Does Diet Influence the Retinal Microvasculature in Children?

To the Editor:

The retinal microvasculature is anatomically and physiologically similar to the cerebral microcirculation, and may thus serve as a surrogate marker for small vessel disease in the brain that predisposes people to the development of stroke.1 The recent article by Kaushik and associates reports that higher glycemic index and lower cereal fiber diet are associated with stroke mortality in persons 50 years and older.2 An interesting finding was that 50% of this association was explained by a corresponding association between high glycemic index and low cereal fiber diet with larger retinal venular caliber, suggesting that the relationship of diet and stroke may be partly mediated by the microcirculation. This is further supported in another analysis of the same cohort in which decreased fish consumption was shown to be associated with similar retinal vascular caliber changes and stroke risk.3

A high glycemic index and low cereal fiber diet may contribute to vascular dysfunction through the formation of advanced glycation end products. However, many systemic diseases (eg, diabetes, hypertension) and eye diseases (eg, diabetic retinopathy, glaucoma) can also affect the state of the retinal microvasculature, and their influence cannot be completely controlled for by statistical modeling.2 Studying the retinal microvasculature in healthy children minimizes confounding by these systemic factors and is therefore an ideal approach for assessing the physiological influence of diet on the microcirculation. We analyzed the relationship between dietary factors and retinal vascular caliber in 823 healthy Singapore Chinese schoolchildren aged 12.8 (±0.8) years who underwent retinal photography and computerized measurement of retinal vascular caliber similar to Kaushik et al.4 Diet was assessed by interviewers using a validated semiquantitative food-frequency questionnaire adapted for teenagers.5 Linear regression models were constructed to assess the quantitative associations between any of the dietary constituents, including fiber and sugar intake, and retinal arteriolar or venular caliber (Table).

Our findings in Singapore Chinese teenagers appear to contrast with Kaushik et al’s study in older white adults and suggest that the microvascular effects of diet may be evident only in later life. This would be consistent with a possible cumulative dose-dependent effect of diet on the retinal vasculature over time. Clearly, additional studies are needed to verify our hypothesis.

Further prospective evaluation of our cohort may shed more light into these mechanisms.

Disclosures

None.

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<table>
<thead>
<tr>
<th>Dietary Component</th>
<th>Retinal Arteriolar Caliber</th>
<th>Retinal Venular Caliber</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy intake per day (g)</td>
<td>0.0002 (−0.001, 0.001)</td>
<td>−0.001 (−0.002, 0.001)</td>
</tr>
<tr>
<td>Protein intake per day (g)</td>
<td>0.004 (−0.03, 0.04)</td>
<td>−0.02 (−0.06, 0.03)</td>
</tr>
<tr>
<td>Saturated fat intake per day (g)</td>
<td>0.01 (−0.05, 0.07)</td>
<td>−0.04 (−0.12, 0.04)</td>
</tr>
<tr>
<td>Monounsaturated fat intake per day (g)</td>
<td>0.01 (−0.06, 0.08)</td>
<td>−0.04 (−0.13, 0.06)</td>
</tr>
<tr>
<td>Polyunsaturated fat intake per day (g)</td>
<td>0.01 (−0.11, 0.13)</td>
<td>−0.04 (−0.20, 0.13)</td>
</tr>
<tr>
<td>Total fat intake per day (g)</td>
<td>0.01 (−0.02, 0.03)</td>
<td>−0.02 (−0.05, 0.02)</td>
</tr>
<tr>
<td>Cholesterol intake per day (g)</td>
<td>0.003 (−0.002, 0.008)</td>
<td>0.001 (−0.01, 0.01)</td>
</tr>
<tr>
<td>Carbohydrate intake per day (g)</td>
<td>0.003 (−0.01, 0.01)</td>
<td>−0.01 (−0.02, 0.01)</td>
</tr>
<tr>
<td>Fibre intake per day (g)</td>
<td>0.06 (−0.06, 0.17)</td>
<td>−0.01 (−0.16, 0.15)</td>
</tr>
<tr>
<td>Sugar intake per day (g)</td>
<td>0.004 (−0.02, 0.02)</td>
<td>−0.01 (−0.03, 0.02)</td>
</tr>
<tr>
<td>Ratio of energy intake to energy requirements per day</td>
<td>0.16 (−2.54, 2.87)</td>
<td>−1.44 (−5.14, 2.26)</td>
</tr>
</tbody>
</table>

*Adjusted for age, gender, mean arterial blood pressure, body mass index.
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