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Mucocele-Like Tumor with Possible Early Mucinous Carcinoma, and Invasive Tubular Carcinoma of the Breast - A Case Report

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Abstract

Mucocele-like tumor (MLT) of the breast is histologically characterized as mucin-containing cysts with mucin leaking to the stroma. MLT is known to accompany atypical epithelium and ductal carcinoma in situ (DCIS). We report here a case of MLT of the breast including atypical epithelium and DCIS. In addition, floating cellular clumps with irregular nuclei were observed. Thus, the MLT was regarded to include mucinous carcinoma in early stage. It is assumed that detachment of cells from the atypical epithelium including DCIS is a possible onset for the development of mucinous carcinoma. In this case, focal invasive tubular carcinoma with features of the predominance of open tubules composed of a single layer of epithelial cells was identified. No myoepithelial cells were confirmed by immunostaining of p63 or DC10 in the neoplastic cells. Pathological features and significance of this rare case are described.

Keywords: ***Mucocele-like tumor (MLT); Mucinous carcinoma; Tubular carcinoma; Breast***

1. Introduction

Mucocele like tumor (MLT) of the breast is a rare neoplasm. MLT of the breast was first reported by Rosen [1] in 1986 as benign neoplasia. This lesion is characterized by dilated, mucin-filled epithelial ducts or cysts that can rupture and expel their contents into the surrounding stroma. MLT and mucinous carcinoma of the breast has represented the two ends of the

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pathological spectrum of mucinous lesions respectively [2]. Subsequent reports identified that some of MLT was associated with ductal hyperplasia and carcinoma [3-5]. Hamlete-Bena et al [6] analyzed 53 mucocele-like tumors and classified into 12 cases of micropapillary atypical duct hyperplasia, 14 micopapillary and cribriform carcinomas, 14 mucocele-like tumors with area of mucinous carcinoma, and 13 other cases contained duct hyperplasia or the cysts. Fadare and Nariappan [7] reported the importance of columnar cell hyperplasia of MLT as a morphologic continuum to mucinous carcinoma. Thus, MLT has been regarded as the precursor lesion for mucinous carcinoma. Nevertheless, the process of differentiation of MLT toward mucinous carcinoma is not well understood.

On the other hand, tubular carcinoma (TC) is regarded as a low-grade invasive carcinoma with features of the predominance of open tubules composed of a single layer of epithelial cells [8]. So far as we are concerned, coexistence of MLT and tubular carcinoma has not been reported. Presently, we report a case of MLT of the breast which accompanied early mucinous carcinoma and independent tubular carcinoma. Pathological features and significance of this rare case are described.

2. Case Presentation

A 45-year-old woman accidentally felt a mass in her right breast 2 years ago and visited Department of Endocrine Surgery of our hospital. Physical examination revealed a moderately mobile mass with ill-defined margins in upper outer quadrant of the right breast. Following ultrasound examination reported cystic dilatation of the mammary ducts and a small mass. The patient underwent an enhanced breast MR examination, and clustered cystic lesions with a solid mass in 4mm size was identified (FIG. 1). T2-weighed imaging sequence confirmed lobular structures with high signal intensity suggesting slight peripheral enhancement (FIG. 2). A needle biopsy was confirmed, and the lesion was diagnosed as an invasive ductal carcinoma. She underwent the mastectomy of the right breast.

