

Sarcopenia, Neurodegeneration, and Risk of Falls: Pathophysiological Mechanisms and Clinical Implications

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RESUMO

Introduction: Population aging is associated with an increased prevalence of sarcopenia, neurodegenerative diseases, and risk of falls, conditions that frequently coexist and share common pathophysiological mechanisms. The loss of muscle mass and function, coupled with cognitive impairment, significantly contributes to reduced autonomy and increased morbidity and mortality in older adults. Recent evidence suggests that chronic low-grade inflammation, oxidative stress, and neuromuscular dysfunction play a central role in the interaction between these conditions. **Objective:** To analyze the pathophysiological mechanisms that relate sarcopenia, neurodegeneration, and risk of falls, highlighting their clinical implications. **Methods:** This is a narrative literature review, with searches conducted in the PubMed, Scopus, and Web of Science databases, using descriptors related to sarcopenia, cognition, aging, and falls. Falls represent one of the main adverse events in older adults, being a significant cause of morbidity, loss of functional independence, and increased mortality in this population. Clinical, observational, and review studies addressing the interaction between muscle function, cognitive performance, and fall risk in older adults were included.

Results: The findings indicate that sarcopenia is associated with reduced muscle strength, alterations in postural control, and decreased mobility, factors that increase the risk of falls. Simultaneously, neurodegenerative processes compromise executive functions, attention, and motor coordination, exacerbating functional instability. Common mechanisms include increased inflammatory mediators such as TNF- α , IL-6, and IL-1 β , elevated oxidative stress, and mitochondrial dysfunction. Furthermore, the interaction between the nervous system and skeletal muscle, through the neuromuscular unit, is impaired, contributing to functional decline. These factors, combined, increase the vulnerability of older adults to falls and their complications. **Conclusion:** The interaction between sarcopenia and neurodegeneration represents an important determinant of fall risk in older adults. Understanding these mechanisms is fundamental for the development of integrated preventive and therapeutic strategies aimed at preserving functionality and quality of life in this population.

Palavras-chave: Sarcopenia; Neurodegeneration; Falls; Aging; Inflammation.