Smooth muscle cell metaplasia is an extremely rare form of stromal differentiation in fibroadenomas. We describe a case of fibroadenoma with exuberant smooth muscle cells in a 72-year-old woman. The mass was located in the upper central portion of the left breast. It was well circumscribed and its greatest dimension was 3 cm. Histologically, the glandular elements resembled the appearance of fibroadenoma, but the stromal elements were composed of spindle cell bundles with abundant eosinophilic cytoplasm and elongated cigar-shaped nuclei. Neither mitotic activity nor cellular atypia was seen. The stromal cells were immunohistochemically positive for smooth muscle actin, calponin, desmin, and estrogen receptor-β, but negative for CD34, S-100 protein, p63, CD10, estrogen receptor-α, progesterone receptor and cytokeratin. These results proved that the stromal cells showed features of smooth muscle cells.

Key Words: Breast; Fibroadenoma; Muscle cells; Metaplasia

Fibroadenoma is the most common benign tumor of the breast. It is comprised of epithelial and stromal components. Unusual smooth muscle cell differentiation – metaplasia – is encountered in a minority of fibroadenomas. Goodman and Taxy first reported two cases of fibroadenoma with prominent smooth muscle cells. Fibroadenoma with smooth muscle cells must be distinguished from muscular hamartoma and leiomyoma. Here we report a case of the fibroadenoma with exuberant smooth muscle cells, and review the relevant literature. To the best our knowledge, this is the first Korean report.

CASE REPORT

A 72-year-old woman presented with a palpable mass in the left breast. She had first noticed the mass several years ago and since then it remained unchanged. Physical examination revealed a 3 cm mobile, well circumscribed, non-tender mass on the central upper area of the left breast. Breast ultrasonography confirmed the presence of a 2.4 × 1.2 cm-sized, well-defined solid mass with calcifications (Fig. 1). The patient underwent mammotome biopsy of the mass under local anesthesia. Microscopically, the tumor was well defined from normal breast tissues (Fig. 2A). The tumor contained glandular and stromal elements. The ducts were distorted into elongated and compressed slit-like structures, resulting in the so-called lumens of intracanalicular pattern (Fig. 2B). The epithelial cells in ducts did not reveal hyperplasia. Stromal elements were mostly consisted of spindle cells with eosinophilic cytoplasm and elongated cigar-shaped nuclei aggregated in small fascicles (Fig. 2C). Nuclear pleomorphism and mitoses were absent. Some cores revealed adipocytes and dystrophic calcifications. Immunohistochemically, stromal spindle cells were strongly smooth muscle actin (1 : 200, Dako, Glostrup, Denmark), calponin (1 : 100, Dako), desmin (1 : 100, Dako), and estrogen receptor-β (ER-β; 1 : 20, Dako) positive, but did not express CD34 (1 : 300, Dako), S-100 protein (1 : 1,000, Zymed Laboratories, South San Francisco, CA, USA), p63 (1 : 100, Dako), CD10 (1 : 100, Novocastra, Newcastle, UK), ER-α (1 : 75, Dako), progesterone receptor (1 : 200, Dako), and cytokeratin (1 : 100, Zymed Laboratories) (Fig. 3). The epi-
The epithelial cells in ducts were only positive for ER-β. These microscopic and immunohistochemical findings proved that the spindle cells in stroma were smooth muscle cells. A final diagnosis of fibroadenoma with exuberant smooth muscle cells was established.

**DISCUSSION**

Smooth muscle cells have been considered as rare stromal components of fibroadenoma since Goodman and Taxi first reported two cases of fibroadenoma with prominent smooth muscle. Of 85 cases of fibroadenoma, Shimizu et al. found 4 (4.7%) that showed smooth muscle cells in the stroma. The distribution of smooth muscle cells was not diffuse. Three cases were classified as intracanalicular subtype. In our case, the overall histologic patterns were that of fibroadenoma with intracanalicular pattern. The stromal component was predominantly comprised of spindle-shaped cells showing morphological and immunohistochemical features of smooth muscle cells.

The origin of the smooth muscle component in fibroadenomas is unknown. Apart from the electromuscle of the nipple, smooth muscle cells are usually absent in normal mammary stroma. Therefore, smooth muscle cells in fibroadenomas have been interpreted as a metaplastic process originating from stromal fibroblasts, myofibroblasts and myoepithelial cells. Shimizu et al. elucidated smooth muscle cells in the stroma, which had marked hyalinization and calcification. Therefore, they suggested that smooth muscle cells could appear in the stroma of longstanding tumors as a metaplastic process. Sapino et al. demonstrated that in cellular fibroadenomas, ER-β expression went in parallel with a smooth muscle differentiation phenotype of stromal cells, with these cells being positive for smooth muscle actin and/or calponin. They suggested a role of ER-β in myofibroblastic differentiation of stromal cells in fibroadenoma. In our case, the stromal elements did not express myoepithelial markers, whereas expressed diffuse positivity for desmin, calponin, and ER-β. The stroma component had dystrophic calcification. The smooth muscle cells in our case may be derived from fibroblasts or myofibroblast and aging factors, and ER-β may participate in these transformations.
The differential diagnoses of fibroadenomas with smooth muscle cells include leiomyoma and myoid hamartoma. Parenchymal leiomyoma is extremely rare. The diagnosis of leiomyoma of the breast should be restricted to lesions exclusively comprised of smooth muscle cells. Myoid hamartoma is a very rare subtype of breast hamartoma, characterized by the presence of smooth muscle cells. Unlike fibroadenoma, epithelial component of myoid hamartoma shows normal mammary lobules. In our case, the distinction from leiomyoma and myoid hamartoma was based on the presence of ductal-stromal proliferation, resulting in an intracanalicular growth pattern.

In conclusion, we report a rare case of fibroadenoma with exuberant smooth muscle cells, and conducted a review of the relevant literature. The smooth muscle component may be arisen from metaplastic changes of the mammary stroma.

Fig. 3. Immunohistochemically, spindle cells express α-smooth muscle actin (A), desmin (B), calponin (C), and estrogen receptor-β (D). Epithelial cells only express estrogen receptor-β.
REFERENCES