



Proposing Cut-Off Values for Respiratory Muscle Strength in Sarcopenia Screening among Older Adult Male: A Study in a Single General Hospital in Korea

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Introduction

This study explores the relationship between respiratory muscle strength and sarcopenia in elderly male patients based on medical examination data from hospitals in Korea. Sarcopenia, characterized by a reduction in muscle mass and strength, leads to significant declines in physical function and quality of life. Recently, the concept of 'Respiratory Sarcopenia' has emerged, highlighting the decrease in respiratory muscle mass and strength. Assessing respiratory muscle strength through Maximal Inspiratory Pressure (MIP) and Maximal Expiratory Pressure (MEP) shows promise as a criterion for sarcopenia screening. The aim is to establish a correlation between respiratory muscle strength and sarcopenia, proposing cutoff values for screening based on respiratory muscle strength, thereby diversifying screening criteria and emphasizing the importance of managing respiratory muscle health.

Methods

In this retrospective analysis conducted at Pusan National University Hospital, from July 2016 to May 2022, 297 male patients over the age of 65 were evaluated for sarcopenia. The study focused on assessing respiratory muscle strength, hand grip strength (HGS), and muscle mass in individuals, primarily those with cardiac or respiratory diseases, excluding those with ambulation difficulties. Statistical analyses, including independent t-tests and receiver operating characteristic (ROC) curves, were utilized to compare functions between patients with and without sarcopenia, identifying optimal cut-off values for screening.

Results

The total number of participants in the study was 297. Among them, based on the sarcopenia screening criteria of the Asian Working Group, 52 patients were identified as having sarcopenia, characterized by a HGS of less than 28kg and muscle mass less than 7.0 kg/m². Detailed information for each group is presented in Table 1. The results of the respiratory muscle strength tests, HGS, and muscle mass for screening sarcopenia in older adult male patients, based on the area under the ROC curve (AUC), are as follows: MIP [AUC=0.69 (0.61-0.77)], MEP [AUC=0.72 (0.64-0.79)], HGS [AUC=0.92 (0.89-0.95)], and SMI [AUC=0.87 (0.83-0.91)]. HGS and SMI, being conventional sarcopenia screening metrics, demonstrate highly effective values. Furthermore, MEP in respiratory muscle strength also shows a significant value (Table 2)(Fig 1). Table 2 presents the optimal cut-off points for each test, where the sensitivity and specificity are most effectively balanced.

Conclusion

This study demonstrates the potential of incorporating respiratory muscle strength, specifically MEP, alongside traditional measures like HGS and SMI, in screening for sarcopenia in older adult male patients. Additionally, the meaningful AUC value for MEP suggests its promising role in enhancing the accuracy of sarcopenia detection. The identification of optimal cut-off points for these metrics, balancing sensitivity and specificity, further supports their clinical utility. Consequently, integrating these assessments could lead to a more comprehensive and effective approach in diagnosing sarcopenia, ultimately contributing to better management and intervention strategies for the older adult population.

Table 1. General characteristics of the subjects

Variable	Non-sarcopenia (n=245)	Sarcopenia (n=52)	P value
Age (years)	72.47±4.76	74.35±5.93	0.036*
Height (cm)	166.59±5.72	161.32±8.90	0.000*
Weight (kg)	65.92±10.15	54.66±9.64	0.000*
MIP (cmH ₂ O)	76.02±28.62	58.69±26.55	0.000*
MEP (cmH ₂ O)	97.13±31.43	73.61±27.40	0.000*
HGS (kg)	32.45±6.28	23.03±4.46	0.000*
SMI (kg/m ²)	7.46±0.93	6.23±0.69	0.000*

Mean ± SD, *= p<0.05, MIP; maximal inspiratory pressure, MEP; maximal expiratory pressure, HGS; hand grip strength, SMI; skeletal muscle mass index

Table 2. Cut-off points, AUC, sensitivity, specificity of muscle strength tests to screening sarcopenia.

