

## Radiologic-pathologic correlation of the mammographic findings retrospectively detected in inflammatory breast cancer: usefulness in clinical practice

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**Background.** The aim of this study was to describe the clinical, mammographical and pathological characteristics of inflammatory carcinoma.

**Patients and methods.** Clinical, mammographical and histological sections of twenty-two women (age range 28-60 years) were reviewed. The examinations had been performed over a period of four years.

**Results.** The clinical findings were: erythema, edema, thickening of the skin and breast heat in ten patients; palpable mass in nine patients; nipple discharge in one patient; absent in two patients. Pathological findings were: tumor emboli in the dermal lymphatics in eight patients; tumor emboli in the vessels in ten patients; tumor emboli both in the dermal lymphatics and in the vessels in four patients. The radiologic findings were: skin thickening, trabecular thickening and blurring of structure in ten patients (common presentation); mass in nine patients; malignant-type calcifications in two patients (uncommon presentation); absent in one patient. The follow-up examination (eighteen months) detected that only one patient with common presentation of inflammatory carcinoma had no local or systemic recurrence against eight patients with uncommon presentation.

**Conclusions.** The clinical and mammographical aspects, which suggest the presence of an inflammatory carcinoma, occur only in 45.4% of the patients. The radiological aspect seems to correlate with the different prognosis of the tumour, resulting in a better prognosis in those with an uncommon aspect.

*Key words:* breast neoplasms - radiography - pathology; inflammation, inflammatory carcinoma

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### Introduction

Inflammatory carcinoma (IC) represents 1% of all breast cancer. The diagnosis of IC depends on clinical (erythema, edema and breast heat without any pain) and/or histological findings (any subtype of breast carcinoma with tumor emboli in the dermal lymphatics or/and tumor emboli in the vessels).

The purposes of our work were: (a) to evaluate the clinical and radiological aspects of

Received 18 June 2002

Accepted 2 July 2002

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this pathology; (b) to determine the correlation between radiological and pathological findings; (c) to identify any usefulness of this correlation in clinical practice.

### Patients and methods

From 1997 to 2000, 22 women aged from 28 to 60 years were treated for IC. We reviewed the clinical history, mammograms and histological sections of these patients. All the patients were examined to evaluate their response to therapy.

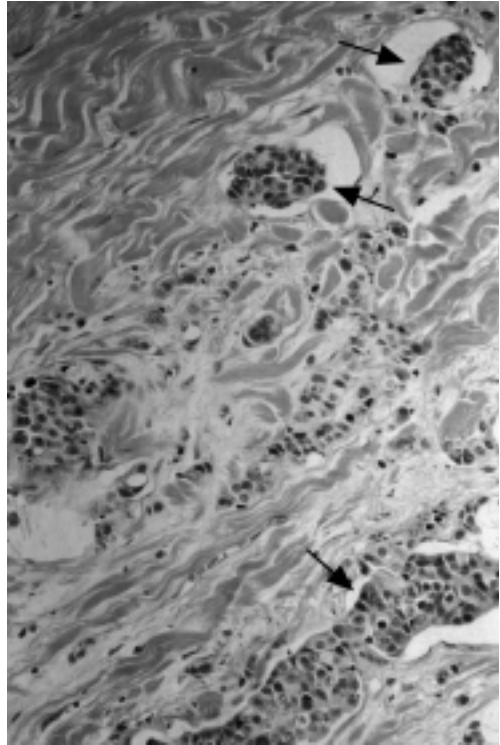
### Results

The clinical findings were: erythema, edema (peau d'orange), thickening of the skin and breast heat in ten patients (45.4%); palpable mass in nine patients (40.9%); nipple discharge in one patient (4.5%) and two patients showed no clinical signs (9.2%).

In eight patients (36.3%) histological sections showed tumor emboli in the dermal lymphatics (Figure 1); in ten patients (45.4%) there were tumor emboli in the vessels, and four patients (18.3%) had tumor emboli in both **the** dermal lymphatics and in the vessels.