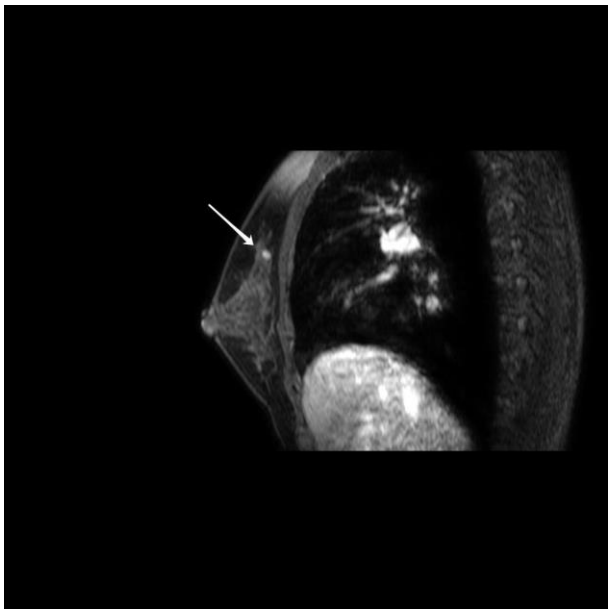

FIG. 1. **A contrast enhanced MRI suggesting a small mass (arrow).**

On the mastectomy, the cut section from the excised sample which measured 2 cm revealed multiple aggregated cysts containing gelatinous materials. The cysts contained an amorphous mucinous secretion. Extrusions of mucinous material into the surrounding stroma was frequently recognized. The lining epithelium of the cysts in most areas was flat or cuboidal epithelium and devoid of cellular atypia (FIG. 3). The lining epithelium also showed proliferative changes with atypical ductal hyperplasia (mostly, micropapillary type) (FIG. 4). In some area, MLT showed atypical epithelial proliferation in the form of a Roman bridge (FIG. 5). Importantly, changes of ductal carcinoma in situ (DCIS) of microcribriform pattern was infrequently observed in the cyst walls (FIG. 6). Some of the cellular clumps were detaching from cyst wall with atypical epithelium (FIG. 7). Furthermore, cellular clumps or squamoid spherules were floating in the mucus (FIG. 8). Microcalcification was recognized in limited place of the mucin (FIG. 2). Immunohistochemically, lining cells without atypia and with atypia of MLT had 1% to 8% (average 1.7% for without dysplasia, 6.7% with atypia) of Ki-67 antigen respectively.

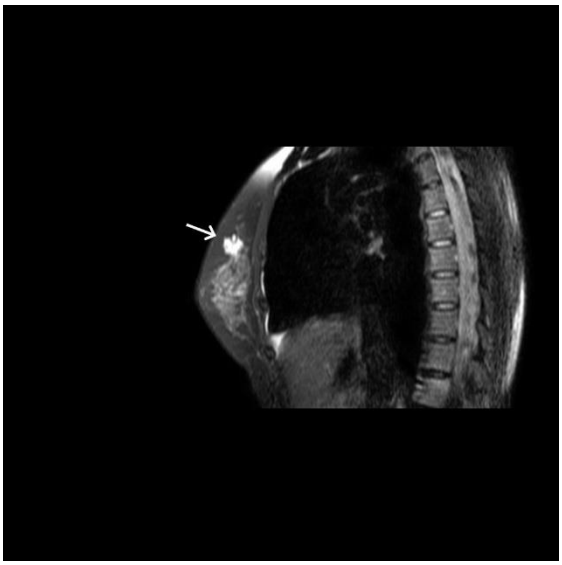

FIG. 2. **T2 weighted imaging sequence indicating clustered cystic lesions(arrow).**

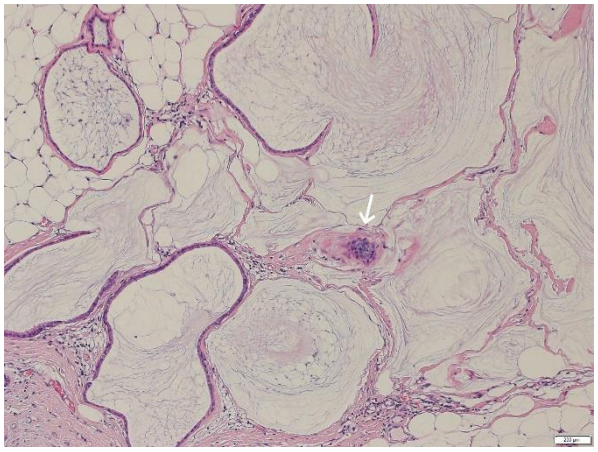

FIG. 3. **MLT containing amorphous mucin. The lining epithelium of cysts are flat or cuboidal epithelium which is devoid of cellular atypia. Arrow indicates microcalcification.**

