Effect of the exercise therapy on patients with cirrhosis with the hepatocellular carcinoma

~ Approach of the liver rehabilitation ~

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JDDW COI Disclosure

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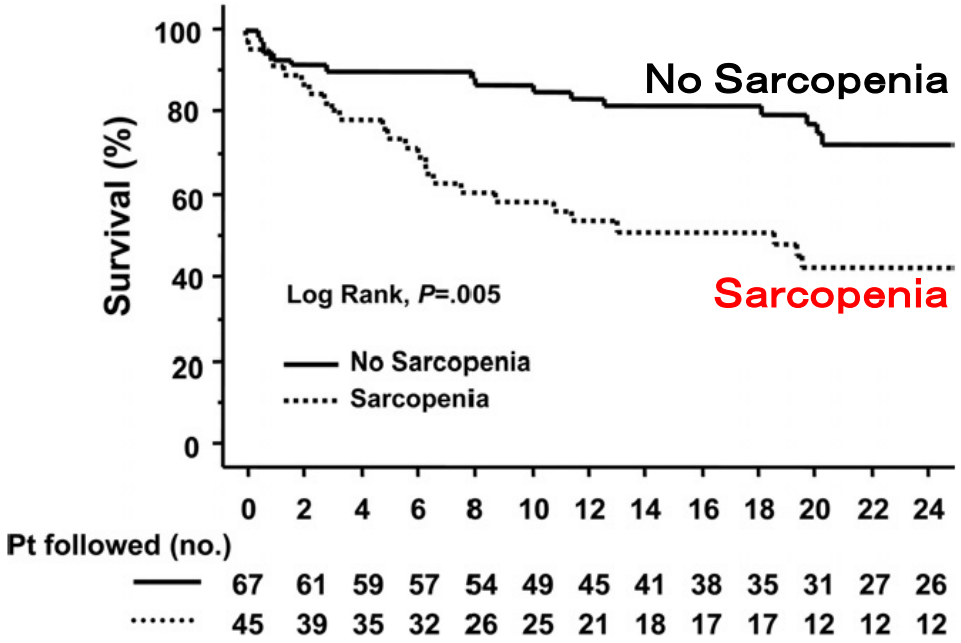
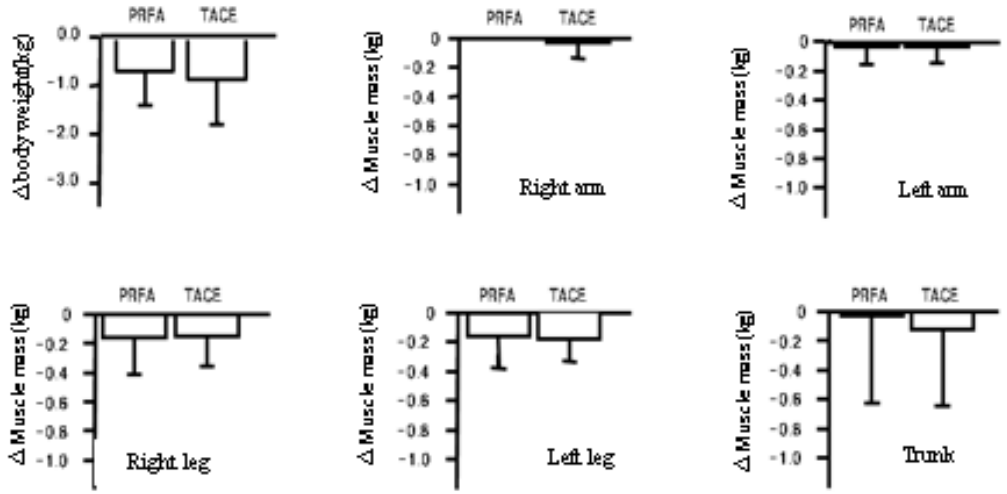
There are no COI with regard to this presentation.

