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Research Paper

A Study of Correlation of Severity of Liver Cirrhosis on Child Pugh Score with Cardiac Function on Echocardiography

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ABSTRACT
INTRODUCTION- *Cirrhotic Cardiomyopathy term was first used to describe irregular cardiac contractile abilities in response to stress and diastolic dysfunction. Cardiovascular diseases are often more prevalent in patients with cirrhosis (1–3).*
MATERIAL AND METHOD- *A total of 60 patients of liver cirrhosis coming to Himalayan Hospital OPD and admitted in ward were included and divided into three groups A,B.C according to Child-Pugh score.*
RESULT- *On echocardiography various parameters were computed in each of the Child-Pugh groups (A ,B & C consisting 20 patients) and compare. Our results indicate that there is no statistical significant correlation between Child -Pugh's score and systolic function of cirrhotic patients in various groups (P value > 0.05).*
CONCLUSION *- Our results indicate that both the diastolic dysfunction as well as relevant echocardiographic changes are associated with patients with liver cirrhosis. In summary, liver cirrhosis has a significant correlation with diastolic dysfunction.*
KEYWORDS- *Cardiac cirrhosis, Diastolic dysfunction ,.*

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I. INTRODUCTION-

Cardiovascular diseases are often more prevalent in patients with cirrhosis (1–3). Studies suggest impairments in diastolic dysfunction (lower E/A ratio; < 1) (4,5) in cirrhotic patients. The causative mechanism for this diastolic dysfunction in cirrhotic-patients is speculated to be from cardiac hypertrophy or subendothelial edema (6). The clinical consequences of cirrhosis-related cardiovascular dysfunction are evident during and after liver transplantation (LT) (7), and this may be a manifestation of occult cirrhotic cardiomyopathy [CCM] (8). To comprehensively address this concern, the present study is aimed to determine the correlation of severity of liver cirrhosis on Child-Pugh score with cardiac dysfunction using echocardiography.

AIMS AND OBJECTIVES- To study the Correlation between severity of liver dysfunction (assessed by Child-Pugh score) in cirrhosis patients and cardiac function on echocardiography.

II. MATERIAL AND METHOD

This cross-sectional study was conducted in the Himalayan Institute of Medical Sciences, Swami Ram Nagar, Dehradun, Uttrakhand for a period of 12 months. Sixty Cirrhosis liver patients in OPD and ward presenting to the Himalayan Hospital were selected for the study and segregated equally into Childs –Pugh's grade A, B and C . 2D- Echocardiography and colour Doppler study was done of each cirrhotic patients. Systolic function was measured from Simpson's method and diastolic function was measured from E/A ratio , Deceleration time [DT], IVRT [Intra Ventricular Relaxation time] and TR [tricuspid regurgitation] Velocity . Patients with known structural/functional cardiac abnormalities were excluded from the study.

III. DATA MANAGEMENT AND STATISTICAL ANALYSIS

- The collected data was entered into Microsoft excel sheet. Statistical analysis was performed using Statistical Package for Social Sciences (SPSS) 20.0.
- Comparison of means of normally distributed variables was done using One way ANOVA test.
- A p-value of < 0.05 was deemed to indicate statistical significance