In ten patients (45.4%), the mammograms revealed the typical aspect of IC: skin thickening, trabecular thickening and blurring of structure caused by edema (Figure 2). These findings can be defined as »common presentation« of inflammatory breast carcinoma. In twelve patients (54.5%), IC had an uncommon mammographic aspect: a mass with or without malignant-type calcifications in nine patients (40.9%) (Figure 3); malignant-type calcifications in two patients (9.2%) (Figure 4), and no radiological findings in one patient (4.5%).

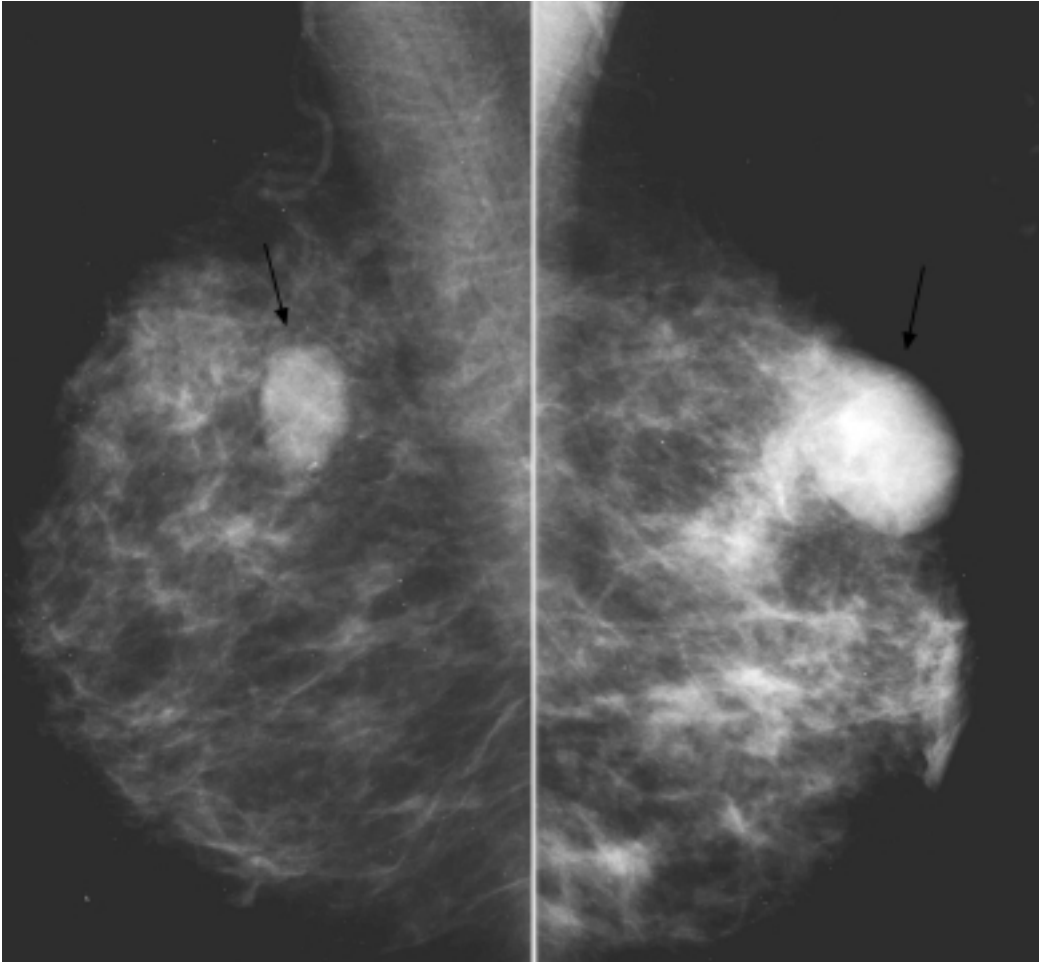
In the histological sections of patients with common presentations, emboli in the dermal



**Figure 1.** Inflammatory carcinoma. Microscopically, the primary tumor is an infiltrated, poorly differentiated ductal carcinoma with clusters of carcinoma cells in dilated lymphatic channels in the derma (arrows).

lymphatics, emboli in the vessels, emboli in both the vessels and **the** dermal lymphatics were found in six, two and two cases, respectively (Figure 5a). In the histological sections of patients with uncommon presentations, the same findings were found in two, eight and two cases respectively (Figure 5b).

