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Sonographic Comparison of Portal Vein Diameter in Cirrhotic and Non-Cirrhotic Patients

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ABSTRACT:

Background: Liver cirrhosis has become one of the major causes of morbidity and mortality. The burden of liver cirrhosis is growing in both the West and the East. In Pakistan death rate of liver cirrhosis is conspicuous because of chronic hepatitis (hepatitis B, C) and hepatocellular carcinoma. It is reported by World Health Organization that Pakistan occupies secondary place in spread of hepatitis C.

Objective: To compare the portal vein diameter in cirrhotic and non-cirrhotic patients through ultrasound.

Methodology: Ultrasound machine Toshiba Xario, Mindray dp 10 and G logic p5 with a curvilinear transducer of frequency 3.5 MHz was used. The study was conducted at, Hussain Diagnostic Ultrasound Centre Jampur, District Rajanpur. Data of 100 patients was collected through Cross-Sectional Analytical study. Statistical software for social sciences (SPSS version 22.0) is used for the analysis of data.

Results: One hundred patients participated in this study. Among them, the minimum age was 30 and the maximum age was 70. Ratio of male patients was more than female patients, due to fact of more alcohol consumption in males. Out of 100 patients, 50 patients had cirrhosis and 50 were non cirrhotic. Liver cirrhosis patients came the severe symptoms like weakness, lethargy, hematemesis and melena. Non cirrhotic patients came with epigastric pain, nausea and vomiting. Mean of Portal vein diameter in non-cirrhotic patients was 10.5mm. Mean of Portal vein diameter in live cirrhosis patients was 14.8mm. A statistical significance difference was found between the two means of portal vein diameter of two groups (cirrhotic and non-cirrhotic) as the p-value 0.000 less than 0.05.

Conclusion: Liver cirrhosis is one of the major issues of health and a big reason for increasing mortality rate all over the world. The most common etiology of liver cirrhosis is alcohol. Patients come with liver cirrhosis having severe symptoms like weakness, lethargy, hematemesis and melena. Non-cirrhotic patients come with mild symptoms like epigastric pain, nausea and vomiting, having normal portal vein diameter. Mean portal vein diameter in cirrhotic patients (14.8mm) was greater than non-cirrhotic patients (10.5mm).

Key words: Liver cirrhosis, Non-alcoholic steatohepatitis (NASH), Non- alcoholic fatty liver disease (NAFLD), alcoholic liver disease (ALD).

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INTRODUCTION:

Liver cirrhosis is one of the major issues of health and a big reason for increasing mortality rate all over the world. According to Global Burden of Disease (GBD) over one million people died due to cirrhosis in 2010 worldwide.[1] According to autopsy studies worldwide occurrence of cirrhosis, measured from 4.5% to 9.5% in

ubiquitous community. In 2001, the evaluated universal death rate from cirrhosis was 771,000 population, grading 14th and 10th as the foremost etiology of demise in the domain and in advanced nations, appropriately. Cirrhosis will be a 12th major issue of demise in 2020. Universally, usual etiologies of cirrhosis are viral hepatitis, alcohol, non-alcoholic steatohepatitis (NASH). Preponderance of cirrhosis is possibly to be underrated as about a 3rd of the sufferers remain undetermined.[2]

Cirrhosis is the main cause of illness and fatality in the United States. It was specified by Centers for Disease Control and Prevention that cirrhosis was the 12th key factor of demise in the United States in 2013, reporting for over 36,000 deaths. Non- alcoholic fatty liver disease (NAFLD) is the superiorly significant source of cirrhosis. Alcohol remains to be one of the large donors to hepatic disorder in the United States. It is clear that alcoholic liver disease (ALD) is the greatest etiology of cirrhosis in whites. According to recent data from the National Institute on Alcohol Abuse and Alcoholism demonstrated that whites are mostly expire from alcoholic liver cirrhosis as compared to blacks.[3] In Europe, about 0.1% of Hungarian males will die of cirrhosis every year compared with 0.001% of Greek females.[4]

In Pakistan death rate of liver cirrhosis is conspicuous because of chronic hepatitis (hepatitis B, C) and hepatocellular carcinoma. It is reported by World Health Organization that Pakistan occupies secondary place in spread of hepatitis C. There are about 1,000,000 persistent patients of hepatitis B and 1,700,000 persistent patients of hepatitis C in Sind province of Pakistan. One main reason of death rate across Pakistani population is cirrhosis, typically the most frequent complexity of cirrhosis with portal hypertension are esophageal varices. Ascites were present in 59% of patients in Pakistan. Spontaneous bacterial peritonitis (SBP) contributes almost 24 % of in death rate in Pakistan, mainly in Sindh. Universally 6th frequently occurring cancer is hepatic cancer; which affects every 12th male and every 4th female per 100,000 males and females respectively, in Pakistan. HCC broadly (96%) experienced in post cirrhotic liver in persistent hepatitis C diseased patients.[5]