IV. RESULTS

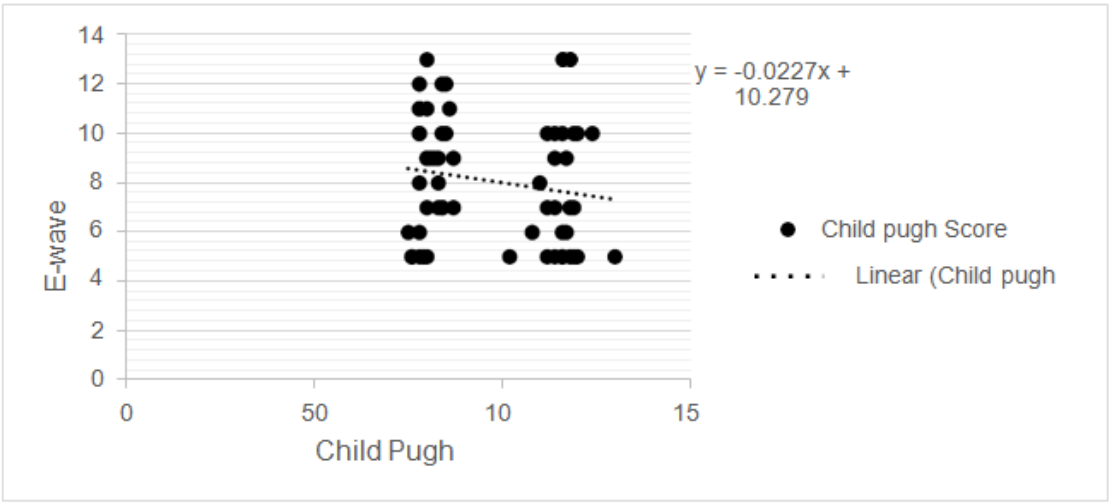
- On echocardiography various parameters were computed in each of the Child-Pugh groups (A ,B & C consisting 20 patients) and compared.
- Our results indicate that there is no statistical significant correlation between Child pugh's score and systolic function of cirrhotic patients in various groups . (P value > 0.05).
- Our results revealed that majority of the patients possessing diastolic dysfunction were from Group B and C (High Child-Pugh score) (Table 1).

Table 1: Tabular depiction of the absolute number of patients in the indicated groups with normal, grade 1 or grade 2 levels of diastolic dysfunction.

DD Grade (absolute scores)			
	NORMAL	**ONE**	**TWO**
Group A	12	5	3
Group B	7	12	1
Group C	8	11	0
DD Grade (Percentage)			
	NORMAL	**ONE**	**TWO**
Group A	60	25	15
Group B	35	60	5
Group C	40	55	0

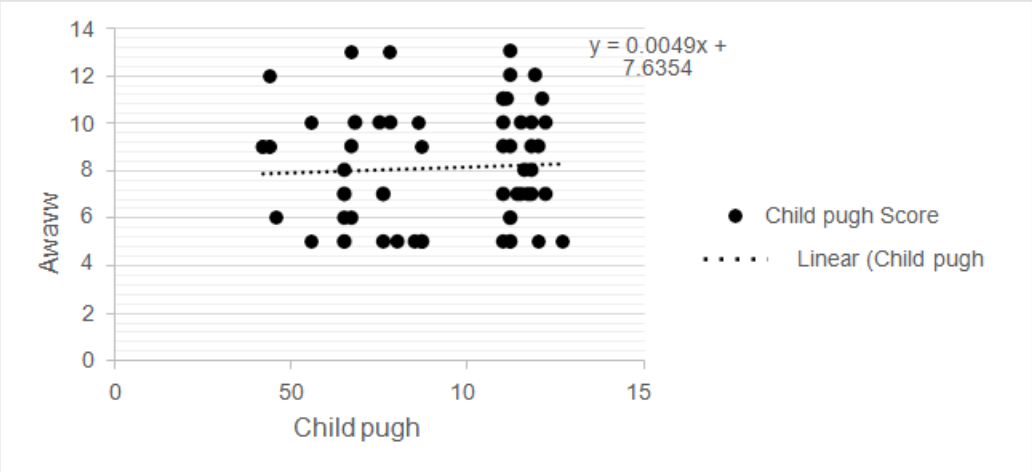
The 60% of patients had normal diastolic function while 40% showed diastolic dysfunction.

Figure 01; Scatter plot depicting the Pearson correlation between E – wave Velocity and Child pugh's score in all cirrhotics patients



- No significant correlation was seen between E-wave velocity and Child pugh Score in all Cirrhotic patients.