【Background】

＊1



＊2



- There is a correlation between muscle mass and life prognosis.
- Treatment of HCC for about 2 weeks decreases the muscle mass of the lower limbs and trunk.
- Intervention of exercise therapy for patients with liver disease is expected.
- There are few reports about the effects of exercise therapy and load setting for patients with liver disease, and there is an urgent need to accumulate evidence.

＊1: Montano-Loza AJ,et at:Muscle wasting is associated with mortality in patients with cirrhosis. Clin Gastroenterol Hepatol 10:166-173,2012

＊2:Muto, Kawaguchi et al. kurumeikaisi, 2011;74:115-121

【Aim】

To investigate the effects of exercise therapy on liver function, muscle mass, and motor function in patients with cirrhosis hospitalized for HCC treatment.

【Subjects】

19 patients with HCC who were hospitalized from January 2017 to September 2017 for TACE/Solafenib.

Age (years)	:77.2±6.2
Sex (male/female)	:13/6
Hospitalization (days)	:10.8±5.7
The exercise therapy enforcement days (days)	:5.8±2.4
HBV/HCV/NonBC	:3/15/1
TNM stage (Ⅰ/Ⅱ/Ⅲ/Ⅳ)	:1/16/1/1
Child-Pugh class (A/B/C)	:15/3/1
Treatment (TACE/Sorafenib)	:17/2
AFP (ng/mL)	:133.7±309.3
PIVKA-II (mAU/mL)	:175.9±187.7

mean±SD

【Methods①】

●Statistical analysis

- We compared liver function, muscle mass, the motor function before and after the exercise therapy.
- The test method was Wilcoxon rank sum test, with a significance level of 5%.

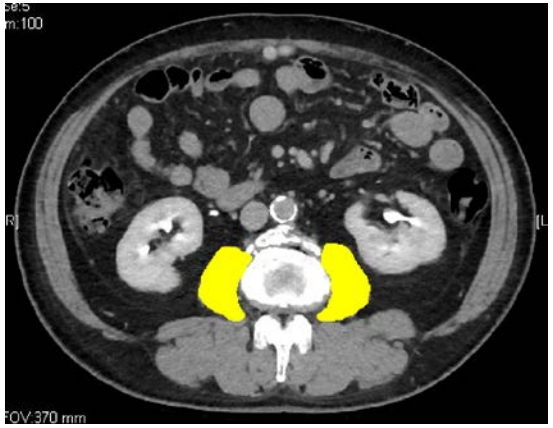
●Liver function evaluation

- Biochemical tests
  (AST, ALT, LDH, ALP, γ - GTP, Albumin, Total bililrubin, PT%, Platelet count)
- Child-Pugh score

●Muscle mass evaluation

- Computed tomography (CT)

  Measuring method:
  Measure muscle area by CT (Use ImageJ)
  Measuring muscle:
  Trunk muscle, Iliopsoas muscle,
  Abdominal muscle group, Back group
  Measurement position: L3 region



(PMI:psoas muscle index)

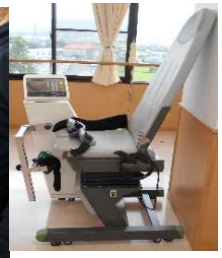
(SMI:skeletal muscle mass index)

