

Proportion of Sarcopenia in Cirrhotic Patients of Age More than 18 Years Admitted with Complications at a Tertiary Care Centre in Thrissur District

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Abstract: ***Introduction:** Liver cirrhosis patients often have decreased physical activity and protein - energy malnutrition and sarcopenia¹. Sarcopenia is part of the frailty which has a predisposition to poor outcomes in chronic liver disease patients². But this is least addressed domain in cirrhotic patients. Hence purpose of this study is to identify the proportion of sarcopenia in liver cirrhosis patients and its association with different complications³. **Methods:** This cross sectional study was done in Department of Gastroenterology of Amala Institute of Medical Sciences over 1.5 year period. Sarcopenia was assessed based on handgrip strength measured using hand grip dynamometer. **Results:** A total of 130 patients were studied and proportion of sarcopenia was 60% (78 among 130 patients). Sarcopenia was more among females (75%) than males (55.88%). Sarcopenia among Child A - 45.28% Child B - 59.26%, child C - 95.65%, MELD >11 66.33% and in MELD >15 80%. Among 130 patients enrolled in the study 102 (78.43%) patients had ascites among whom 71 (69.61%) had sarcopenia. 15 (11.54%) patients had hepatic encephalopathy, 6 (4.62%) had HRS and all of them had sarcopenia. 7 (5.38%) had SBP and 5 (71.43%) had sarcopenia. 26 patients (20%) had variceal bleed among whom 13 (50%) had sarcopenia. **Conclusion:** In this study of 130 patients with chronic liver disease admitted with complications 78 patients (60%) were found to have sarcopenia. All patients with HRS and Hepatic encephalopathy had sarcopenia. 71.4% of patients with SBP, 69.6% patients with ascites and 50% of patients with variceal bleed had Sarcopenia. Proportion of sarcopenia among CLD patients is high and has association with different CLD related complications, hence addressing this problem must be an integral part of CLD management.*

Keywords: Sarcopenia, handgrip strength

1. Introduction

The liver plays a central role in energy disposal and is involved in protein, carbohydrate, and fat metabolism⁴.

Nutritional status can be profoundly affected in patients with chronic liver disease^{5, 6}. Malnutrition is not only a consequence of progressive liver insufficiency, but it is also a condition that may in itself affect the natural history of cirrhosis, thus influencing patient outcome and survival^{7, 8}. Recently a great deal of attention has been focused on the loss of skeletal muscle mass (i. e. sarcopenia) in patients with advanced liver disease, suggesting that muscle wasting could be the main detrimental alteration affecting prognosis⁹.¹⁰. Sarcopenia is an important component of frailty and frailty assessment of cirrhotic patients is gaining more relevance in prognostication¹¹

2. Methods

Study Design: Cross sectional study

Study Setting: This study was conducted in Department of Gastroenterology of Amala Institute of Medical Science

Study Period: A one and half year period from February 2021 to July 2022 after getting clearance from research ethical committee.

Sampling Technique: Consecutive sampling - All cirrhotic patients getting admitted in Gastroenterology Department who meet inclusion and exclusion criteria

Sample Size Calculation

$$n = (Z_{1-\alpha})^2 pq/d^2$$

α -> significance level 5% (1.96)

p -> prevalence of frailty in cirrhosis patients (42.9%) 1

q -> 1 - p

d -> Relative precision 20% of p

Sample Size n=130

Inclusion Criteria: All patients with cirrhosis liver of age more than 18 years, with complications attending Gastroenterology OPD

Exclusion Criteria:

Liver cirrhosis patients with other coexisting chronic debilitating diseases

Liver cirrhosis patients of age less than 18 years

Methods of Data Collection

Informed written consent will be obtained from the patient as well as bystander

Data will be collected using a semi - structured interviewer administered questionnaire

Nutritional status and sarcopenia of the patient will be assessed using standardised tools at the time of enrolment to the study

Ethical Issues

Study was done after obtaining permission from Institutional Research Committee

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3. Data Analysis

Descriptive analysis:

Descriptive analysis was carried out by mean and standard deviation for quantitative variables, frequency, and proportion for categorical variables. Non normally distributed quantitative variables were summarized by median and interquartile range (IQR). Data was also represented using appropriate diagrams like bar diagram, pie diagram and box plots.

