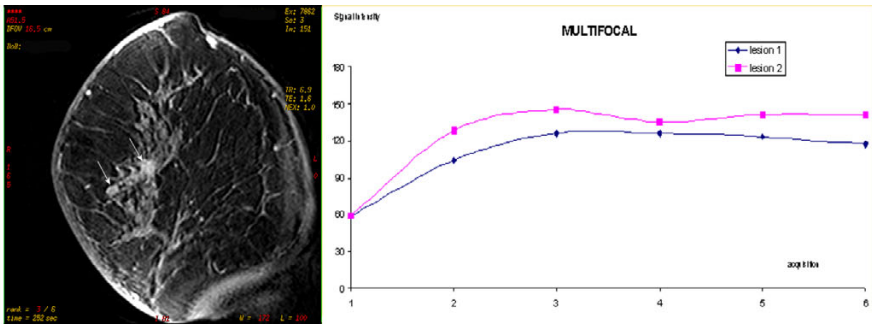
Figure 4



Magnetic resonance mammography 2 years after therapies for invasive ductal carcinoma. This shows two lesions (arrows) (Breast Imaging Reporting and Data System IV, V), reported by biopsy as malignant.

Six true-positive cases were identified, one case graded as Fischer 4, two cases graded as Fischer 5, two cases graded as Fischer 6, and one case graded as Fischer 8. Among these patients, 3/6 had no malignancy on the surgical scar: one of them underwent a controlateral quadrantectomy; the remaining two patients, having enhancing lesions in a different quadrant, underwent a total mastectomy. Three out of six patients had second cancer foci distant from the scar as well as on the scar, confirmed by histology as multifocal carcinomas: in two cases the enhancing lesions were on the same quadrant and the patients underwent a second quadrantectomy, and in one case the lesion was in another quadrant and the patient underwent a total mastectomy (Figure 4). For 3/6 true-positive cases, all graded as BI-RADS IV at mammography, second-look ultrasound examinations were performed: in all three cases the lesion was detected. Only in 1/3 had an ultrasound examination been performed before the MRM, and it was considered negative.

Two false positive-cases were detected; they were graded as Fischer 4, demonstrated as negative by histological findings and confirmed by follow-up.

Five true-negative cases confirmed by negative findings during the follow-up were graded as follows: one case graded as Fischer 2, and four cases graded as Fischer 3.

During the follow-up, no enhancing lesions remote from the scar were detected in any of the 80 patients with negative MRM, thus confirming the absence of false-negative results.

The sensitivity, specificity, negative predictive value, positive predictive value and accuracy of MRM for the detection of recurrence on the surgical scar were, respectively, 90%, 91.6%, 98.7%, 56.3% and 91.4%. The overall sensitivity, specificity, negative predictive value, positive predictive value and accuracy of MRM in the detection of breast cancer lesions (including areas not related to the scar) were, respectively, 93.8% (95% confidence interval, 82–100%), 90% (95% confidence interval, 83–96%), 98.8%, 62.5% and 90.6%.

Discussion

The long-term survival rate among women who undergo breast-conserving surgery is the same as that among women who undergo radical mastectomy [12]. Breast-conserving surgery is therefore currently considered the treatment of choice for women with relatively small breast cancers [12], and the rate of recurrence reported in these patients is about 1–2% per year [1,2]. Long-term survival of patients with new malignancy after conservative treatment improves with early detection [10,13].

The diagnostic evaluation of the treated breast is unfortunately still a challenge because post-treatment changes of breast tissue can show great variability, hiding or mimicking recurrent lesions [3,14]. Changes following breast-conserving surgery can include hematoma, seroma, fat tissue necrosis, scar tissue development and dystrophic calcifications [15]. Changes after radiotherapy can include vascular dilatation, capillary damage, microcirculatory changes and edema [15,16]. The association of these changes after breast-conserving surgery and irradiation make the interpretation of clinical examination and mammography very difficult because of focal thickening, decreased compressibility and increased density at the surgical site [3,13].

At our institution the usual follow-up of breast cancer patients treated with breast-conserving surgery and irradiation is based on annual imaging evaluation performed with mammography, completed by clinical examination and/or ultrasound examination, according to the density of the breast.

Local recurrence is the development of a tumor in the ipsilateral (treated) breast that occurs after treatment of the initial breast cancer [17]. Comparison of studies relating to the detection of recurrence can be difficult because of differences in the definitions of local recurrence [17]. Mammography has limited sensitivity in these lesions [8,18], because of an insufficient morphological distinction between therapy-induced edema and lymphangiosis carcinomatosa or between radially striated scar tissue and tumor recurrence [15]. This