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Effective Proposal of Food Pyramid for Understanding of Low Carbohydrate Diet (LCD)

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Abstract

There have been several types of dietary approaches, such as low-fat diet (calorie restriction, CR), Mediterranean diet, and low carbohydrate diet (LCD). LCD was started by Atkins and Bernstein, and LCD in Japan was initiated by authors and collaborators. We proposed petite-LCD, standard-LCD and super-LCD for practical use through the activity of Japan LCD promotion association (JLCDPA). Furthermore, seven golden rules for LCD and food pyramid for LCD were presented, which were also beneficial for patients and usual people for providing educational information. Our experience would be hopefully to become some reference for future practice.

Keywords: ***Food pyramid; Low-carbohydrate diet, Japan LCD promotion association, Non-communicable diseases***

Abbreviation

- LCD: Low-Carbohydrate Diet
- JLCDPA: Japan LCD promotion association
- NCDs: Non-communicable diseases
- CR: Calorie Restriction
- Loc-S: Locomotive syndrome

Congratulations for an inaugural issue of "Case Reports and Reviews: Open Access (CRROA)" in Gnoscience group. We can find the root origin of the word "Gno", which means know and recognition. The word recognition is divided as

follows: re (again) + co (together) + gnize (know). From its etymology, derived vocabularies include knowledge, diagnosis, prognosis, cognitive, ignore, ignoble, acquaintance and so on. We expect that CRROA will broaden new and meaningful medical knowledge and information, and contribute towards the development of medical research and practice across the world.

For some decades, non-communicable diseases (NCDs) have been medical, social, and economic problems worldwide. Among those, metabolic disease including obesity and diabetes mellitus has to be managed properly [1,2]. The fundamental therapy would be an adequate nutritional treatment. There have been several types of dietary approaches [3] such as low-fat diet (calorie restriction, CR), Mediterranean diet, high protein diet, vegetarian diet, and low carbohydrate diet (LCD).

Among them, there were variety of discussions between CR and LCD [4,5]. Systematic reviews have found to be predominance of LCD [6]. Furthermore, Prospective Urban Rural Epidemiology (PURE) study with more than 135 thousand subjects in the world showed the significant relationship between high carbohydrate intake and high mortality, associated with high fat intake and low mortality [7].

From historical point of view, LCD was started by Atkins and Bernstein, et al [8,9]. Consequently, LCD had been known in the health and medical care. After that, LCD was initiated in Japan by authors and collaborators [10]. We have continued developing LCD by textbook, lectures, English reports, and others with three types of LCD [11]. They are petite-LCD, standard-LCD, and super-LCD, which included carbohydrate ratio as 40%, 26%, and 12%, respectively [11]. Our research included the comparison of CR and LCD, daily profile of blood glucose, Morbus (M) value, meal tolerance test (MMT), continuous glucose monitoring (CGM), and so on [12].

LCD was applied to many patients with obesity, in which 2773 subjects were educated to continue LCD [13]. As a result, weight reduction ratio are as follows: 10% or more was 666 (24.0%), 5.0 - 9.9% was in 863 (31.2%), the reduction of 5.0% or more was 55.2%, and 3.0% or more was 71.4%. Furthermore, we have continued these activities of LCD for social movement with seminars and workshops through Japan LCD promotion association (JLCDPA) [14].

Among our educational picture slides, basic concept of LCD method was shown in Fig. 1[11]. This is a recommended “food pyramid” for easy understanding and continuation of LCD. This scheme was used for not only patients with diabetes mellitus, obesity, metabolic syndrome, locomotive syndrome (Loc-S), but also for the general people who want to become healthy state.

