



Original article

Patterns and determinants of surgical management of screen detected breast cancer in the South-East Netherlands



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ABSTRACT

Introduction: Patients with screen detected breast cancer tend to have small, non-palpable tumours with favourable characteristics for breast conserving surgery (BCS). The aims of this study were to analyse patterns in surgical management in patients with screen detected breast cancer and to determine factors predictive of the need for a re-operation after BCS (re-excision or secondary mastectomy).

Methods: Patient data were retrieved from the population based Eindhoven Cancer Registry, which covers 14 hospitals in the south of the Netherlands. Data of patients aged 50–74 years, diagnosed with operable, invasive, non-metastasised, T1 or T2 tumours in the period from 1999 to 2005 were linked to the patients recorded by the Dutch Breast Screening Organisation to identify the screen-detected cancers.

Results: A total of 5657 patients were diagnosed with early stage invasive breast cancer. In 2822 of the 5657 patients (50%) breast cancer was detected by screening. Eighty percent of the screen-detected breast cancers was smaller than 2 cm. Of all 2822 patients with screen-detected cancer 82% underwent primary BCS. From 1999 until 2006 the percentage of re-excisions after this primary BCS decreased from 14% to 8% and the percentage of secondary mastectomies decreased from 23% to 8%. Primary BCS rates ranged from 64% to 93% between the 14 hospitals. Multivariable analyses showed that tumour size >2 cm, lobular histology, axillary nodal tumour involvement and poor differentiation of the tumour were associated with a statistically significant increase in the risk of re-operation after BCS.

Conclusion: The need for a second operation after breast conserving surgery in patients with screen-detected breast cancer has decreased significantly in the southern Netherlands since 1999. However, considerable variation in surgical approach and re-operation rate between hospitals was observed.

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Introduction

Breast cancer is the most frequently diagnosed cancer among women, with a worldwide estimated 1.38 million new cancer cases diagnosed in 2008 (23% of all cancers).¹ In the Netherlands, the Dutch nation wide breast cancer-screening program offers biennial screening mammography for women aged 50–75 years. It is well known that patients diagnosed with breast cancer through mammographic screening tend to have smaller tumours than those not attending the screening program or presenting with symptoms

between screening rounds.² As a result of the detection of smaller tumours, most patients diagnosed by screening are considered suitable candidates for breast conserving surgery (BCS).

As most screen detected tumours are not palpable, exact radiologic tumour localisation is important to achieve a high complete resection rate.³ After BCT clear histological margins should be obtained to minimise the risk of local recurrence.^{4,5}

The aim of this study is to analyse the trends in the surgical approach in patients with screen-detected breast cancer in the Southeast Netherlands from 1999 until 2005, and to analyse differences between hospitals in the use of a re-operation after BCS (re-excision as well as secondary mastectomy). Furthermore, we determined which factors are predictive for the need to undergo a re-excision or secondary mastectomy after BCS, besides the hospital in which the patient was treated.

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Patients and methods

Patient data were retrieved from the population based Eindhoven Cancer Registry. The Eindhoven Cancer Registry serves 12 general hospitals on 14 locations in the Southern part of The Netherlands, an area with approximately 2.4 million inhabitants. The hospitals, consisting of large non-university teaching hospitals and community hospitals are covered by six pathology laboratories, all participating in the nationwide network and registry of histo- and cytopathology in the Netherlands PALGA (Pathologisch-Anatomisch Landelijk Geautomatiseerd Archief), which notifies the regional cancer registries. The cancer registry is receiving lists of newly diagnosed cases on a regular basis from the pathology departments. In addition, the medical registries of the hospitals are providing lists of outpatients and hospitalized cancer patients on a regular basis as well. Following this notification, the medical files of newly diagnosed patients are collected and trained tumour registrars from the cancer registry abstract the necessary information from these files. Data on patient and tumour characteristics and local and systemic treatment are collected. Tumour stage is recorded according to the Tumour-Node-Metastasis (TNM) system of the International Union Against Cancer (UICC) version 6. Completeness of cancer registration is estimated to be more than 95%.⁶

For our study, we used registered data of patients aged 50–75 years diagnosed with operable, non-metastasised, invasive, T1 and T2 breast tumours, irrespective of their lymph node status in the period from January 1999 until January 2006. Patients with DCIS, T3, T4 or unknown tumour stage were excluded, because DCIS is considered as a separate disease entity in most studies and the large majority of the patients with a T3 or T4 tumour are considered to be ineligible for breast conserving therapy. Patients recorded by the Eindhoven Cancer Registry were linked to the patients recorded by the Dutch Breast Screening Organisation until 2006. Through this linkage it was possible to define the patients with a screen-detected breast tumour.

