Original Research Article

Comparative study of ultrasound findings on meld score in established case of liver cirrhosis and portal hypertension

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Abstract

Background: USD has a complementary role in the diagnosis of advanced fibrosis/cirrhosis and represent the preferred screening methodology for the examination of patients with suspected portal hypertension. The MELD score is superior to other prognostic models in patients with end-stage liver disease. **Aim:** To compare ultrasound findings and MELD score in established case of liver cirrhosis and portal hypertension. **Material and Methods:** A total of 50 patients clinically suspected or proven to have portal hypertension because of varied etiology were studied with ultrasound Doppler study and MELD score was done. **Results:** The majority of patients had mild portal hypertension 27 (54%), followed by moderate 14 (28%) and severe 9 (18%).The majority of patients had MELD score 8-15 (46%), followed by 15-25 (42%) and >25 (12%).The MELD score shows significant positive correlation with outcome (P<0.001). **Conclusion:** Presence of refractive channels on USG is diagnostic of PHT due to cirrhosis. MELD score is good clinical course to predict severity of liver disease and is also good prognostic marker in predicting encephalopathy and mortality.
Key Word: Liver cirrhosis, portal hypertension, ultrasonography, MELD score, outcome

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INTRODUCTION

Increased pressure inportal venous system indicates portal hypertension (PHT). Normal portal venous pressure is 10 mmHg (14 cm of H_2O).[1] Splenomegaly, life threatening gastrointestinal bleeding and ascites are the usual presentations in patients with portal hypertension. Ultrasound Colour Duplex Doppler (USD) is a non-invasive technique which allows the study of splanchnic organs and vessels. At the present state of technological development, USD has a complementary role in the diagnosis of advanced fibrosis/cirrhosis and represent the preferred screening methodology for the examination of patients with suspected portal hypertension. In addition, ultrasound examination provides information about liver, biliary, or pancreatic diseases that may be the cause of portal hypertension, and is able to better define indirect signs of portal hypertension such as splenomegaly, ascites, and the presence of porto- collateral vessels.[2] The Model for End-Stage Liver Disease (MELD) score incorporates serum bilirubin, creatinine, and the international normalized ratio (INR) into a formula that provides a continuous variable that is a very accurate predictor of 90-day mortality in patients with cirrhosis. The MELD score is superior to other prognostic models in patients with end-stage liver disease.[3]Hence, the present study was conducted to compare ultrasound findings and MELD score in established case of liver cirrhosis and portal hypertension.

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MATERIAL AND METHODS

The present observational study included patients clinically suspected or proven to have portal hypertension because of varied etiology.

Inclusion criteria

- All patients above 18 years.
- Clinically suspected or proven to have portal hypertension
- Patients with history of hepatitis (Infective/Alcoholic/ NAFLD/Autoimmune).

Exclusion criteria

- Patients age less than 18 years.

The study protocol was reviewed by the Institutional Ethical Committee and permitted by it. All patients clinically suspected or proven to have portal hypertension were selected. Informed consent was taken from the patients. The selected subjects were visited and the questionnaire was administered. The questionnaire consisted of demographic details clinical examination, hematological findings and USG findings with outcome. The questionnaire was validated by translation into the local language and reviewed by a group of experts.

Doppler Ultrasound: Doppler ultrasound examinations were obtained using a right lateral intercostal approach. Peak velocity of the HAv was measured in centimeters per second at the porta hepatis using a Doppler angle of less than or equal to 608 for angle correction. The HARI was calculated from the following equation:[4] Resistance index=[(peak systolic velocity - end diastolic velocity)/peak systolic velocity]. Peak velocity of portal vein (PVv) was measured in cm per second at the porta hepatis using a Doppler angle of less than or equal to 608 for angle correction.

MELD score: The MELD score for each patient was calculated according to the following formula:[3]MELD = 3:78 x In[serum bilirubin (mg/dL)]+ 11:2 x In [international normalized ratio] + 9:57x In [serum creatinine (mg/dL)] + 6:43.

Statistical analysis: Correlation of measured Doppler parameters with MELD score was performed using linear regression analysis. Statistical analyses were performed using SPSS software(version 22) for windows.

RESULTS

Majority of patients had cirrhosis of liver 32 (64%) followed by non-cirrhotic portal fibrosis 12 (24%), extrahepatic portal vein obstruction 5 (10%) and Budd Chiari syndrome 1 (2%). On ultrasonography,the mean portal vein diameter among patients was 12.85 ±4.77mm. The mean splenic vein diameter among patients was 10.61 ±3.19 mm. The mean hepatic vein diameter among patients was 9.79 ±2.13 mm. The mean spleen size among patients was 149.26 ±40.20 mm.