Liver carries out a series of activities that assist metabolism, immunity, digestion, detoxification, vitamin storage among other activities.[6] Its main tasks are to detoxify various metabolites, synthesize proteins, and generate enzymes essential for digestion. The liver also has an important role in metabolism, management of red blood cells (RBCs) and glucose composition and retention.[7] The liver gathers its blood delivery from two resources: 80% is supplied by the portal vein, which drains the spleen and intestines; the remaining 20%, the oxygenated blood, is supplied by the hepatic artery.[8]

Cirrhosis is a significant deteriorative disease in which interchange of normal liver tissue with fibrous tissue takes place that results in distortion of liver anatomy and performance. In patients with persistent hepatic disease, portal hypertension and cirrhosis are obvious. Current progress in the interpretation of the usual report and morbid physiology of cirrhosis, and in cure of its problems, leading to enhanced administration, living standards and survival rate of cirrhotic patients. Now a days, the single remedial choice for a preferred panel of sufferers is liver transplantation, but progression of pharmacological drugs have sopped the development of decompensated cirrhosis or while converse cirrhosis are presently being augmented.[9]

RESULTS

One hundred patients participated in this study. Among them, the minimum age was 30 and the maximum age was 70. Out of 100 patients, 50 patients had cirrhosis and 50 were non-cirrhotic. Patients came with liver cirrhosis had severe symptoms like weakness, lethargy, hematemesis and melena. Non-cirrhotic patients came with mild symptoms like of epigastric pain, nausea and vomiting. Mean of Portal vein diameter in non-cirrhotic patients was 10.5mm with standard deviation of 1.613. Mean of Portal vein diameter in live cirrhosis patients was 14.8mm with standard deviation of 1.244, according to table 1. A statistical significance difference was found between the two means of portal vein diameter of two groups (cirrhotic and non-cirrhotic) as the p-value 0.000 less than 0.05, according to table 2. A detail description is given below

	N	Mean(mm)	Std. Deviation	Std. Error Mean
Non cirrhotic	50.000	10.550	1.613	0.228
cirrhosis	50.000	14.890	1.244	0.176

Table 1: Mean of portal vein diameter (PVD) in cirrhosis and non-cirrhotic patients.

	Mean	Std. Error	*t*	df	Sig. (2-tailed)
Equal variances assumed	-4.340	.288	-15.066	98.000	.000
Equal variances not assumed	-4.340	.288	-15.066	92.057	.000

Table 2: Independent Samples Test

DISCUSSION

One hundred patients participated in our study. Among them, the minimum age was 30 and the maximum age was 70. Out of 100 patients, 50 patients had cirrhosis and 50 were control. In current study, there were more male patients than female patients. A .study .done .by .Ndububa .et .al in 2010; .in .South-Western .Nigeria .on .145 .patients .on .the .contribution .of .alcohol .to .development .of .CLD .had .more .males .(102) .than .females .(43)10. .A study of 108 CLD patients by Kamran et al on correlation between sonographic PV diameter and flow velocity in cirrhotic patients also had more males (66) than females (42).

In .our .study, .the .most .common .etiology .of .cirrhosis .was .alcohol. .General .symptoms .found .in .our .cirrhotic .patients .were weakness, hematemesis and melena. Non cirrhotic patients came with the symptoms of epigastric pain, vomiting, weakness and nausea.

Maaji .et .al in 2016 also .had .male .predominance .in .his .study .on .sonographic .findings .of .CLD .patients .in Sokoto. .These .findings .concorded .with .this .study .confirming .male .predominance .in .CLD .in .our environment. .The .male .dominance .in .this .study .was .possibly .due .to .high .alcohol .intake .and .increased risk .of .hepatitis .B .infection .which .increases .the .risk .of .the .disease11. In our study male dominance was also seen.