Information on type of detection (screen detected vs. non-screen detected), age, year of detection, type of surgery, data on tumour and axillary lymph node status and number of re-excisions or secondary mastectomies were used for the analyses.

Statistical analysis

Characteristics of patients with screen-detected breast cancer or clinically detected breast cancer were compared by using the Chi-square test. Multivariate logistic regression analyses were performed on the data of patients with screen-detected invasive breast cancer to determine the independent effect of year of diagnosis of the primary tumour, patients' age, tumour histology, tumour size, tumour grade and presence and extent of axillary nodal involvement on three different outcome measures: the odds of undergoing initial BCS, the odds of undergoing a second operation (re-excision or secondary mastectomy) after initial BCT and the odds of receiving definitive BCS. Odds ratios and 95% confidence intervals (95% CI) were calculated for each of the co-variables included in the multivariable model. All statistical analyses were carried out for patients with using SAS statistical software (version 9.1 for Windows, SAS institute Inc., Cary, NC).

Results

General characteristics

Between 1999 and 2005, 5657 patients were diagnosed with T1 or T2 invasive breast cancer. In 2822 of the 5657 patients (50%)

the cancer had been detected by screening. Their characteristics are shown in Table 1. In 81% of the screen-detected patients, histology showed a ductal carcinoma, in 13% a lobular carcinoma and in 1% of the cases tumour histology was unknown. Tumour size was smaller than 2 cm in 80% of the cases and 71% had no axillary lymph node metastasis. From 1999 until 2006 82% of the patients with screen-detected early stage invasive breast cancer underwent primary BCS and 18% had a primary mastectomy (Table 1).

Type of surgery per year

Table 2 shows the trend in type of surgery among patients with screen-detected breast cancer from 1999 until 2006. The percentage of screen-detected tumours ranged from 45 to 54% in this period. A small increase in the use of primary mastectomy and a small decrease in primary BCS were observed during this period. The percentage of re-excisions after initial BCS decreased from 14% to 8% ($P < 0.0001$) and the percentage of secondary mastectomies (after a primary BCS) decreased from 23% to 8% ($p < 0.0001$).

Type of surgery per hospital

The percentage of patients with screen-detected breast cancer varied from 34% to 58% between the 14 hospitals. A significant difference in surgical approach was observed between the hospitals for patients with screen-detected breast cancer. The proportion of patients with primary mastectomy ranged from 7% to 36% ($p < 0.0001$) (Fig. 1) and the proportion undergoing a re-excision or mastectomy after initial BCS ranged from 6 to 40% ($P < 0.0001$) between the hospitals (Fig. 2).

Hospitals with a higher proportion of patients undergoing primary BCS displayed a slightly lower proportion undergoing re-operations.

Table 1

Characteristics of patients with screen detected breast cancer ($N = 2822$).

Characteristic	N (%)
Age	
50–59 year	1063 (38)
60–69 year	1160 (41)
70–74 year	599 (21)
Histology	
Ductal carcinoma	2301 (81)
Lobular carcinoma/mixed	364 (13)
Other	123 (4)
Unknown	34 (1)
Grade ^a	
I	604 (21)
II	948 (34)
III	521 (18)
Unknown	749 (27)
Tumour Size	
0–1 cm	847 (30)
1–2 cm	1413 (50)
2–5 cm	562 (20)
pN	
N0	1989 (70)
Isolated tumour cells (ITC)	25 (1)
N1m	138 (5)
N1a	443 (16)
N > 1a	156 (6)
Unknown	70 (2)
Type of Surgery	
Primary mastectomy	503 (18)
Primary Breast Conserving Surgery	2319 (82)

^a According to the Bloom–Richardson classification.

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