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RESEARCH ARTICLE

THE CORRELATION BETWEEN SONOGRAPHIC PORTAL AND SPLENIC VEIN DIAMETERS WITH CLINICOPATHOLOGICAL LIVER STATUS IN CIRRHOTIC PATIENTS.

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Key words:-
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Abstract

Background:- liver cirrhosis is defined as chronic disease of the liver with destruction of the hepatic parenchymal cells. pathologically it is characterized by hepatic parenchymal necrosis and fibrosis of the perivascular connective tissue.
Methods:- 50 patients with liver cirrhosis were included in this study and divided into three groups.group 1 included cirrhotic patients with Child-Paugh score class A , group II included cirrhotic patients with Child-Paugh score class B , group III included cirrhotic patients with Child-Paugh score class C . all cases were subjected to estimate biochemical parameters in the form of liver function tests including AST, ALT , serum Bilirubin , serum Albumin , Prothrombin time , INR , HCV Ab and HBS Ag , abdominal ultrasonography with measurement of portal vein diameter (PVD) (mm) and splenic vein diameter (SVD) (mm) and upper GIT endoscopy to detect presence of oesophageal varices (o.v) .In this study we exclude patients with history or clinical evidence at enrollment of variceal bleeding , patients with history or clinical evidence of hepatocellular carcinoma on the basis of ultrasonography , Alpha-fetoprotein levels > 400 microgram / L , patients with history of liver transplantation and patients with evidence of portal vein thrombosis.
Results:- all 50 patients (19 males and 31 females) , of these 50 patients 7 are child A , 19 are child B , and 24 are child C.The mean age (± SD) was 55.54 ± 11.81years (range 29-90). The results of the present study revealed that there is no relation between PVD and presence of O.V, the mean PVD ± SD of the cirrhotic patients is 1.29±0.23, there is no statistically significant difference between different child scores aacording to presence of O.V and there is no statistically significant difference in PVD between different child scores in cirrhotic patients.
Conclusion:- sonographic portal vein parameters cannot be asubstitute for clinical grading and staging of cirrhosis and it cannot be used as adiagnostic indicator in grading liver cirrhosis with accuracy.

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Introduction:-

Cirrhosis is defined histologically as a diffuse hepatic process characterized by fibrosis and the conversion of normal liver architecture into structurally abnormal nodules. The progression of liver injury to cirrhosis may occur over weeks to years. Indeed, patients with hepatitis C may have chronic hepatitis for as long as 40 years before progressing to cirrhosis ***(Piekarska et al., 2008).***

Sonography is one of the diagnostic methods used for studying hepatobiliary pathologies, where patients are not exposed to ionizing radiation. It is cheap and easily available, that is why is frequently the first examination performed when liver cirrhosis or portal hypertension is suspected ***(Vilgrain et al., 1990)***, and with the progress of this field it can even be used in staging of cirrhosis and its complications ***(Kudo et al.,2008) , (Han and Yoon , 2008)***.

Child-Turcotte-Pugh (CTP) score was proved to be a valid independent predictor and prognostic factor of survival. Class C in the CTP grading was strongly correlated with worse survival. This clinical score is the most commonly used system; and must be taken into consideration for adequate evaluation and staging of cirrhosis ***(Samada et al., 2008)***.

According to our best knowledge, there are very few studies investigated the relationship between sonographic portal vein diameter (PVD) and portal flow velocity (PFV) with clinical scoring system. Some studies showed positive relationship and proposed sonography as a good diagnostic modality, while others have totally questioned the role of sonography in diagnosis of cirrhosis ***(Ong and Tan , 2003), (Williams et al., 2004)***.

Material and methods:-

Patients:-

- In this cross sectional study about 50 patients (19 males and 31 females) diagnosed with liver cirrhosis were enrolled. The mean age (± SD) was 55.54 ± 11.81years (range 29-90).the inclusion criteria were patients with established cirrhosis diagnosed by clinical manifestation , Biochemical investigations and Ultrasonographic finding

Sampling and scanning techniquues:

Blood sampling was performed for measuring serum bilirubin , albumin , Prothrombin time**(PT)** and International Normalized Ratio**(INR)**. Clinical judgments was performed to assess hepatic encephalopathy and ascites.
sonography was performed in all patients for confirming criteria of cirrhosis, measurement of portal vein diameter and splenic vein diameter.

Upper GIT Endoscopy was done to detect presence of O.V
CTP score used to asses the severity of cirrhosis.

