Role of Higher Dietary Carbohydrate Intake in Cataract Development

We read with great interest the article by Chiu et al., who examined the cross-sectional associations between total carbohydrate intake, dietary glycemic index (dGI), and the risk of cortical and nuclear cataracts. The main result is that the highest quartiles of carbohydrate intake correspond with a 2.13-fold risk of developing cortical cataract. There are some points in the paper that should be clarified, to avoid the false perception that a higher dietary carbohydrate intake, per se, is responsible for cataract development.

Although experimental evidence has suggested an association between nutrition and lens opacities, a defined role for dietary differences and cataract formation has not yet been ascertained. For example, a dietary deficiency of antioxidants and reactive oxygen scavengers may be involved in the pathogenesis of the idiopathic human senile cataract, as well as in some experimental cataracts and in cataracts in developing countries. On the contrary, studies performed in subjects living in industrialized countries have failed to demonstrate significant differences in the blood levels of nutrients or metabolites between cataractous and controls subjects.

The same is true of high carbohydrate intake. Normal persons exposed to the highest carbohydrate intake do not develop diabetes or diabetes complication, such as cataract, since the blood glucose test results (A1C test, fasting plasma glucose test, and/or oral glucose tolerance test [OGTT]) remain within the normal range. The situation is different in diabetic patients and in patients with reduced tolerance to glucose. Before developing type 2 diabetes, individuals are in a disease stage called prediabetes, in which blood glucose levels are higher than normal, but are not yet high enough to be diagnosed as diabetic. Recent research has shown that some long-term damage to the body, especially the heart and circulatory system, may already be occurring during the prediabetes period, which is characterized by impaired fasting glucose (IFG) and impaired glucose tolerance (IGT). Both IFG and IGT exhibit elevated glucose levels that are not sufficient to be classified as diabetes, but that represent the development of insulin resistance. Achieving glycemic control in patients with prediabetes through lifestyle and pharmacologic interventions can effectively prevent or delay the development of diabetes and its associated complications (cataract).

The prevalence of prediabetes in adults aged ≥18 years varies by age, sex, and race/ethnicity, and there is a considerable discordance between the indicators used to measure the risk. The first step, however, is to identify patients at risk. Although patients can be identified with an OGTT or a fasting plasma glucose (FPG) screening, a normal FPG does not preclude an elevated OGTT and, therefore, the presence of prediabetes. Thus, the risk of developing prediabetes is always underestimated.

In the study by Chiu et al., the problem related to the prediabetes status was not considered at all, although they declared that “diabetes is a strong confounder of the associations that were of interest to us.” In fact, they looked only at a prior diagnosis of diabetes, which was responsible for the exclusion of only 121 (4.66%) diabetic persons of 2594 participants. Ravikumar et al., in a recently published cross-sectional study on the prevalence and risk factors of diabetes in a community-based study in North India, found that the prevalence of diabetes was 15.7% (95% CI, 13.9–16.9) with a similar percentage for prediabetes (15.4%; 95% CI, 14.3–17.1). On the other hand, Twigg et al., in a study performed in Australian adults to evaluate the presence of impaired fasting glucose/glycemia and/or impaired glucose tolerance, found that prediabetes affected approximately 16.4% of their recruited subjects. This percentage would significantly affect the results reported by Chiu et al.

In conclusion, we believe that carbohydrate intake, per se, is not responsible for cataract development in normal individuals. The situation is different in the presence of reduced glucose tolerance. Thus, rather than to glucose intake, the relationship should be made to prediabetes status, which accounted for a percentage higher than diabetes itself in the Australian population.

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