

Metaplastic Breast Carcinoma - A Case Report with Review of Literature

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Abstract: *Metaplastic breast carcinoma is a rare breast neoplasm with an incidence of 0-2.5%. This heterogenous group of tumors are characterised by an admixture of adenocarcinoma with dominant areas of spindle cells, squamous cells and/or mesenchymal differentiation. This case presentation reviews a challenging case of metaplastic breast carcinoma showing spindle cell features with areas of infiltrating ductal carcinoma and squamoid differentiation. Due to its rarity and paucity of literature, we are presenting this case by highlighting the cytomorphological and histopathological correlation along with immunohistochemistry and differential diagnosis.*

Keywords: Metaplastic Brest Carcinoma, Mesenchymal Metaplasia, Spindle Cell Metaplasia, Squamoid Differentiation, Phyllodes Tumor.

1. Introduction

Metaplastic breast carcinoma is a rare breast neoplasm with an incidence of 0-2.5%, It encompasses a group of neoplasms characterised by differentiation of neoplastic epithelium into squamous cells and/or mesenchymal looking elements, including but not restricted to spindle cells[1], Thus metaplastic carcinoma of breast is a rare entity with positive distinguishing features of having epithelial and mesenchymal tissue types incorporated within one tumor[2]. In fewer than 5 % of all mammary adenocarcinoma, part of all carcinomatous epithelium is transformed to nonglandular growth pattern by a process referred to as metaplasia[3]. It was first defined by Huvos et al.,(1973)[4] and then Tavassoli,(1992)[5]. This case presentation reviews a challenging case of metaplastic breast carcinoma showing spindle cell features with areas infiltrating ductal carcinoma and squamoid differentiation. Due to its rarity and paucity of literature we are presenting this case by highlighting the cytomorphological and histopathological correlation along with immunohistochemistry and differential diagnosis.

2. Case Report

A 55 years old postmenopausal female presented with lump in left breast since 3 months. On examination there was a 7x6 cm firm, mobile, non-tender lump in outer-upper quadrant of left breast. The skin over the swelling and nipple areolar complex appeared to be normal. The underlying

muscles and chest wall were free. Left axillary lymphnodes were palpable. The other breast was normal.

Ultrasonography: of left breast showed a large well defined irregular soft tissue nodule with central area of necrosis measuring 5.5x4.5 cm in outer upper quadrant.

FNAC: Revealed a cellular smear showing malignant ductal epithelial cells in irregular clusters, acini and singles. some of the cells also show plasmacytoid appearance with eccentrically placed hyperchromatic nuclei showing prominent nucleoli. Features were suggestive of ductal adenocarcinoma of left breast.

Her haematological and biochemical parameters were normal.

Subsequently she underwent left Modified radical mastectomy.

On Gross examination : The specimen measured 17x16x5 cm, With an elliptical skin flap measuring 17x9cm. The overlying skin and nipple areolar complex appeared to be normal. On cut section there was a irregular solid gray white mass measuring 5x 4.5 cms seen in outer upper quadrant of breast, it was firm in consistency and also 5 lymph nodes were dissected from the axillary tail.



Figure 1: Gross photo of left modified radical mastectomy specimen. On cut section showing irregular solid grey white mass measuring 5x4.5 cms.

3. Microscopy

Multiple sections studied showed tumor consisting of pleomorphic round to polygonal to spindle cells, in groups and sheets with large vesicular nuclei and varying amount of eosinophilic cytoplasm. Tumor giant cells and mitotics were seen along with few ducts containing tumor cells and

lympho vascular emboli. Foci of necrosis were seen. Also seen were areas of infiltrating ductal carcinoma and nests of squamoid differentiation amidst of sheets of atypical spindle cells. Features were suggestive of Metaplastic breast carcinoma. No metastatic deposits were seen in all the dissected lymphnodes.

