Commentary
Open Access
CrossMark

Recent tendency of frailty and geriatric syndrome for elderly diabetic patients

Abstract

Frailty, sarcopenia, geriatric syndrome and diabetes have been in focus. Several types of frailty are present from medical, psychological, and social points of view. The risk of developing diabetic frailty is 1.48 times for meta-analysis. By a systematic review of 15 studies, type 2 diabetes (T2D) patients showed higher sarcopenia risk with odd ratio (OR) 1.55. Concerning the relationship of senile frailty and body composition, male body fat mass correlated with frailty associated with cut off value of 27.6%. Protein intake amount per weight per day was divided into quartile groups. Hazard ratio of mortality for lowest/highest quartile was 2.26. In conclusion, geriatric syndrome may bring generalized various influence to each subject. For patient-centered practice of medicine, personalized medical practice would be required and recommended from now on.

Keywords: frailty, sarcopenia, geriatric syndrome, type 2 diabetes (T2D), protein intake

Volume 7 Issue 2 - 2022

Hiroshi Bando
Japan Low Carbohydrate Diet Promotion Association (JLCDPA), Tokushima University / Medical Research, Japan

Correspondence: Hiroshi Bando, MD, PhD, FACP, Tokushima University /Medical Research, Nakashowa 1-61, Tokushima 770-0943, Japan, Tel +81-90-3187-2485, Email pianomed@bronze.ocn.ne.jp

Received: April 26, 2022 | **Published:** June 24, 2022

Introduction

In developed countries around the world, life expectancy is increasing. With aging, the frequency of diabetes and prediabetes increases. The Ministry of Health, Labour and Welfare (MHLW), Japan has a slogan representing "for people, for life, for the future".[1] In a recent survey, 22.6% of people aged 65-74 and 21.5% of people aged 75 and over were strongly suspected of having diabetes. The characteristic of diabetes in the elderly is that it is not uniform and varies greatly among individuals.[1] These include cerebrovascular accident (CVA) and coronary heart disease (CHD) as macroangiopathy, dementia, decreased ADL and frailty as geriatric syndrome.

As regards to geriatric syndrome, a meta-analysis of prospective studies (n=144) was reported.[2] Compared to the standard level, Alzheimer's disease (AD) is 1.5 times more found and vascular dementia is twice compared to the standard level. The prevalence of mild cognitive impairment (MCI) has been found more. Several impaired situations of memory, execution function, information processing ability and attention are about 1.5 times higher, and are easily impaired.[2] Several types of frailty are present from medical, psychological, and social points of view. In particular, diabetes has been characterized for its higher ratio of frailty.

In a meta-analysis, the risk of developing diabetic frailty is 1.48 times.[3] Some risk factors of frailty are hypoglycemia,[4] hyperglycemia,[5] functional disability[6] and macroangiopathy.[7] These risk factors have been the same for developing dementia and increasing the probability of long-term care, impaired quality of life (QOL), activity of daily living (ADL) and death.

There are several reports of frailty risk factors. In the adult changes in thought study, 1848 elderly people were followed up for 4.8 years.[8] As a result, there is a relationship between frailty and HbA1c level, and the Hazard ratio (HR) is the lowest (1.0) at HbA1c 7.6% (mean blood glucose 170 mg/dL). The correlation curve showed the result of U-shaped-type graph. HbA1c 6.9% (150 mg/dL) had HR 1.41 and HbA1c 8.2% (190 mg/dL) had HR 1.30. Various methods have been reported for the evaluation method of frailty. It usually includes items such as weight loss, general malaise, weakness, decreased activity, and decreased walking speed. About 3 items have been diagnosed with frailty and 1-2 items have been diagnosed with pre-frailty.[9] The relationship among frailty, body composition and its target value were investigated. The protocol included the number of the subjects as 343 cases, in which female cases were 76%. As a result, age was a significant independent variable in the female. On the other hand, body fat mass showed the correlation with frailty, associated with the cutoff value of 27.6%.[10]

A systematic review was conducted for association of diabetes and sarcopenia risk.[11] Using PubMed, CENTRAL and Scopus databases, 15 studies including 1832 cases with type 2 diabetes (T2D) and 1159 sarcopenia cases were analyzed. T2D patients showed higher sarcopenia risk in comparison with euglycemic subjects (OR 1.55 [1.25-1.91], p<0.001). Furthermore, T2D revealed lower muscle strength and performance than euglycemic cases. Frailty and sarcopenia are associated with protein intake and mortality for the patients. Two prospective studies were analyzed in diabetic patients.[12] As a protocol, 2494 T2D cases from the Japan Diabetes Complications Study (JDCS)[13] and the Japanese Elderly Diabetes Intervention Trial (J-EDIT).[14] Protein intake amount per body weight per day was divided into quartile groups. The Hazard ratio (HR) for the lowest quartile mortality per body weight was 2.26 ([1.34-3.82], p=0.002) compared to the highest quartile. By subgroup analyses, significant relationships were found between lower protein intake and higher mortality in cases for >75 years and < 65 years. Furthermore, significant association was found between protein intake amount and mortality degree especially for diabetic cases with age 75 and older.

The MID-Frail study was a RCT for evaluation of a multimodal intervention in frail and prefrail T2D people. Subjects were 964 patients which were allocated for usual care group (UCG) or intervention procedures group (IG).[15] For assessment for changes in functional performance after a year, Short Physical Performance Battery (SPPB) scores were used. As a result, IG showed 0.85 points higher SPPB scores compared with UCG. Using the value of incremental cost-effectiveness ratio (ICER), the mean saving by intervention would be 428 EUR per year per patient.

