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## **Obesity Linked With Poorer Breast Cancer Outcomes**

- Obesity leads to late diagnosis of breast cancer.
- Obese patients have poorer breast cancer survival.
- Adjuvant treatment is less effective in patients with a higher BMI.

SAN ANTONIO – Breast cancer patients with a high body mass index (BMI) have a poorer cancer prognosis later in life. Specifically, their treatment effect does not last as long and their risk of death increases.

“Overall, women should make an effort to keep their BMI less than 25,” said Marianne Ewertz, M.D., professor in the Department of Oncology at Odense University Hospital, Denmark. “Those who have a high BMI should be encouraged to participate in mammography screening programs for prevention efforts.”

Ewertz and colleagues examined the influence of obesity on the risk of breast cancer recurrence and mortality in relation to adjuvant treatment. She presented study results at the CTRC-AACR Annual San Antonio Breast Cancer Symposium, held Dec. 9-13.

Using the Danish Breast Cancer Cooperative Group database, they evaluated health information — such as status at diagnosis, tumor size, malignancy grade, number of lymph nodes removed, estrogen receptor status, treatment regimen, etc. — from almost 54,000 women. Ewertz and colleagues were able to calculate BMI for 35 percent of the women, whose information about height and weight was available. A healthy, normal BMI score is between 20 and 25; a score below the normal range indicates underweight and a score above indicates overweight.

After 30 years of follow-up (from 1977 through 2006), the researchers found that women with higher BMIs were older and had more advanced disease at diagnosis compared with those who had a BMI within the normal range. The risk of distant metastases increased the higher the BMI. However, BMI played no role in loco-regional recurrence.

Women with a high BMI had an increased risk of dying from breast cancer, a finding that remained constant over the study period. Further, adjuvant treatment seemed to lose its effect more rapidly in obese patients, according to Ewertz.

“More research is needed into the mechanisms behind the poorer response to adjuvant treatment among obese women with breast cancer,” she said.

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The mission of the CTRC-AACR San Antonio Breast Cancer Symposium is to produce a unique and comprehensive scientific meeting that encompasses the full spectrum of breast cancer research, facilitating the rapid translation of new knowledge into better care for breast cancer patients. The Cancer Therapy & Research Center (CTRC) at The University of Texas Health Science Center at San Antonio, the American Association for Cancer Research (AACR), and Baylor College of Medicine are joint sponsors of the San Antonio Breast Cancer Symposium. This collaboration utilizes the clinical strengths of the CTRC and Baylor, and the AACR’s scientific prestige in basic, translational and clinical cancer research to expedite the delivery of the latest scientific advances to the clinic. The 32nd annual symposium is expected to draw more than 8,500 participants from more than 90 countries.

**Presenter Name:** Marianne Ewertz, M.D.

**Institution:** Odense University Hospital

**Abstract Number:** 18

**Abstract Title:** Effect of Obesity on Prognosis after Early Breast Cancer

**Abstract Body:**

**Background:** Obesity is associated with an increased risk of dying from breast cancer. There may be several explanations for this such as obese women being diagnosed at a more advanced stage of disease or that treatment is less effective in obese patients. The aim of this study was to examine the influence of obesity on the risk of recurrence and death from breast cancer or other causes in relation to adjuvant treatment.

**Material and methods:** From the database of the Danish Breast Cancer Co-operative Group (DBCG) we identified 53816 women who received treatment for early breast cancer according to the DBCG protocols between 1977 and 2006 with complete data on follow up. Information was available on age and menopausal status at diagnosis, tumor size, number of lymph nodes removed, number of positive lymph nodes, deep fascia invasion, histological type, grade of malignancy, estrogen receptor status, treatment regimen, and protocol version (year), while data on height and weight to derive the body mass index (BMI, weight in kilograms divided by the square of height in meters) were available for 18967 patients or 35 % of the patients. The chemotherapy regimens included cyclophosphamide, metotrexate, and fluorouracil (CMF) up to 1999 and cyclophosphamide, epirubicin, and fluorouracil (CEF) from 1999 onwards. Endocrine therapy included mainly tamoxifen of durations from one to five years depending on time period. Associations between BMI (<25 vs  $\geq$ 25, <30 vs  $\geq$ 30) and other prognostic factors were analyzed by using the chi square test. Cause specific survival and invasive disease-free survival (type of first failure) were analysed by univariate and multivariate methods using Cox proportional hazards regression models.

**Results:** Compared with patients with a BMI less than 25, those with a higher BMI were older, more often postmenopausal, had larger tumors, more lymph nodes removed and more positive lymph nodes, more often invasion into deep fascia (all  $p < 0.0001$ ), and more often grade III tumors ( $p = 0.04$ ). Univariate analyses showed that the risk of a loco-regional recurrence was not related to BMI while the risk of distant metastases increased with increasing BMI after 3 years of follow up. The risk of dying from breast cancer remained elevated for patients with high BMI throughout 30 years of observation. Adjusting for the effect of other prognostic factors, multivariate analyses confirmed an independent prognostic effect of obesity. Within the first 10 years of follow-up chemotherapy and endocrine treatment were equally effective in lean and obese patients. However, after 10 or more years of follow-up, the treatment effect did not last in obese patients who had a poorer survival despite treatment.

**Conclusion:** Results from this population-based cohort of almost 19000 patients followed for up to 30 years confirmed that obesity is associated with a poorer prognosis after breast cancer. This is likely to be due to obese patients having a higher risk of developing distant metastases than lean patients and that adjuvant treatment seems to lose its effect more rapidly in obese patients.