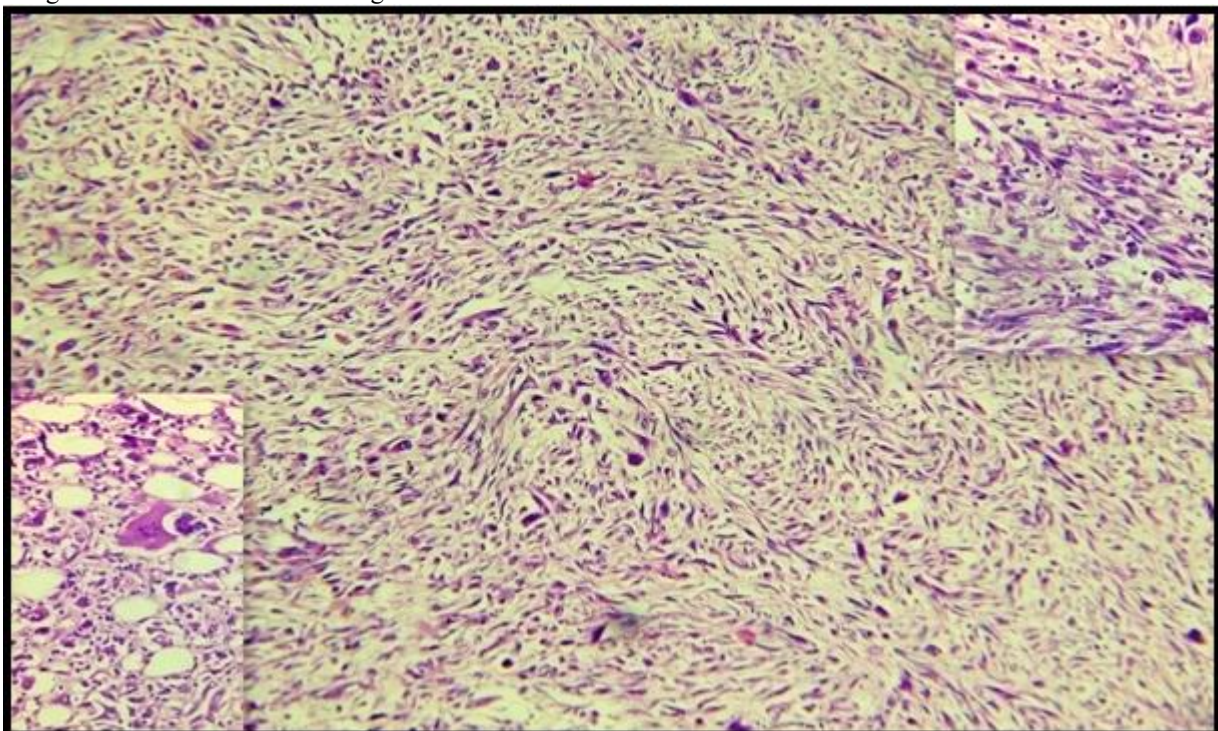


Figure 2: H&E Section (10X10 view) from tumor showing pleomorphic round to polygonal to spindle cells arranged in sheets, with tumor giant cells and mitotic seen in inset figures (40X10) view.

