

Preliminary Study of Diet as an Adjunct Therapy for Breast Cancer

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The clinical course of breast cancer is highly variable. Some women die soon after the discovery of a lump in the breast, while others survive 20 or more years in apparently good health, only to die from their original cancer.¹ There have been many observations made on factors related to the progress of breast cancer. Of these, obesity,^{2,3} and high levels of serum cholesterol,² prolactin,⁴ and estrogen (estradiol)⁵ are correlated with a poor prognosis. Overweight breast cancer patients with high serum cholesterol have less than half the five-year survival of slimmer patients who have low levels of serum cholesterol.² Reducing levels of endogenous prolactin and estrogens by means of drugs and surgery can retard the growth of established breast cancer and cause regression of tumors.⁶ Of particular importance is the fact that these four prognostic factors are a direct consequence of the patient's nutrient intake and, therefore, may be manipulated to her benefit. Diets consumed in affluent western societies are high in fat and cholesterol and low in fiber.⁷ This type of diet frequently results in obesity and in levels of cholesterol,⁸ estrogens,⁹ and prolactins¹⁰ that are higher than in diets typical of less affluent societies where cancer of the breast is a less common occurrence.

Previous investigators have shown that when starch-centered diets (low fat, low cholesterol, high fiber) patterned after diets of people in less affluent societies are fed to volunteers, weight reduction¹¹ occurs and levels of cholesterol,¹² estrogen,¹³ and prolactin¹⁰ are reduced. Also, women on low-fat, starch-centered diets have lower levels of plasma estrogen when compared to controls.¹⁴ To date, these findings have not been specifically reported in women with a previous diagnosis of breast cancer. This preliminary study was thus performed to determine the effect of a starch-centered, low-fat diet on body weight and levels of serum cholesterol, total es-

trogen, estradiol, and prolactin in a small group of postmenopausal women with a history of breast cancer. An additional intention of this report is to stimulate future investigations into the possible benefit of a starch-centered, low-fat diet on the survival and the disease-free interval of women with breast cancer.

Subjects

Five postmenopausal women with a history of breast cancer (**Table 1**) were located through a newspaper advertisement. These women all expressed a willingness to maintain a starch-centered, low-fat meal plan for at least three months, the time period set for this preliminary investigation. Postmenopausal women were chosen because they have little cyclic hormonal variation from ovarian function. All subjects previously had been consuming a diet typical of that consumed in western affluent societies. Dietary questionnaires with the aid of food tables listing the nutrient composition of common foods¹⁵ revealed that the average nutrient intake of this diet consisted of 45% fat, 40% carbohydrate, and 15% protein; approximately 600 mg of cholesterol and 10 g of dietary fiber were ingested per day.

None of the subjects were taking any medications during the study. All of them were free of clinically detectable disease and none underwent surgery, radiation, or chemotherapy during the study period. Physical activity was not appreciably altered during the study.

Protocol

An initial examination was performed to assess the general health of the participants and to confirm that they were free of clinically detectable breast cancer. Weight determinations and laboratory tests were done prior to starting the subjects on the proposed diet. Each subject then received individual instructions regarding a starch-centered, low-fat diet. Instructional aids included two slide presentations, meal plans, a recipe book, and

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personal interviews with participants conducted by the principal investigator and his staff.

Follow-up was conducted weekly for the first four weeks of the study and then monthly for the next two months. Dietary compliance was assessed by a questionnaire given to the subjects at each follow-up visit. Weight measurements and laboratory tests were repeated at the end of the study period.

Diet

The meal plan was designed to center around a variety of starches, with the addition of low-fat fruits and vegetables. Vegetable foods excluded were those high in fat: vegetable oil, avocados, nuts, seeds, olives, soybean, wheat germ, and high-fat by-products of these foods. Typical meals were hot and cold cereals, waffles, pancakes, and breads for breakfast; soups and vegetable sandwiches for lunch. Dinners included such meals as spaghetti, lasagna, "fried" rice, chili, potato salad, and a variety of casseroles. Nutritional analysis of this starch-centered diet using tables for nutrient values of common foods¹⁵ revealed that fat constituted approximately 8% of calories (lineolic acid 3% of total calories), protein 12% of calories, and carbohydrate 80% of calories; there was 60 g dietary fiber and 0 g cholesterol per day.

Analytic methods

Laboratory tests were conducted at the same hour (8 AM) of the day and the same day of the month to minimize hourly and cyclic changes of the hormones. Prolactin and estrogen levels were determined by radioimmunoassay

techniques¹⁶ and cholesterol determinations were performed with a Technician Autoanalyzer using methods previously described by Ness.¹⁷

Results

All five women remained on the starch-centered, low-fat meal plan without deviation for the prescribed time period. Compliance, as assessed by dietary questionnaire, was excellent.

On the average, there was a 7% decrease in body weight over three months; however, none of the participants were considered to be obese at the outset of the study. Cholesterol was reduced by 16.2%, prolactin dropped 38%, total estrogen decreased by 36.6% and estradiol levels decreased by 45% on the average over the three-month study period (**Table 2**).

Discussion

This preliminary study of five postmenopausal women has demonstrated a favorable change of four factors associated with a poor prognosis in women with breast cancer—solely through dietary manipulation. Actual benefit in terms of survival and disease-free interval will take many years and well-designed studies to evaluate. However, there is considerable data to support the position that a change to a starch-centered, low-fat diet may benefit women with breast cancer. Furthermore, there are other cogent reasons for now recommending this dietary change to breast cancer patients as an adjunct to other therapies.

