Primary malignant tumors of the breast are the most frequently occurring neoplasms in women whereas breast metastases are rare. We report the first case, in literature, of metastasis within the breast resulting from a previous cecum carcinoma. We discuss the case and review the literature.

Keywords Cecum carcinoma · Breast metastasis

Introduction

Primary malignant tumors of the breast are the most frequent neoplasms in women. Whereas breast metastases are rare and are usually seen in patients with disseminated malignant neoplasms [9, 12, 24].

It is important to differentiate between primary breast cancer and metastasis in order to avoid unnecessary radical treatment and to treat the primary tumor correctly [19].

To our knowledge this is the first case, in literature, of breast metastasis resulting from primary cecum carcinoma.

Case report

A Caucasian 77-year-old multigravida female patient was evaluated for dull and continuous ache in the right iliac fossa. There was no family history of cancer. The patient had not previously undergone surgery. She had spontaneous menopause at the age of 51. In her case history there were no pathologies and she had undergone periodic mammographic screening in the past which were always negative.

On examination, there was a 5 cm hard, discrete mass in the right iliac fossa, which was fixed to underlying structures. Palpation of this mass provoked superficial and deep pain. The following abdominal ultrasound examination showed a voluminous nodular mass hypoechoic with not well-defined partly lobulated, irregular margins. Proctosigmoidoscopy was normal. Barium enema in the cecum showed an irregular, polypoid mass, consistent with that of a malignant tumor. Preoperative tumor markers such as CA-19-9, carcinoembryonic antigen (CEA) had the following values: 385 IU/mL (normal value: < 38 IU/mL), 11 ng/mL (normal value: 0 ng/mL). Abdominal ultrasonography and bone scintigraphy showed no abnormality.

An exploratory laparotomy revealed, in the cecum, a big neoplasm that completely infiltrated the whole bowel wall and surfacing on visceral peritoneum. Right hemicolectomy with ileotransverse-anastomosis and lymphadenectomy were performed. Histology of the specimen showed a poorly differentiated adenocarcinoma, ulcerous mucinous arising in the cecum, with signet-ring appearance, invading the whole bowel wall as far as the perivisceral fat where numerous malignant masses protruded. There was lymphatic invasion. The tumor involved the ileum, appendix and perirectal fat. The margins of resection in the bowel wall were free from disease. The metastases were in 16 out of 27 lymph nodes dissected from the perivisceral fat and in 2 gastroepiploic lymph nodes. The staging was pT4N2Mx (Duke’s C2).

After surgery, following the oncologist advice, she did not receive adjuvant chemotherapy for old age.

Three months after surgery the patient returned and brought our attention to a hard lump in the upper outer quadrant of the left breast. Examination revealed a 2×2 cm hard lump, which was not fixed to the skin or underlying structures, slightly painful, with neither retraction of the skin nor nipple discharge. The other breast and both axillae were clinically normal. Mammography revealed a 1.8 cm homogenous dense nodule, with slightly irregular margins (Fig. 1). Ultrasonography showed a dishomogenous nodule with a “surrounding ring” and a centre liquid-corpuscolate (Fig. 2).

We then performed Fine-Needle Aspiration Cytology (FNAC) with 22-gauge needle under ultrasound guidance. Cytological analysis of FNAC of the breast lump showed it to consist of clusters of malignant epithelial cells with voluminous, irregular nuclei, consistent with carcinoma.

Afterwards the patient underwent “tumorectomy” in day-surgery. Histology of the surgical specimen revealed: sections of mammary tissue with 2 cm neoplasm consisting of a proliferation of epithelial cells placed in solid clusters or in glandular structures with focal aspects of alcian positive mucous. Staining with periodate-borohydride/KOH/PAS technique was performed. This staining distinguishes mucin-producing metastases originating from adenocarcinomas in the lower gastro-intestinal tract from those...
Metastatic tumors to the breast from non-mammary malignant neoplasms are rare [20, 24]. In clinical studies the ratio between primary and metastatic breast tumors is 165:1, with a high proportion of leukemia/lymphoma cases and metastases from contralateral breast cancer [3].

The incidence of metastases to the breast is difficult to assess because many cases are probably not revealed by clinical examination and autopsy studies are rarely performed in a routine fashion [10]. However, in a series of women treated for breast tumor, less than 1% had metastases to the breast [1, 12, 17, 24], whereas in autopsy studies the overall frequency ranged between 1.7 and 6.6% [1, 21]. Hematological malignancies, melanoma and lung carcinoma are the most common tumors metastasizing to the breast [12, 17, 24]. On the contrary, neoplasms of the ovary, stomach, kidney and other sites are less frequent sources of metastases [12, 18, 24].

We report the first case in literature of metastasis within the breast resulting from a previous cecum carcinoma.

Only a further 4 cases of breast metastasis from colonic carcinoma, such as 1 neoplasm arising from ascending colon [4], 1 from sigmoid [22] and 2 from an unspecified part of the colon [19], have been reported in literature. These latter authors [19], who reviewed the literature of metastases to the breast resulting from extramammary carcinomas, state that only 2 cases of breast metastasis from colonic carcinoma had been reported in literature, by McIntosh et al. [17], before their study. Hence, to date, only 7 cases of breast metastasis from colonic carcinoma, including our case, have been reported in literature.

In some cases a breast metastasis may be the first sign of an occult malignant tumor elsewhere [12, 24]. In these cases it is important to discover the real nature of mammary neoplasm (primary or secondary) in order to avoid unnecessary mutilating treatment for a secondary tumor (for which the indication is the only excision of the mass), and to begin the correct treatment of primary forms.

The differential diagnosis between primary and secondary breast tumor is based on clinical, mammographic and especially histologic criteria.

In our case of breast metastasis resulting from cecum carcinoma clinical breast examination revealed a hard 2 cm lump, which was not fixed to the skin or underlying structures, with neither retraction of the skin nor nipple discharge.

Mammography then showed a 1.8 cm homogenous dense nodule with slightly irregular margins. However, mammographic features are not always univocal and may even be misleading. While the presence of microcalcifications may be observed in some rare cases of breast metastases, it is normally not found. In fact, ovarian cancer metastasizing to the breast, may be radiographically similar to a primary breast carcinoma if it is rich

**Discussion**

Metastatic tumors to the breast from non-mammary malignant neoplasms are rare [20, 24]. In clinical studies the ratio between primary and metastatic breast tumors is 165:1, with a high proportion of leukemia/lymphoma cases and metastases from contralateral breast cancer [3].

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**Fig. 1** Mammogram of the left breast showing a 1.8 cm homogenous dense nodule

**Fig. 2** Ultrasound scan of the left breast showing a dishomogenous nodule with "surrounding ring" (indicating by arrowheads) and a centre liquid-corpuscolate

arising elsewhere [7]. In our case the staining confirmed the breast metastasis resulting from a primary colonic carcinoma. Indeed, immunohistochemical staining for CEA and CA 19-9 was positive whereas it yielded negative results for estrogen and progesterone receptors as well as for BRST2 [8]. The picture was consistent with infiltrating mucinous adenocarcinoma; thus both the morphology, superimposable to the lesion visualized on histology in colonic neoplasia, and the immunohistochemical staining were in favor of a secondary origin.

Today, 6 months later, the patient is clinically well with no signs of relapse. Tumor markers such as CA 19-9, CEA and abdominal ultrasonography as well as mammography are negative.