For elder T2D patients, glycemic target has been based on ADL, multimorbidity and cognition. However, its evidence of these relationships seemed to be limited. From J-EDIT study, 843 elder diabetes case were followed up for 6 years and several associations among all-cause mortality and functional categories were analyzed.[16] As a result, 64 mortalities were found during 6 years. Cases were

divided to 3 categories by using Barthel index (BI), Mini-Mental State Examination (MMSE) and Tokyo Metropolitan Institute of Gerontology Index of Competence. The HRs for mortality in categories II and III per I showed 1.83 [1.06-3.14] (p=0.030) and 3.05 [1.12-8.26] (p=0.029), respectively. Consequently, functional categories may predict all-cause of mortality in elder diabetic patients.

Conclusion

In conclusion, recent crucial topics concerning geriatric syndrome, diabetes, frailty, sarcopenia, as well as various evidence from several important investigations were introduced in this article. American Diabetes Association (ADA) has presented latest adequate diabetes guideline in Jan 2022.[17] Among them, diabetic standard care for older adults associated with geriatric syndrome would be included.[18] Geriatric syndrome may bring generalized various influence to each subject who seemed to have arteriosclerotic diseases. For patient-centered applicable practice of medicine in various care and cure circumstance, personalized medical practice would be required and recommended from now on. General commentary described here will become hopefully significant reference in actual clinical medicine and research in the future.

Acknowledgments

None.

Conflicts of interest

The authors declare they have no conflicts of interest that are directly or indirectly related to the research.

Funding

None.

References

1. The Ministry of Health, Labor and Welfare. Japan.
2. Xue M, Xu W, Ou YN, et al. Diabetes mellitus and risks of cognitive impairment and dementia: A systematic review and meta–analysis of 144 prospective studies. *Ageing Res Rev*. 2019;55:100944.
3. Hanlon P, Fauré I, Corcoran N, et al. Frailty measurement, prevalence, incidence, and clinical implications in people with diabetes: a systematic review and study–level meta–analysis. *Lancet Healthy Longev*. 2020;1(3):e106–e116.
4. Chao G, Zhu Y, Chen L. Evaluation of risk factors and correlation in large sample from the perspective of hypoglycemia. *Food Sci Nutr*. 2021;9(12):6627–6633.
5. Kalyani RR, Metter EJ, Egan J, et al. Hyperglycemia predicts persistently lower muscle strength with aging. *Diabetes Care*. 2015;38(1):82–90.
6. Godino JG, Appel LJ, Gross AL, et al. Diabetes, hyperglycemia, and the burden of functional disability among older adults in a community–based study. *J Diabetes*. 2017;9(1):76–84.
7. Espinoza SE. The Association of Prior Intensive Lifestyle Intervention and Diabetes Support and Education with Frailty Prevalence at Long–Term Follow–up in the Action for Health in Diabetes Extension Study. *J Gerontol A Biol Sci Med Sci*. 2021;12.
8. Zaslavsky O, Walker RL, Crane PK, et al. Glucose Levels and Risk of Frailty. *J Gerontol A Biol Sci Med Sci*. 2016;71(9):1223–12229.
9. Satake S, Arai H. The revised Japanese version of the Cardiovascular Health Study criteria (revised J–CHS criteria). *Geriatr Gerontol Int*. 2020;20(10):992–993.
10. Tanaka S, Jung H, Tanaka R. Identifying Target Values of Body Composition for Preventing Frailty: A Descriptive Study in Older Adults. *Gerontol Geriatr Med*. 2022;8:23337214211064493.
11. Anagnostis P, Gkekas NK, Achilla C, et al. Type 2 Diabetes Mellitus is Associated with Increased Risk of Sarcopenia: A Systematic Review and Meta–analysis. *Calcif Tissue Int*. 2020;107(5):453–463.
12. Yamaoka T, Araki A, Tamura Y, et al. Association between Low Protein Intake and Mortality in Patients with Type 2 Diabetes. *Nutrients*. 2020;12(6):1629.
13. Tanaka S, Iimuro S, Yamashita H, et al. Japan Diabetes Complications Study Group. Cohort profile: The Japan diabetes complications study: a long–term follow–up of a randomised lifestyle intervention study of type 2 diabetes. *Int J Epidemiol*. 2014;43(4):1054–62.
14. Araki A, Iimuro S, Sakurai T, et al. Japanese Elderly Diabetes Intervention Trial Study Group. Long–term multiple risk factor interventions in Japanese elderly diabetic patients: the Japanese Elderly Diabetes Intervention Trial—study design, baseline characteristics and effects of intervention. *Geriatr Gerontol Int*. 2012;12.
15. Rodriguez Mañas L, Laosa O, Vellas B, et al. European MID–Frail Consortium. Effectiveness of a multimodal intervention in functionally impaired older people with type 2 diabetes mellitus. *J Cachexia Sarcopenia Muscle*. 2019;10(4):721–733.
16. Omura T, Tamura Y, Sakurai T, et al. Japanese Elderly Diabetes Intervention Trial Research Group. Functional categories based on cognition and activities of daily living predict all–cause mortality in older adults with diabetes mellitus: The Japanese Elderly Diabetes Intervention Trial. *Geriatr Gerontol Int*. 2021;21(6):512–518.
17. American Diabetes Association. Introduction: Standards of Medical Care in Diabetes. *Diabetes Care.* 2022;45(Suppl.1):S1–S2.
18. ADA Professional Practice Committee. 13. Older adults: Standards of Medical Care in Diabetes. *Diabetes Care*. 2022;45(Suppl. 1):S195–S207.