Figure 02. Scatter plot depicting the Pearson correlation between A wave velocity and Child pugh score of all cirrhotic patients



- No significant correlation was seen between A -wave velocity and Child pugh Score in all Cirrhotic patients.

Table 2; Tabular depiction of components of diastolic dysfunction, and its relation to Child pugh's score phenotypes.

- **Correlation table:-**

Correlations	Child Pugh Score	
	r-value	P-value
IVRT	.126	.339
TR velocity m/s	.340	.008
E wave velocity	-.165	.207
A wave velocity	.050	.707

Table 3: Tabular and bar graph depiction of the number of patients in the indicated groups with normal, trace, mild and moderate mitral regurgitation phenotypes.

MR	Group A	Group B	Group C
Normal	13	10	7
Trace	7	7	6
Mild	0	3	7
Moderate	0	0	0

- Our results indicate that for mitral regurgitation, normal patients were more in group A and it further decreases with the increase in Child-Pugh score (in comparison to Group B to C) . Moreover, patients with trivial or mild phenotype for mitral regurgitation were comparatively higher in group B and C (higher Child-Pugh score) **(Table 3)**. Taken together, with the increase in Child-Pugh score, there is a tendency of an increase in mitral regurgitation phenotypes

Table 4: Tabular depiction of the number of patients in the indicated groups with normal, mild and moderate pulmonary hypertension phenotypes.

PHTN			
	Group A	Group B	Group C
NORMAL	20	17	17
MILD	0	2	3
MODERATE	0	1	0

- Our results indicate that the incidence of Pulmonary hypertension was slightly higher in patients in group

V. DISCUSSION

The prevalence of the left ventricular diastolic dysfunction (LVDD) in cirrhotic patients ranges from 25.7% to as high as 81.4% as reported in different studies. In several studies the severity of diastolic dysfunction (DD) correlated with degree of Liver failure and rate of dysfunction was higher in patients with decompensated cirrhosis compared with compensated. In a systemic review done by Stundiene et al (9) , it was found that 51.2% of cirrhotic patients had Lv diastolic dysfunction diagnosed and grade i was almost prevalent (59.2%, P<0.001) among them ,the grade iii was rarely diagnosed only 5.1%. The data about the prevalence of diastolic dysfunction in cirrhotic patient depending on Child Pugh Classes was available from five studies (365 patients overall) and only in 1 research diastolic dysfunction was found being associated with severity of Liver Cirrhosis ($p < 0.005$). They established that diastolic dysfunction was diagnosed in 44.6% of Child –Pugh A class patient ,in 62% of Child B class and 63.3% of Child C patients ($P = 0.028$). "They showed that patient with higher diastolic dysfunction grades increases in more severe cirrhosis patients ($P< 0.001$)."

In our study we found no significant correlation between systolic function and Child-Pugh score ($P> 0.05$) . Moreover similar results were obtained or deceleration time and in all the inter group comparison results , no statistical significance was observed . Notably , similar to other studies our studies showed that diastolic dysfunction was found in almost every patient of cirrhotic cardiomyopathy . Its diagnosis can be done by measuring echocardiographic diastolic dysfunction indices such as E/A ratio as the resting state. We observed that strong increase in number of patients with diastolic dysfunction with increase in Child-Pugh score . Majority of patients in group B/C possess diastolic dysfunction score of 1,where a small proportion of patients in group B / C also possess score of +3.

In studies conducted by Karagiannakis DS , et al(10) in 2018 and Lee SK ,et al in 2018(11) it was found that development of LVDD in cirrhotic patients is predictor of worse progonosis. Therefore it is more important to monitor closely cirrhotic patients who developed LVDD

VI. CONCLUSION

Cardiac dysfunction is frequently present and hidden complication patients with cirrhosis liver. Systolic dysfunction has no significant correlation with Child-Pugh score. But diastolic dysfunction correlates with Child-Pugh score significantly. All patients with cirrhosis should undergo echocardiography to estimate level of cardiac diastolic dysfunction which is a predictor of poor prognosis in cirrhotic patients."

