Original Article

Diagnosis of Portal Hypertension

Portal Vein Diameter in the Diagnosis of Portal Hypertension Confirmed on Serum-Ascites Albumin Concentration Gradient in Patients with Decompensated Chronic Liver Disease

1. Shaista Ahmed 2. AttiyaSabeenRahman 3. JawahirLal 4. Aisha Javed 5. Laeeq Ahmed

1. Asst. Prof. Medicine, Karachi Medical and Dental College. 2. Assoc. Prof. Medicine, Karachi Medical and Dental College. 3. Senior Registrar, Medicine, Karachi Medical and Dental College. 4. Senior Registrar, Medicine, Karachi Medical and Dental College. 5. Prof. of Medicine, Karachi Medical and Dental College.

ABSTRACT

Objective: In patients with chronic liver disease, determine the accuracy of portal vein diameter in the diagnosis of portal hypertension confirmed on Serum-Ascites Albumin Concentration Gradient.

Study Design: Cross sectional study.

Place and Duration of Study: This study was conducted in the Department of Medicine at AbbasiShaheed Hospital, Karachi for a period of six months from January to June 2012.

Materials and Methods: Seventy patients with decompensated CLD were included in this study. The routine testing of ascitic fluid was included total protein, albumin and cell count. All patients underwent ultrasonography of abdomen.

Results: The average age of the patients was 48.97±7.52 years. 47(67.1%) were male and 23(32.9%) were female. In the diagnosis of portal hypertension confirmed by serum ascites albumin of decompensated chronic liver disease 95.7% positive accuracy of portal vein diameter was found.

Conclusion: Our study of small predominantly male sample found a very high positive accuracy of portal vein diameter in determining portal hypertension. The results are similar to previous researches that have also shown a higher accuracy rates but slightly lower than our study.

Key Words: Ascites, portal hypertension, portal vein diameter

Citation of article:Ahmed S, Rahman AS, Lal J, Javed A, Ahmed L.Portal Vein Diameter in the Diagnosis of Portal Hypertension Confirmed on Serum-Ascites Albumin Concentration Gradient in Patients with Decompensated Chronic Liver Disease. Med Forum 2016;27(1):33-36.

INTRODUCTION

One of the major complications of liver cirrhosis and portal hypertension is ascites. More than 50% of patients develop ascites within ten years of the diagnosis of cirrhosis.[1,2] Ascites is a poor prognostic factor with a mortality of 15% at one year and 44% at five year followup respectively.[1]

Excess fluid within the peritoneal cavity, which is pathologic, is called ascites. It has important diagnostic prognostic and therapeutic implicitions.[3] Ascites has a diverse etiology, so the primary physician needs to have a systematic approach to seek the underlying cause. Cirrhosis with ascites has been found in approximately 85% of patients and a non-hepatic cause of fluid retention in 15% of patients.[3,4] It is important to do paracentesis in every patient to determine the cause and complications of ascites and target the management.[3]

The commonest cause of portal hypertension is secondary to chronic liver disease which accounts for 78% of patients with ascites.[3,5] To reduce morbidity and mortality early detection of portal hypertension before development of complications is important. Ascites is either exudative or transudative based on the estimation ofascitic fluid total protein concentration[6] or ascitic fluid to serum ratio of total protein or lactic dehydrogenase (LDH).[6] Unfortunately, none of these parameters has been found to be entirely conclusive.

The serum ascites albumin concentration gradient (SAAG) in the discrimination of ascitic fluid compared with the exudate transudate concept has found to be superior with a validity rate of 90% or more in determining the ascites due to portal hypertension has been estimated. The SAAG is found to be highly precise yet minimally invasive method which allows to classify ascitic fluid according to the absence and presence of portal hypertension.[7] SAAG based on oncotic hydrostatic balance, it is an index of the serum ascites oncotic pressure difference correlates directly with the pressure gradient between portal capillaries and the peritoneal cavity.[8] Subtracting the albumin concentration of ascitic fluid from the serum albumin obtained at the same time calculates SAAG.[9] SAAG of 1.1 g/dl or more suggests portal hypertension, if < 1.1 g/dl then other causes should be considered and

Correspondence: Dr. Shaista Ahmed
Asst. Prof. Medicine, Karachi Medical and Dental College
Contact No.: 0333-3179504
E-mail: shaistaahmed.dr@gmail.com

excluded. The accuracy of such determination is 97%.[4,6,8,9]

Ultrasonography, a non-invasive tool to measure portal vein diameter (larger than 1.3 cm) helps in the diagnosis of portal hypertension.[10] The relative change in size of the portal vein with respiration is more sensitive, than the absolute size of the portal vein. An increase of less than 20% in the diameter of the portal vein with deep inspiration indicated portal hypertension with a sensitivity and specificity of 80% and 100% respectively. [11,12,13]

The rational of this study is to determine the accuracy of portal vein diameter (>1.3cm) on ultrasound confirmed by SAAG ratio as a marker of portal hypertension, so that noninvasive modality in diagnosing portal hypertension.