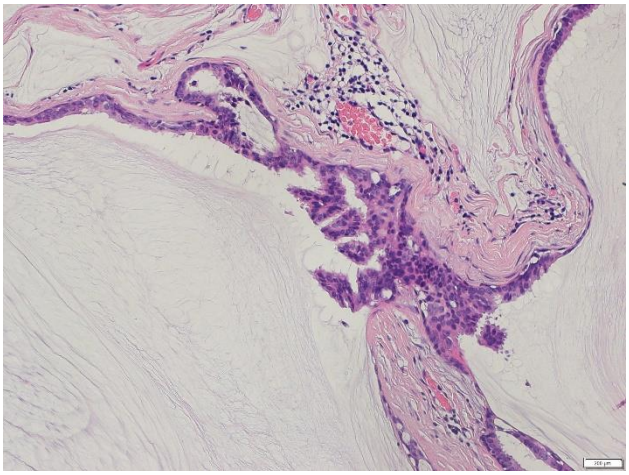

FIG. 4. **Atypical ductal hyperplasia (micropapillary type) of the cyst wall.**

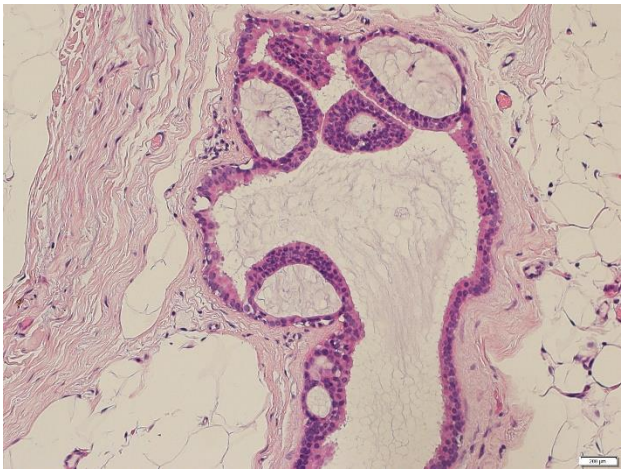

FIG. 5. **Atypical epithelium in a form of Roman bridge.**

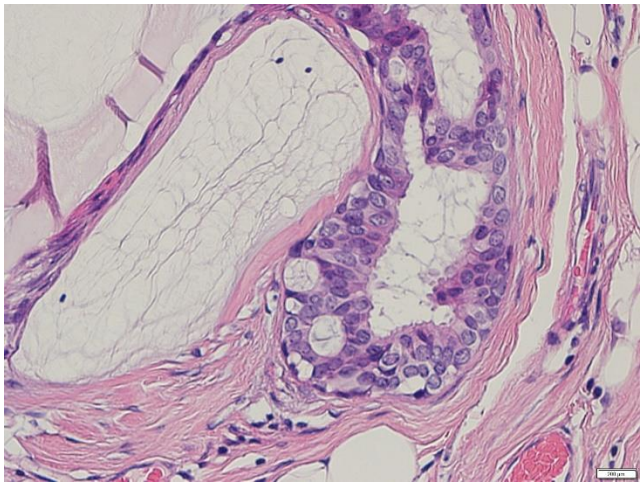

FIG. 6. **DCIS lesion with a microcribriform pattern in the cyst wall.**

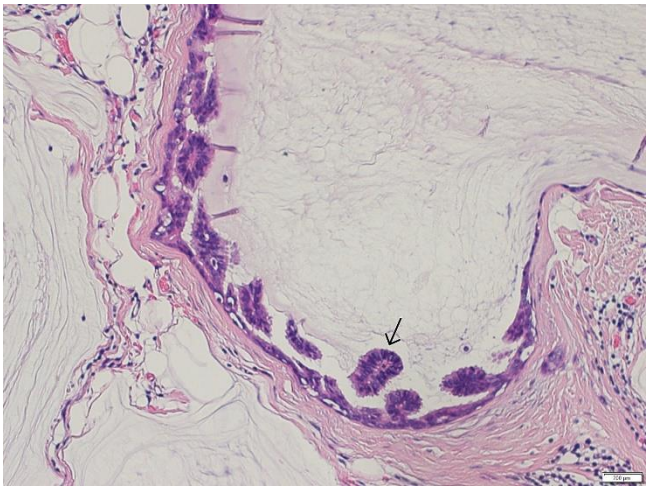

FIG. 7. **Duct with atypical hyperplasia. Some of cellular clumps seems to detach from the cyst wall (arrow).**

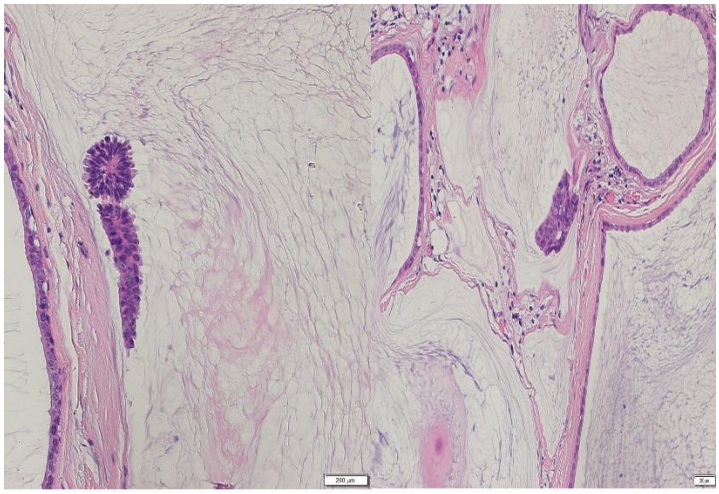

FIG. 8. **Floating cellular clump (a) and squamoid spherule (b).**

Meanwhile, the area of the nodule with 4 mm size which was first diagnosed as an invasive ductal carcinoma by biopsy had characteristic features of open