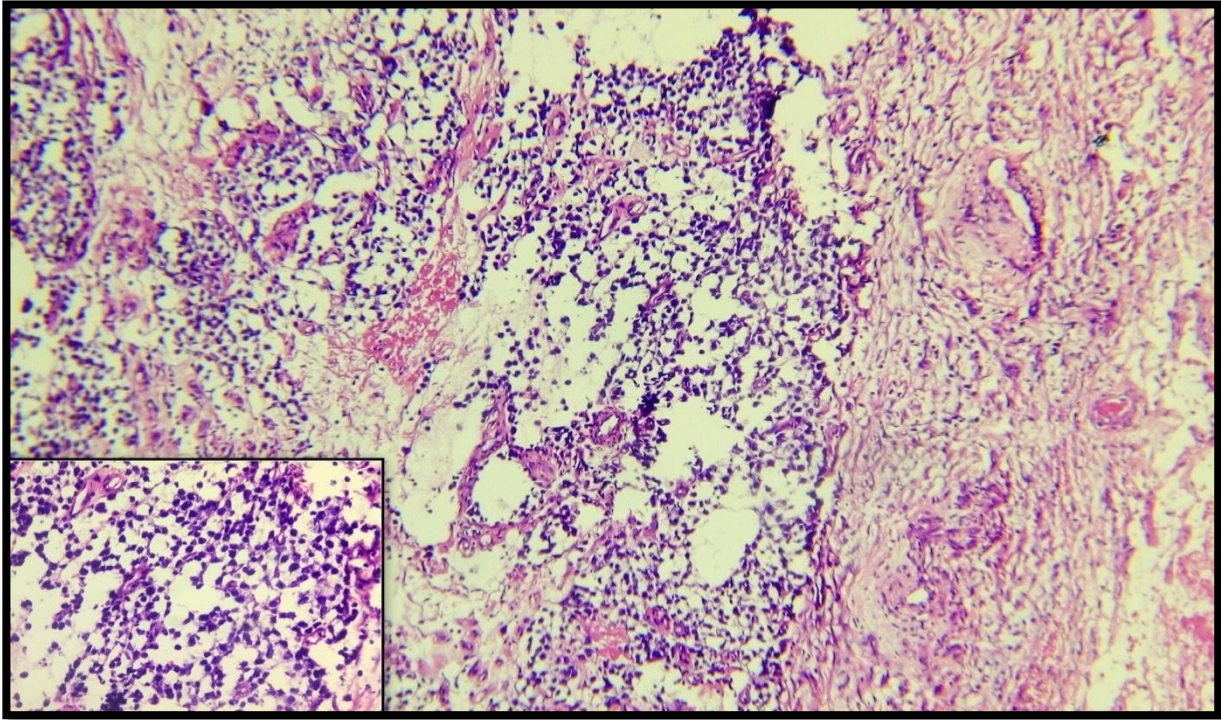


Figure 3: H&E (10x10 view) section from tumor showing areas of infiltrating ductal carcinoma, same section seen at (40x10 view) in inlet.