MATERIALSAND METHODS

It is a cross sectional study conducted in the department of medicine at AbbasiShaheed Hospital Karachi for a period of six months (January to June 2012). A total of 70 patients were enrolled in the study. All patients, above 18 years of age, presenting with decompensated CLD, confirmed on ultrasonography, to the department during the six month period were included in the study. Non probability purposive sampling.

Inclusion criteria: All patients were above 18 years of age with decompensated CLD with a duration of symptoms 1- 2 months were included in the study. Patients in childs class A & B were included.

Exclusion criteria: Patients having **a**scites other than decompensated chronic liver disease or having co-morbids like congestive cardiac failure, chronic renal failure etc. were excluded. Patients who refused to give consent were also excluded.

Data was collected from patients with ascites meeting the inclusion criteria. Informed consent was taken from the patient. After thorough history and physical exam ascitic fluid was collected by paracentesis done under sterile condition using 21gauge cannula. The routine testing of ascitic fluid was included total protein, albumin and cell count. Blood was drawn from antecubital vein under sterile technique for serum protein, albumin, A/G ratio, P.T and INR and liver function tests, blood sample drawn at the same time of abdominal paracentesis and with these results SAAG was calculated. All patients underwent ultrasonography of abdomen, presence of portal vein diameter of >1.3cm or above and SAAG >1.1g/dl were taken as an evidence of portal hypertension along with coarse echotexture of liver, splenomegaly and presence of ascites.

Statistical Analysis: Data was entered and analyzed by statistical software package SPSS version 15.0. Statistical analysis was expressed as frequencies and percentages for gender and accuracy. Mean and standard deviation were calculated for the age of patient and duration of disease. Stratification was done with regards to age, gender and duration of disease to see the effect of these on the outcome.

RESULTS

A total of 70 patients with decompensated chronic liver disease were included in this study. The mean age of the patients was 48.97±7.52 years (95%CI: 47.18 to 50.76) similarly the average duration of disease was 4.73±2.56 months (95%CI: 4.12 to 5.34), figure 1 and table 1.

Out of 70 patients, 47(67.1%) were male (figure 2). Duration of disease of the 24(34.3%) patients was 1 to 3 months, 17(24.3%) was 4 to 5 months, 24(334.3%) was 6 to 8 months and 5(7.1%) patients duration of disease was 8 to 12 months (figure 3 and table 1).

It has been found that 95.7% positive accuracy of portal vein diameter in the diagnosis of portal hypertension is confirmed by serum ascites albumin of decompensated chronic liver disease. Similarly positive accuracy was 90% to 100% in all age groups, gender and 80-100% duration of disease as presented in table 2, 3 and 4 respectively.

Table No.1: Descriptive statistics of the characteristics of the patients

Variable	Mean ± SD	95%CI	Median (IQR)	Max-Min
Age (Years)	48.97± 7.52	47.18 to 50.76	48(13)	60-32
Duration of disease (months)	4.73± 2.56	4.12 to 5.34	4(3)	12-1

Table No.2: Accuracy of portal vein diameter in the diagnosis of portal hypertension with respect to age groups

Age Groups	n	Accuracy Positive	Percentage
31 to 40 Years	15	14	93.3%
41 to 50 Years	26	26	100%
51 to 60 Years	29	27	93.1%

Table No.3: **Accuracy of portal vein diameter in the diagnosis of portal hypertension with respect to gender**

Gender	n	Accuracy Positive	Percentage
Male	47	46	97.9%
Female	23	21	91.3%

Table No.4: Accuracy of portal vein diameter in the diagnosis of portal hypertension with respect to duration of disease

Duration of disease	n	Accuracy Positive	Percentage
1 to 3 months	24	24	100%
4 to 5 months	17	14	82.4%
6 to 8 months	24	24	100%
>8 months	5	5	100%