tubules composing a single layer of epithelial cells enclosing a clear lumen, at the excised sample (FIG. 9). The neoplastic cells lining the tear-drop-shaped tubules lacking significant atypia. No myoepithelial cells were confirmed by immunostaining of p63 or DC10 in the neoplastic cells (FIG. 10). Mitoses in the neoplastic cells were uncommon. Furthermore, vascular, periductal and stromal elastoses were clear in them.

As for immunohistochemical staining analysis, tubular carcinoma showed ER(+), PGR(+), HER2(-) and positive expression (15%) of Ki67. Accordingly, the area was diagnosed as an invasive tubular carcinoma.

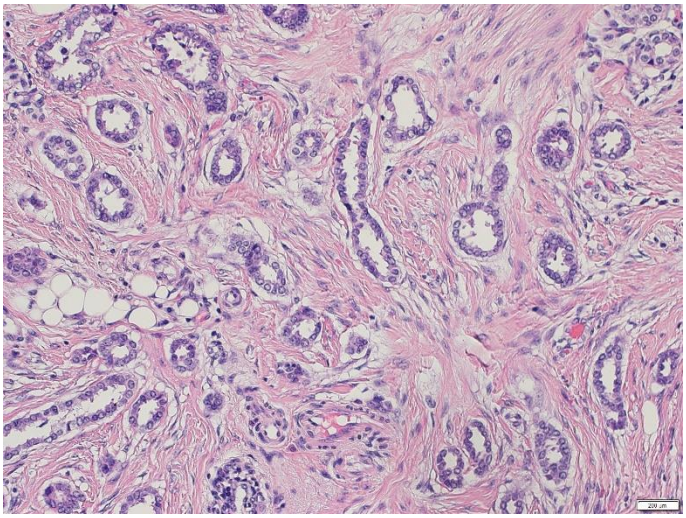

FIG. 9. **Histology of tubular carcinoma with a single layer of epithelial cells.**