All Quantitative variables were checked for normal distribution within each category of explanatory variable by using visual inspection of histograms and normality Q - Q plots. Shapiro - wilk test was also conducted to assess normal distribution. Shapiro wilk test p value of >0.05 was considered as normal distribution.

Categorical outcome / Crosstab:

Categorical outcomes were compared between study groups using Chi square test /Fisher's Exact test (If the overall sample size was < 20 or if the expected number in any one of the cells is < 5, Fisher's exact test was used.)

P value < 0.05 was considered statistically significant. IBM SPSS version 22 was used for statistical analysis. (1)

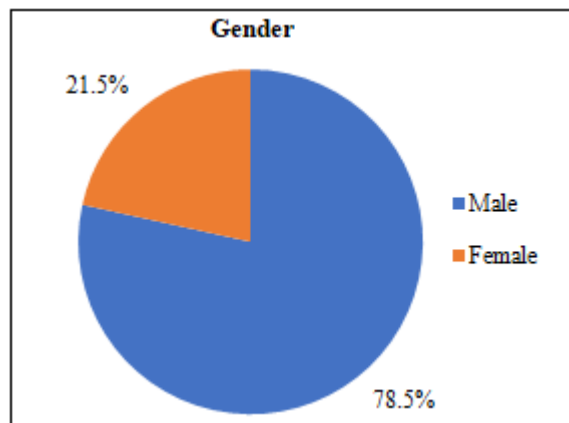
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4. Results

Descriptive analysis of Age in the study population (N=130)

Parameter	Mean ± SD	Median	Minimum	Maximum	95% C. I	
					Lower	Upper
Age	56.02 ± 10.2	55.0	36.0	77.0	54.3	57.8
Weight	70.59 ± 12.57	69.0	48.0	105.0	68.4	72.8
Height	165.74 ± 8.73	167.0	145.0	181.0	164.2	167.3
BMI	25.93 ± 4.34	26.0	18.0	37.6	25.2	26.7

Gender in the study population (N=130)



Descriptive analysis of MUAC & Hand grip in the study population (N=130)

Name	Mean ± S. D	Median	Minimum	Maximum	95% CI	
					Lower CI	Upper CI
MUAC	24.30±3.32	23	20	32	23.73	24.87
Hand grip	24.50±7.27	25	11	35	23.25	25.75

Descriptive analysis of Low Hand grip in the study population (N=130)

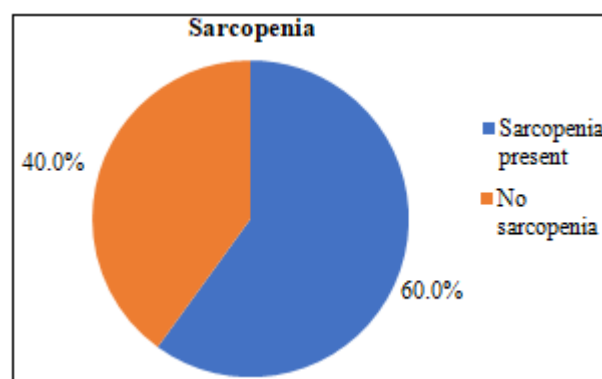
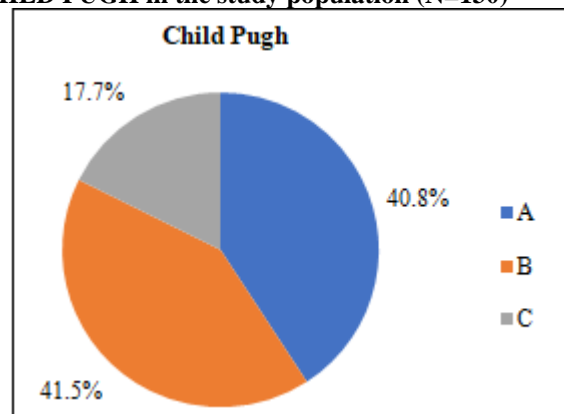
Parameter	Frequency	Percentage
Low Hand grip		
Yes	62	47.69%
No	68	52.31%