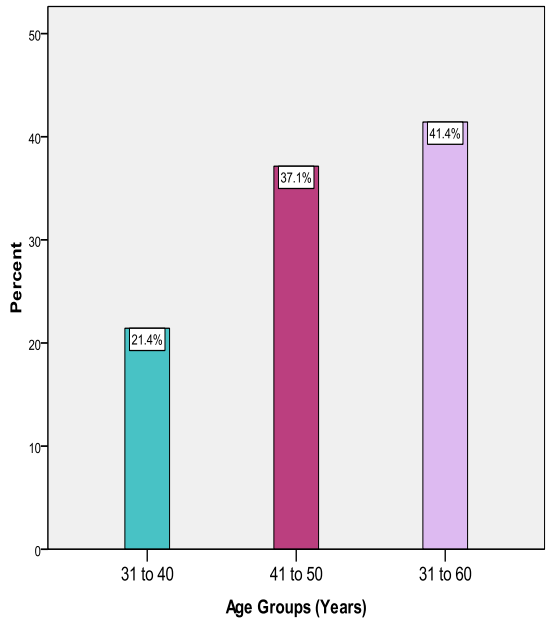

Figure No.1: Age distribution of the patients n=70

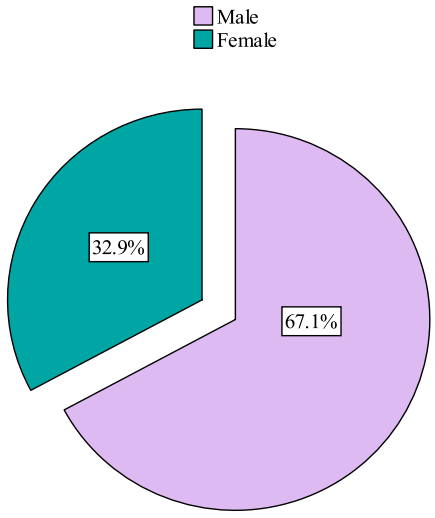

Figure No.2: Gender distribution of the patients n=70

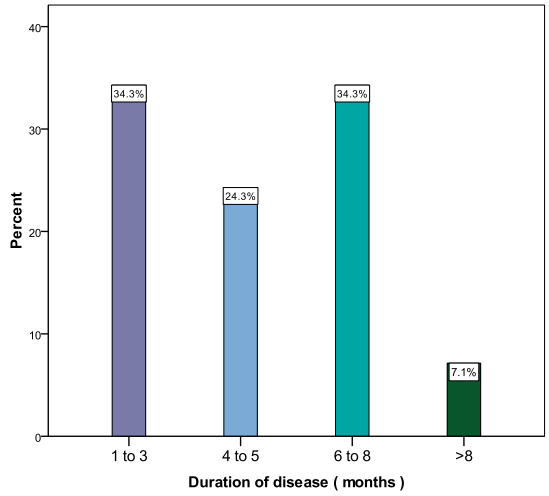

Figure No.3: Duration of disease

DISCUSSION

Chronic liver disease is a common medical problem.[4,14] Portal hypertension and its complications not only cause significant morbidity in patients with chronic liver disorders but also a cause of mortality due to serious consequences like variceal bleeding and hepatic encephalopathy etc.[14,15] SAAG is a reliable marker in detecting portal hypertension. A high SAAG (more than 1.1gm/dl) reflects abnormally high hydrostatic pressure gradient between portal bed and ascitic compartment where as low SAAG (< 1.1 gm/dl) excludes portal hypertension with a diagnostic accuracy and sensitivity of 97%. It distinguishes ascites related to portal hypertension from other causes regardless of presence of bacterial infection within the peritoneal cavity.[14] It is rapid cheap and effective method to detect portal hypertension.[4, 14]

We conducted a study of 70 patients with decompensated CLD with average age 48.97 years, average duration of disease 4.73±2.56 months, 47(67.1%) were male showed 95.7% positive accuracy of portal vein diameter in the diagnosis of portal hypertension confirmed by serum ascites albumin of decompensated chronic liver disease. It was interesting to note that positive accuracy was 90% to 100% in all age groups, gender and all duration of disease. While a cross sectional study conducted in Karachi showed lesser accuracy of detecting portal hypertension by portal vein diameter in which only 70% of the patients were correctly identified.[3]

Jaffri et al. evaluated portal vein diameter accuracy in detecting portal hypertension on 140 patients, 100 (71%) were males. The study found that at the cut of value of PV diameter 13 mm, 70% patients had evidence of portal hypertension and esophageal varices.[3] Similarly our study showed similar male to female proportion and found a very high positive accuracy of portal vein diameter in detecting portal hypertension in about 95% of cases.

