Reassessment of the Role of Dietary Fat in Cancer Etiology

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Abstract

The role of dietary fat in cancer etiology is briefly discussed in terms of several major types of epidemiological evidence: geographic correlations, migrant studies, low-risk populations, and dietary modification trials. It appears that there is no conclusive evidence that lowering dietary fat intake will result in lowering the cancer death rate. Furthermore, it appears possible to have a relatively low death rate from "diet-related" cancers with an average fat intake. However, in order to fully assess the fat hypothesis, it is important to identify and carefully study a group of Americans with a genuine low-fat diet.

Introduction

The concept that dietary fat plays a major role in the etiology of human cancer, primarily colon and breast cancer, has evolved over the past 15 years, mainly because of Dr. Ernst Wynder's initiative and persistence (31—33). This subject has been reviewed extensively elsewhere (2—4, 11, 24, 25). The volume of indirect circumstantial evidence has grown to the point that a U. S. Senate Committee (23) and the National Cancer Institute (29) have issued dietary guidelines advocating less fat consumption.

I think such conclusions regarding fat and cancer are premature and unjustified. We should recall the 5 criteria used by the 1964 Surgeon General's Advisory Committee on Smoking and Health to establish a "causal" relationship between cigarette smoking and lung cancer: consistency, strength, specificity, temporal relationship, and coherence of association (28). The epidemiological evidence with regard to dietary fat and "diet-related" cancers, such as colon and breast cancer, is contradictory and controversial and comes nowhere near satisfying the above criteria for "causality" (6, 8, 11).

Geographical Correlations

Because previous retrospective and prospective studies have been very inconclusive (4, 11), the "strongest" epidemiological data relating dietary fat to cancer are international geographical correlations between estimated per capita fat consumption and age-adjusted colon and breast cancer rates (3, 31—33). But the weaknesses of these correlations are well known (9, 11). For instance, fat consumption for each country is usually estimated from the national sales and disappearance of foodstuffs but often does not agree with fat consumption obtained from direct dietary surveys (1, 3, 15, 31). Furthermore, correlations between cancer rates and fat intake in 65 areas within the United States, based on a national dietary survey (21), are essentially zero (9)—far different from the strong international correlations (33). Also, different correlations with other factors, such as beer drinking, urbanization, and per capita income, are left unexplained (9). The time has come to stop overinterpreting geographical correlations.

Migrant Studies

Japanese who migrate from Japan to the United States show increased rates for colon and breast cancer relative to rates in Japan (13). These increased rates are frequently attributed to the substantially increased fat intake of Japanese migrants relative to Japanese natives (31—33). However, this is again a selective use of data. In spite of increases in colon and breast cancer, the total cancer rate among Japanese-Americans, including those born in the U. S., remains essentially unchanged, and their total death rate decreases and remains lower than that of Japanese natives (13, 18, 30). So there is an overall improvement in the health of Japanese when they move to America and adopt the American diet. American Japanese appear to have almost the same dietary fat intake as American whites, about 80 g/day (and about 40% of total caloric intake) (1, 21), and yet their death rates remain relatively low. The 1959 to 1962 standardized mortality ratio for Japanese-Americans compared with U. S. whites is 70% for all causes, 88% for total cancer, 58% for colon cancer, and 27% for breast cancer (13). These overall low Japanese-American rates are confirmed by cancer mortality data for the periods 1950 to 1969 (19) and 1968 to 1972 (18). These and other data indicate that Japanese are the healthiest race in America (27).

Low-Risk Populations

In addition to Japanese-Americans, there are at least 2 U. S. white subpopulations which have relatively low "diet-related" cancer rates without any obvious relationship to low-fat intake. Mormons, for instance, advocate abstention from tobacco, alcohol, and caffeine-containing beverages, as well as dietary moderation (7). The average standardized mortality ratio for California and Utah Mormons circa 1970 is about 70% for total cancer, 65% for colon cancer, and 85% for breast cancer (7, 10). Mexican-Americans, defined as U. S. whites born in Mexico, have a 1959 to 1961 standardized mortality ratio of about 95% for total cancer, 46% for colon cancer, and 60% for breast cancer (17). Los Angeles County Mexican-Americans show fairly similar rates for cancer incidence (20). The diets of Mormons and Mexican-Americans need to be studied in much greater detail, but based on the limited data now available, they do not appear to differ noticeably from other white Americans with respect to fat consumption (10, 21).

Given the existence of at least 3 groups, Japanese-Americans, Mormons, and Mexican-Americans, who have substantially lower rates of "diet-related" cancer than other U. S. whites, it would seem imperative to understand the reasons for this lower risk. Low-dietary-fat intake does not appear to be an
explanation. Whether or not Americans with low-fat intake have cancer rates as low or lower than these 3 groups is not known. Apparently, Seventh-Day Adventists as a whole do not have an overall low-fat diet in spite of low-meat consumption (22). 3

Dietary Modification Trials

The rigorous way to assess the effect of a “prudent” low-fat diet on subsequent cancer occurrence is to conduct randomized controlled trials on human subjects. Such trials have already been conducted for cholesterol-lowering diets, and they show no significant change in either cancer or total mortality rates (5, 26). Trials involving fat-lowering diets remain to be done.

Another way to assess the effects of fat intake is to examine obesity in relation to cancer. Recently, data on 750,000 adults from the American Cancer Society cohort showed that, compared with persons of average weight, there was less than a 20% increase in the death rate for colon, breast, and total cancer among persons up to 30% overweight (16). This small increase was not statistically significant, and only about 2% of the men and 5% of the women were more than 30% overweight (16).

Conclusions

In my opinion, there does not now exist enough scientific evidence to recommend a general decrease in the fat intake of Americans as a means of reducing cancer deaths. This action might be justified if it were part of a hypothesis testing randomized controlled trial or other well-designed epidemiological study. To resolve this matter it is essential to identify and study a U. S. group which already has a very-low-fat diet or will convert to one. Also, it is important to investigate why certain groups in the U. S. have relatively low cancer rates in spite of fairly average fat intake. What is required are rigorous epidemiological studies of the complete diet and other factors in several diverse groups, as recommended by Graham (12). Only if clear and consistent evidence emerges should a reduction in dietary fat be recommended to the general public as a means of reducing cancer mortality. After all, the current diet is associated with best overall health and longest life expectancy in American history (14, 27).

References


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