

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:** Methods: This is a narrative literature review. Searches were conducted in the PubMed, Scopus, and Web of Science databases using descriptors such as "sarcopenia", "cognition", "neurodegeneration", "aging", "falls", "inflammation", "oxidative stress", and "neuromuscular function", combined with Boolean operators. Included studies were clinical, observational, and review articles addressing the interaction between muscle function, cognitive performance, and fall risk in older adults, published primarily within the last 15 years in English, Portuguese, or Spanish. Excluded were studies with populations younger than 60 years, case reports, editorials, conference proceedings, animal or in vitro studies, and duplicate articles. Study selection followed these steps: identification in the databases, removal of duplicates, title and abstract screening by two independent reviewers, full-text reading of preselected articles, and finally, descriptive data extraction and synthesis related to the pathophysiological mechanisms of interest. **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.