Age and Frailty as Key Determinants for Nutritional Therapy Individualization in Elderly Adults with Diabetes

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Abstract from Tamura Y, Omura T, Toyoshima K, et al.: Nutrition Management in Older Adults with Diabetes: A Review on the Importance of Shifting Prevention Strategies from Metabolic Syndrome to Frailty. *Nutrients* 2020;12:3367.

Keywords

Cognitive impairment · Diabetes mellitus · Elderly · Frailty · Nutrition management

Abstract

The increasing prevalence of older adults with diabetes has become a major social burden. Diabetes, frailty, and cognitive dysfunction are closely related to the mechanisms of aging. Insulin resistance, arteriosclerosis, chronic inflammation, oxidative stress, and mitochondrial dysfunction may be common mechanisms shared by frailty and cognitive impairment. Hyperglycemia, hypoglycemia, obesity, vascular factors, physical inactivity, and malnutrition are important risk factors for cognitive impairment and frailty in older adults with diabetes. The impact of nutrients on

health outcomes varies with age; thus, shifting diet therapy strategies from the treatment of obesity/metabolic syndrome to frailty prevention may be necessary in patients with diabetes who are over 75 years of age, have frailty or sarcopenia, and experience malnutrition. For the prevention of frailty, optimal energy intake, sufficient protein and vitamin intake, and healthy dietary patterns should be recommended. The treatment of diabetes after middle age should include the awareness of proper glycemic control aimed at extending healthy life expectancy with proper nutrition, exercise, and social connectivity. Nutritional therapy in combination with exercise, optimal glycemic and metabolic control, and social participation/support for frailty prevention can extend healthy life expectancy and maintain quality of life in older adults with diabetes mellitus.

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Knowledge Transfer

Background

The world population is undeniably ageing. Even though people live longer, longevity does not come without a price, since it is often accompanied with longer periods of diminished health. Globally, the prevalence of diseases and disabilities associated with older age such as diabetes, heart disease, and cognitive decline along with sarcopenia and frailty is on the rise, posing an increasing burden on global health. These non-communicable diseases which accompany the ageing process are often interrelated, and share common pathophysiological backgrounds and in some cases common therapeutic interventions.

Study results

The study by Tamura and colleagues from late 2020 in *Nutrients* is a comprehensive review of the effects of old age on health parameters in diabetes patients, with a special focus on nutrition and frailty. The first part is a short review of the interaction between old age and diabetes and their independent and combined effects on frailty and cognition. Subsequently, data which show the interplay between glucose dysregulation, frailty, and cognitive impairment and their common pathophysiological traits are presented (fig. 1). The review then focuses on the effects of age and diabetes on nutrient metabolism and body composition. Based on the presented data, the authors suggest that there should be a shift in focus regarding nutrition therapy in older individuals with diabetes towards not only glycemia management but also, and sometimes primarily, the prevention and treatment of frailty and sarcopenia in affected individuals, since in some cases their presence may be more detrimental to the patient's overall health and survival (fig. 2).

Commentary

From a dietitian's point of view, the reviewed paper addresses a very important issue regarding nutrition therapy for older adults with diabetes. The need to prioritize frailty and malnutrition in elderly diabetes patients is not emphasized enough, and no specific recommendations are provided, neither in the recent ADA nutrition therapy consensus for people with diabetes [2] nor in the 2021 "Older Adults: Standards of Medical Care in Diabetes" [3], even though the joined consensus report by ADA and EASD recognizes an urgent need for optimal approaches to diabetes management in frail and older adults [4].

We are well aware of the multiple nutritional problems and increased malnutrition and frailty risk of the elderly population, either as a result of normal aging or as a consequence of multiple morbidities and their therapies [5]. Approximately 1 in 6 community-dwelling people > 65 years old is frail [6], a percentage that increases with age. In elderly people with diabetes, the reported prevalence of prefrailty and frailty can be as high as 51.5% and 19.2%, respectively [7].

Sarcopenia, which is a common phenotype of frailty, is formally recognized as a muscle disease with an ICD-10-MC Diagnosis Code, and its diagnosis is confirmed by three criteria: (1) muscle strength, (2) muscle quantity/quality, and (3) physical performance as an indicator of severity [8]. Although frailty and sarcopenia are distinct entities, they share some common diagnostic criteria, risk factors, phenotypes, and treatments. A low body mass index is common in both and is strongly associated with 5- and 10-year mortality in older adults with diabetes, even more than HbA1c [9]. Inadequate protein intake is a key factor contributing to sarcopenia. Aside from

Fig. 1. Cognitive impairment and frailty in older adults with diabetes. The mechanisms of diabetes, frailty, and cognitive dysfunction are closely related in the context of aging. Insulin resistance, arteriosclerosis, chronic inflammation, oxidative stress, and mitochondrial dysfunction are integrally involved in the pathogenesis of cognitive impairment, frailty, and diabetes mellitus. Obesity, inappropriate nutrition, physical inactivity, hyperglycaemia, and hypoglycaemia can be risk factors for cognitive impairment and frailty in older adults with diabetes. Proper management of body weight, nutrition, and exercise together with optimal glycaemic control are the cornerstones of good health. Figure by [1].

Fig. 2. Shift in dietary strategies for frailty prevention in older adults with diabetes. For the prevention of frailty, optimal energy intake and high protein intake (1.0–1.5 g/kg actual weight) are recommended. High intake of vegetables and fish may be desirable for the maintenance of physical and cognitive function. Healthy dietary patterns including a Mediterranean diet are highly recommended. High dietary diversity may be another approach to the prevention of frailty. In the dietary management in older individuals, maintaining diet-related quality of life is important. QOL, quality of life. Figure by [1].

the general guideline of a dietary intake of at least 1.0 g/kg body weight (BW)/day for older people and > 1.5 g/kg BW/day for those with severe illness and no contraindications such as renal disease [10], there are recommendations that older people should have a protein intake of 25–30 g per meal with about 2.5–2.8 g leucine in order to surpass the higher anabolic threshold of dietary protein/ amino acid intake in older individuals [11]. Recently, new scientific studies have started to address this matter with practical guidelines [12].

An issue which is not addressed in the current review but plays a very important role in food intake and the pleasure of eating is the effect of age, cognition, medications, and disease therapies on the decline in the gustatory and olfactory senses of elderly people. These senses greatly regulate food intake, and their decline can lead to undesirable food behaviours and malnutrition. Yet they are not included as a separate section in any of the available nutritional risk screening tools [13].

Conclusion for clinical practice

As dietitians, we are expected to and should provide dietetic advice based on evidence-based recommendations. When treating elderly individuals with diabetes, we should identify and address all nutritional problems, always keeping in mind the special nutritional needs and difficulties of this fragile population. Strict glycaemic and metabolic control through restrictive diets in relation to either energy or macro-/micronutrients might not be in the best interest of all patients, especially those with frailty and cognitive impairment, and we should prioritize those issues that are most important

with the ultimate goal of helping our patients achieve the best quality of an as healthy as possible life.

Disclosure Statement

I hereby confirm that there are no conflicts of interest with regard to this commentary.

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