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Case report

Muscular hamartoma of the breast

An electron microscopic study

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Summary. A rare case of muscular hamartoma of the breast was presented. An electron microscopic study confirmed that the proliferating spindle cells were of smooth muscle cell origin.

Key words: Muscular hamartoma – Leiomyocyte – Myofibroblast – Myoepithelium

Smooth muscle bundles can be seen in the dermis of the nipple and may be the source of leiomyomas (Stout 1937). These tumors apparently develop from the muscularis mammillae and areolae (Stout 1937) and have rarely been mentioned in the literature (Doctor and Sirsat 1971; Nascimento et al. 1979; Stout 1937; Weber 1975). Leiomyosarcoma of the nipple is an equally rare breast lesion (Hernandez 1978). Besides the benign and malignant smooth muscle tumors of the nipple and areola, smooth muscle can occasionally be found as a principal component of benign lesions of the breast, such as fibroadenomas (Mackenzie 1968) and muscular hamartomas (Davies and Riddle 1973). We report another case of muscular hamartoma of the breast with an electron microscopic study of spindle cells derived from the smooth muscle.

Case report

The patient was a 34 year old woman who was found to have a left breast mass during a routine physical examination. The mass was non-tender and not fixed to the surrounding tissue. The upper central aspect of the left breast contained a $11 \times 10 \times 9$ cm homogenous mass consistent with cytosarcoma phyllodes by mammography. Sonogram showed that the mass contained more fluid than would typically be seen in these tumors. The patient denied pain or discharge. The rest of the physical examination and history was noncontributory. The patient underwent an excisional biopsy of the lesion.

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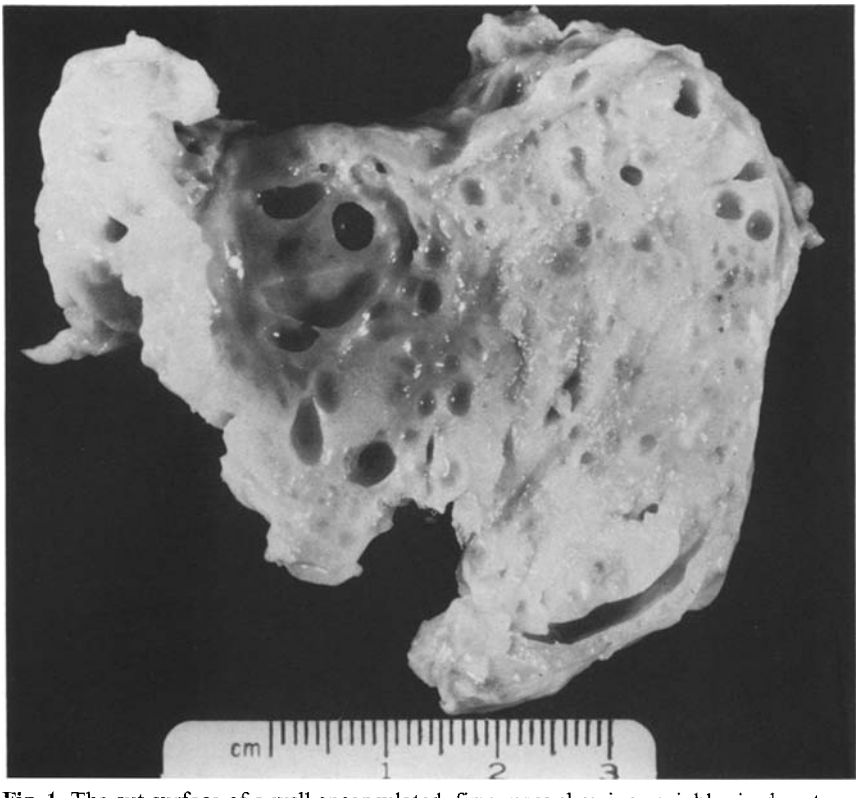

Fig. 1. The cut surface of a well encapsulated, firm mass showing variable sized cysts

Materials and methods

For light microscopy study, twenty blocks of tissue from the tumor were fixed in a 10% neutral buffered aqueous solution of formaldehyde, embedded in paraffin, cut at 5 microns and stained with hematoxylin and eosin. Masson's trichome stain was used to demonstrate intracytoplasmic myofilaments of smooth muscle cells.

