

The Effects of Muscle Mass and Quality on Mortality of Patients with AKI Requiring CRRT

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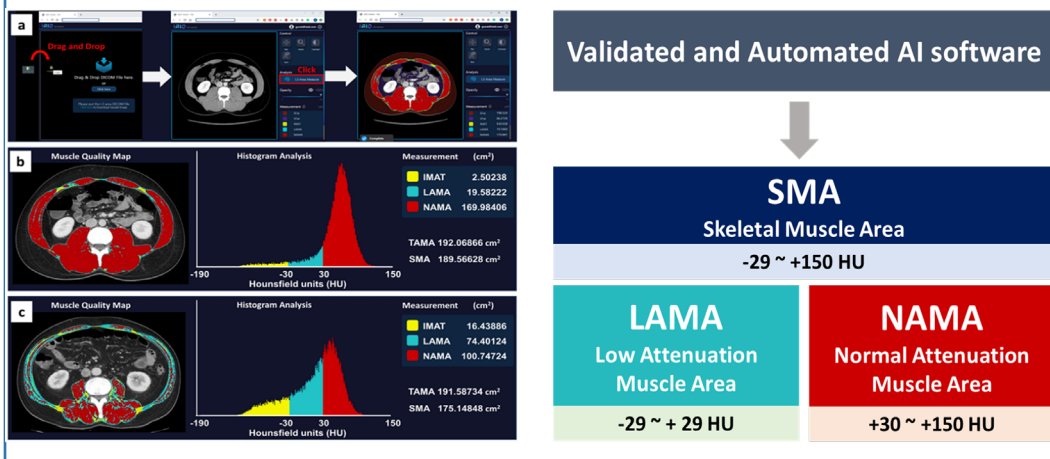
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Introduction

- Sarcopenia is a known risk factor for mortality and morbidity.
- However, few studies have reported the effects of muscle mass on mortality in patients with acute kidney injury (AKI) requiring continuous renal replacement therapy (CRRT).

Methods and Materials

- Study population**
 - 2,221 subjects from retrospective CRRT cohort of 8 multi-centers
 - From January 2006 to December 2021 in Korea.
- Muscle mass assessment using Artificial Intelligence**
 - Standardized abdominal CT images
 - Level of the 3rd lumbar vertebra measured within 15 days before or after CRRT initiation



Results

Muscle Mass and Mortality

Variable	Model1	Model2	Model3
SMA/BMI			
Q1	1 [Reference]	1 [Reference]	1 [Reference]
Q2	1.01 (0.86,1.18)	0.84 (0.59,1.19)	0.78 (0.54,1.12)
Q3	0.83 (0.70,0.98)	0.72 (0.49,1.05)	0.66 (0.45,0.98)
Q4	0.72 (0.61,0.86)	0.65 (0.44,0.97)	0.60 (0.40,0.90)
P for trend	0.01	0.03	0.01
Linear	0.84 (0.77,0.91)	0.84 (0.69,1.01)	0.81 (0.66,0.98)
NAMA /BMI			
Q1	1 [Reference]	1 [Reference]	1 [Reference]
Q2	0.93 (0.79,1.10)	0.72 (0.51,1.02)	0.74 (0.51,1.06)
Q3	0.84 (0.71,0.99)	0.64 (0.45,0.91)	0.71 (0.49,1.02)
Q4	0.74 (0.62,0.88)	0.92 (0.63,1.34)	1.09 (0.73,1.62)
P for trend	0.01	0.58	0.68
Linear	0.85 (0.78,0.93)	0.99 (0.82,1.20)	1.09 (0.89,1.33)
LAMA /BMI			
Q1	1 [Reference]	1 [Reference]	1 [Reference]
Q2	0.96 (0.81,1.14)	1.00 (0.73,1.38)	1.02 (0.73,1.42)
Q3	1.06 (0.90,1.26)	0.96 (0.70,1.31)	0.91 (0.66,1.26)
Q4	0.93 (0.79,1.10)	0.79 (0.57,1.09)	0.61 (0.43,0.86)
P for trend	0.69	0.14	0.01
Linear	0.96 (0.89,1.04)	0.83 (0.72,0.97)	0.74 (0.63,0.87)

