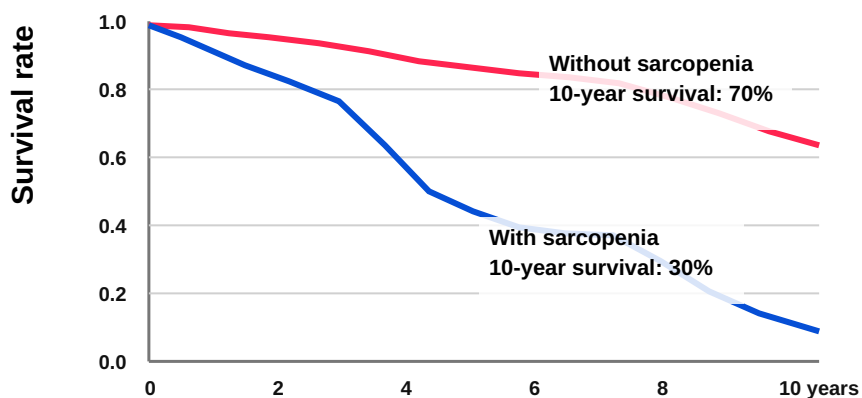


## Diagnosis and Treatment of Sarcopenia (Muscle Loss Syndrome)

Sarcopenia is a medical condition in which decreased muscle strength and skeletal muscle mass, particularly in older adults, reduce quality of life (QOL) in daily living and may shorten healthy life expectancy. Similar conditions include frailty and locomotive syndrome.

Patients with gastrointestinal diseases, especially liver disease, are prone to sarcopenia because of malnutrition and metabolic disorders. Once sarcopenia develops, liver disease may progress more rapidly.

Figure 1. Survival is lower in patients with liver cirrhosis complicated by sarcopenia



Reference: Nishikawa H, Nishiguchi S, et al. J Hepatobiliary Pancreat Sci. 2017;24(7):409-416.

Several diagnostic methods are available for sarcopenia. At our hospital, we diagnose sarcopenia using the Japan Society of Hepatology criteria, which Dr. Nishiguchi helped develop.

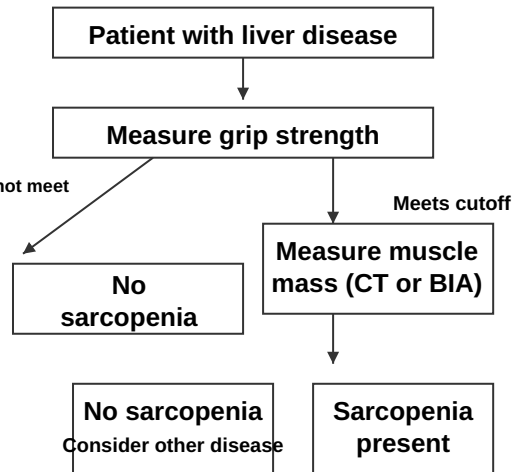
Figure 2. Diagnostic criteria for sarcopenia in patients with liver disease  
 Second edition, Japan Society of Hepatology

1) Cutoff values

	JSH
CT	Men: 42 cm <sup>2</sup> /m <sup>2</sup> Women: 38 cm <sup>2</sup> /m <sup>2</sup>
BIA*	Men: 7.0 kg/m <sup>2</sup> Women: 5.7 kg/m <sup>2</sup>
Grip	Men: < 28 kg Women: < 18 kg

\*BIA: bioelectrical impedance analysis.  
 At our hospital, BIA is measured with InBody.

2) Flowchart



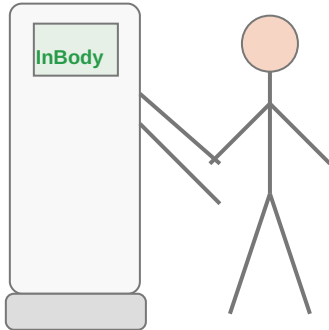
Criteria issued by the Japan Society of Hepatology.  
 They allow simple and accurate assessment.

**At our hospital, specialized outpatient care is provided on Tuesday and Thursday afternoons by Dr. Nishiguchi.** We perform diagnosis, early detection, and treatment of sarcopenia.

