Low body mass index (BMI) is associated with poor survival in Japanese patients with early breast cancer: an exploratory analysis of randomized phase III trials N-SAS BC02 and 03

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Background: Obesity is reported to be associated with worse prognosis in early breast cancer. However, there is little data regarding the impact of low BMI on survival in patients with breast cancer. As obesity is rare and low BMI is relatively common in Japanese population compared to Caucasians, Japanese cohort is suitable to assess the impact of low BMI on survival in patients with early breast cancer. Recently an exploratory analysis of a small Japanese randomized phase II trial (JFMC 34-0601) suggested that low BMI was associated with a decreased overall survival rate to neoadjuvant endocrine therapy with exemestane. We further explored the impact of low BMI on survival in patients with early breast cancer using a dataset of randomized phase III trials in Japan.

Methods: Patients included in prospective randomized phase III trial N-SAS BC02 or BC03 were retrospectively analyzed. N-SAS BC02 investigated four arms of adjuvant chemotherapy consisted of taxane alone or in combination with anthracycline-containing regimen (median follow up of 6.1 years). N-SAS BC03 compared anastrozole with tamoxifen as adjuvant endocrine therapy (median follow up of 6.4 years). The correlation of BMI and overall survival was then explored by univariate analysis.

Results: A total of 1726 patients were included in our study. Median age was 56 (range 24–82) years. 71.2% of tumors were ER positive, and 9.7% were HER2 positive. Mean BMI was 23.6 and only 4.6% of patients had BMI over 30. 33.1% of patients’ BMI values were less than 18 (BMI < 18). Median follow up was 11 years. A total of 216 patients (12.5%) had died during follow up (14.2% for N-SAS BC02 and 9.3% for N-SAS BC03).

1. We found that patients with BMI < 18 have a lower overall survival rate compared to patients with BMI ≥ 18 (p = 0.01). Median survival for patients with BMI ≥ 18 was 15.6 years, whereas 10.4 years for patients with BMI < 18.

2. We also found a significantly lower relapse free survival rate among patients with BMI < 18 compared to patients with BMI ≥ 18 (p = 0.003). Median relapse free survival was 16.6 years for BMI ≥ 18 and 12.4 years for BMI < 18.

3. The impact of low BMI on overall survival was more pronounced in TNBC patients (HR 0.43, 95% CI 0.25–0.72, p = 0.002). Median survival was 9.3 years for BMI ≥ 18 and 5.3 years for BMI < 18.

4. In multivariate analysis, the impact of low BMI on overall survival was confirmed (HR 0.61, p = 0.064).

Conclusion: There is little data regarding the impact of low body mass index (BMI) on overall survival in patients with breast cancer. Japanese are relatively in low BMI compared to Caucasian population and therefore suitable to assess the impact of low BMI on survival in patients with early breast cancer.