Results:-

All 50 patients (19 males and 31 females) , of these 50 patients 7 are child A , 19 are child B , and 24 are child C, **Figure (1)** .The mean age (± SD) was 55.54 ± 11.81years (range 29-90),**Figure (2).**there is no statistically significant difference between different child scores according to age and sex(p value >0.05).

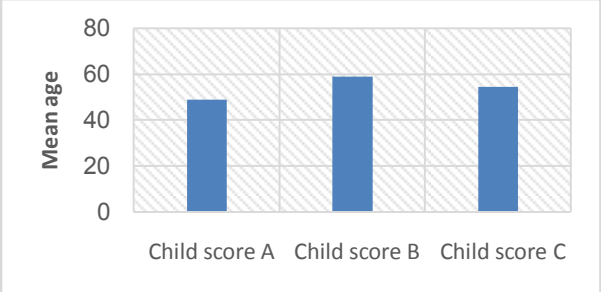

Figure 1:- Comparison between different child scores according to Age.

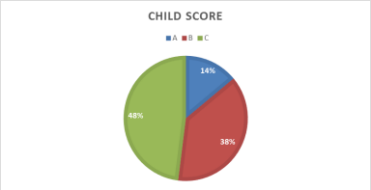

Fig 2:- Child score distribution of the studied groups.

As regard clinical data about (36%) of patients had severe ascites, (20%) had moderate ascites,(22%) had mild ascites and (22%) had no ascites, so there was highly statistically significant difference between different child scores according to ascites (p value <0.01).

As regard encephalopathy about (16%) of patients had mild encephalopathy, (16%) of patients had severe encephalopathy and (68%) had no encephalopathy, so there was highly statistically significant difference between different child scores according to encephalopathy (p value <0.01) .

As regard laboratory data , theresults are shown in table(1),so there was highly statistically significant difference between different child scores according to laboratory data(p value<0.01).
As regard presence of O.V about 15 patients (43%) had O.V and 35 patients (57%) had no O.V , there was no statistically difference detween different child scores according to presence of O.V (p value>0.05) .

As regard ultrasonographic finding in group A , the mean PVD ±(SD) was (1.26±0.010) ,In group B , the mean PVD ±(SD) was (1.33±0.22)

In group C, the mean PVD (±SD) was (1.27±0.27), so there was no statistically significant difference in PVD between different child scores,there was also no statistically significant difference in PVD according to presence of O.V. As regard SVD , the mean SVD(±SD) was (0.90±0.14) in groupA, (1.12±0.31) in group B and (0.97±0.19) in group C , so there was no statistically significant difference in SVD between different child scores(p value> 0.05), **Table (1).**

So, the rate of pathologic changes in the portal hemodynamics, as indicated by the sonographic PVD and SVD does not accurately correlate, and does not go in parallel with the rate of progressive deterioration of the heptocellular function, as indicated by the clinical predictors. So, sonographic portal vein parameters cannot be a substitute for clinical grading and staging of cirrhosis; and we cannot propose it as a single acceptable diagnostic indicator in grading liver cirrhosis with accuracy.

Table 1:- Distribution of the studied groups according to laboratory investigation, clinical data, PVD, SVD and presence of OV.

	Child score A mean ±SD	Child score B mean ±SD	Child score C mean ±SD	F test	P value
Albumin	3.26±0.86	2.99±0.49	2.57±0.33	7.18	0.002**
Bilirubin	1.31±0.53	1.97±1.3	3.11±1.75	5.42	0.008**
PT	14.1±1.58	15.04±1.30	18.48±4.80	7.14	0.002**
INR	1.10±0.10	1.28±0.20	1.82±0.41	22.77	<0.001**
Ascites **Mild** **Moderate** **Severe** **No**	1(14.3) 0(0.0) 0(0.0) 6(85.7)	7(36.8) 3(15.8) 4(21.1) 5(26.3)	3(12.5) 7(29.2) 14(58.3) 0(0.0)	^27.21	<0.001**
Encephalopathy **Mild** **Severe** **No**	0(0.0) 0(0.0) 7(100)	2(10.5) 0(0.0) 17(89.5)	6(25.0) 8(33.3) 10(41.7)	^14.54	0.002**
PVD	1.26±0.10	1.33±0.22	1.27±0.27	0.371	0.692
SVD	0.90±0.14	1.12±0.31	0.97±0.19	2.88	0.066
OV **Yes** **No**	3(42.9) 4(57.1)	14(73.7) 5(26.3)	18(75.0) 6(25.0)	^2.72	0.30

