Sarcopenia and Risk of Falls in Community Dwelling Elderly Females

Thesis

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Aya Mostafa Sayed Mostafa

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List of Abbreviations

Abb.	Full term
ADL	*Activities of daily living*
AF	*Atrial fibrillation*
AMP	*Adenosine monophosphate*
BIA	*Bio impedance analysis*
BMI	*Body Mass Index*
BP	*Blood pressure*
CDC	*Center for Disease Control*
CHF	*Congestive Heart Failure*
CLD	*Chronic liver Disease*
COPD	*Chronic obstructive pulmonary disease*
CRF	*Chronic Renal Failure*
CVS	*Cerebrovascular stroke*
DEXA	*Dual energy X-ray absorptiometry*
DM	*Diabetes Mellitus*
EPESE	*Established Populations for Epidemiologic Studies of Elderly*
EWGSOP	*The European Working Group on Sarcopenia in Older People*
Fig	*Figure*
FRAT	*Falls risk Assessment Tool*
GDS	*Geriatric Depression scale*
GH	*Growth Hormone*
GS	*Grip Strength*
IADL	*Instrumental Daily Living*
IHD	*Ischemic Heart Disease*
MMSE	*Mini Mental status Examination*
MNA	*Mini Nutritional Assessment*
MRI	*Magnetic Resonant Imaging*
OH	*Orthostatic Hypotension*

List of Abbreviations (Cont)

Abb.	Full term
OTC	*Over The Counter*
PBK	*partial body potassium*
PD	*Parkinsonism Disease*
PEF	*peak expiratory flow*
POMA	*performance-oriented mobility assessment*
PPAR-δ	*Peroxisome-proliferator-activated receptor-δ*
SD	*Standard Deviation*
Sec	*Seconds*
SPPB	*Short Physical Performance Battery*
SSCWD	*Society of Sarcopenia, Cachexia and Wasting Disorders*
TBK	*Total body potassium*
TUG	*Timed Up and Go test*
WGFOM	*Working Group on Functional Outcome Measures for Clinical Trials*
WHO	*World Health Organization*

INTRODUCTION

Sarcopenia is "a syndrome characterized by progressive and generalized decrease of skeletal muscle mass and strength with a risk of adverse outcomes such as physical disability, decrease quality of life and death" ***(Tanimoto et al., 2013).***

Muscle is 60% of the human body's protein stores. Muscle mass decrease leads to functional decline with decrease of strength, loss of autonomy and increased risk of falls, respiratory muscle function is also decrease with reduction of vital capacity ***(Janssen et al., 2004).***

Aging is associated with decrease in muscle mass. When you are 80 years old, it is estimated that 40% of the muscle mass at age 20 is lost ***(Boirie, 2009).***

Sarcopenia starts in the 4^{th} decade of life and accelerates at the age of 75years ***(Baumgartner and Garry, 2000)***.

The development of sarcopenia is a multifactorial. These factors including physical inactivity, motor-unit remodeling, decreased hormonal levels, sedentary lifestyle, chronic illness decreased protein synthesis, and less optimal diet.***(Paddon-Jones and Short, 2008).***

Many consequences of sarcopenia are prognostic indicators of public health burden, as the development of

physical disability, nursing home admission, depression, hospitalization, and even increase mortality ***(Walston, 2012).***

Falls is one of the most common Geriatric syndromes and also is a common serious medical problem that affects the quality of life of the elderly persons. Falls usually is a misdiagnosed problem in the primary care with a major impact on healthcare costs and affects the independence of older person ***(Rao, 2005).***

Falls and fall-related injuries are a common and major problem among older adults. Fall is the leading cause of severe injuries, as hip fractures in older population ***(Edwards et al., 2013)***

Such injuries can result in "disability, chronic pain, loss of independence, poor quality of life, and in severe cases, death" ***(Scott et al., 2010).***

Also the post-fall anxiety syndrome, fear of falling; is another consequence of falls, this in turn lead to deconditioning, weakness and gait problems and may actually increase risk of falls ***(Tanimoto et al., 2014).***

Falls result from mix of biological or medical, behavioral and environmental risk factors. Therefore, it is important to identify risk factors for falls in the community ***(Deandrea et al., 2010).***

Muscle strength, gait, and balance problems were found to be the strongest risk factors for falls among community dwelling elderly ***(Tinetti and Kumar, 2010).***

Sarcopenia, frailty, decrease muscle mass, and loss of muscle strength are well-documented and cardinal indicators of falls ***(Mühlberg and Sieber, 2004).***

Sarcopenia is an important risk factor for falls. Because sarcopenia is associated with loss of muscle mass and decrease physical performance which leads to physical inactivity, slow gait speed, slow protective reflexes and decreased mobility ***(Fried et al., 2001).***

Aim of the Work

The aim of the study to identify the association between sarcopenia and the risk of falls in community dwelling elderly females in Egypt.

