

Breast Cancer & Iron

One of the more well-known dangers of excessive iron is its ability to favor cancer cell growth. The metal is carcinogenic because it is:

1. a powerful oxidant and mutagen
2. an inhibitor of defense white blood cells, and
3. a nutrient for rapidly growing cancer cells.

In a typical study in animals, for instance, rats fed an excessive amount of iron had a significantly increased number of mammary carcinomas as compared with rats fed a level of iron adequate for excellent growth and health. Additionally, in a recent study, exposure of breast cancer cells to excess iron has been shown in mice to enhance invasiveness and metastases.

Breast cancer in women has been associated with elevated iron for the past thirty years. For example, in a study of 229 women with early breast cancer as compared with 250 healthy women of similar age, the mean serum ferritin of the patients was 97 ng/mL; of the healthy persons, 57 ng/mL. Moreover, those patients with serum ferritin levels greater than 200 ng/mL had a significantly greater recurrence rate than patients with lower serum ferritin values.

Indeed, the possibility that these striking differences could have resulted from chance is less than one in one thousand!

In a recent study of 42 breast cancer patients, high levels of transferrin receptor were observed in poorly differentiated tumors and elevated ferritin was associated with lymph node metastases. A principal carcinogen in tobacco smoke is iron.

Not surprisingly, the risk of breast cancer is elevated in women who actively or passively inhale tobacco smoke. For instance, a set of 244 patients with breast cancer was compared with 1,032 healthy women. The risk of breast cancer for active or former smokers was increased by 2.2 fold (lifetime consumption of 1-9 cigarettes per day), by 2.7 fold (10-19 cigarettes per day), and by 4.6 fold (20 or

more cigarettes per day). Among passive smokers exposed for an average of 2 hr per day for 25 years, the risk of breast cancer was increased by 3.2 fold.

Genetic mutations that increase dietary absorption of iron also are associated with increased risk of breast cancer. In a study of hemochromatotic compound heterozygotes (CY/HD), the risk of breast cancer in those persons who also had a transferrin receptor gene mutation was increased by 7.3 fold.

Breast cancer is the most common cancer among women in the United States. In 2001, an estimated 192,200 women were diagnosed with breast cancer, and 40,600 women died from the disease. Male breast cancers account for approximately 1% of all breast cancer cases.

Source: The American Cancer Society

References for your physician

Beckman LE, Van Landeghem GF, Sikstrom C, Wahlin A, Markevarn B, Hallmans G, Lenner P, Athlin L, Stenling R, "Interactions Between Hemochromatosis and Tf Receptor Genes in Different Neoplastic Disorders." *Carcinogenesis* 20 (1999):1231-33.

Jacobs A, Jones B, Ricketts C, Bulbrook RD, Wang DY. "Serum Ferritin Concentration in Early Breast Cancer." *British Journal of Cancer* 34 (1976):286-90.

Kajdacsy-Balla et al "The Effect of Iron on Prostate and Breast Cancer Cell Invasion." *Metal Ions in Biology & Medicine* 7 (2002):617-20.

Morabia A, Bernstein M, Heritier S, Khatchatrian N. "Relation of Breast Cancer with Passive and Active Exposure to Tobacco Smoke." *American Journal of Epidemiology* 143 (1996):918-28.

Singh M, Lu J, Briggs SP, McGinley JN, Haegele AD, Thompson HJ. "Effect of Excess Dietary Iron on the Promotion of Nitrosourea-induced Mammary Carcinogenesis." *Carcinogenesis* 15 (1994):1567-70

Weinberg ED. "The Role of Iron iCancer." *European Journal of Cancer Prevention* 5 (1996):19-36.

Weinberg ED. "The Development of Awareness of the Carcinogenic Hazard of Inhaled Iron." *Oncology Research* 11 (1999):109-13.

Yang DC, Wang F, Elliott RL, Head JF. "Expression of Transferrin Receptor and Ferritin H-chain mRNA are Associated with Clinical and Histopathological Prognostic Indicators in Breast Cancer." *Anticancer Research* 21 (2001):541-9.

Resources:

National Alliance of Breast Cancer Organizations
9 East 37th Street, 10th Floor New York, NY 10016
<http://www.nabco.org/>(888) 80-NABCO

Y-ME National Breast Cancer Organization
212 W. Van Buren, Suite 500
Chicago, IL 60607
Phone: 312-986-8338
Fax: 312-294-8597
1-800-221-2141 (English)
1-800-986-9505 (Español)
<http://www.y-me.org/>

Susan G. Komen Breast Cancer Foundation
5005 LBJ Freeway, Suite 250
Dallas, TX 75244
972-855-1600
<http://www.komen.org/bci/>

University of Pennsylvania:
<http://www.oncolink.com/>

National Cancer Institute:
<http://cancer.gov/>

For Information about Male Breast Cancer:
<http://www.menstuff.org/issues/byissue/breastcancer.html>

For a copy of our article about the dangers of inhalation of iron:
Contact Iron Disorders Institute 864-292-1175