Discussion:-

- Chronic liver diseases and cirrhosis are now being recognized as an important cause of morbidity and mortality world-wide. Established cirrhosis has a 10-year mortality of 34-66% ***(Burroughs et al.,2009)***.
- The most common cause of portal hypertension is cirrhosis. Vascular resistance and blood flow are 2 important factors in its development ***(Sanyal et al.,2008)***.
- At least two-thirds of liver cirrhosis patients develop esophageal varices during the course of their disease, however only 30-40% of patients with cirrhosis develop severe upper gastrointestinal bleeding ***(Tacke et al., 2007).***
- Upper GI endoscopy is usually performed for detection of esophageal varices in cirrhotic patients to avoid life threatening bleeding. This means that a large number of cirrhotic patients undergo unnecessary endoscopic examination ***(Koreum,2006)***.
- Child-Turcotte-Pugh (CTP) score was proved to be a valid independent predictor and prognostic factor of survival. Class C in the CTP grading was strongly correlated with worse survival. This clinical score is the most commonly used system; and must be taken into consideration for adequate evaluation and staging of cirrhosis ***(Samada et al., 2008)***.
- The results of the current study show that the mean PVD ± SD of the cirrhotic patients is 1.29±0.23 cm and this in agreement with ***(Macias Rodriguez et al., 2003), (Dib et al., 2005) , (Prihatini et al., 2005***) , ***and (Kamran Shateri et al., 2012)*** but not in alignement with previous studies (< 10 mm) performed to define normal ranges of ultrasound PVD from 6.3 - 9.7 mm ***(Anakwue, 2009), (Li YS, Kardorff R, et al., 2004) and (Weinreb, Kumari, et al., 1982).***
- The present study showing that there is no correlation between presence of esophageal varices and child-paugh scores and this in agreement with ***(Kleber, et al., 1993), (Odelowo et al., 2002) and (Adrover, et al., 2004) ,*** but not in alignement with ***(Zaman, et al., 2001).***
- Sonography is one of the diagnostic methods used for studying hepatobiliary pathologies, where patients are not exposed to ionizing radiation. It is cheap and easily available, that is why is frequently the first examination performed when liver cirrhosis or portal hypertension is suspected ***(Vilgrain et al., 1990),*** and with the progress of this field it can even be used in staging of cirrhosis and its complications ***(Kudo et al., 2008) , (Han and Yoon, 2008).***
- The present study showing that there is no relation between PVD and presence of esophageal varices and this is in agreement with ***Li FH et al.,2005 but not in alignement with Sarwar et al.,2005, Dib et al.,2005 , and Prihatini et al., 2005***
- The present study showing that there is no statistically significant difference in PVD between different child scores in cirrhotic patients and this in agreement with ***(Ong et al., 2003), (Lafortune et al., 1984), (Ditchfield et al., 1992) and (Kamran Shateri et al.,2012) ,*** but not in alignement with ***(Yan et al., 2005).***

Conclusion:-

According to the results of the current study, it seems that, in cirrhosis, the rate of pathologic changes in the portal hemodynamics, as indicated by the sonographic portal vein diameter (PVD) and splenic vein diameter (SVD) does not accurately correlate, and does not go in parallel with the rate of progressive deterioration of the heptocellular function, as indicated by the clinical predictors. So, sonographic portal vein parameters cannot be a substitute for clinical grading and staging of cirrhosis; and we cannot propose it as a single acceptable diagnostic indicator in grading liver cirrhosis with accuracy.