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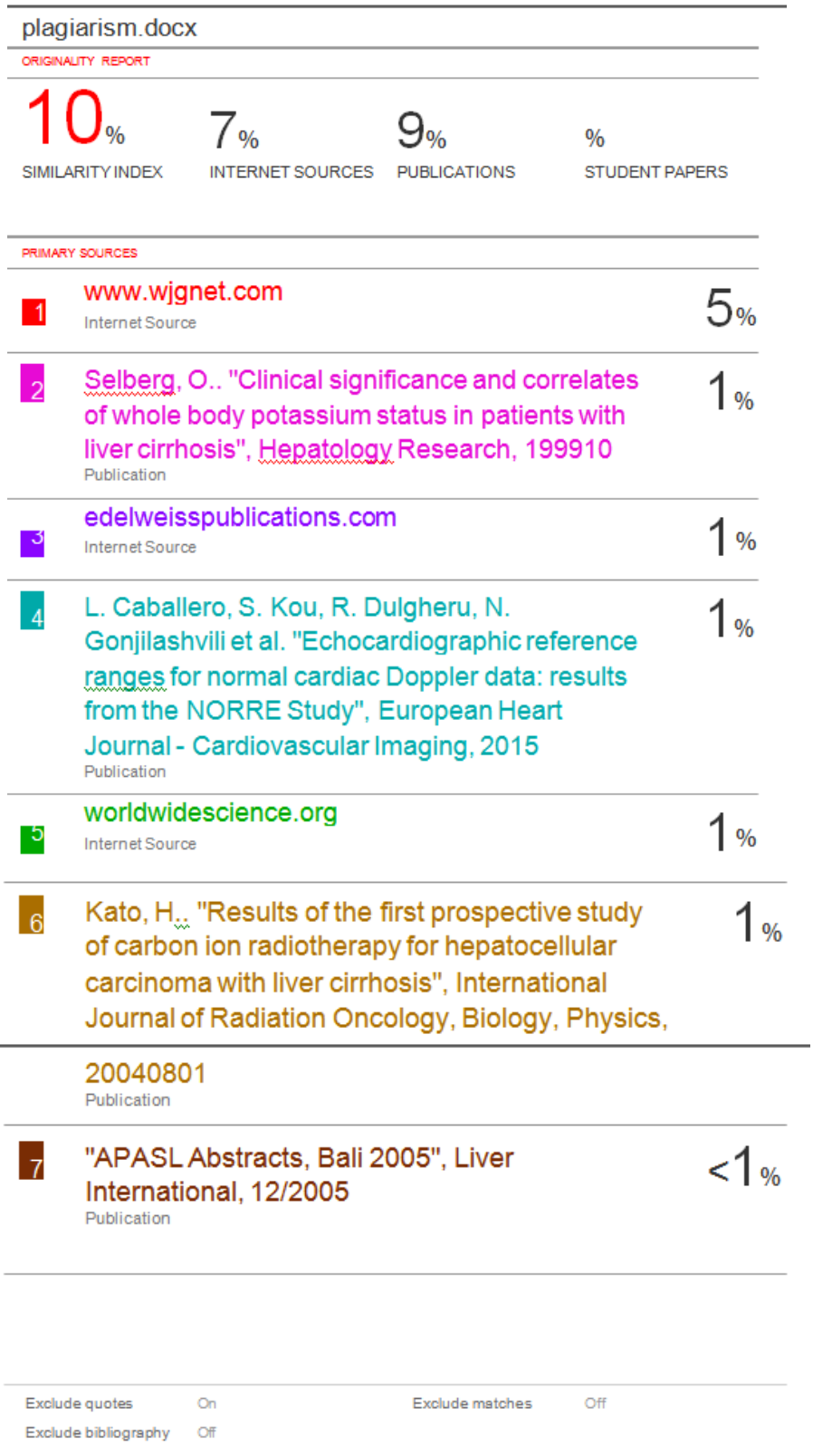

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