All patients were treated with a multimodality therapy that consisted of chemotherapy and then mastectomy followed by chemotherapy or radiotherapy. The survival rate, without local or systemic recurrence in the patients with common presentation of IC, was 10% after a follow-up period of 18 months. In the patients with uncommon presentation after an average follow-up period of 28 months, the survival rate was 66.6%.



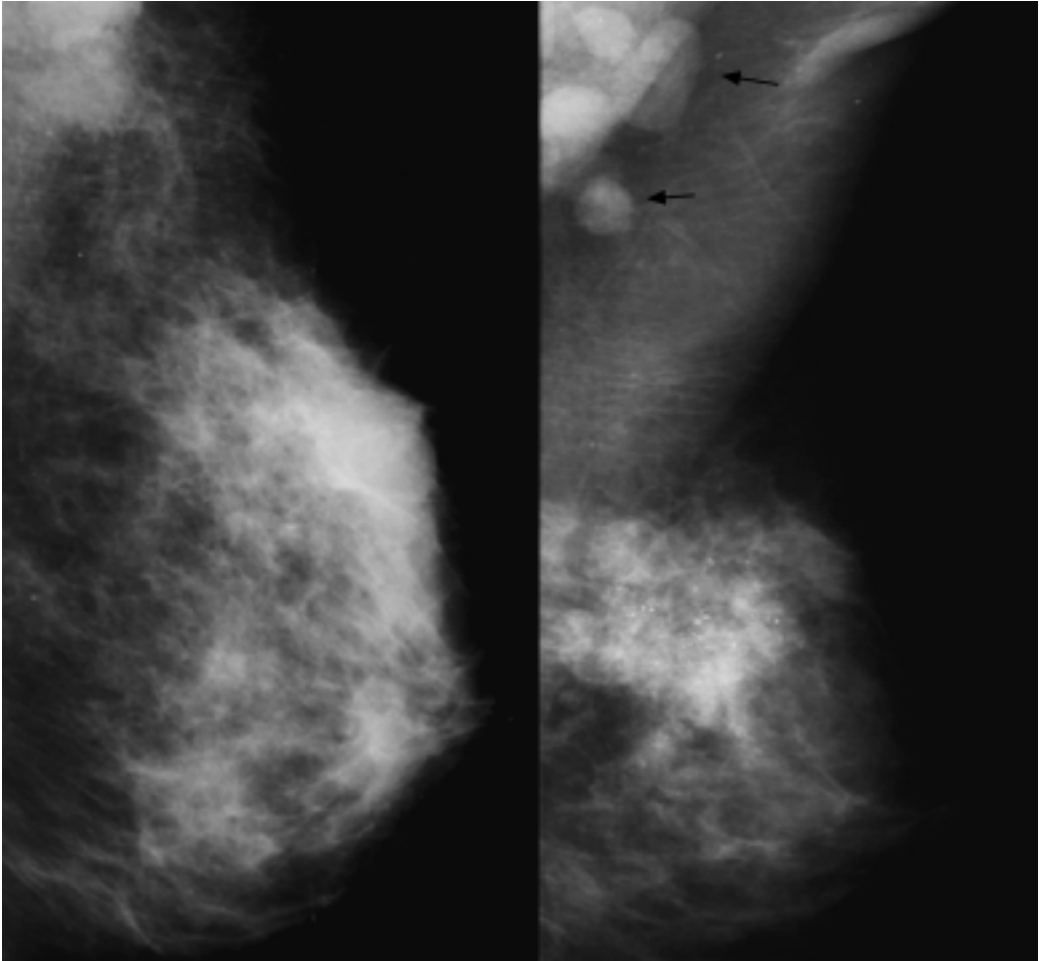
**Figures 2a, 2b.** Inflammatory carcinoma, common presentation. (a) Lateral oblique right mammogram shows a fibroadenoma (arrow) in an otherwise normal breast. In the counterpart (b), diffuse increase in breast density, trabecular thickening and architectural distortion are noticeable throughout the breast. The opacity on the upper side of the breast is a cyst (arrow)

### Discussion

Diagnosis of IC was made, according to the most recently reported data, on clinical and pathological criteria.<sup>1</sup> Edema, erythema and breast heat occurred in 45.5% of examined cases and represented the common presentation of IC. Among the remaining cases, about 54.5% showed uncommon clinical findings such as palpable mass, and nipple discharge. In 2 cases, no clinical signs were observed.