【Methods②】

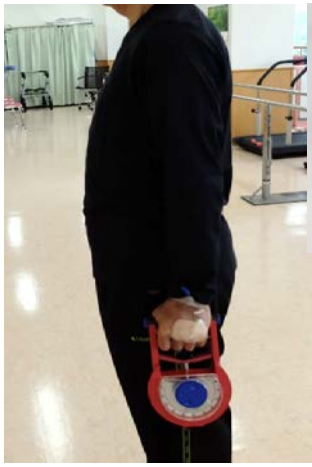
●Motor function evaluation

『Muscle strength』

- Quadriceps maximum muscle strength



- Grip strength



- 30-seconds chair stand test（CS-30）

『Activities of daily living (ADL) ability』

- Functional Independence Measure（FIM）

FIM評価表

患者番号		生年月日			
患者氏名	様	性別		年齢	歳
傷病名		発症日			
評価日		評価担当			

		評価項目	点数	コメント
運動項目	セルフケア	食事		
		整容		
		清拭		
		更衣・上半身		
		更衣・下半身		
		トイレ動作		
	括約筋コントロール	排尿管理		
		排便管理		
	移乗	ベッド・椅子・車椅子		
		トイレ		
		浴槽・シャワー		
	移動	主な移動手段		
		歩行		
		車椅子		
		階段		
認知項目	コミュニケーション	理解		
		表出		
	社会的認知	社会的交流		
		問題解決		
		記憶		

合計点数	0

【Methods③】

●Exercise therapy

Type of the exercise	Exercise therapy	Exercise intensity	frequency
Resistance training	・Combit CB- 1 (Quadriceps exercise)	60%MVC	2,3days/week
	・Standing stepping exercise	Body weight	5days/week
	・Calf raise	Body weight	5days/week
	・Half squat	Body weight	5days/week
Stretching	・Stretch exercise	Painless strength	3days/week
Aerobic exercise	・Walking movement (Voluntary walk)	Borg scale 11～13 (Fairly light～ Somewhat hard)	every day

＊ACSM(American College of Sports Medicine) Guidelines for Exercise Testing and Prescription Eighth Edition 2011.159-187

【Methods④】

『Resistance training』

Combit CB-1

Standing stepping exercise

Calf raise

Half squat

『Stretching』

Stretch exercise

『Aerobic exercise 』

Walking movement

【Results①】Comparison of the liver function (n=19)

	Before	After	*P*	
AST (U/L)	:40.4±17.0	:42.2±20.9	0.888	
ALT (U/L)	:31.2±15.5	:42.6±26.4	0.083	
LDH (U/L)	:225.2±46.0	:212.3±58.2	0.301	
ALP (U/L)	:416.1±179.4	:378.1±105.1	0.154	
γ-GTP (U/L)	:53.6±41.9	:59.9±43.8	0.305	*
Albumin (g/dL)	:3.6±0.6	:3.3±0.5	0.002	
Total bililrubin (mg/dL)	:0.9±0.6	:0.9±0.5	0.831	*
PT (%)	:78.7±13.3	:73.2±10.7	0.020	
Platelet count ($\times 10^4/\mu L$)	:12.6±6.4	:14.4±9.2	0.868	
Child-Pugh score (point)	:5.9±1.8	:6.4±1.2	0.112	