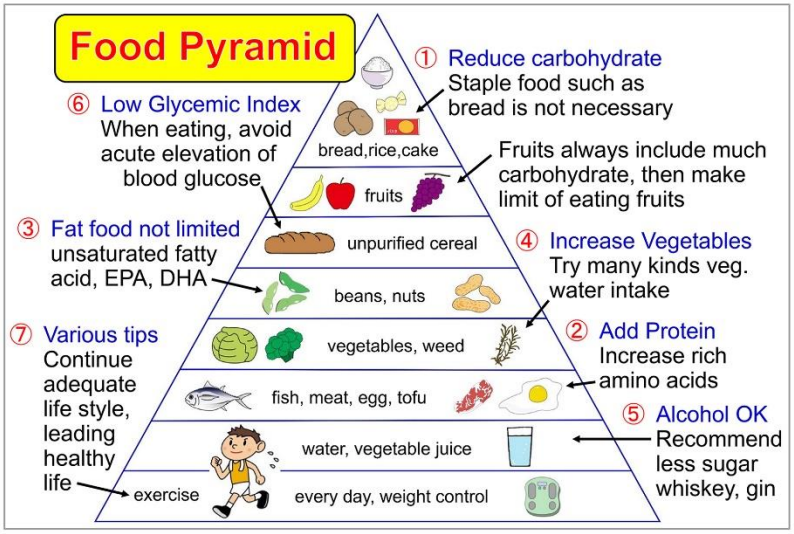

Fig. 1: Food pyramid for providing lecture of LCD

Author has proposed "Seven golden rules for LCD" and given lectures so far [15,11]. The practical seven principles of LCD are as follows:

- Reduce carbohydrate: We can select three degrees of LCD, which are petite-LCD, standard-LCD, super-LCD. For these diet methods, a person skips intake of carbohydrate food in 1, 2, 3 meals per day, respectively.
- Add protein: We can increase protein element using fish, meat, egg, tofu, and others.
- Do not have to limit fat food: Formerly, limitation of intake for fat food was observed. On the other hand, recent research showed that restriction of fatty food is not necessary, when LCD has been continued.
- Increase vegetables and water: Recommend to eat many kinds of vegetables in starting of every meal. One of the beneficial effects would be the protection of hyperglycemia.
- Alcohol intake is fine: Carbohydrate content in alcohol beverages are usually much in beer, less in wine, and almost none in whiskey, gin, and rum. Then, we recommend the alcohol with less carbohydrate.
- Choose low glycemic index (GI) or glycemic load (GL) food: When taking the meal, try to avoid acute elevation of blood glucose. Some advices include taking fiber-rich food, and eating vegetable first in a meal.
- Continue regular lifestyle: In the daily life, make stable activity in the light of meal, exercise, working, and so on.

As to the definition of LCD, there have been a variety of guidelines. Among the situation, Feinman had proposed a standard for the carbohydrate content percentage in usual daily meals [16]. There are four categories in the following i) Very low-carbohydrate (< 10% carbohydrates), ii) Low-carbohydrate (<26%), iii) Moderate-carbohydrate (26%-44%) and iv) High-carbohydrate (45% or greater).

Furthermore, the detail classification in the research was found [17]. It has nine kinds from various type of the meal: a) Low carbohydrate (LC) diet: less than 25% carbohydrates of total energy intake, high intake of protein, and often high intake of fat. [16,17]. b) Moderate-carbohydrate diet: 25–45% carbohydrates, and 10–20% protein intake [17]. c) High protein (HP) diet: more than 20% protein intake, high intake of protein, and less than 35% fat) [17]. d) Low fat (LF)

diet: less than 30% fat, high intake of cereals and grains, and 10–15% protein intake [18]. e) Low glycemic index/load (LGI/GL) diet [17]. f) Vegetarian/Vegan diet: no meat and fish/no animal products [19]. g) Mediterranean dietary pattern: fruit, vegetables, olive oil, legumes, cereals, fish, and moderate intake of red wine during meals [20]. h) Palaeolithic diet [21]. i) Control diet: no intervention or minimal intervention [22].

The important aspect of LCD includes the beneficial effect for cardiovascular axis [6,7]. In response to LCD, there are also beneficial effect for lipid metabolism, which are increase of HDL, reduction of triglycerides, and probable small increase or decrease in LDL [6,23]. Consequently, LCD seems to have beneficial efficacy [24].

In summary, the author has continued clinical research of LCD in health care and medical care. Three kinds of petite-, standard-, super-LCD, and food pyramid for LCD and healthy life would be useful and beneficial for developing LCD. This article would hopefully help to become some reference for future practice.

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Conflicts of interest

The author declares no conflict of interest.

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