Sarcopenia in the study population (N=130)

Descriptive analysis of Complications in the study population (N=130)

Complications	Frequency	Percentage
As cites	102	78.46%
Portal hypertension	25	19.23%
Variceal bleed	26	20.00%
Spontaneous bacterial peritonitis	7	5.38%
LRTI	3	2.31%
Hepatic encephalopathy	15	11.54%
HCC	2	1.54%
Hepatorenal syndrome	6	4.62%

CHILD PUGH in the study population (N=130)



Comparison of gender between sarcopenia (N=130)

Sarcopenia	Gender		Chi square	P value
	Male (N=102)	Female (N=28)		
Sarcopenia Present	57 (55.88%)	21 (75%)	3.346	0.067
No Sarcopenia	45 (44.12%)	7 (25%)		

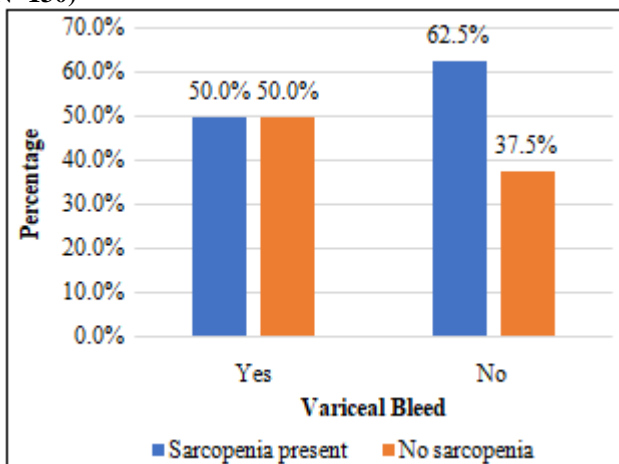
Comparison of sarcopenia across Child Pugh score (N=130)

Sarcopenia	Child Pugh			Chi square	P value
	A (N=53)	B (N=54)	C (N=23)		
Sarcopenia Present	24 (45.28%)	32 (59.26%)	22 (95.65%)	16.977	<0.001
No Sarcopenia	29 (54.72%)	22 (40.74%)	1 (4.35%)		

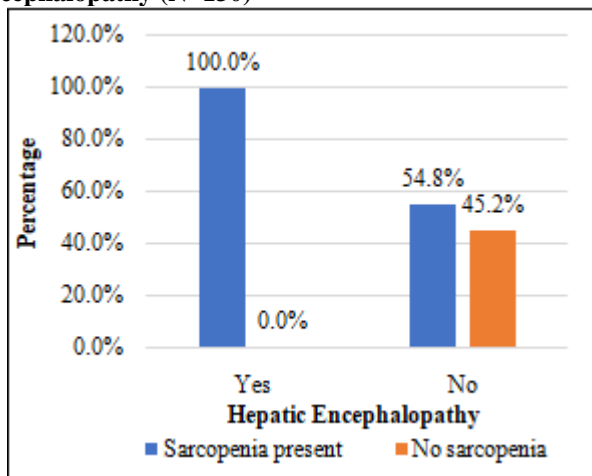
Comparison of sarcopenia between MELD score (N=130)

Sarcopenia	MELD Score		Chi square	P value
	>11 (N=98)	<=11 (N=32)		
Sarcopenia Present	65 (66.33%)	13 (40.63%)	6.640	0.010
No Sarcopenia	33 (33.67%)	19 (59.38%)		
	>15 (N=40)		9.630	0.002
Sarcopenia Present	32 (80%)	46 (51.11%)		
No Sarcopenia	8 (20%)	44 (48.89%)		

