Perspective of Nutrition Therapy for Diabetes

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Summary The type 2 diabetes (T2DM) pandemic in Asian countries has become an urgent problem to be solved for each country from a socioeconomic viewpoint, because the expense for management of diabetic complications is rapidly increasing. This is due to Westernization of lifestyle in Asian countries, which results in a greater prevalence of visceral obesity. Thus far, it is believed that impaired insulin secretion from pancreatic islets mainly contributes to the pathogenesis of T2DM in Asians. However, insulin resistance clearly underlies the prevalence of T2DM in Asian countries, as well as Western countries. Lifestyle intervention, including exercise and diet is an essential approach in care for patients with T2DM. In particular, nutrition therapy is a fundamental treatment that aims to correct overweight and improve insulin resistance. The principal requirement of nutrition therapy consists of energy restriction and a well-balanced intake of various nutrients. The lifestyle of people in Asian countries has dramatically changed in recent decades due to economic growth, which has made it difficult to provide guidelines for nutrition therapy. The uniform setting of nutrition goals is difficult to achieve because of diversity in eating patterns. This symposium aims to promote optimal nutrition therapy for T2DM through comparing the guidelines of different countries, including Korea, Japan, and the United States. Interactive talks among speakers are expected to yield a new perspective in nutrition therapy for the management of T2DM.

Key Words type 2 diabetes, insulin resistance, nutrition therapy, BMI

Introduction Lifestyle intervention is a fundamental treatment for type 2 diabetes (T2DM), the benefit of which is evidenced by many clinical studies. In particular, nutrition therapy plays an important role in the prevention and management of T2DM. However, how nutrition therapy for diabetes should be practiced has been a subject of debate since the discovery of insulin in 1921. In addition, because of diversity in lifestyle associated with economic status in Asian countries, it is necessary to individualize nutritional goals with consideration of the background characteristics of patients. We herein discuss problems to be overcome in nutrition therapy for the management of T2DM.

Difference in the pathogenesis of type 2 diabetes of Caucasians and Asians

Insulin resistance in insulin target organs and the impairment of insulin secretion from pancreatic islets are major causes of T2DM. Visceral obesity is considered to play an important role in the development of insulin resistance. The recent T2DM pandemic in Asian countries has become an urgent problem for each country to solve from a socioeconomic viewpoint, because the expense associated with the management of diabetic complications is rapidly increasing. In the past, impairment of insulin secretion from beta cells of islets has been believed to contribute more profoundly to the onset of T2DM in Asians in comparison to insulin resistance. As in Caucasians, the insulin response to an oral glucose challenge becomes exaggerated in individuals with impaired glucose tolerance (IGT) in comparison to those with normal tolerance, and the consequent decline of the insulin response results in diabetes. In Asians, the insulin response to glucose continuously declines from IGT to diabetes, since most Asians lack a hyperinsulinemic phase. Hence, the insulinoenic index, an indicator of the insulin secretion capacity, is lower in in Asians than in Caucasians. In contrast, HOMA-R, an indicator of insulin resistance, is higher in Caucasians than in Asians (1).

The role of insulin resistance in type 2 diabetes in Asians

There is a precise correlation between BMI and the incidence of T2DM in both Caucasians and Asians, and a small increase in body weight is associated with an elevated risk of T2DM in Asians (2). A recent study demonstrated that Asians—even individuals with a BMI within the normal range—easily accumulate visceral fat along with an increase in body weight and develop insulin resistance (3). The reason why—in lean Asian people—excessive energy is likely to be converted to visceral rather than subcutaneous fat remains to be elucidated. However, insulin resistance clearly underlies the prevalence of T2DM in Asian countries, as it does in Western countries, and this may be due to the Westernization of lifestyle.
Lifestyle intervention, including exercise and diet, is an essential approach in T2DM care. In particular, nutrition therapy is a fundamental treatment that aims to correct overweight and improve insulin resistance. The principal requirement of nutrition therapy consists of energy restriction and a well-balanced intake of various nutrients. The lifestyle of people in Asian countries has dramatically changed in recent decades due to economic growth, which has made it difficult to provide guidelines for nutrition therapy. The uniform setting of nutritional goals is difficult to achieve because of diversity in eating patterns.

What is the ideal body weight in individuals with type 2 diabetes?