The pathological criteria utilized to diagnose IC were any subtype of breast carcinoma associated with emboli in the dermal lymphatics and/or in the vessels. All these findings are extremely important in the diagnosis of IC as this entity can be diagnosed even in cases of uncommon clinical presentation. In fact, not all women with clinical findings suggestive of IC have dermal lymphatic involvement at skin biopsy.

The most common clinical findings are



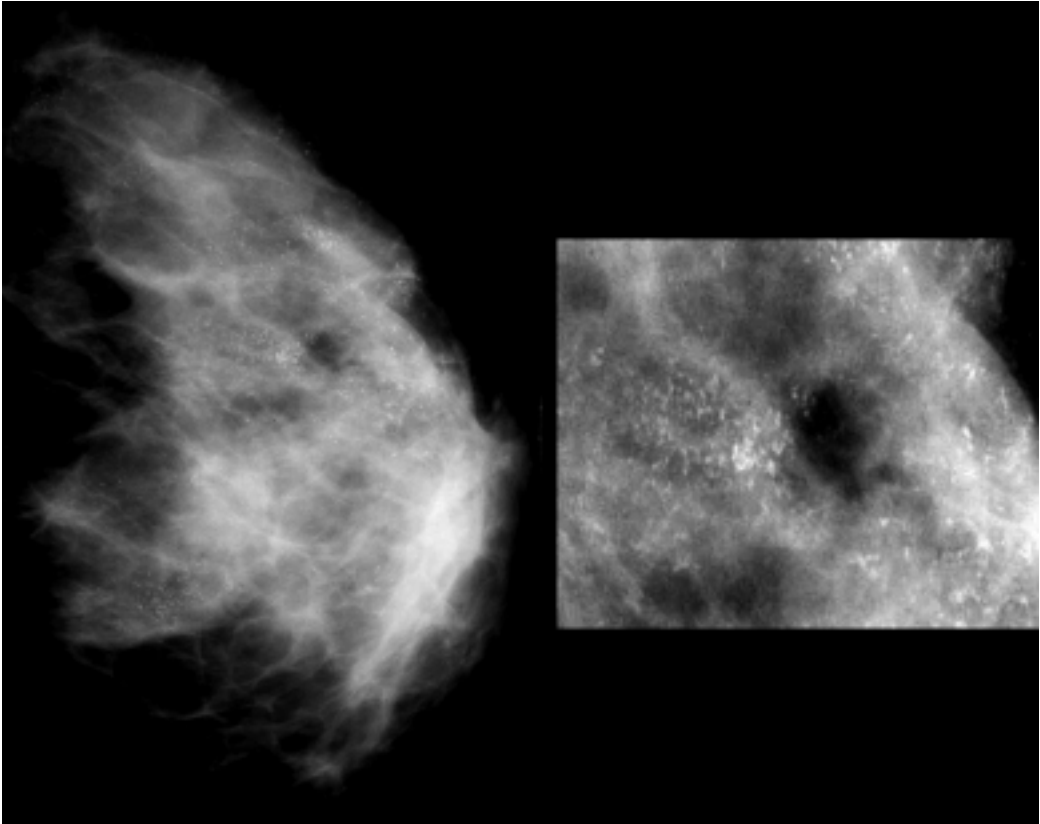
**Figures 3a, 3b.** Inflammatory carcinoma, uncommon presentation. (a) Mediolateral oblique left mammogram. A dense mass is seen in the upper part of the breast. (b) Another case, mediolateral oblique mammogram. In the lower part of the breast, a mass with calcifications is present. In the axilla, some lymph nodes are also appreciable (arrows).