Muscle mass is measured using bioelectrical impedance analysis (BIA), a method performed with a high-precision body composition analyzer. Our hospital uses the InBody system. The measurement is quick, comfortable, and can be performed during an outpatient visit.

**Figure 3. Measurement of limb muscle mass by BIA**  
Bioelectrical impedance analysis

At our hospital, InBody 720 is used to measure body composition. It measures body water, body fat mass, and skeletal muscle mass.



**Muscle mass indicators**

**Skeletal muscle mass (SM)**

**Skeletal muscle mass index (SMI)**

$$\text{SMI} = \text{SM (kg)} / \text{height (m)} / \text{height (m)}$$

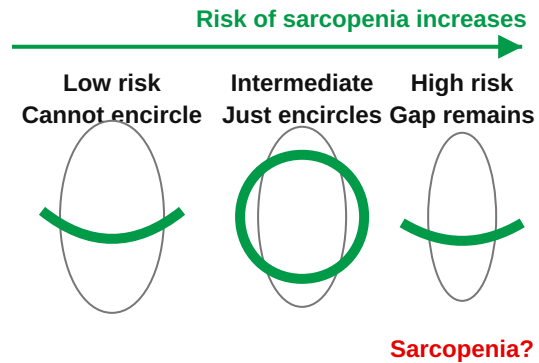
BIA helps assess whether weight gain is due to fluid retention, fat, or increased muscle mass.

Sarcopenia can also be self-checked using the finger-ring test. This test helps determine whether there is atrophy of the calf muscles.

**Figure 4. Finger-ring test for self-checking sarcopenia**

**This test can screen for calf muscle atrophy.**

How to check for sarcopenia:



Reference: Tanaka T, et al. Geriatr Gerontol Int. 2018;18(2):224-232.

If you have recently become unsteady when walking, fall frequently, or find it difficult to climb stairs, please try this self-check method. If the finger-ring test suggests an abnormal result, we recommend visiting our specialized outpatient clinic.

## Treatment of Sarcopenia

If sarcopenia is diagnosed, adequate protein intake and exercise are essential. When dietary protein is insufficient, the body breaks down its own muscle proteins into amino acids in order to produce the proteins it needs. As a result, skeletal muscle mass decreases.

The recommended protein intake for patients with liver disease is higher than that for healthy individuals. A general target is approximately 1.2 to 1.3 g of protein per kilogram of standard body weight per day. For a person with a standard body weight of 60 kg, this corresponds to approximately 75 g of protein per day.

Achieving this level of protein intake requires a sufficient intake of protein-rich foods such as dairy products and meat. However, increasing protein intake may also lead to excessive fat or salt intake. Patients should therefore avoid fatty cuts of meat such as heavily marbled beef and should use cooking methods that reduce oil and salt.

Some patients develop elevated blood ammonia levels after eating a large amount of protein, which may lead to hepatic encephalopathy or hepatic coma. This condition is called protein intolerance. In the past, these patients were often instructed to restrict protein intake.

However, excessive protein restriction may worsen sarcopenia and can also aggravate liver cirrhosis itself. The current treatment approach is to actively use medications that lower blood ammonia levels while avoiding unnecessary reduction of dietary protein as much as possible.

Appropriate dietary therapy and exercise therapy differ depending on each patient's medical condition. Consultation with a specialist is recommended.

## Exercise Therapy

In the past, patients with liver cirrhosis were often advised to rest. However, this is now considered inappropriate in many cases. Excessive rest decreases skeletal muscle mass in patients with liver cirrhosis and may accelerate disease progression.

Recommended exercise is not limited to simply walking. Patients are encouraged to walk at a brisk pace whenever possible and to include slopes or stairs in their daily activities. Patients who are able to do so should also perform resistance training, such as squats.

## Medication for Sarcopenia

If dietary therapy and exercise therapy alone are not sufficient, medication should be considered.

Branched-chain amino acids (BCAAs), which are administered to patients with decompensated liver cirrhosis, help promote muscle growth and may therefore help prevent sarcopenia.

Ammonia promotes muscle breakdown. Therefore, the ammonia-lowering medications described above may help increase or preserve skeletal muscle mass.

## Our Goal

At Kano General Hospital, we aim to improve the prognosis of patients with liver disease by diagnosing sarcopenia early and providing appropriate treatment.

Written by: Shuhei Nishiguchi, M.D.