CARCINO-OSTEOGENIC SARCOMA

A MALIGNANT MIXED TUMOR OF THE CHEST WALL: REPORT OF A CASE

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Mature bone tissue is sometimes found in the stroma of carcinoma but the association of rapidly growing osteogenic and epithelial tissue is believed to be of uncommon occurrence.

FIG. 1. A ROUNDED MASS OF CARCINOMA CELLS SURROUNDED BY OSTEOID AND SARCOMATOUS TISSUE

The multilayered epithelium forms a sharply defined line where it comes in contact with the cystic space wall. Note the large number of mitoses in the epithelium. A few are present in the sarcomatous stroma. × 100

CASE REPORT

A white female, aged fifty-nine, entered the hospital Nov. 10, 1932, complaining of a lump in the chest wall above the right breast. This tumor, which was first noticed in 1903, had enlarged very slowly until 1931 but in the past year had increased in size quite rapidly. A purplish discoloration of the skin had recently appeared. The patient did not remember receiving trauma to this area.

The tumor measured 1.8 × 2.0 cm. in diameter and was located in the subcutaneous tissue of the chest 3.5 cm. below the middle of the right clavicle. It was hard, apparently
encapsulated, and freely movable over the pectoral muscles. The surface was elevated about 1 cm. above the level of the adjacent skin, and was covered by purple colored epidermis, that was moderately adherent to the tumor. There was no tenderness.

This tumor with the adjacent skin and subcutaneous tissue was excised on the day of admission to the hospital. A diagnosis of malignancy was made from a study of frozen sections but no further operative treatment seemed to be indicated since the local lesion was apparently completely resected. The wound healed in a satisfactory manner. Four years after the operative removal of this tumor the patient was entirely free of recurrence and evidence of metastases.

Pathology: The operative specimen was a lozenge-shaped segment of skin and subcutaneous tissue 2.5 × 3 cm. in diameter, in the center of which was a globular tumor, 1.8 cm. in diameter, having a hemispherical surface covered by adherent skin. The nodule was bony hard in consistence. A thick, fibrous capsule covered a portion of the periphery, but elsewhere cellular tissue was present at the margin of the growth. The sectioned surface was mottled by numerous 1–3 mm. calcified foci, opaque, lusterless, and of a yellowish-white color, intermingled with soft pinkish-gray areas.

Microscopic examination revealed a tumor composed of epithelial and osteogenic tissues which occurred in foci of variable sizes either independent or intimately fused with one another. The tissue was viable and actively growing except for areas of necrosis in the central part of a few larger bone spicules. Encapsulation by very dense hyalinized scar tissue was incomplete and cellular nodules of epithelium were invading normal structures at the margins of the mass.

The epithelial cells occurred chiefly in solidly packed clusters of round or branching outline, supported by cellular fibrous stroma or osteogenic tissue (Fig. 1). The cells were
large and varied markedly in shape, depending upon their position in the cell mass (Figs. 2). Their cytoplasm was homogeneous and pale staining except for occasional eosinophilic hyaline granules suggestive of keratohyaline droplets. Fine intracellular epithelial fibrils were seen rarely. Mitoses were numerous, six to ten sometimes being found in a high-power field.

In the osteogenic portion of the tumor all gradations were found from a very cellular undifferentiated structure to mature bone (Figs. 3 and 4). The osteoblasts in the former areas were large, stellate or spindle-shaped, often multinucleated, and were arranged in branching columns with pale stained deposits of homogeneous intercellular substance in the interstices. Very large multinucleated giant cells of a bone-marrow type were often present. Usually the osseous tissue, either mature or undifferentiated, formed the stroma of cellular epithelial masses, but the carcinomatous tissue sometimes seemed to invade the cancellous spaces of more mature bone.

The tumor was considered as carcino-osteosarcoma.

**COMMENT**

Many authors have doubted the occurrence of carcinosarcoma and explained these mixed tumors as pure carcinoma showing either (a) exuberant

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1 See Greenblatt, R. B.: Am. J. Path. 9: 525, 1933.
proliferation of ordinary connective-tissue stroma or (b) spindle-cell metaplasia of the epithelium which may simulate sarcoma in appearance. Others are of the opinion that the connective-tissue stroma of carcinoma may show a true sarcomatous transformation and cases are reported in which separate sets of metastases have been demonstrated for each of the two types of tissue.

In view of the existing controversy, sections of the tumor were submitted to Drs. Ewing, Mallory, and Masson for their opinions. Ewing believed the tumor to be a straightforward mammary cancer throughout, in which bone deposits had been added by a curious type of metaplasia. He regarded the process as cancer from the beginning but quiescent for many years. Mallory thought there was first an intracanalicular adenoma with calcification in which a carcinoma and an osteogenic sarcoma had developed, one invading the other. Masson observed three types of structure: (a) the carcinoma (most likely mammary), (b) solid and diffuse cellular areas which might be considered as either epithelial or sarcomatous, and (c) the osteosarcoma. He believed he could follow a direct transformation of the epithelioma into the osteosarcoma.

Some tumors, as carcinoma of the kidney (Fig. 5), may stimulate bone formation in their connective-tissue stroma, but in these cases the tumor cells definitely do not participate in the osteogenesis. In our own opinion the formation of definite bone tissue by the spindle-shaped cells in this tumor excluded the possibility of epithelial metaplasia. We interpret the atypical

Fig. 4. Area of the Sarcoma Showing Calcification of the Osteoid Trabeculae. × 300
osteoid tissue as due to the inclusion of cancer cells in the newly formed intercellular substance of the osteogenic portion of the tumor. The structure resulting from this union is analogous to the atypical cartilage found in certain mixed tumors of the salivary gland where both the neoplastic epithelium and the connective tissue participate in its formation. These atypical bony and cartilaginous tissues are pathological products, however, and cannot be interpreted as evidence that epithelial tissue may form bone and cartilage respectively.

We believe that this lesion is a true mixed tumor because the osteogenic tissue exhibits as much evidence of invasion and rapid and autonomous growth as the carcinoma. It seems probable that there has been a sarcomatous transformation of the connective-tissue stroma of the carcinoma and this sarcoma has assumed osteogenic properties.

**Summary**

1. A tumor of the chest wall removed after twenty-eight years of relative quiescence and one year of rapid growth was found microscopically to consist of rapidly growing neoplastic epithelium and osteogenic tissue.
2. The patient has remained free of additional neoplastic disease for four years after local removal of the tumor.