There is strong and consistent evidence that obesity management can delay the progression from prediabetes to T2DM and that it is highly beneficial in the treatment of T2DM. Modest weight loss improves glycemic control and reduces the need for glucose-lowering medications. In order to attain significant weight loss, the optimal energy intake for the target body weight should be evaluated for each individual. The past guideline of the Japanese Diabetes Society (JDS) provided the formula for calculation of optimal energy intake with the aim of achieving a standard body weight of BMI 22 kg/m², and this formula had been widely adopted to many guidelines of other Japanese academic societies. BMI 22 kg/m² was deemed an ideal body weight for both Japanese men and women based on a cohort study that was conducted in the 1980s. This study investigated the relationship between BMI and abnormal clinical findings due to 10 medical problems using 4,565 Japanese men and women of 30–59 y of age and demonstrated that the total number of abnormal findings was lowest—in both sexes—at BMI 22 kg/m². This result was accepted as reasonable because the average BMI of the whole Japanese population at that time was close to this value.

How should target body weight be determined in type 2 diabetes care?

Recent epidemic studies on the relationship between BMI and mortality revealed that BMI within the range of 20 to 25 kg/m² is associated with the lowest mortality rate in both Asians and Caucasians. With regard to T2DM, BMI values in the range of 20 to 25 kg/m² were reported to be associated with the lowest all-cause mortality rates in Chinese patients and Japanese patients. Of note, no increase was observed in mortality among elderly individuals (age ≥75 y) with BMI values of ≥25 kg/m², which suggests that the relationship between BMI and mortality differs according to age. We should also consider that because of the shortening of height in elderly individuals, BMI may not accurately reflect the body mass. With regard to the body weight range with the lowest mortality, a desirable BMI would be in the range of 20 to 25 kg/m², and BMI 22 kg/m² is not a target that should be uniformly achieved. In addition, even if the BMI does not indicate that an individual is overweight, individuals with symptoms of metabolic syndrome, such as dyslipidemia and hypertension have significantly higher mortality than healthy non-obese individuals, while overweight subjects without metabolic syndrome show no increase in mortality.

In Japan, where the number of elderly individuals with diabetes is increasing and where obese individuals with a BMI of ≥30 kg/m² are no longer rare, it is necessary to set a different target weight for each patient, taking into consideration the fact that the desirable weight differs depending on age, metabolic state and other patient factors. Therefore, a new guideline of JDS published in 2019 described that it is reasonable to set a target weight based on the current weight by first evaluating patient characteristics such as age, congenital disorders, and metabolic state, then changing the target weight on a stage-by-stage basis, rather than setting a uniform target. For elderly individuals of ≥75 y of age in particular, the target weight should be individualized considering frailty, complications, body composition, shortening of stature, food intake and nutrition state.

Eating pattern

There is no optimal ratio of macronutrients for the management of T2DM. A meta-analysis of studies investigating the effects of a low-carbohydrate diet suggests that such diets are effective for achieving a short-term reduction in HbA1c (<6 mo), with less difference beyond 1 y. Weight reduction was a goal of many studies on the effects of a low-carbohydrate diet, which further complicates evaluating the distinct contribution of this eating pattern to weight loss. Therefore—rather than focusing on the role of particular macronutrients—various eating patterns should be recommended to meet personal needs and preferences.

On the other hand, irregular eating, such as skipping breakfast and eating dinner in the late evening is associated with an increased risk of obesity and T2DM. The significance of time of eating in the management of obesity and T2DM has been recently investigated in terms of chronological nutrition, providing scientific evidence to support the benefits of a regular eating pattern in T2DM care.

Scope of this symposium

With the above problems, this symposium aims to promote optimal nutrition therapy for T2DM through a comparison of the guidelines of different countries. Professor Kee-Ho Song and Professor Hae-Jeung Lee will present the dietary guidelines of the Korean Diabetes Association (KDA), raising the issues on debate in Korea. Professor Michiaki Fukui will give a talk on the latest guidelines of the JDS, referring to the recent change in the nutritional status of the Japanese population. Professor William S. Yancy will introduce the updated consensus on nutrition therapy of the American Diabetes Association (ADA). This symposium is expected to yield a new perspective in nutrition therapy.
for the management of T2DM.

Disclosure of state of COI

There is no conflict of interest to be declared.

REFERENCES


