



Original Research

Breast magnetic resonance imaging use in patients undergoing neoadjuvant chemotherapy is associated with less mastectomies in large ductal cancers but not in lobular cancers[☆]



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KEYWORDS

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Abstract Background: To assess the impact of breast magnetic resonance imaging (MRI) use on surgical outcome per histological breast cancer subtype in patients treated with neoadjuvant chemotherapy.

Patients and methods: All patients aged 18–70 years who underwent neoadjuvant chemotherapy for stage I–III invasive breast cancer in the Netherlands in the years 2011–2013 were identified from the Netherlands Cancer Registry. Patients with cT4 tumours were excluded from the analysis. Use of breast MRI and impact on surgical treatment, resection margins and detection of contralateral breast cancer were analysed by multivariable analyses.

Results: Breast MRI was performed in 2879 (83.9%) out of 3433 patients treated with neoadjuvant chemotherapy. Younger age (odds ratio [OR] 1.42; 95% confidence interval [CI] 1.17–1.71 for 18–50 years compared with 50–70 years), larger tumour stage (OR 1.46 [95% CI 1.15–1.86] for cT3, compared to cT1–2 tumours) and multifocality (OR 1.30; 95% CI 1.04–1.61, versus unifocality) were associated with increased breast MRI use. In ductal breast cancer, after stratification for cT-status, breast MRI use is associated with a significant lower OR for mastectomy as final surgery in cT3 tumours (OR 0.45, 95% CI 0.21–0.99). Resection margin involvement and detection of contralateral breast cancer were not associated with breast MRI use.

Conclusion: In patients treated with neoadjuvant chemotherapy, the use of breast MRI was associated with a reduced mastectomy rate, particularly in patients with large invasive ductal breast tumours but not in patients with lobular breast cancer.

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1. Introduction

For the treatment of early breast cancer, neoadjuvant chemotherapy is increasingly being used. Neoadjuvant chemotherapy has the potential to downstage the tumour and the axillary lymph nodes. This may facilitate breast conserving therapy and may obviate the need for extensive axillary treatment in selected patients [1]. Moreover, the time window created by neoadjuvant chemotherapy offers the opportunity for counselling and analysis of germ line mutations, which supports more careful planning of the desired type of breast surgery and is of particular importance in young patients [2]. In addition, it allows evaluation of clinical tumour response to systemic treatment and—in case of no response—an early switch of systemic therapy [3,4].

In patients undergoing surgery without neoadjuvant systemic therapy, magnetic resonance imaging (MRI) has generally shown to increase the number of mastectomies [5–9]. However, studies addressing the impact of breast MRI on surgical outcome specifically in lobular breast cancer reported conflicting results [6–9].

Only few and small studies have addressed breast MRI use in neoadjuvant treated patients in relation to mastectomy rates as surgical outcome [10–13]. Straver *et al.* examined breast MRI exams in 208 patients, with an underestimation of tumour size by MRI in 35 patients and an overestimation in 9 patients, with an overall accuracy of MRI for surgical treatment selection of 83% [10]. Similar findings were seen by others

[11–13]. However, these studies were too small to assess the impact of breast MRI on mastectomy rates in patients undergoing neoadjuvant chemotherapy.

The current study was performed to analyse the variables associated with breast MRI use in patients with invasive breast cancer treated with neoadjuvant chemotherapy and the impact of breast MRI use on performing mastectomy as first surgical procedure after neoadjuvant chemotherapy in all patients and per histologic subtype (ductal versus lobular breast cancer). In addition, we analysed presence of a positive surgical margin status after the first surgical procedure and treatment with final mastectomy including those who had first undergone breast conserving therapy. Finally, we assessed the detection rate of contralateral breast cancer in patients treated with neoadjuvant chemotherapy.

2. Patients and methods

2.1. Patients

Patients were selected from the Netherlands Cancer Registry (NCR), which is hosted by the Comprehensive Cancer Organization. All patients newly diagnosed with stage I–III invasive breast cancer in the Netherlands in the period 2011–2013, who underwent neoadjuvant chemotherapy followed by surgery were included. Patients aged under 18 years or over 70 years of age at primary diagnosis, patients undergoing neoadjuvant endocrine therapy and patients with cT4 tumours (and

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