Chapter 1

SARCOPENIA

Introduction

Sarcopenia (Greek 'sarx' or flesh + 'penia' or loss) "used to describe this age-related decline of muscle mass" ***(Cruz-Jentoft et al., 2010).***

Skeletal muscle is the major reservoir of the body proteins and represents 50% of the total body weight. Their function is to provide the body movement, strength, respiration, balance, posture and to regulate the temperature ***(Lenk et al., 2010).***

Sarcopenia has since been defined as the loss of skeletal muscle mass and strength that occurs with aging ***(Cruz-Jentoft et al., 2010).***

Sarcopenia is considered one of the geriatric syndromes because its prevalence in older populations ***(Chien et al., 2008).***

Sarcopenia may cause functional disabilities, decrease mobility, falls, and fractures, which cause the loss of independence, frailty, and also increased risk of mortality ***(Freiberger et al., 2011).***

There are no effective treatments for sarcopenia yet. Pharmacological trials are not effective, these include hormonal

as growth hormones, testosterones, estrogens, and tibolone ***(Sanchis-Gomar et al., 2011).***

Only exercise ***(Freiberger et al., 2011),*** and proper nutrition ***(Volkert, 2011)*** found to be the partially effective intervention with the minimal side effects.

Definition of Sarcopenia

The European Working Group on Sarcopenia in Older People (EWGSOP) made a practical clinical definition and diagnostic criteria for age-related sarcopenia ***(Morley & Cruz-Jentoft, 2012).***

The EWGSOP recommends using the presence of both low muscle mass and low muscle function (strength or performance) for the diagnosis of sarcopenia ***(Cruz-Jentoft et al., 2010).***

Society of Sarcopenia, Cachexia and Wasting Disorders ***(SSCWD) in July 2011*** defined sarcopenia as "reduced muscle mass, with limited mobility" and that all elderly persons should be screened for it ***(Morley & Cruz-Jentoft, 2012).***

Although the definition of sarcopenia differed in different studies**,** sarcopenia is always defined as the age-related progressive decline in muscle mass ***(Visser & Schaap, 2011).***

Mechanisms of sarcopenia

There are many mechanisms that may be involved in the onset and progression of sarcopenia. These mechanisms are protein synthesis, proteolysis, neuromuscular integrity and muscle fat content ***(Narici and Maffulli, 2010).***

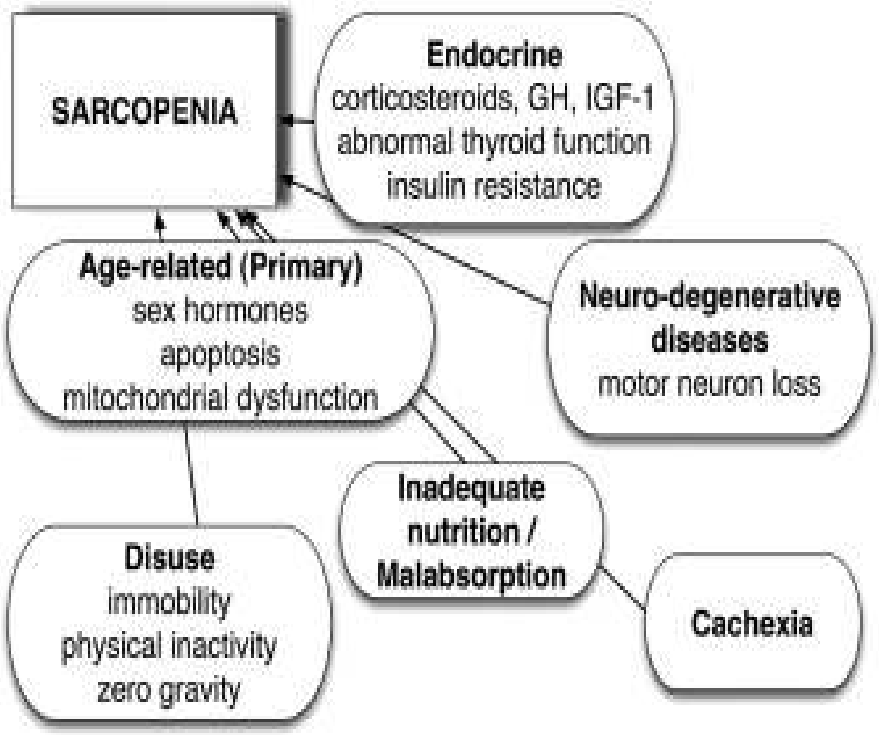

Fig. (1): Mechanisms of sarcopenia ***(Cruz-Jentoft et al., 2010).***

Prevalence of Sarcopenia

The prevalence of sarcopenia depends on age, sex, race ***(Tan et al., 2011)***, morbidity ***(Muscaritoli et al., 2010),*** nutrition ***(Volkert, 2011),*** and physical activity ***(Freiberger et al., 2011).***