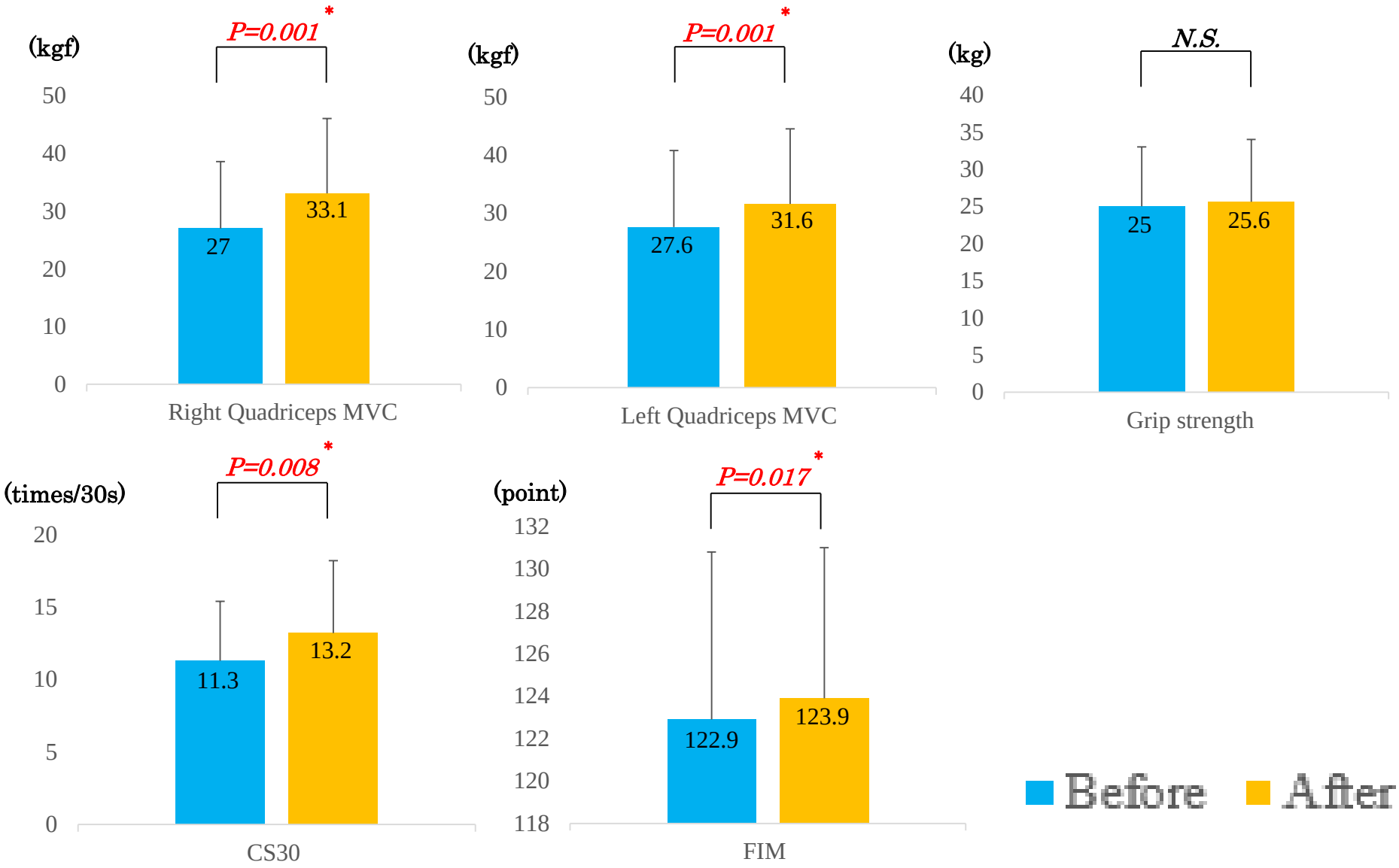
Wilcoxon, mean±SD, ＊:p＜0.05

【Results②】Comparison of the muscle mass (n=19)

	Before	After	*P*
Trunk muscle area (cm^2)	:99.3±19.0	:98.3±22.1	0.314
Iliopsoas muscle area (cm^2)	:12.0±2.8	:13.2±4.8	0.133
Abdominal muscle area (cm^2)	:46.8±9.6	:46.1±9.6	0.572
Back area (cm^2)	:38.9±11.8	:38.3±11.4	0.287
CT area SMI (cm^2/m^2)	:39.8±6.3	:39.4±7.4	0.473
CT area PMI (cm^2/m^2)	:4.8±0.9	:5.2±1.6	0.199

Wilcoxon, mean±SD, ＊:p＜0.05

【Results③】Comparison of the motor function (n=19)



Wilcoxon, mean±SD, ＊:p＜0.05

【Conclusions】

・Effect of the exercise therapy

① Muscle mass ⟶ Maintained

② Motor function ⟶ Improved
(Muscle strength・ADL)

③ Liver function ⟶ No change in Child-Pugh score

・Load setting (Resistance training)

→ It became clear that there was no deterioration of liver function when the exercise load was up to 60% of the maximum muscle strength.