In current study, mean of portal vein diameter in patients with non-cirrhotic came 10.5 with standard deviation of 1.613. Mean of portal vein diameter in patients with live cirrhosis came 14.8 with standard deviation of 1.244, according to table 15 and figure 4. Similar findings were found by other researchers. A .study .done .by Lopamudra et .al.in 2011 on .82 .CLD .patients .found .a .higher .value .of .mean .PV .diameter .of .13.99 .± .1.12 mm12. Nizar .et .al. .also .reported .an .increased .PV .diameter .of .up .to .17 .mm13. .In .another .study Rina Mohanty et al 2017 on .107 .CLD .patients .also .found .an .increase .in .diameter .of .the .extrahepatic .PV .which .was .>13 mm14. .Similar .studies .done .also .showed .increase .in .diameter .of .the .main .PV. Hawaz Y in 2009, .studied the .mean .diameter .of .the .main .PV .in .CLD .patients .was .higher .(18.68 .± .2.59 .mm) .than .that .of .the control .(10.87 .± .0.81 .mm). .The .variation .in .the .values .of .the .main .PV .diameter .in .the .various .studies may .be .due .to .the .difference .in .sample .size, .ethnic .and .geographical .differences .between .the .populations studied15. .Hawaz .et .al. .reported .an .increase .in .diameter .of .PV .with .increase .in .age .in .normal individuals which .is .consistent .with .the .finding .of .Anakwue .et .al done in 200915,17. .Similar .findings were .also .found by .many .researchers i.e, Shankar RG et al in 2011 and by Subramanyam BR in 198918,19.

In current study, a statistical significance difference found between the two means of portal vein diameter of two groups (cirrhotic and non-cirrhotic) as the p-value 0.000 less than 0.05. Aminu Umar Usman et al. .in .his .study

on .191 .CLD .patients .and .247 .controls .reported .no .difference .in .PV .diameter .values .between .male .and females .in .both .groups16. . .However, .Hawaz .et .al. .and .Anakwue .et .al. .found .correlation .between .PV diameter .with .sex .in .CLD .patients, .but .they .found .no .correlation .between .PV .diameter .and .sex .in .normal subjects. .This .study .found .no .significant .difference .PV .diameter .in .male .and .females .in .CLD .patients (P .> .0.005). .However, .there .was .a .statistical .difference .in .the .control .group .(P .< .0.05) .with .values .slightly higher .in .females .than .males19,20.

A .study .by . Shankar RG et al .on .50 .CLD .patients .and .50 .controls. This .study .found .a .significant difference between .right .and .left .PV .diameter .in .male .CLD .patients .and .control .group .(P .< .0.005). .No difference was, .however, .found .in .female .CLD .patients .(P .> .0.005)69. Bolondi L et al .found .a .mean .portal .vein diameter .of .7 .± .1 .mm .among .normal .subjects .and .12 .± .2 .mm .among .cirrhotic .patients21. .Schepis .etlal 10 .found .a .portal .vein .diameter .of .13.82 .± .2.1 .mm. .Prihatini .et .al 11 .concluded .in .their .study .that portal vein .size .1.2-cm22.