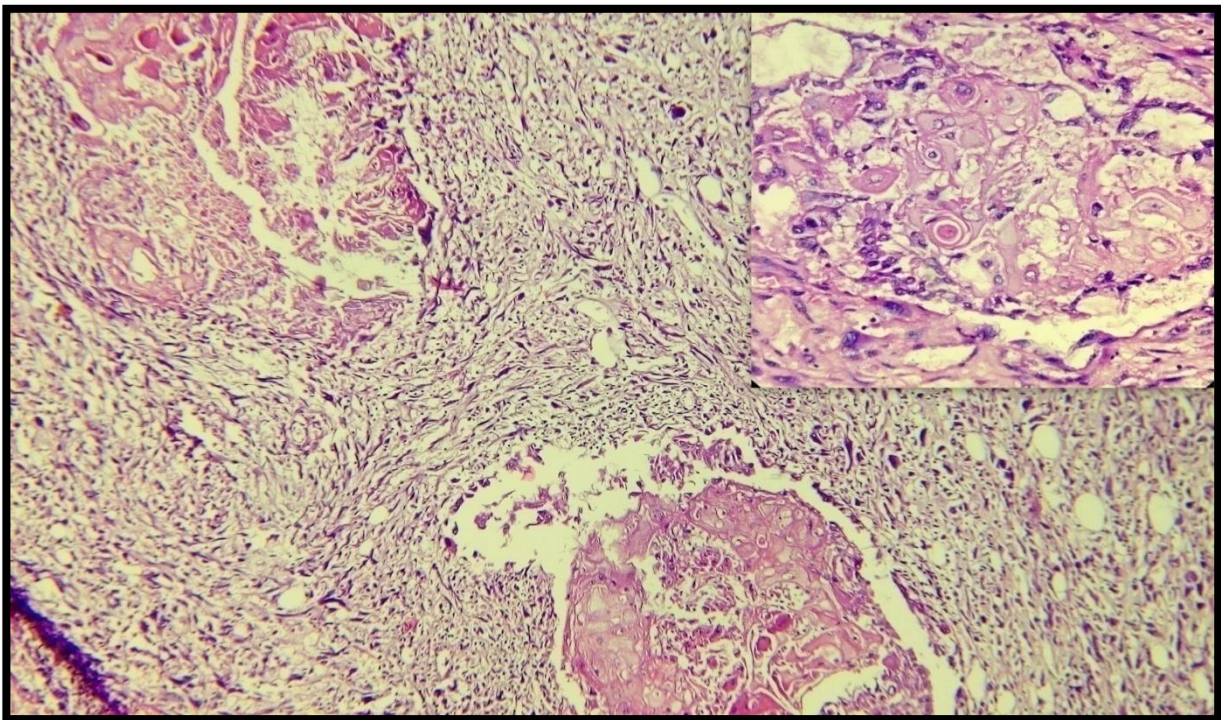
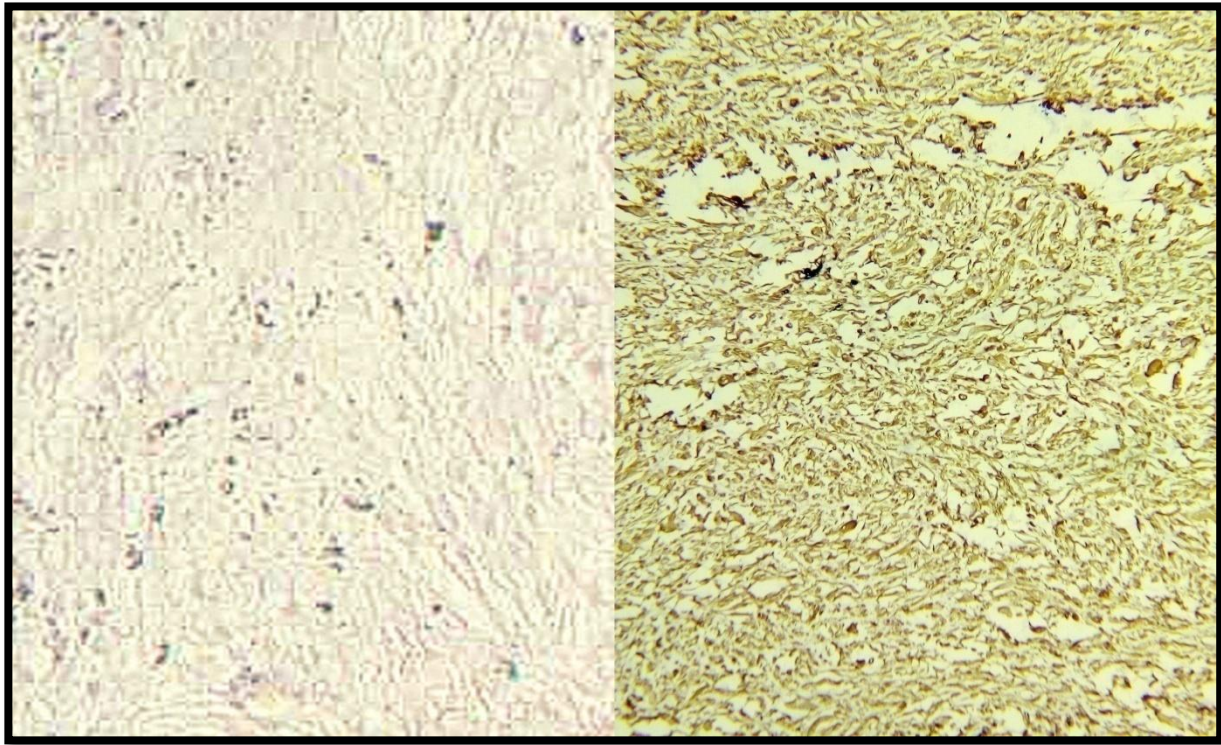


Figure 4: H&E section (10X10 view) from tumor showing nests of squamous differentiation amidst of the sheets of pleomorphic spindle cells.

On Immunohistochemistry : The malignant spindle cells showed diffuse strong cytoplasmic positivity for vimentin

and focal faint positivity for cytokeratin. However they were negative for ER, PR , HER-2 neu and S-100. Diagnosis of Metaplastic breast carcinoma was given.



4. Discussion

This heterogenous group of tumors are characterised by an admixture of adenocarcinoma with dominant areas of spindle cells, squamous cells and/or mesenchymal differentiation. The mesenchymal component is usually composed of non-specific malignant spindle cells but may include differentiated sarcomas like fibrosarcoma, leiomyosarcoma and osteogenic sarcoma [6]

