

Relationship between pre-sarcopenia and related factors in pre-operative patients with lumbar spinal stenosis

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Background and Purpose

Background

Previous studies

The prevalence of sarcopenia with LSS

LSS: lumbar spinal stenosis

- ✓ 33.0%¹⁾
- ✓ 24.1% (pre-operative patients)²⁾

The relationship between sarcopenia and related factors

- ✓ BMI¹⁾²⁾
- ✓ Age²⁾
- ✓ EQ-5D²⁾

- 1) Park S et al; The prevalence and impact of sarcopenia on degenerative lumbar spinal stenosis. Bone Joint J, 2016
- 2) Sakai Y et al; Sarcopenia Affects Surgical Results in Patients with Lumbar Spinal Stenosis. Journal of Spine Research, 2018

However, there are only a few previous studies.

Purpose

To clarify the prevalence of pre-sarcopenia and the relationship between pre-sarcopenia and related factors in pre-operative patients with LSS

pre-sarcopenia



Demographic data
Pain related factors
Psychological factors
Body functions **etc.**

Material and Methods

Study design: cross-sectional study

55 pre-operative patients
with LSS

24 males **31** females

Mean age: 72.1 years old
(60 - 89)

Tottori University Hospital
From October 2015 to October 2017

Exclusion criteria

- 1) Under 60 years
- 2) Severe medical problem
- 3) Dementia
- 4) Spinal problems as a result of trauma
- 5) Previous spinal surgery
- 6) Previous implant surgery for lower extremity

1. Demographic data

- Age
- Gender
- Height, body weight,
- Body mass index (BMI)
- Symptom duration
- Comorbidities

2. Questionnaire

- Leg pain, back pain (Numerical Rating Scale (NRS))
- Japanese Orthopaedic Association (JOA) score
- Pain Catastrophizing Scale (PCS)

3. Body function and structure measurements

- Walking distance (m)
- Walking velocity (m/sec)
- Grip strength (kg)
- Appendicular muscle mass (AMI) (kg/m²)
(bioelectrical impedance analysis)

Statistical analysis

AMI (appendicular muscle mass index)
= Muscle mass / Height (kg/m²)

Asian Working Group for Sarcopenia (AWGS)

Males: AMI < 7.0 kg/m² Females: AMI < 5.7 kg/m²

Pre-sarcopenia group

Normal group
(without pre-sarcopenia)

Pearson's χ^2 -test
Non-paired t-test
Mann–Whitney U-test
Multivariate logistic regression



Results

The prevalence of pre-sarcopenia **20.0%** (11 of 55 patients)

| | All (n = 55) | pre-sarcopenia (n = 11) | normal (n = 44) |
|-------------------------------|---------------------------|--------------------------|---------------------------|
| Age (years) | 72.1±6.5 | 73.6±5.6 | 71.7±6.7 |
| Gender (male/female) | 24 / 31 | 2 / 9 | 22 / 22 |
| Height (cm) | 156.0±8.9 | 154.9±7.4 | 156.2±9.3 |
| Weight (kg) | 60.3±11.0 | 52.2±5.2 | 62.3±11.2 |
| BMI (kg/m²) | 24.7±3.0 | 21.8±1.5 | 25.4±2.9 |
| Symptom duration (mo) | 30.8 (6.0-36.0) | 25.0 (7.0-67.0) | 10.0 (4.0-36.0) |
| Hypertension (%) | 54.5 | 54.5 | 54.5 |
| Dyslipidemia (%) | 25.5 | 45.5 | 20.5 |
| Diabetes (%) | 16.4 | 0.0 | 20.5 |
| Hyperuricemia (%) | 9.1 | 0.0 | 11.4 |
| Cardiovascular disease (%) | 7.3 | 18.2 | 4.5 |
| Kidney disease (%) | 3.6 | 0.0 | 4.5 |
| Smoking habits (%) | 9.1 | 9.1 | 9.1 |
| NRS for leg pain | 5.0 (3.0-7.0) | 7.0 (5.0-7.0) | 4.5 (2.0-7.0) |
| NRS for back pain | 5.0 (3.0-8.0) | 7.0 (5.0-9.0) | 5.0 (3.0-7.8) |
| JOA score | 15.2±4.2 | 13.6±3.3 | 15.7±4.3 |
| PCS | 34.6±9.9 | 40.4±9.0 | 33.1±9.7 |
| Walking velocity (m/sec) | 0.9±0.3 | 0.9±0.3 | 0.9±0.3 |
| Grip strength (kg) | 27.9±9.3 | 23.4±7.7 | 29.0±9.3 |
| Walking distance (m) | 170.0 (50.0-500.0) | 60.0 (10.0-160.0) | 200.0 (80.0-500.0) |
| AMI (kg/m²) | 7.0±1.2 | 5.7±0.4 | 7.2±1.1 |

Results

Multivariate logistic regression analysis for association with sarcopenia

| | OR | 95%CI | p-value |
|-------------------------|-------------|--------------------|------------------|
| Age | 0.97 | 0.83 – 1.13 | 0.68 |
| Gender | 1.51 | 0.13 – 16.99 | 0.74 |
| BMI | 0.33 | 0.15 – 0.70 | < 0.01 |
| PCS | 1.10 | 0.94 – 1.26 | 0.25 |
| Walking distance | 0.99 | 0.98 – 0.99 | 0.03 |

BMI and **Walking distance** were related to **sarcopenia**

Discussion

BMI is related to pre-sarcopenia

Park S et al, Bone Joint J, 2016

Sakai Y, et al, Journal of Spine Research, 2018

Walking distance is related to pre-sarcopenia

Reductions in walking distance is associated with decreases in physical activity in daily life

Winter CC et al, BMC Musculoskelet Disord, 2002

PCS is related to walking speed and continuous walking distance

Wada T et al, Physical Therapy Japan, 2018

Severe pain catastrophizing



Intermittent claudication
Decreased walking distance



Low activity



Decrease muscle mass
Sarcopenia

Conclusion

1. The prevalence of pre-sarcopenia 20.0%.
2. The pre-sarcopenia group had a lower body weight, BMI, severe PCS, and decreased walking distance.
3. These findings suggest that pre-sarcopenia is caused by intermittent claudication.
4. Our results demonstrate that decreasing walking distance and severe pain catastrophizing lead to low activity, then muscle mass decreases.

Disclosure of Conflict of Interest
Name of first author: Takashi Wada

I have no COI
with regard to our presentation.