The course of breast cancer and the ultimate time of

Table 1. Age, Ethnicity, and Breast Cancer History in Study Subjects

Subject	Age	Ethnicity	Years Since Initial Diagnosis	Stage at Diagnosis	Mastectomy
1	61	Caucasian	2 years	I	Radical Mastectomy
2	68	Caucasian	0 years	I (clinical)	Lumpectomy
3	51	Caucasian	2 years	II	Modified Radical Mastectomy
4	63	Chinese	1 year	I	Modified Radical Mastectomy
5	56	Japanese	10 years	I	Modified Radical Mastectomy

death are determined by the patient's strength to resist the aggressiveness of her tumor, commonly referred to as the host-versus-tumor relationship.¹⁸ Present modes of therapy, including surgery, radiation and chemotherapy, approach this relationship with techniques aimed at removing or weakening the tumor. Unfortunately, many years of experience with these modalities have been largely disappointing and have left many investigators wondering if any real progress has been made against breast cancer.^{1, 18-24}

Comparatively little attention has been given to strengthening the host defenses. Nutritional factors have long been recognized as important in our ability to resist and recover from disease.²⁵ Hypothetically, the nutritional support provided by a starch-centered diet may act simply by improving the general health of the individual. Specific benefits for health from such a diet have been described in diabetes,²⁶ hypercholesterolemia,^{26, 27} hypertriglyceridemia,²⁶ hypertension,²⁸ and vascular insufficiency.^{27, 29} The decrease in weight, cholesterol, prolactin, and estrogens in these five postmenopausal women may only reflect a nonspecific improvement in their general health; or there may be some specific, as yet unidentified mechanisms, by which lower values of these factors might benefit women with breast cancer.

Another mechanism of potential benefit by which a starch-centered diet may function is that of removing factors currently believed to initiate and promote breast cancer. Epidemiologic studies demonstrate a direct correlation between mortality rates from breast cancer and diets of affluent nations which are high in fat and cholesterol, and low in fiber and complex carbohydrates.^{30, 31} Most attention to date had been focused on the possible influence of dietary fats and oils which, when acted upon by intestinal bacteria, yield estrogen-like

hormones.³² Another hypothesis for the influence of diet on breast cancer involves obesity and the production of hormones by the adipose tissue.³³

Animal studies support these epidemiologic findings by demonstrating that fat and oil promote tumor growth irrespective of obesity and caloric intake.³⁴ Experimental studies also show that animals receiving high cholesterol diets show the greatest tumor occurrence, and metastasis.³⁵ In contrast, other work has demonstrated that mice with a variety of solid tumors have a prolonged survival and a decreased rate of tumor growth when fed fat-free cholesterol-free diets.³⁶

Factors that cause cancer are also believed to promote the disease.² For example, patients with small cell carcinoma of the lung who continue smoking after diagnosis have a significantly shorter survival than those who quit smoking.³⁷ It has been observed by several investigators that women with breast cancer who live in countries where low-fat diets are consumed survive longer with less progression of disease when compared to women on higher fat diets.³⁸⁻⁴⁰ For example, the five-year survival for breast cancer patients in Japan is 74.9% as compared to 57.3% of breast cancer patients in Boston, Massachusetts.³⁸ Japanese women have a considerably lower fat intake in their diets.⁴¹

Benefits from drugs with anti-estrogen (tamoxifen) and antiprolactin (bromocriptine) properties have been reported in women with breast cancer.⁶ In animal studies, hypocholesteremic agents have prolonged survival and retarded tumor growth.³⁶

Conclusion

Dietary manipulations which lower the endogenous levels of estrogens, prolactin, and cholesterol might be

Table 2. Measurements of Weight, Serum Cholesterol, Prolactin, and Total Estrogens and

Subject	Age	Weight (lb.) Initial/Final	Change	Cholesterol Initial/Final	Change	Prolactin (ng/dl) Initial/Final	Change
1	61	142.5/131.5	-11	196/158	-38	7/6.7	-0.3
2	68	126.5/117	-9.5	196/166	-30	14/14	0
3	51	130.5/121	-8.5	197/204	+7	23/9.6	-13.4
4	63	131/117.5	-13.5	282/238	-44	18/7.2	-10.8
5	56	106/104	-2	226/153	-73	9/6.5	-2.5
Average	59.8	127.3 lb.	-8.9	219.4 mg/dl	-35.6	14.2 ng/ml	-5.4
% Change			-7%		-16.2%		-38%

expected to provide similar benefits in people.

Dietary advice to prevent breast cancer by consuming more fruits, vegetables, and grain has been proposed by the Senate Select Committee on Nutrition and Human Needs,⁷ the National Cancer Institute,⁴² and the National Academy of Sciences.⁴³ Similar advice should also apply to the unfortunate women who have already become victims of this disease. Two additional advantages of this dietary approach are that it is free of adverse effects and it is inexpensive.

Thus, even though further study in this area is needed, there is already sufficient evidence and reason to support the recommendation of a starch-centered, low-fat diet to breast cancer patients as an adjunct to other therapies being utilized. □

The author wishes to acknowledge the assistance of Robert Worth, MD, PhD (epidemiologist) and Fred Gilbert, MD (principal investigator for the Breast Cancer Research Project of Hawaii) in designing and reviewing this study.

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Estradiol Before and After Diet

Total Estrogens (pg/ml)		Change	Estradiol (pg/ml)	
Initial/Final	Change		Initial/Final	Change
202/102	-100	39/0	-39	
250/188	-62	16/23	+7	
206/145	-61	40/14	-26	
226/74	-152	31/23	-8	
120/128	+8	39/30	-9	
200.8 pg/ml	-73.4 -36.6%	33 pg/ml	-15 -45%	