	AUC (95%CI)	Cut-off values	Sensitivity	Specificity
MIP (cmH ₂ O)	0.69 (0.61-0.77)	65.50	0.63	0.62
MEP (cmH ₂ O)	0.71 (0.64-0.79)	83.00	0.66	0.66
HGS (kg)	0.92 (0.89-0.95)	26.83	0.85	0.84
SMI (kg/m ²)	0.87 (0.83-0.91)	6.80	0.76	0.77

Mean ± SD, AUC; area under the ROC curve, MIP; maximal inspiratory pressure, MEP; maximal expiratory pressure, HGS; hand grip strength, SMI; skeletal muscle mass index

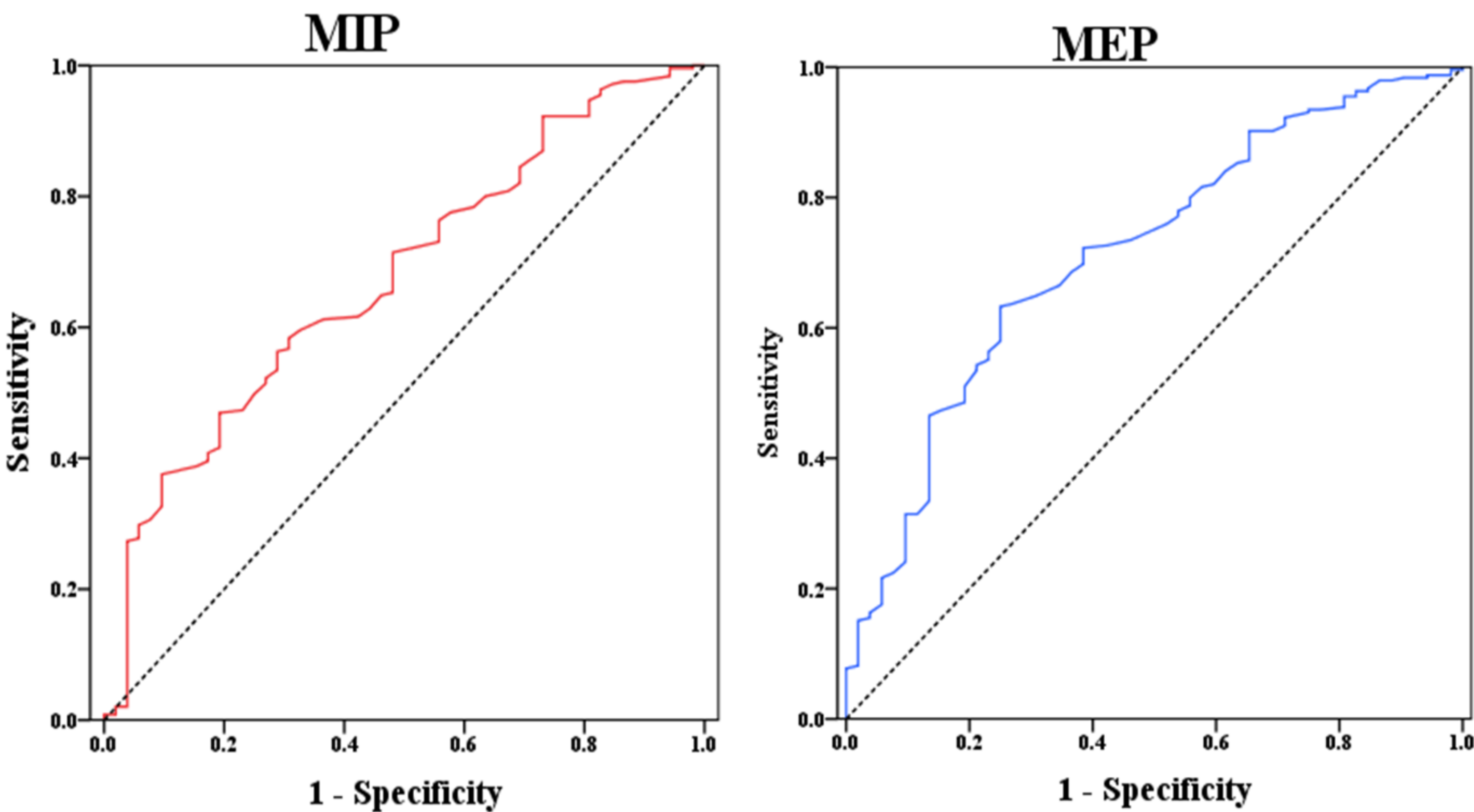


Fig 1.Sarcopenia Screening: ROC Curves and AUC for MIP [AUC=0.69 (0.61-0.77)] and MEP [AUC=0.72 (0.64-0.79)]

MIP; maximal inspiratory pressure, MEP; maximal expiratory pressure