For electron microscopy study, five portions of the formalin fixed tissue taken randomly from different areas of the mass were minced into thin 1 mm blocks, postifxed in 1% osmium tetroxide, dehydrated in graded alcohols and embedded in Epon. Following examination of 1 micron sections with the light microscope for areas that contained bundles of spindle cells, suitable blocks were selected for ultrathin sections. The thin sections were stained with uranyl acetate, lead citrate and examined and photographed with a Zeiss 10 A electron microscope.

Results

Gross and microscopic pathologic examinations

The breast lesion was a circumscribed mass measuring $8.0 \times 7.0 \times 5.0$ cms. The cut surface was firm, glistening white to light tan and contained numerous variable sized cysts filled with tan brown fluid (Fig. 1).

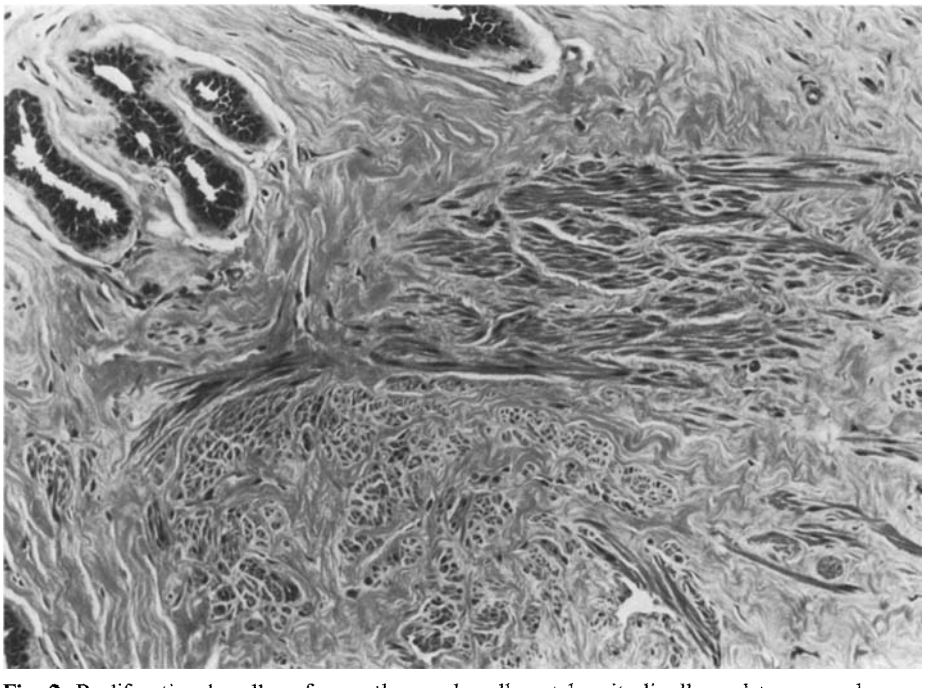

Fig. 2. Proliferating bundles of smooth muscle cells cut longitudinally and transversely near mammary ducts