Rizwan et al. found the sensitivity and specificity of SAAG were 100% and 87.8% respectively and they concluded that serum ascites albumin gradient is a reliable marker to see that ascites is due to portal hypertension or not which was similar to our study.[14]

The differences of higher positive accuracy of detecting portal hypertension by portal vein diameter observed in our study as compared to the above studies conducted within same geographical location may be attributed to differences in severity of cirrhosis the gold standard or other standard criteria selected to which portal vein diameter is compared and may also be attributed to the cut off value for portal vein diameter selected.

Limitations: Like most studies our study has also few limitations the cross sectional study design lacks biological plausibility and inferences regarding temporal relationships and causative associations,

though certainly provide an account of relationships. The selection of non-probability purposive sampling limits generalizability of the study results and findings. Although study sample size was scientifically calculated, the selection of an epidemiological study warrants a large sample size to provide true estimation of frequency and prevalence. Another main limitation of the study was not establishing the sensitivity, specificity, positive predictive and negative predictive values that is not identifying in terms of true positive, false positive, true negative and false negative cases.

CONCLUSION

Our study of small predominantly male sample found a very high positive accuracy of portal vein diameter in determining portal hypertension. We recommend further future studies with large multiple settings and sample and detecting of sensitivity, specificity, PPV and NPV to reach a firm conclusion.

Conflict of Interest: The study has no conflict of interest to declare by any author.

REFERENCES

1. Biecher E. Diagnosis and therapy of ascites in liver cirrhosis. World J Gastroenterol 2011;17(10): 1237-48.
2. Gines P, Quintero E, Arroyo V, Teres J, Bruguera M, Rimda A, et al. Compensated cirrhosis: natural history and prognostic factors. Hepatol 1987;7: 122-8.
3. Jaffri MSA, Shaikh AA, Jaffri MH, Khushk A, Shah MA, Munir SM. Diagnostic sensitivity and specificity of serum ascites albumin gradient (SAAG) in patients with ascites. JLUMHS 2009; 8(3):196-200.
4. Heidelbaugh J.J, Sherbondy M. Cirrhosis and chronic liver failure (part II) complications and treatment. Am Fam Physician 2006;74:770-6.
5. Garcia T, Sao G. Portal hypertension. Curr OpinGastroenterol 2006;22:254-62.
6. Runyon BA, Montano AA, Akriviadis AA, Antillon MR, Irving MA, Mc Hutchison JG. The Serum As- cites Albumin Gradient is superior to the exudate – transudate concept in the diagnosis of ascites. Ann Intern Med 1992;117:215-20.
7. Torres E, Barros P, Calmet F. Correlation between serum ascites albumin concentration gradient and endoscopic parameters of portal hypertension. Am J Gastroentrol 1998;93:2172-8.
8. Rector WG, Reynold TB. Superiority of the serum ascites albumin difference over the ascites total protein concentration in separation of transudative and exudative ascites. Am J Med 1984;77:83-5.
9. Runyon BA. Care of patients with ascites. N Engl J Med 1994;330:337-42.
10. Sandors RC, Winter TC, Kluwar W, editors. Clinical Sonography: A practice guide. Forth edition. New Delhi: Lippincott Williams and Wilkins; 2007.
11. Al-Nakshbani NA. The role of ultrasonography in portal hypertension. Saudi J Gastroentrol 2006;12:111-7.
12. Bolondi L, Mazziotti A, Arienti V, Casanova P, Gasbarrini G, Cavallari A, et al. Ultrasonography of portal venous system in portal hypertension and after protosystemic shunt operations. Surgery 1984;95:261-9.
13. Vilgrain V, Lebrec D, Menu Y, Scherrer A, Nahum H. Comparisons between ultrasonographic signs and the degree of portal hypertension in patients with cirrhosis. GastrointestRadiol 1990;15: 218-22.
14. Khaliq R, Baqai S, Aatif S. Sensitivity of serum ascites albumin gradient for detection of portal hypertension. Ann AbbasiShaheedHospKar Med Dent Coll 2007;12(2):57-60.
15. Mene A, Sharma D, Raina VK. Correlation between serum-ascitic albumin concentration gradient with gastrointestinal bleeding in patients of portal hypertension. Trop Doct 2003;33(1): 39-41.