Hospital-related differences in breast cancer management
A nalysis of an unselected population-based series of 1353 radically operated patients

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Summary
A retrospective review is presented of 1353 consecutive patients with histopathologically confirmed invasive breast carcinoma treated radically with curative intent during the decade 1980–89. None had received adjuvant systemic therapy with hormones or prolonged chemotherapy. The distribution of lymph-node negative (N−) and lymph-node positive (N+) patients was 75% and 25%, respectively.

The treatment and outcome were analysed as regards conventional prognostic parameters, in particular considering the axillary lymph-node status and the responsible hospital category (General Municipal Hospitals (MH)) versus Comprehensive Cancer Center (CC)).

The most striking difference was detected as regards the number of examined lymph nodes. The median number of nodes described at the MH was 7, as compared to 14 at the CC (p < 0.001). In patients with pT1 tumours the highest rate of lymph-node positivity was observed when 10 or more axillary nodes were removed. Adjuvant radiotherapy reduced the loco-regional recurrence rate in the N− patients, whereas only the regional recurrences were reduced among the N+ patients. The five- and 10-year tumor-related survival rates were 86% and 76%, respectively, with no difference between the MH and the CC.

Life-prolonging adjuvant hormone therapy and chemotherapy is now available for patients with axillary lymph node metastases, it is important that patients with breast cancer are operated adequately with the aim to remove at least 10 axillary lymph nodes. A thorough examination of the axillary content should be performed by the pathologist, and the number of resected lymph nodes and metastases should be reported. The establishment of nation-wide standard criteria for the management of breast cancer is recommended.

Introduction
In recent years, clinicians and health care administrators have increasingly become aware of the variability of diagnostic procedures, treatment and outcome when different hospitals are considered. In some studies, the number of patients per institution and thus the medical staff’s experience with a treatment has been related to the therapeutic results [1, 2]. Few reports have dealt with quality control of diagnostics and treatment in patients with breast cancer [3, 4]. Such studies are, however, of particu-
ular importance, as breast cancer is the most common malignancy in women and patients are treated at almost all general hospitals, even at small general surgical units. These patients have often to compete with patients with other types of malignancies or with benign diseases, with regard both to resources and the devotion of the staff to their specific problems.

The purpose of the present study was to analyse the treatment policy and outcome for radically operated patients with invasive breast carcinoma in relation to the accuracy of surgical staging with regards to the number of axillary lymph nodes, with particular emphasis on the institution in which the surgical treatment took place.

Do the treatment attitudes to breast cancer and the patient outcome at a hospital dedicated to the management of cancer differ from those at a general hospital?

**Patients and methods**

During the 1980–89 period, 2792 women living in Oslo county developed histologically or cytologically confirmed invasive breast carcinoma. Records were obtained from the Norwegian Cancer Registry and then cross-checked with the registrations of the respective hospitals. The patients were treated at four municipal hospitals in Oslo, at a few small private clinics and at the Norwegian Radium Hospital, a national comprehensive cancer center located in Oslo. For the purpose of the study the records of all 2792 patients were reviewed and 2001 radically operated patients were identified. Excluded from further analysis were 38 patients treated at the private clinics (not belonging to the Norwegian Breast Cancer Group) and 21 patients who unexpectedly proved to have metastases immediately after surgery (16 patients), or up to three months later (5 patients). Of the remaining 1942 patients, a subgroup of 180 patients with heterogenous tumour characteristics were excluded: 67 and 50 patients with pT3 and pT4 tumours, 21 patients with Paget’s disease and 42 patients with tumours of unknown histopathological size, respectively.

The surgical stage of preoperatively treated patients could not be compared to patients undergoing immediate surgery, and subsequently 55 patients were excluded (49 radiotherapy, 6 tamoxifen).

Of the remaining 1707 patients, further 354 patients receiving heterogenous adjuvant systemic therapy were excluded: 201 patients with systemic hormone therapy, 74 who were castrated, 32 having prolonged chemotherapy (CMF-regimen) and 47 patients receiving immunotherapy, respectively.

Finally eligible for the present study were 1353 patients, 1157 were treated in the municipal hospitals (M H ) with the possibility of being referred to the Municipal Oncological Department if medically indicated. One hundred and seven patients had their primary treatment at the cancer center (C C). Of these latter patients, 55% had their diagnosis before 1982. Thereafter a regionalized health care system was introduced, making it mandatory for patients to be treated in their county of residence. From 1982, referral of patients living within the city of Oslo to the CC thus occurred only exceptionally, as the CC was not defined as an Oslo county hospital.

The medical variables for the whole series have previously been described in detail [5] and are summarized in Table 1 for the patients of the present report.

The results of histological grading were not analysed in the present study, as grading of the primary tumour was done only at the M H, but not at the C C.

According to the recommendation of European Organisation for Research and Treatment of Cancer (EORTC), patients below the age of 56 were considered premenopausal [6].

Tumours were defined as estrogen receptor positive (ER +) if they contained $\geq 10 \text{ fmols/mg protein estrogen}$.

**Surgery**

A radical operation was defined as a complete mastectomy (1266 patients) or a lumpectomy, segmentectomy or quadrantectomy (87 patients) combined with an axillary node dissection. Early in the 80’s no detailed recommendation existed in Norway for the...