Table 1: Distribution according to type of portal hypertension

Type of Portal hypertension (HVPG)	No. of patients (n=50)	Percentage (%)
Mild (5-10mmHg)	27	56.00
Moderate (10-13mmHg)	14	28.00
Severe (>13mmHg)	09	18.00
Total	50	100

(HVPG=Hepatic venous pressure gradient)

The majority of patients had mild portal hypertension 27 (54%), followed by moderate 14 (28%) and severe 9 (18%).The majority of patients had MELD score 8-15 (46%), followed by 15-25 (42%) and >25 (12%).

Table 2: Distribution according to MELD score

MELD score	No. of patients	Percentage (%)
8-15	23	46.00
15-25	21	42.00
>25	06	12.00
Total	50	100

The majority of patients deteriorated (52%), followed by same status (32%) and recovered (14%).One patient expired in the study. The MELD score shows significant positive correlation with outcome (P<0.001).

Table 3: Distribution according to final outcome

Final outcome	No. of Patients	Mean MELD score
Recovered	07 (14%)	11.14 ±4.84
Status quo	16 (32%)	16.63 ±5.08
Deteriorated	26 (52%)	19.30 ±6.95
Expired	01 (2%)	18.00 ±00

DISCUSSION

Liver cirrhosis and portal hypertension with its complications account for majority of the cases admitted in tertiary care center. Liver cirrhosis though commonly is the leading cause of portal hypertension. It need not be the cause of portal hypertension every time. Various other causes like splenic vein thrombosis, portal vein thrombosis, portal fibrosis, schistosomiasis can be the causes of non-cirrhotic portal hypertension. The present observational study was undertaken to study correlation of biochemical parameters and Ultrasonography imaging technique in portal hypertension in a tertiary care centre. The distribution of patients according to etiology of portal hypertension showed that majority of patients had cirrhosis of liver (64%) followed by non-cirrhotic portal fibrosis (24%), extrahepatic portal vein obstruction (10%) and Budd Chiari syndrome (2%).Goel *et al*[5] studied etiology of portal hypertension in adults at a tertiary centre in southern India observed commonest causes of portal hypertension were cryptogenic chronic liver disease (35%), chronic liver disease due to alcohol (29%), hepatitis B (17%) or hepatitis C (9%). Of the 203 patients with cryptogenic chronic liver disease, idiopathic non cirrhotic intrahepatic portal hypertension (NCIPH) was seen in 16 patients (41%), while five patients had cirrhosis due to non-alcoholic fatty liver disease. Fifty-six (10%) adult patients with portal hypertension had vascular liver disorders. The mean portal vein diameter among patients was 12.85±4.77 mm. The mean splenic vein diameter among patients was 10.61±3.19 mm. The mean hepatic vein diameter among patients was 9.79 ±2.13 mm. The mean spleen size among patients was 149.26 ±40.20 mm. The majority of patients had mild portal hypertension (56%), followed by moderate (28%) and severe (18%).The associated USG presentation in the present study was splenomegaly (72%), followed by refractive channels in spleen (38%), abnormal liver pattern (46%), ascites (46%) and pleural effusion (40%). The majority of patients deteriorated (52%), followed by same status (32%) and recovered (14%). One patient expired in the study. The majority of patients had MELD score 8-15 (46%), followed by 15-25 (42%) and >25 (12%). The MELD score shows significant positive correlation with outcome. (P<0.001) Portal hypertension secondary to cirrhosis has multisystem effects and complications. Once a patient develops such complications, they are considered to have decompensated disease with the high morbidity and mortality. The quality of life and survival of patients with cirrhosis can be improved by the prevention and treatment of these complications. Ultrasound is a well-established noninvasive diagnostic modality for assessment of portal hypertension. Addition of color and spectral Doppler of porto-splenic hepatic vessels reveals significant hemodynamic information and helps in precise evaluation of the vascular anatomy in portal hypertension.

CONCLUSION

Presence of refractive channels as noted on USG is diagnostic of PHT due to cirrhosis. Dilated portal vein diameter though a helpful tool is not specific and sensitive marker of PHT. MELD score is good clinical course to predict severity of liver disease and is also good prognostic marker in predicting encephalopathy and mortality.

REFERENCES

1. Mathur SK. Cirrhosis and portal hypertension. In: Haribhakti S, ed. Clinical GI surgery e a reference book for surgeons. 1st ed. Ahmedabad: Haribhakti Education Foundation; 2008:835e856.
2. Cottone M, D'Amico G, Maringhini A, Amuso M, Sciarrino E, Traina M, *et al*. Predictive value of ultrasonography in the screening of non-ascitic cirrhotic patients with large varices J Ultrasound Med 1986;5:189-192.
3. Kamath PS, Kim WR. The model for end-stage liver disease (MELD) Hepatology. 2007;45: 797–805.
4. Lim AK, Patel N, Eckersley RJ, *et al*. Can Doppler sonography grade the severity of hepatitis C-related liver disease? Am J Roentgenol 2005; 184:1848–1853.
5. Goel A, Madhu K,Zachariah U. A study of aetiology of portal hypertension in adults (including the elderly) at a tertiary centre in southern India.Indian J Med Res. 2013 May; 137(5): 922–927.

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