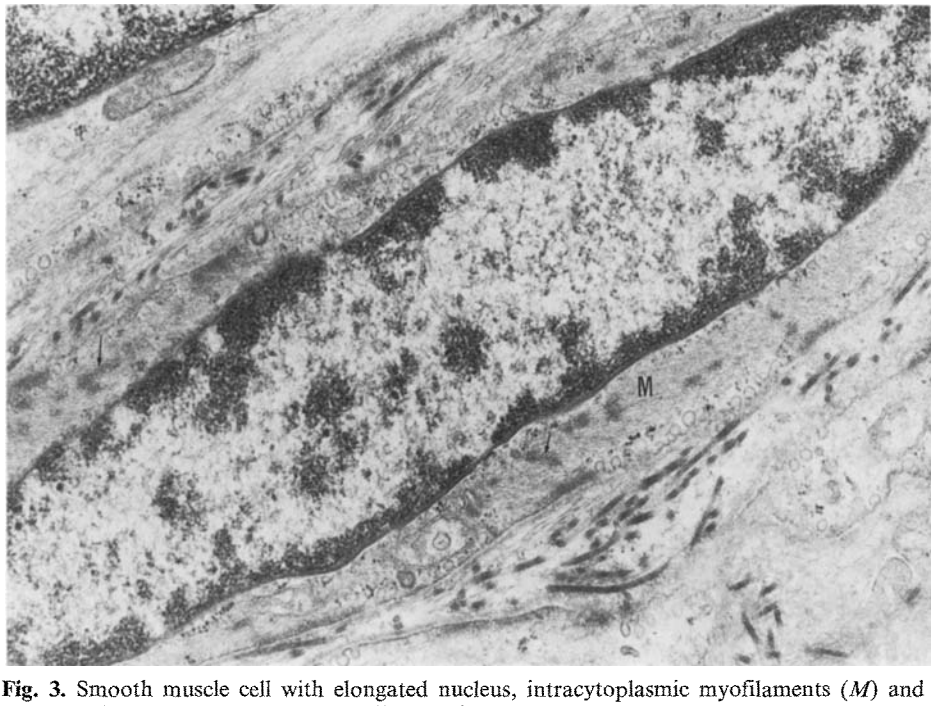

Fig. 3. Smooth muscle cell with elongated nucleus, intracytoplasmic myofilaments (*M*) and scattered fusiform dense (*arrows*) bodies dominate the cytoplasm of the cells. Note absence of granular endoplasmic reticulum

