An Autopsy Case of Breast Carcinoma with Prominent Lipid-Secretions in the Metastatic Foci

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Received for publication May 2, 1989

Summary: A 70-year-old woman was treated with a simple mastectomy followed by a course of 5000 rad to the breast and chemotherapy with 5-fluorouracil for breast cancer. About 15 months later, the patient died of widespread metastases. An autopsy revealed no recurrent cancer in the breast. The metastases were seen in bones (sternum, ribs and spine), pleura, spleen, uterus, ovaries, small intestine, adrenal glands, and lymph nodes (hilar, paraaortic and mesenteric). Histologically, the resected tumor was a solid-tubular carcinoma with an infiltrative growth pattern. At autopsy, the tumor cells in the metastatic foci contained an abundance of lipids in the cytoplasm, while the tumor cells in the primary tumor contained small amounts of lipids.

Key words: breast carcinoma—lipid-secretion—lipid-secreting carcinoma—mastectomy—autopsy

Introduction

Lipid-secreting mammary carcinomas, first described by Aboumrad et al. in 1963, are uncommon and were categorized as "others" in the WHO classification of 1981. In Japan, there have been only a few reports of this type of carcinoma (Abe et al. 1984; Takashima et al. 1985; Kurosumi et al. 1988). Lipid-secreting mammary carcinoma is characterized by an abundant and foamy cytoplasm containing a large amount of neutral lipid. In all the cases previously reported, except for one (Takashima et al. 1985), the cancer cells exhibited prominent lipid-secretions at the primary site. An autopsy case of a breast cancer with the characteristic features of a lipid-secreting mammary carcinoma, only at the metastatic sites, is described in this report.

Case Report

A 70-year-old Japanese lady was admitted to the Kurume University Hospital in October, 1985, because of a tumor in the breast. The past history included schizophrenia of about twenty years' duration. On physical examination, a vague induration was noted in the upper inner quadrant of her left breast. The nipple, skin and lymph nodes were not involved. Mammography disclosed an irregular mass, 1.5 cm in diameter. A CT scan showed no

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systemic metastases. She underwent simple mastectomy (T1a, N0, M0, Stage I) on November 12, 1985, followed by a course of 5000 rad to the breast and chemotherapy with 5-fluorouracil. About 15 months later, the patient died of widespread metastases, and an autopsy was performed. The autopsy showed no recurrent cancer in the breast. Metastases were noticed in bones (sternum, ribs and spine), pleura, spleen, uterus, both ovaries, small intestine, adrenal glands and lymph nodes (hilar, periaortic, and mesenteric).

Pathologic findings

Resected breast: Grossly, the cut surface of the resected breast revealed a lamp of induration with a poor demarcation, 1.0 cm in diameter, which was irregular, firm, white and without invasion to the skin. Light microscopy of the tumor showed thread-like strands of malignant epithelial cells and some areas had tumor cells loosely dispersed throughout a fibrous stroma with invasion to adipose tissue (Fig. 1). The tumor cells had an eosinophilic and foamy cytoplasm with various amounts of glycogen and/or mucin. (Fig. 2). Electron microscopic examination of formaldehyde-fixed, paraffin-embedded tissue from the resected breast tumor revealed small amounts of intracytoplasmic lipid droplets, 1-2 μm in diameter, tonofilaments, rough endoplasmic reticulum, Golgi apparatus, lysosomes and swollen mitochondria. Occasionally, intracytoplasmic lumina with numerous microvilli at the luminal border of the cytoplasm were also observed.

Discussion

Lipid-secreting mammary carcinoma (Aboumrad et al. 1963), or lipid-rich carcinoma of the breast (Ramos and Taylor, 1974), was first described in association with Paget’s disease of the nipple by Aboumrad in 1963. After this report, only a few papers on this carcinoma were published (Van Bogaert and Maldague, 1977; Lim-Co and Giser, 1978; Abe et al. 1984; Takashima et al. 1985; Kurosumi et al. 1988). This cancer accounts for less than 1% of all breast carcinomas described by Aboumrad (1963), 1.4% of those described by Ramos and Taylor (1974), and 1.6% of those described Van Bogaert and Maldague (1977).

Lipid-secreting mammary carcinoma is characterized by an abundant and foamy cytoplasm containing a large amounts of neutral lipids. With light microscopic observation, the tumor consists of small sheets and thread-like strands of malig-
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nant epithelial cells loosely dispersed throughout a fibrous stroma. Ultrastructurally, intramitochondrial crystals, as well as lipids, are often recognized; these do not occur in other types of breast cancer (Ramos and Taylor, 1974). In the present case, the resected breast tumor had an infiltrative growth pattern similar to that of a lipid-secreting mammary carcinoma, but the tumor cells had only a small amount of lipid. However, the tumor cells of the metastatic foci contained abundant lipids which stained positively with Sudan Black. Takashima et al. (1985) reported a case in which a resected breast had a common duct carcinoma exhibiting some lipid secretion, but the autopsy tissue consisted mostly of a lipid-secreting carcinoma.

The lipid content of breast cancers may be the result of a degenerative process, but Aboumrad et al. (1963) considered it to be a manifestation of some secretory activity due to its abundance, the regularity of its production, the presence of metastasis, and the presence of mitoses in the fat-laden tumor. Furthermore, ultrastructural observation identified secretory vacuoles containing fat and mucin which were very close to the Golgi apparatus, the absence of autophagic vacuoles, and the presence of a prominent rough endoplasmic reticulum (Ramos and Taylor, 1974).

It is known that cancer cells in mammary carcinomas of the common type also contain lipid. Aboumrad et al. (1963) reported that 8 of 12 mammary carcinomas analyzed for fat, contained tumor cells stained by flaming red. Fisher et al. (1977) studied 87 consecutive breast cancers for lipid content with oil red O, and demonstrated intracytoplasmic lipids in 65 of 87 tumors. In the present case, the cancer cells exhibited prominent lipid-secrections in the metastatic sites, but little secretion in the primary site. It is conceivable that the cancer cells have changed their biologic nature to secret more lipid after metastasis or that only the cancer cells in the primary tumor with lipid-secretory activity have metastasized.

Prognostically, this tumor appears to be more aggressive. Eleven of 12 patients studied by Ramos and Taylor (1974) had extensive involvement of the regional lymph nodes, and almost half had died within two years of diagnosis. Fisher et al. (1977) suggested that lipid content was positively correlated with anaplastic nuclear and malignant grades. Van Bogaert and Maldague (1977) tentatively suggested that secretory carcinomas have a poor prognosis compared with other types. The present case also had a poor outcome and died of wide-spread metastases about 15 months after surgery.

References


Fig. 1. Microscopic findings of the resected breast.
A) The tumor consisted of a cluster of small sheets and thread-like strands of malignant epithelial cells.
B) Some areas had tumor cells loosely dispersed throughout a fibrous stroma. (hematoxylin-eosine, ×50)
Fig. 2. High-power view of tumor cells from the resected breast showing an eosinophilic and foamy cytoplasm.

Fig. 3. The tumor cells of the autopsy specimen had a larger and more foamy cytoplasm in comparison to cells of the resected breast. The nuclei were fairly irregular and vesicular with prominent nucleoli. (hematoxylin-eosine, ×200)
Fig. 4. Sudan Black staining, applied to paraffin sections from the autopsy specimen, revealing large amounts of lipids within the cytoplasm of the tumor cells. (×20, inset: higher magnification, ×200)