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Correlation between functional status and psoas muscle area in patients with liver cirrhosis

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Objective

Liver cirrhosis is characterized by protein wasting, which causes muscle loss. Recently, there were many researches on the measurement of psoas muscle volume using computer tomography (CT) scan, but there was a lack of research on evaluation of functional status. We investigated the correlation between the psoas muscle area and functional status in patient with liver cirrhosis.

Methods

Among patients with liver cirrhosis who were admitted between January 2017 and July 2018, patients with no history of other diseases were included. The psoas muscle area (Figure 1) at the end plate level of L4 vertebra was measured in an abdominal axial CT scan image using Image J Fiji (Laboratory for Optical and Computational Instrumentation, University of Wisconsin-Madison, USA). Muscle strength and short physical performance battery (SPPB) were evaluated to measure functional status. Muscle strength was evaluated twice by dominant hand grip power and the average of two measurements was used. SPPB consists of three evaluation items : balance, gait speed, and endurance.

Results

Twelve subjects were included in this study and their demographic characteristics were investigated (Table 1). And psoas muscle area and functional status were evaluated (Table 2). The Pearson's correlation coefficient between psoas muscle area and dominant hand grip power was 0.858, which was statistically significant at the level of $p < 0.01$ (Figure 2). Psoas muscle area and SPPB score were statistically significant at the level of $p < 0.48$ in the Mann Whitney U-test.

Conclusion

In this study, we could find the correlation between psoas muscle area and functional status. Therefore, it is necessary to evaluate the functional status in patients with liver cirrhosis in order to recover functional status and muscle strength early.

table1. Demographic and general characteristics of the subjects

Characteristics [Ⓢ]	Mean(range) or N(%) [Ⓢ]
Age(yr) [Ⓢ]	57.2(43-68) [Ⓢ]
Sex [Ⓢ]	[Ⓢ]
Male [Ⓢ]	12(100) [Ⓢ]
Female [Ⓢ]	0(0) [Ⓢ]
Height(m) [Ⓢ]	1.68(1.56-1.74) [Ⓢ]
Weight(kg) [Ⓢ]	64.2(52.8-73.3) [Ⓢ]
Body mass index(BMI) [Ⓢ]	22.92(18.05-29.91) [Ⓢ]
Child-Pugh classification [Ⓢ]	[Ⓢ]
Class A [Ⓢ]	6 [Ⓢ]
Class B [Ⓢ]	6 [Ⓢ]
Class C [Ⓢ]	0 [Ⓢ]
Duration of liver cirrhosis(months) [Ⓢ]	5(1-18) [Ⓢ]

table2. Functional status of the subjects

Variables [Ⓢ]	Mean(range) [Ⓢ]
Psoas muscle area(mm ²) [Ⓢ]	925.75(752-1441) [Ⓢ]
Dominant hand grip power(kg) [Ⓢ]	24(18-36) [Ⓢ]
Short physical performance battery score [Ⓢ]	9.6(9-11) [Ⓢ]
Balance test score [Ⓢ]	2.7(2-3) [Ⓢ]
Gait speed test score [Ⓢ]	3.7(3-4) [Ⓢ]
Endurance test score [Ⓢ]	2.9(2-4) [Ⓢ]

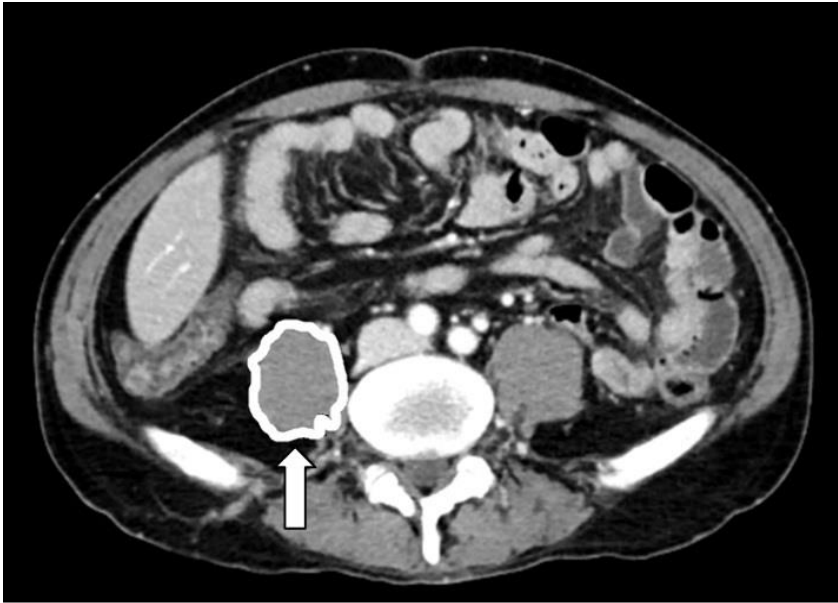


Fig. 1.

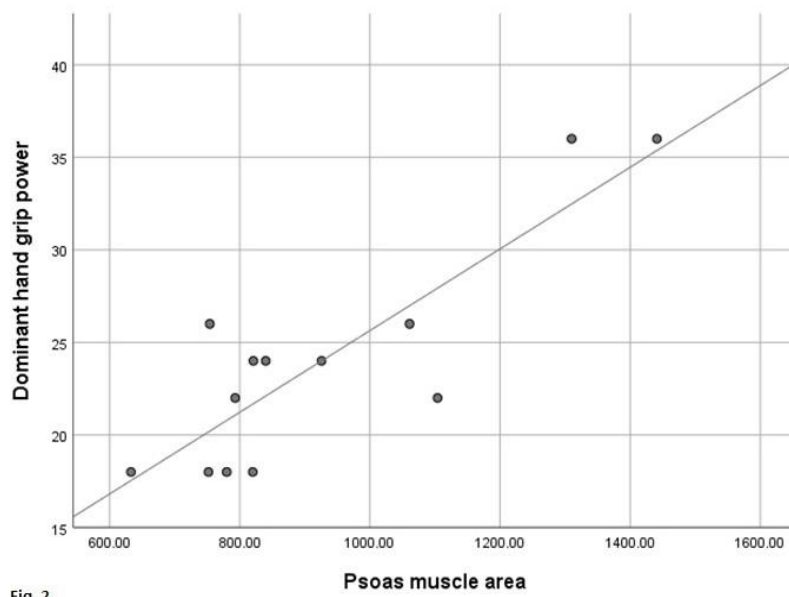


Fig. 2.

Fig 1. Measurement of psoas muscle area (arrow) at the level of endplate of L4 vertebra on an axial CT scan image using ImageJ Fiji

Fig 2. Correlation between psoas muscle area and dominant hand grip power