Metaplastic sub-types have been difficult to isolate. Because of the rarity not a lot of research has been done on these tumors. Three recently published series over 13, 11 and 16 years yielded only 21, 19 and 43 patients respectively [7-9]. There is still quite a bit of discussion on how to classify the sub-types and how to describe them most precisely. In 1989 a detailed study of MBC was done by Wargotz and Norris . Wargotz and Norris divided MBC into five sub-types as matrix-producing carcinoma, spindle-cell carcinoma; Carcinosarcoma; Squamous cell carcinoma; Osteoclastic giant cell. The World Health Organization (WHO) in 2011 came up with a new and more accurate categorization of MBC[10-15]. The WHO classified the sub-types as Low-grade adenosquamous carcinoma, Fibromatosis-like metaplastic carcinoma, Squamous cell carcinoma, Spindle cell carcinoma, Carcinoma with mesenchymal differentiation , Chondroid differentiation, Osseous differentiation , Other types of mesenchymal differentiation and Myoepithelial carcinoma. In our case patient had spindle cell component with areas of infiltrating ductal carcinoma and focal squamous differentiation. (figures 2,3,&4)

According to the literature , the median age of metaplastic carcinoma breast patients is over 50yrs of age[24] in our case she is 55yrs and also there are evidences that tumor size is frequently bigger and incidence of axillary lymph node

involvement is less for metaplastic carcinoma patients in comparison to classical adenocarcinomas[25], all the dissected lymph nodes were negative for tumor in our case. Metaplastic breast carcinoma is usually had negative expression of oestrogen receptor, progesterone receptor, and HER2neu known as triple negative[26], our case also had same features on immunohistochemistry.

Spindle cell carcinoma of the breast is characterized by a histology that shows a predominant spindle cell pattern. The spindle cells may be benign appearing low-grade cells or may have a high-grade sarcomatoid appearance. Although ductal, lobular and squamous patterns may also be present, sometimes there is a pure spindle cell pattern[16].

Pure spindle cell lesions are diagnostically challenging, and the use of immunohistochemistry may be required for a correct diagnosis. Although there is no consensus on the minimal antibody panel, several antibodies are useful in supporting the diagnosis of metaplastic carcinoma. Studies[17,18] have shown that the spindle cells in metaplastic carcinomas are positive for high-molecular-weight/basal cytokeratin, such as 34bE12 and CK5/6 with high sensitivity. Broad-spectrum cytokeratin antibodies, such as MNF116, are positive as well.

CAM5.2 and AE1/AE3 antibodies are often negative or focally positive. Cytokeratin expression in metaplastic carcinomas may be focal and patchy, which underscores the need for staining several sections and carefully assessing cytokeratin expression in all fields. Our case showed focal faint positivity for pan-cytokeratin. And positivity for vimentin.

The Differential diagnosis of metaplastic carcinomas with predominantly spindle cell component depends on the degree of spindle cell atypia observed in the tumor. In our case tumor showed atypical spindle cells with tumor giant cells and atypical mitoses.

Metaplastic carcinomas with evident spindle cell atypia must be distinguished from malignant phyllodes tumor and primary or metastatic sarcoma. The distinction between metaplastic carcinoma and malignant phyllodes tumors [20,21] of the breast is critical because the treatment and prognosis differ significantly. Leaflike architecture and lack of cytokeratin expression can be helpful hints favoring a diagnosis of phyllodes tumor. The possibility of a prominent stromal component of a malignant phyllodes tumor is more likely than it is with a pure sarcoma [22], and a careful evaluation for the presence of a benign, epithelial component should be attempted, for which extensive tissue sampling should be done as we did for our case.

The metaplastic breast carcinoma has poor prognosis as compared to breast adenocarcinoma (23). Till today specific treatment guidelines for metaplastic breast carcinoma and subgroups is uncertain hence studies to evaluate different treatment alternatives for different subgroups may yield better treatment choices, in future. As for our patient she was doing well in post mastectomy period and was started on chemotherapy treatment following histopathological diagnosis.

5. Conclusion

Metaplastic carcinoma breast is a rare malignant tumor composed of mostly spindle cells component. It is an aggressive malignancy with poor prognosis hence the early diagnosis is must considering the high risk of recurrence after surgery. Though cytology, imaging studies, histopathology and IHC will be helpful for diagnosis but histopathology is the gold standard tool for final diagnosis of Metaplastic carcinoma breast.

Since the clinical behavior is as diverse as the histopathology and majority of these tumors are receptor negative, The prognosis reported in the literature is quite variable hence Multi institutional prospective trials after consensus on pathology are needed to advance the knowledge in understanding and managing this uncommon tumor.

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