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References:-

1. **Li YS, Kardorff R, Richter J, et al.,(2004):** Ultrasound organometry: the importance of body height adjusted normal ranges in assessing liver and spleen parameters among Chinese subjects with Schistosoma japonicum infection. Acta Trop. 92(2):133-138.
2. **Adrover R., CoCozzella D., Borzi S., et al,.(2004):**When is the best time to perform upper digestive endoscopy to detect the presence of esophageal varices in patients with cirrhosis?. Gastroenterology Hepatol. 27 (6): 353-6.
3. **Anakwue AC. (2009):** Sonographic Evaluation of Normal Portal Vein Diameter in Nigerians.European Journal of Scientific Research. 36 (1):114-117
4. **Burroughs AK, Triantos CK, O'Beirne , et al.,(2009)**: Predictors of early rebleeding and mortality after acute variceal hemorrhage in patients with cirrhosis. Nat Clin Pract Gastroenterol Hepatol; 6: 72-73.
5. **Dib N,Konate A,Obesti F, et al., (2005):**Non invasive diagnosis of portal hyper tension in Cirrhosis.Application to the primary prevention of varices.Gastroenterol Clin Diol; 29(10);975-87
6. **Ditchfield MR, Gibson RN, Donlan JD, et al.,(1992):** Duplex Doppler ultrasound signs of portal hypertension: relative diagnostic value of examination of paraumbilical vein, portal vein and spleen. Australas Radiol. 36(2):102-105
7. **Han KH and Yoon KT.(2008):** New diagnostic method for liver fibrosis and cirrhosis. Intervirology; 51 Suppl 1:11-16.
8. **Kleber G., Sauerbrauch T., Ansari H., et al.,(1993)**: Prediction of variceal haemorrhage in cirrhosis: a prospective follow-up study. Gastroenterology; 100 (5): 1332-7.
9. **Koreum A.(2006)**: Screening endoscopy in patients with liver cirrhosis Gastroenterology; 48:180-187.
10. **Kudo M, Zheng RQ, Kim SR, et al.,(2008)**: Diagnostic accuracy of imaging for liver cirrhosis compared to histologically proven liver cirrhosis. A multicenter collaborative study Intervirology ; 51 Suppl 1:17-26 .
11. **Lafortune M, Marleau D, Breton G, et al.,(1984):** Portal venous system measurements in portal hypertension. Radiology. 151(1):27-30
12. **Li FH, Hao J, Xia JG et al.,(2005):** Haemodynamic analysis of oesophageal varices in patients with liver cirrhosis using colour doppler ultrasound. World J Gastroenterol 2005; 11 (29): 4560-5.
13. **Macias Rodriguez MA, Rendon Unceta P, Navas Relinque C, et al.,(2003):** Ultrasonography in patients with chronic liver disease: its usefulness in the diagnosis of cirrhosis. Rev Esp Enferm Dig. 95(4):258-264, 251-257.
14. **Odelowo O.O., Smoot D.T., and Kim K.(2002)**: Upper gastrointestinal bleeding in patients with liver cirrhosis. J. Natl med Assoc; 94 (8): 712-5.
15. **Ong TZ, Tan HJ.(2003):** Ultrasonography is not reliable in diagnosing liver cirrhosis in clinical practice. Singapore Med J.;44(6):293-295.
16. **Piekarska A, Zboinska J, Szymczak W, et al.,(2008)**: Independent prognostic factors in patients with liver cirrhosis. Hepatogastroenterology ;55(84):1034-1040.
17. **Prihatini J, Lesmana LA, Manan C, et al.,(2005)** . Detection of oesophageal varices in liver cirrhosis using non-invasive parameters. Acta Med Indones ; 37 (3): 1
18. **Samada Suarez M, Hernandez Perera JC, Ramos Robaina L, et al.,(2008)**: Factors that predict survival in patients with cirrhosis considered for liver transplantation. Transplant Proc. ;40(9):2965-2967.
19. **Sanyal AJ, Bosch J, Blei A, et al.,(2008):** Portal hypertension and its complications. Gastroenterology. 134(6):1715-28.
20. **Tacke F, Fiedler K and Trautweina C.(2007):** A simple clinical score predicts high risk for upper gastrointestinal hemorrhage from varices in patients with chronic liver disease. Scandinavian Journal of Gastroenterology; 42: 374_382.
21. **Vilgrain V, Lebrec D, Menu Y, et al.,(1990):** Comparison between ultrasonographic signs and the degree of portal hypertension in patients with cirrhosis. Gastrointest Radiol. ;15(3):218-222.
22. **Weinreb J, Kumari S, Phillips G, et al., (1982):** Portal vein measurements by real-time sonography. AJR Am J Roentgenol. 1982;139(3):497-499.
23. **Williams R, Donohue J, Ng C, et al.,(2004):** Diagnostic value of Doppler assessment of the hepatic and portal vessels and ultrasound of the spleen in liver disease. Eur J Gastroenterol Hepatol. ;16(2):147-155.
24. **Yan G, Duan Y, Ruan L, et al.,(2005):** A study on therelationship between ultrasonographic score and clinical score (MELD, CPT) in cirrhosis. Hepatogastroenterology. 52(65):1329-1333.
25. **Zaman A., Beker T., Lapido J., et al.,(2001):** Risk factors for the presence of varices in cirrhotic patients without a history of variceal hemorrhage. Arch. Intern. Med; 161: 2564-2570.