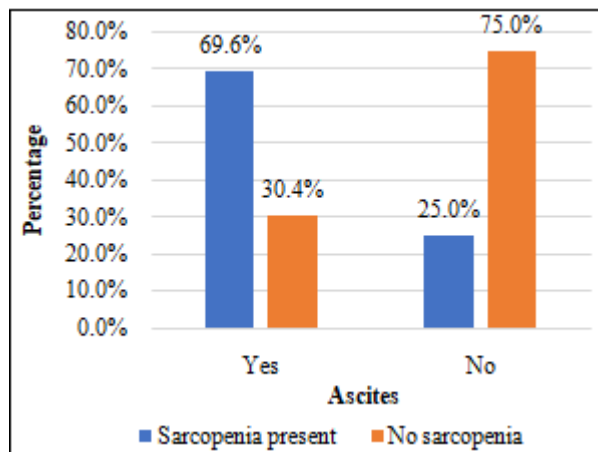
Comparison of sarcopenia between variceal bleed (N=130)



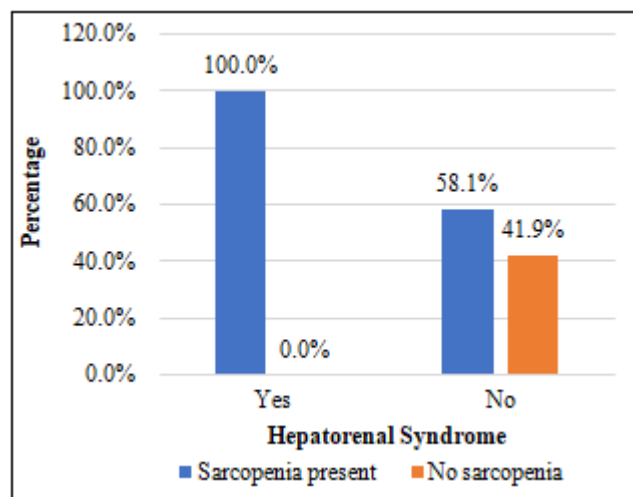
Comparison of sarcopenia between Hepatic encephalopathy (N=130)



Comparison of sarcopenia between Ascites (N=130)



Comparison of sarcopenia between Hepatorenal Syndrome (N=130)



5. Discussion

This study was done to find out proportion of sarcopenia among cirrhotic patients admitted with complications and was conducted in 130 patients whose age is more than 18 years and has chronic liver disease with any complications.

The mean age of patients presenting with chronic liver disease was about 56.02 with a standard deviation of 10.2, of which 102 (78.46%) were males and 28 (21.54%) were females.

In this study sarcopenia was assessed using Hand grip strength using Hand grip dynamometer. Sarcopenia was 60% (78 among 130 patients). Sarcopenia was more among females (75%) than males (55.88%). Sarcopenia among Child A - 45.28% Child B - 59.26%, child C - 95.65%, MELD >11 66.33% and in MELD >15 80%. Among 130 patients enrolled in the study 102 (78.43%) patients had ascites among whom 71 (69.61%) had sarcopenia. 15 (11.54%) patients had hepatic encephalopathy, 6 (4.62%) had HRS and all of them had sarcopenia. 7 (5.38%) had SBP 5 (71.43%) had sarcopenia. 26 patients (20%) had variceal bleed among whom 13 (50%) had sarcopenia.

6. Conclusion

A total of 130 patients were studied and proportion of sarcopenia was 60% (78 among 130 patients). Sarcopenia was more among females (75%) than males (55.88%). Sarcopenia among Child A - 45.28% Child B - 59.26%, child C - 95.65%, MELD >11 66.33% and in MELD >15 80%. Among 130 patients enrolled in the study 102 (78.43%) patients had ascites among whom 71 (69.61%) had sarcopenia. 15 (11.54%) patients had hepatic encephalopathy, 6 (4.62%) had HRS and all of them had sarcopenia. 7 (5.38%) had SBP 5 (71.43%) had sarcopenia. 26 patients (20%) had variceal bleed among whom 13 (50%) had sarcopenia.

Proportion of sarcopenia among CLD patients is high and has association with different CLD related complications, hence addressing this problem must be an integral part of CLD management.

7. Limitations

- 1) This study was conducted in a single centre and consist of a small population and the results may not be representative
- 2) More accurate assessment of sarcopenia is by imaging like CT or MRI at the level of 3rd lumbar vertebra which was not done
- 3) Number of male and female patients were not same
- 4) Follow up of the patients were not done

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