

## Background

In younger patients breast cancer is associated with a worse prognosis compared to older patients. Only few data are available presenting the development of prognostic factors regarding a period of several decades. This 40 year longitudinal comparison of the main prognostic factors was performed to investigate differences in younger women with primary breast cancer in contrast to older women over time.

## Methods

In this retrospective analysis a consecutive cohort of 4010 patients was analyzed. Patients were documented and treated for primary invasive breast cancer between 1963 and 2003 at two University Hospitals in Germany. To be eligible, patients were required to have identified tumor characteristics, including TNM-status. Patients with carcinoma in situ or distant metastases were excluded. The cohort was divided in two age groups, ≤40 years and >40 years. Furthermore to reveal trends and changes over the duration of 41 years the period of analysis was split into 3 time frames: 1963-1976, 1977-1989 and 1990-2003. We analyzed the main prognostic factors for breast cancer including tumor size, grading, nodal status and hormone receptor-status in longitudinal comparison regarding the three time frames, respectively. During 1963-77 hormone receptor-status was determined in just 12.6% of patients. Thus, this time frame was excluded in the analysis of hormone receptor-status.

In 41 years, 747 (18.6%) patients were treated between 1963-76, 1722 patients (42.9%) in 1977-89 and 1541 patients (38.4%) in 1990-2003. Overall 358 patients were ≤40 years and 3652 patients were over the age of 40.

### TUMOR SIZE:

A significant reduction of tumor size (metric assessment) at primary diagnosis was observed for both age groups (pts ≤40y: p=0.012; pts >40y: p<0.0001) with no difference between young and old within the time frames, respectively (1963-76: p=0.289; 1977-89: p=0.647; 1990-2003: p=0.937).

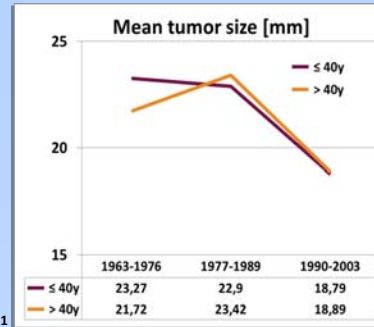


Fig. 1

### NODAL STATUS:

The number of node-positive patients significantly decreased in patients >40 years (p=0.001) whereas no difference could be seen in patients aged ≤40 years (p=0.991).

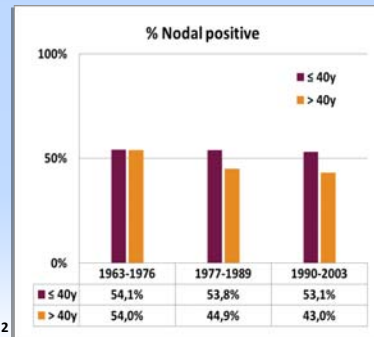


Fig. 2

## Results

**GRADING:** In both age groups the number of G2/3 tumors increased over the years (pts ≤40y: p=0.001; pts >40y: p<0.0001). Between 1963-76 more G1-tumors were diagnosed in younger patients (p=0.041) whereas in the two following periods significantly more G2/3 tumors (p=0.001; p=0.002) were observed in this group.

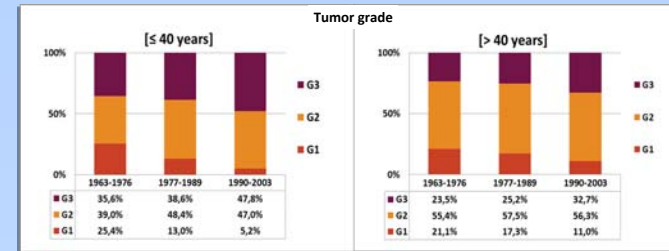


Fig. 3

### HORMONE RECEPTOR STATUS:

In young patients, 54.2% were hormone receptor-negative in 1977-89 and 47.6% in 1990-2003 (p=0.323). In patients >40 years 38.4% and 21.7% were hormone receptor-negative, respectively (p<0.0001). Comparing the age groups, significantly more patients were hormone receptor-negative in the young patient group (p=0.001 (1977-89) and p<0.0001 (1990-2003)).

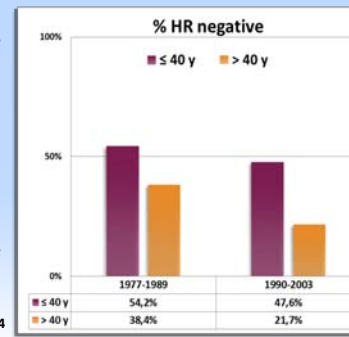


Fig. 4

## Conclusion

Concerning the large period of 40 years, technical improvement and increasing awareness for breast cancer are reasons for decreasing tumor size at the time of primary diagnosis.

However, the rate of node-positive patients in the young patient group remained stable. Furthermore, the high percentage of hormone receptor-negative patients and the increasing number of patients with unfavorable tumor grade might indicate more aggressive tumor types in younger patients.

These data confirm the need to improve screening tools to early identify young women with the risk to develop breast cancer, and for personalized treatment approaches in these patients.

## Strength & Limitations

- Large cohort
- Long observation period
- Retrospective analysis
- No HER2 status available
- Methodological changes over time
- Heterogenous study population

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