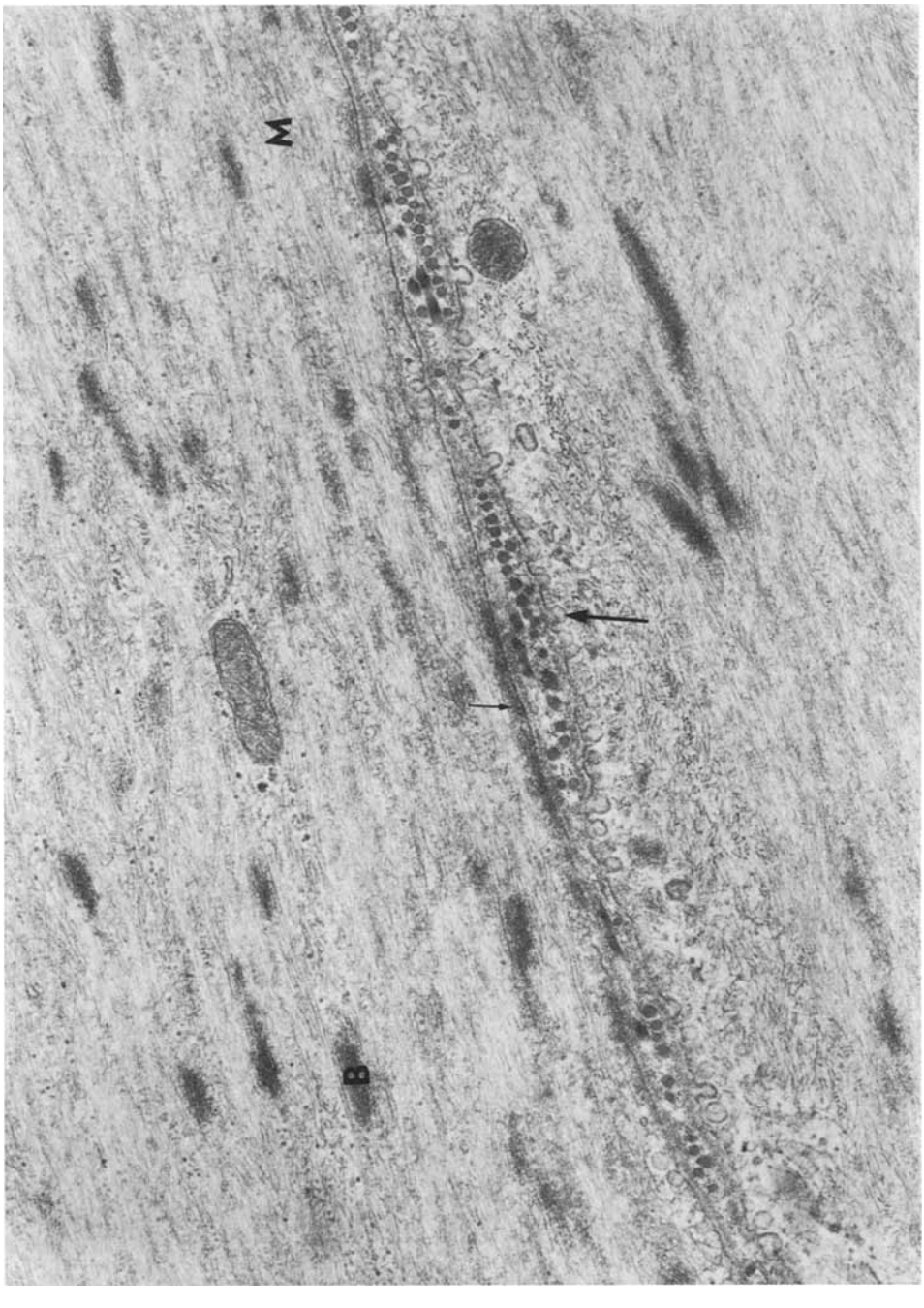

Fig. 4. Two adjacent portions of smooth muscle cells displaying intracytoplasmic myofilaments (*M*), fusiform dense bodies (*B*) plasmalemmal plaques (*short arrow*), pinocytotic vesicles (*long arrow*) and continuous external lamina

Microscopically, the architecture of the breast was distorted by marked interstitial fibrosis and variable sized cysts. While some cysts were devoid of a lining, others were lined by cuboidal or flattened epithelial cells. Apocrine metaplasia was frequently found. Scattered around the lobular ductules were bundles of spindle cells with pale eosinophilic cytoplasm. These cells were relatively uniform and lacked mitotic figures (Fig. 2). The cytoplasm stained red with trichrome stain.

Ultrastructurally, the spindle cells were relatively uniform size, with regular outlines. The nuclei were oval with occasional prominent nucleoli. Parallel arrays of intracytoplasmic actin microfilaments with interspersed fusiform dense bodies dominated the cytoplasm of the cells (Fig. 3). Plasmalemmal attachment plaques, surface pinocytotic vesicles and external lamina were also constant findings (Fig. 4).

Discussion

While the breast lesion bears a superficial resemblance to a fibrocystic disease, the presence of a well circumscribed mass and scattered smooth muscle bundles is unusual for this entity. Unlike the two reported cases by Davies and Riddle (1973), the breast lesion in our case did not have islands of mature adipose tissue intermixed with smooth muscle bundles. Nevertheless, this breast lesion can be designated as a muscular hamartoma which, by definition, is a tumor-like malformation in which there is an abnormal blending of the normal components of an organ.

The possible sources of the smooth muscle proliferation include muscle in the walls of blood vessels, undifferentiated mammary mesenchyme and myoepithelium. At the light microscopic level, smooth muscle cells can be confirmed by Masson's trichome stain but this stain cannot totally exclude the possibilities of these cells being myofibroblasts or myoepithelial cells. Both of these are hybrid contractile cells and have abundant cytoplasmic myofilaments and can stain red with Masson's trichome stain. However, a fine distinction among smooth muscle cells (leiomyocyte), myofibroblast and myoepithelial cells can be determined with electron microscopic study.

Myofibroblasts are mesenchymal cell that share ultrastructural features of both fibroblasts and smooth muscle cells (Erlandson 1981). Since the spindle cells in our case lack certain features of fibroblasts such as granular endoplasmic reticulum and prominent Golgi apparatus and have only features of leiomyocytes (Erlandson 1981), it is therefore, unlikely that the spindle cells represent myofibroblasts.

Myoepithelial cells are spindle shaped cells of ectodermal origin located between the ductular epithelial cells and the basal lamina of numerous glandular tissue, both in man and animals (Dardick et al. 1982; Franke et al. 1980; Hamperl 1970). In our case, the proliferating spindle cells were at a greater distance from the mammary ducts than anticipated for myoepithelial cells and also lacked certain features of myoepithelial cells such as desmosomal junctions (Erlandson 1981). Ultrastructurally, these cells were con-

firmed to be smooth muscle cells rather than myoepithelial cells or myofibroblasts as postulated by Davies (1973).

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