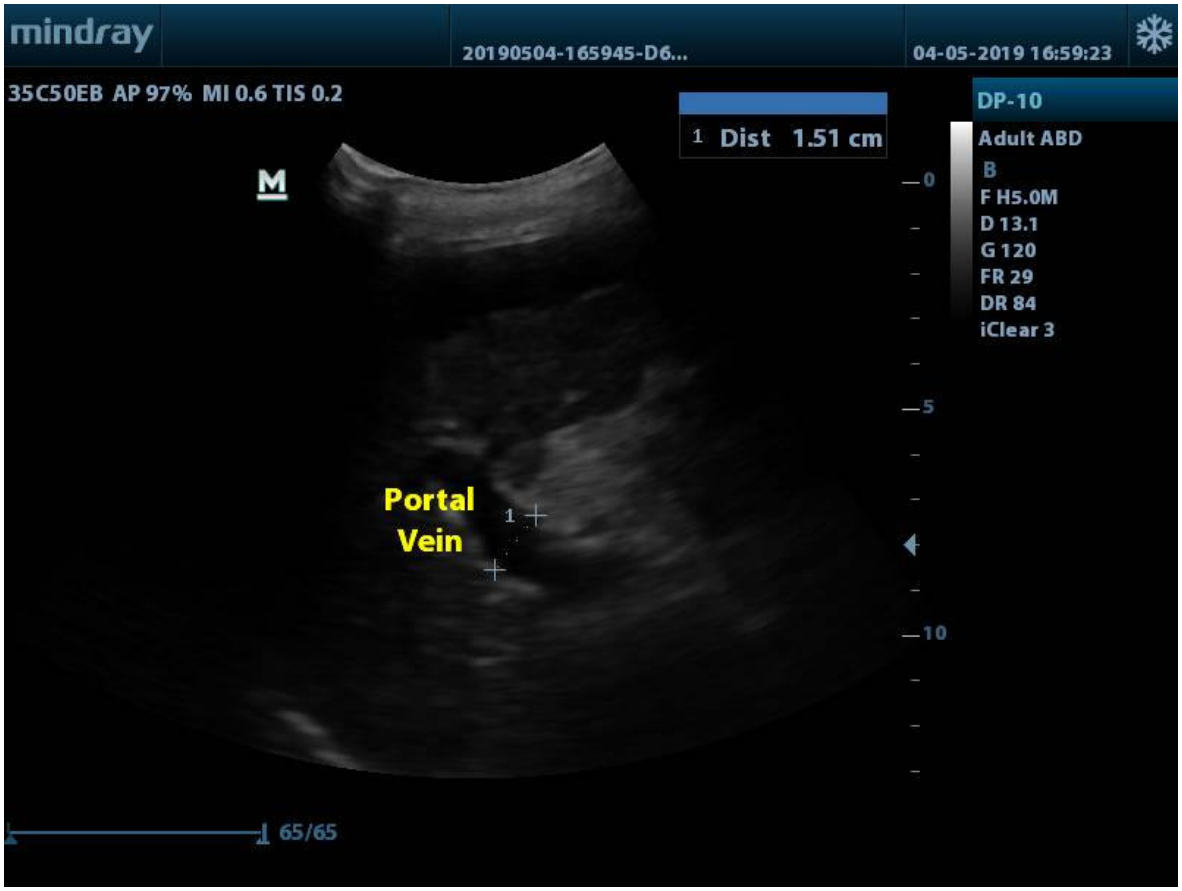

Figure 1: TA gray scale image showing, portal vein diameter of 1.51cm.

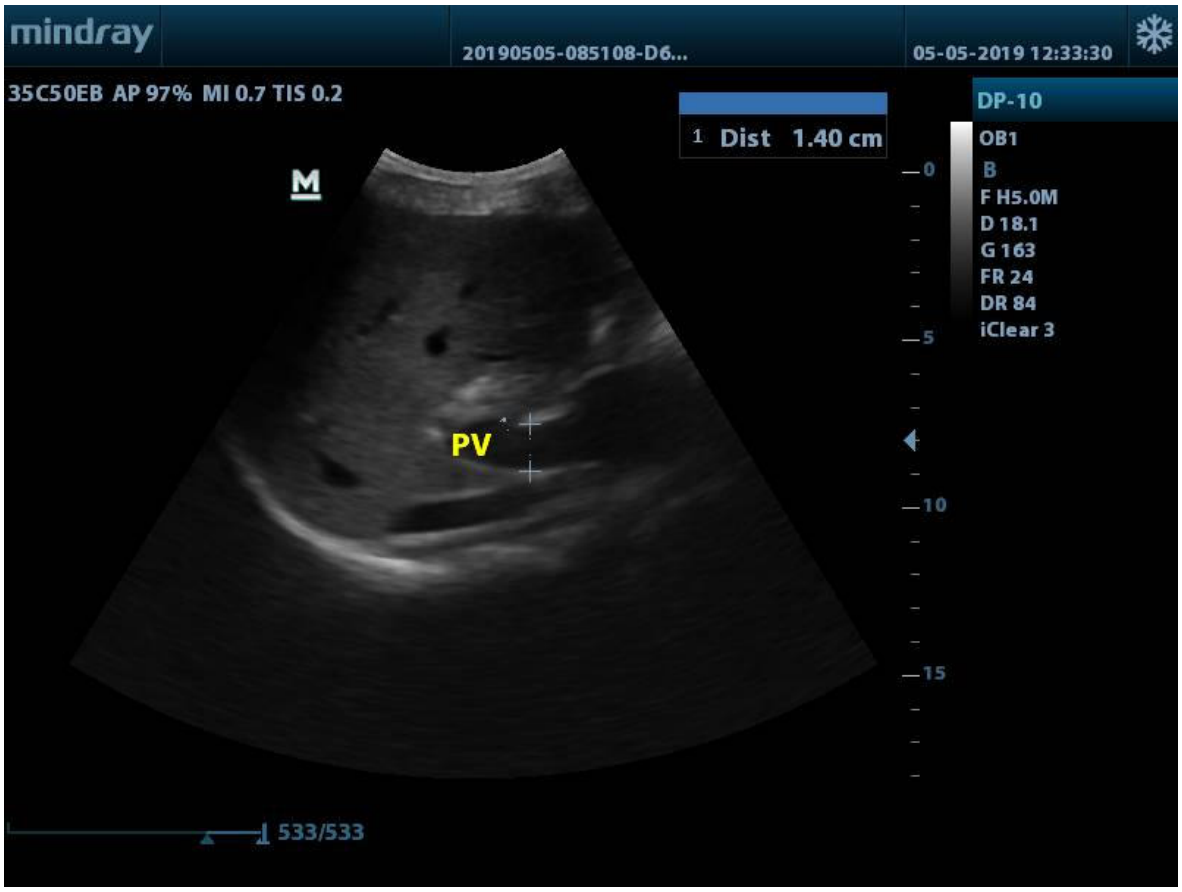

Figure 2: TA gray scale image showing, portal vein diameter of 1.4cm.

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