usually, but not always, associated with diffuse increase in breast density, trabecular thickening and blurring of structure caused by edema on the mammograms. These mammographic findings<sup>2</sup> are not specific and can also be seen in other diseases, such as acute inflammatory process, post lumpectomy radiation changes and trauma. With the exception of the one patient in our series who had a negative mammogram, the other women had an uncommon presentation: a mass and/or malignant-type calcifications. These

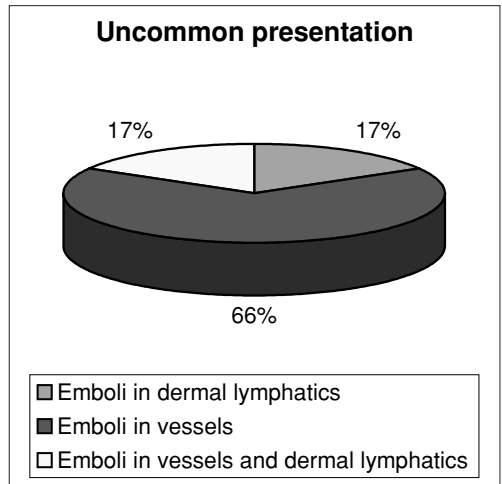
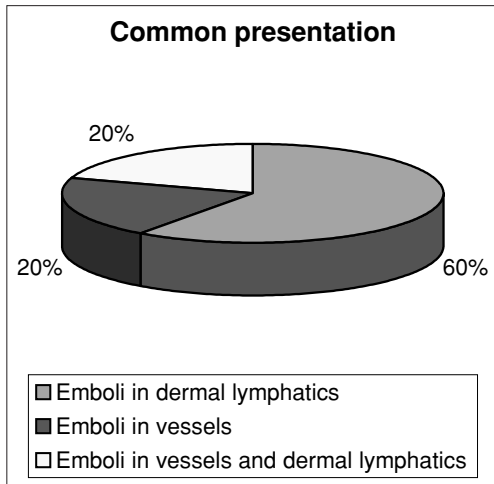
results support the concept that primary IC of the breast has different mammographic appearances; consequently, the diagnosis is made by biopsy.<sup>3,4</sup>

We correlated the two mammographic groups, common and uncommon, with the histological findings, but there were no significant differences between the two groups.

All the patients were treated with the same multimodality therapy. The disease-free survival rate for the patients with uncommon presentation is significantly better compared



**Figure 4.** Inflammatory carcinoma, uncommon presentation. Malignant pleomorphic calcifications are scattered throughout the breast, but in particular in the deep upper region of the gland (magnification view).



**Figures 5a, 5b.** Graphs showing the incidence of the different anatomic-pathologic findings encountered in the common (a) and uncommon (b) presentations.

to that of patients with common presentation. This discrepancy is probably a result of the stage of the disease: early in the uncommon presentation, advanced in the common one.

### Conclusions

The clinical and mammographic findings suggesting the presence of an IC, with erythema, oedema and breast heat together with skin and trabecular thickening and blurring of structures were present in only 45.4% of the patients. These aspects cannot be considered pathognomonic as they can also be present in non-neoplastic diseases.

Diagnosis of IC can be carried out only on a histological specimen. The histological aspects are different to the clinical and radiographical signs of the tumour.

The radiological aspect seems to indicate, after similar treatment, a different tumour prognosis, resulting better in those with an uncommon appearance.

The relationship that exists between the common and uncommon presentations is not clear. The second could be the earlier stage of the first.

### References

1. Gardenosa G. *Breast imaging companion*. Washington: Lippincott Williams & Wilkins: 2001.
2. Dershaw DD, Moore MP, Liberman L. Inflammatory breast carcinoma: mammographic findings. *Radiology* 1994; **190**: 831-4.
3. Kushwaha AC, Whitman GJ, Stelling CB, Cristofanilli M, Buzdar AU. Primary inflammatory carcinoma of the breast: retrospective review of mammographic findings. *Am J Roentgenol AJR* 2000; **174**: 535-8.
4. Tardivon AA, Viala J, Rudelli AC, Guinebretiere J-M, Vanel D. Mammographic patterns of inflammatory breast carcinoma: a retrospective study of 92 cases. *Eur J Radiol* 1997; **24**: 124-30.