]. In portal hypertension portosystemic collaterals, decompress portal circulation and give rise to varices.

The prevalence of EV in Pakistan is 65%[4]. Increasing size of varices is associated with an increase in variceal-wall tension to a critical level at which varices rupture and cause life-threatening bleeding. The mortality rate from variceal bleeding is about 20% when patients are treated optimally in hospital[5]. Incidence of first variceal hemorrhage ranges from 20 to 40% within two years. Recurrent bleeding occurs in 30 to 40% of patients within the next two to three days and in upto 60% within one week. Thus, prevention of EV bleeding remains at the forefront of long-term management of cirrhotic patients[6].

The incidence of bleeding can be reduced by endoscopic screening but it is unpleasant for the patients and is costly. Diagnosis of EV may improve management of cirrhotic patients by screening[7,8]. According to a Pakistani study portal vein diameter (PVD) >11mm were associated with varices[4]. Other studies documented, PVD of 1.5cm, 75% sensitivity and 54.5% specificity as a predictive factor for EV in cirrhotic patients. Bleeding in such patients is fatal[9,10,11].

Predicting the presence of EV through non-invasive means may reduce a large number of unnecessary endoscopies. Upper GI endoscopy is the most common method of diagnosing varices. Different classification are used to described varices in terms of red colors, size and location, but its useful to evaluate in terms of those which require intervention, that include small which do not warrant intervention and large which do need[12].

The PVD may be proposed as a safe guard means to improve management of cirrhotic patients prior to endoscopic screening.

Aim of this study is to explore non invasive means *i.e.* portal vein diameter to diagnose esophageal varices and thus improve management of liver cirrhosis.

MATERIAL AND METHODS

A cross sectional study was conducted in Department of Medical-II and OPD, Services Hospital Lahore from December 2007-2008 on 180 patients age range 20-60 year. It was conducted by non probability purposing sampling techniques. Both genders with evidence of cirrhosis on clinical, laboratory and abdominal ultrasonography were taken into consideration.

Exclusion criteria

1. Past history of bleeding like malena
2. Patients already on prophylaxis for EV.
3. Patients receiving drugs like interferon,
4. Patients with co-morbid disease i.e. autoimmune or ischemic heart disease.

Data analysis

Data was collected on predesigned sheets in 180 cirrhotic patient after taking consent. The collected data was entered into SPSS version 16 and analyzed through its statistical package. The demographics like age and sex were presented as mean and standard deviation. The final outcome was presented by calculating frequency and percentage.

RESULTS

One hundred and eighty patients admitted in Services Hospital, Lahore and fulfilling the inclusion criteria were included in this study.

The mean age of the patients 50.2±10.5 years. There were 9 (0.5%) patients in the age range of 20-30 years, 21 (11.7%) patients in the age range of 31-40 years, 67 (37.2%) patients in the age range of 41-50 years and 70 (46.1%) patients in the age range of 51-60 years (Table 1).

Regarding sex distribution 97 (53.9%) were male and 83 (46.1%) were female (Table 2).

Table 1: Distribution of cases by age (n = 180)

Age (year)	Number	Percentage
20-30	09	05.0
31-40	21	11.7
41-50	67	37.2
51-60	70	46.1
Total	**180**	**100.0**
Mean±SD	**50.2±10.5**	

Table 2: Distribution of cases by sex (n=180)

Sex	Number	Percentage
Male	97	53.9
Female	83	46.1
Total	**180**	**100.0**

Comparison of portal vein diameter vs endoscopy finding esophageal varices was tabulated (Table 3). It was observed that positive percentage of esophageal varices via endoscopy was 78.3%. On the other hand positive percentages of esophageal varices via portal vein diameter was 76.1%. Portal vein diameter has mean sensitivity of 98.5%, specificity of 90.2%, diagnostic accuracy of 96.6%, positive predictive value of 97.1% and negative predictive value of 94.8% in detecting esophageal varices (Table 3).

Table 3: Comparison of portal vein diameter vs endoscopy finding esophageal varices.

Esophageal varices	Positive (%)	Negative (%)
Endoscopy	78.3%	21.7%
Portal vein diameter (PVD)	76.1%	23.9%

It was observed that portal vein diameter can be used as a noninvasive screening test of predicting EV with sensitivity of 98.5%, specificity of 90.2% and diagnostic accuracy of 96.6%. On the other hand portal vein diameter has a positive predictive value of 97.1% and negative predictive value of 94.8% in detecting EV.

DISCUSSION

Bleeding of EV is a major complication of portal hypertension with high morbidity and mortality. Almost half of cirrhotic patients developed EV, among then only 30%, bleed[1]. According to British Association of Liver Diseases all cirrhotic patients must under go endoscopy[13]. This procedure increases both emotional and financial burden on patients, so if non-invasive parameters are desired to reduce the need for screening endoscopy in all patients with cirrhosis. According to the statistics patient with EV and first episode of bleeding are mostly likely to have next episode within proceeding next 6 month and mortality with next 6 years. So they can be screened by non-invasive technique (PVD) and later endoscopy can be done to confirmed the diagnosis.

Endoscopy ultrasound can be used to assess high risk bleeding and identified cross sectional area of varies[14,15]. Esophageal capsule endoscopy is a promising modality to assess EV. It provide more accurate and less invasive alternate to other type of endoscopy[16].

The incidence of first episode of bleeding can be reduce with selective ß-blocker or prophylactic endoscopy variceal ligation, thus reducing mortality in cirrhotic patient with large varices.

In this study 180 patients underwent clinical, biochemical and ultrasonography procedures, had PVD >1.1 mm. Out of 180 only 137 had EV confirmed by endoscopy. In this study and attempt had been made to find out sensitivity, specificity, negative and positive predictive values and diagnostic accuracy of PVD for predicting EV taking endoscopy has gold standard.

The findings of this study has considerable consistency with results of different previous national and international studies in which different variables has been taken into consideration as non-invassive markers to detect EV. The current study is easy to use and has comparable accuracy with previous models and thus the non-invasive markers are not only simple but can be practically used in clinical practice.

In one recent study cirrhotic patients without EV on initial endoscopy were follow up with annual surveillance. During followup it was proven that PVD proved to be an effective means for ruling out EV along with other parameters like platelet count and splenic diameter[15].

In above mentioned study all patients were followed up and endoscopy done and patients with PVD less than the normal 8 mm were less likely to develop EV[16].

In another study using bivariate analysis, it was found that PVD of 1.15 (75%, sensitivity, 54.5% specificity) along with two other parameters like platelet count of 82,000/uL (90.9%, sensitivity, 41.7% specificity) and anterior posterior diameter of spleen 10.3 cm (83.3% sensitivity and 63.6% specificity) were predictive factors of EV, thus depicting similar results.

The results of this study are comparable with study of Prihatini et al.[9,17] A local study concluded that using standard criteria of a PV diameter 13 mm for diagnosis of PVD, about 70% patients had endoscopic evidence of EV. Another recent study conducted showed that these non-invasive parameters; prothrombin index below 60%, alkaline phosphatase activity over 110 IU and hyaluronate over 100 g/l were best marker for prediction of EV with diagnostic accuracy of 80%[18].

Comparing the results of previous similar studies, the results of this study is encouraging. It can be concluded from the current study, that PVD can be used with reliability to assess the presence of EV.

CONCLUSION

Results of current study indicates that patients of chronic liver disease of any etiology an be screened for EV using PVD as non-invasive parameter prior to endoscopic confirmation. It will possible prevent first episode of variceal bleeding

by various pharmacological and non-pharmacological strategies.

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