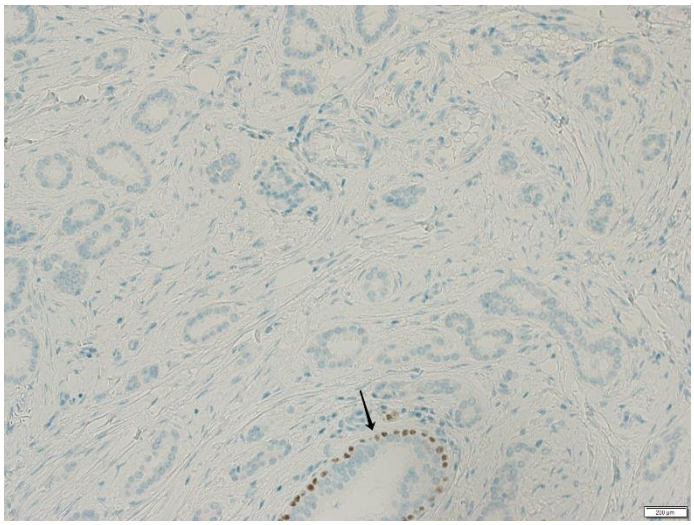

FIG. 10. **Immunostaining of p63 of the same part. No myoepithelial cells are associated. Arrow shows a normal mammary duct.**

3. Discussion

In the present case of MLT, cystic structures with atypical epithelium composed of micropapillary or cuboidal cells were present together with flat attenuated or simple columnar epithelium. Furthermore, atypical cells with features of DCIS were also recognized in the cyst wall. In addition, atypical cells arranged in clumps or squamoid spherules were floating in some place of the mucin. These evidences suggested that some part of MLT was already in the early stage of mucinous carcinoma. Certainly, it is difficult to distinguish the cellular clumps of mucinous carcinoma from the detached cells located in the cyst wall with flat epithelium by extravasation of mucin. However, floating cells in the present case displayed cellular atypia with irregular nuclei. Probably, some of the floating cells seen in the mucin were assumed to be atypical cells like those of DCIS or those derived from the tissues already transformed to mucinous carcinoma. Details of the process for the transition from MLT

to mucinous carcinoma is not proved, although MLT has been regarded as a prominent precursor lesion. Present authors consider that detachment of cells from the atypical epithelium including DCIS may be a possible onset for the occurrence of mucinous carcinoma.

In this case, microcalcification was recognized in the mucin of MLT. It has been suggested that MLT associated with malignancy has microcalcifications more frequently and to a greater extent than does benign MLT, on mammograms [9,10]. MLT of the breast was originally described as a benign lesion. Therefore, whether core biopsy can diagnose MLT reliably has been controversial. Ohi et al [11] executed a long-term follow-up study on MLT and concluded that complete resection is recommended in case of MLT with atypical ductal hyperplasia or DCIS because of intralesional heterogeneity and the probabilities of relapse.

It is known that mucinous carcinoma, particularly type A infrequently accompany invasive ductal carcinoma of nonspecial type [12]. Furthermore, coexistence of MLT and ductal carcinoma especially, DCIS type is also known [13,14]. Thus, it might be possible that three lesions of MLT, mucinous carcinoma and tubular carcinoma occur simultaneously in the breast, although histogenesis of these lesions are poorly understood. It is also suggested that tubular carcinoma is the earliest form of breast carcinoma, which then gives rise to other types of carcinoma [15]. MLT and tubular carcinoma may share some primitive root.

4. Source of Support

None.

5. Consent Statement

We obtained the informed consent from the patient by writing.

6. Ethics approval

The report was made along the guidelines of the ethics committee of our hospital.

7. Conflict of Interest

Authors declare no conflict of interest.

8. Data Availability

All relevant data are within the paper and its Supporting information files.

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