Model 1 : Stratified by CRRT year and medical center

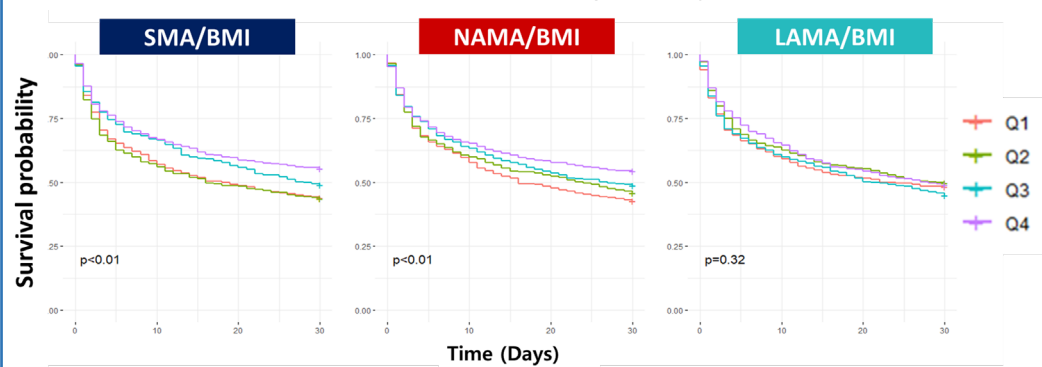
Model 2 : Additionally stratified by sex and age

Model 3 : Further adjusted by albumin, hemoglobin, PT INR, c-reactive protein, and history of hypertension

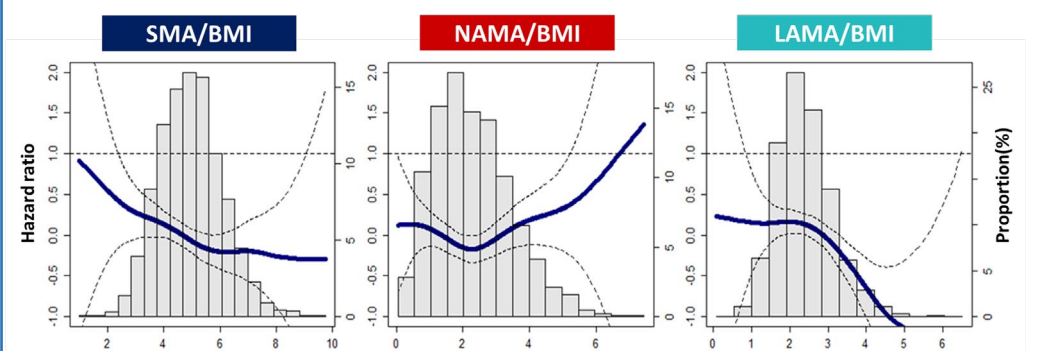
Stratified analysis for sex, age, APACHE II and SOFA

	N	SMA/BMI	NAMA/BMI	LAMA/BMI
Sex				
Male	1327	0.78 (0.62,0.97)	1.04 (0.84,1.29)	0.73 (0.61,0.88)
Female	894	0.98 (0.64,1.49)	1.39 (0.83,2.31)	0.79 (0.57,1.10)
Age				
<65	943	0.98 (0.71,1.37)	0.98 (0.72,1.33)	1.00 (0.76,1.32)
≥65	1278	0.71 (0.56,0.91)	1.14 (0.87,1.50)	0.63 (0.52,0.77)
APACHE II				
<median	881	0.85 (0.56,1.28)	1.06 (0.69,1.64)	0.78 (0.55,1.10)
≥median	1014	0.89 (0.64,1.23)	1.23 (0.89,1.70)	0.70 (0.53,0.92)
SOFA				
<median	613	0.64 (0.35,1.17)	1.17 (0.68,2.02)	0.50 (0.29,0.86)
≥median	834	0.91 (0.60,1.37)	1.21 (0.84,1.73)	0.71 (0.51,0.99)

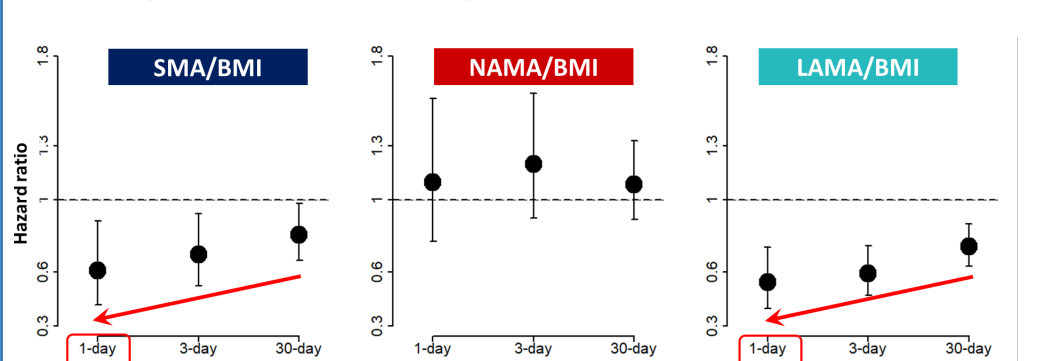
Quartile of SMA and NAMA related index was significantly related to survival



The effects of SMA/BMI and LAMA/BMI on mortality showed distinct inverse linearity



Mortality risks within 1, 3, and 30 days



Conclusions

- Survival benefit of muscle mass** of patients requiring CRRT
 - Even if the muscle quality was low
 - Useful for clinical mortality evaluation in ICU



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