

## Invasive Lobular Carcinoma Of The Breast With Extracellular Mucin - A Rare Entity

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### ABSTRACT

Invasive lobular carcinoma of the breast is the second most prevalent subtype of breast cancer. It constitutes 5 – 15 % of all invasive breast cancers<sup>(1)</sup>. Invasive lobular carcinoma may produce intracellular mucin-producing characteristic signet ring cell morphology by pushing the nucleus to one side<sup>(2)</sup>. Carcinoma of ductal origin is usually related to extracellular mucin production. Recently a new rare variant of invasive lobular carcinoma with extracellular mucin has been described<sup>(1)</sup>. In this manuscript, we report a case of invasive lobular carcinoma with extracellular mucin production with an emphasis on clinico-pathological features.

**Keywords:** Breast, invasive lobular, mucin

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### I. Introductions

Invasive lobular carcinoma(ILC) of the breast is the second most prevalent subtype of breast cancer. It constitutes 5 – 15 % of all invasive breast cancers. ILC consists of dyscohesive cells mostly distributed in single-file linear patterns or as individual cells. Commonly seen in the 6<sup>th</sup> to 7<sup>th</sup> decade of life. ILC can be centrally located or multifocal and can present as an ill-defined palpable mass in the unilateral or bilateral breast<sup>(1)</sup>. Histological variants of ILC include solid, signet ring cell, alveolar, trabecular, pleomorphic, mixed, and tubulolobular<sup>(3)</sup>. Extracellular mucin production has been related to carcinoma of ductal origin. We herein report a rare case of ILC with extracellular mucin production.

### II. Case history

A 54-year-old postmenopausal woman presented with a mass in the right breast for one year. Multiple palpable hard masses were noted along with nipple retraction. There were no significant illnesses in the past.

Mammography of bilateral breasts revealed three hyperdense lesions of the right with spiculations, lobulations, perilesional architectural distortion, and extension to the nipple-areolar complex with focal thickening of the skin suggesting multifocal and multicentric malignant lesion – BIRADS 6. Two lesions were noted in the lower inner quadrant of the right breast measuring 4.2 cm x 2.9cm x 3.4cm and 3cm x 2.7cm x 2cm respectively. Another similar hypodense lesion was noted in the upper and lower outer quadrant of the right breast measuring 4.5cm x 1.9cm x 1cm. Multiple enlarged lymph nodes with few showing loss of fatty hilum were noted in the right axilla. Scattered macrocalcifications were noted in the left breast with no obvious mass.

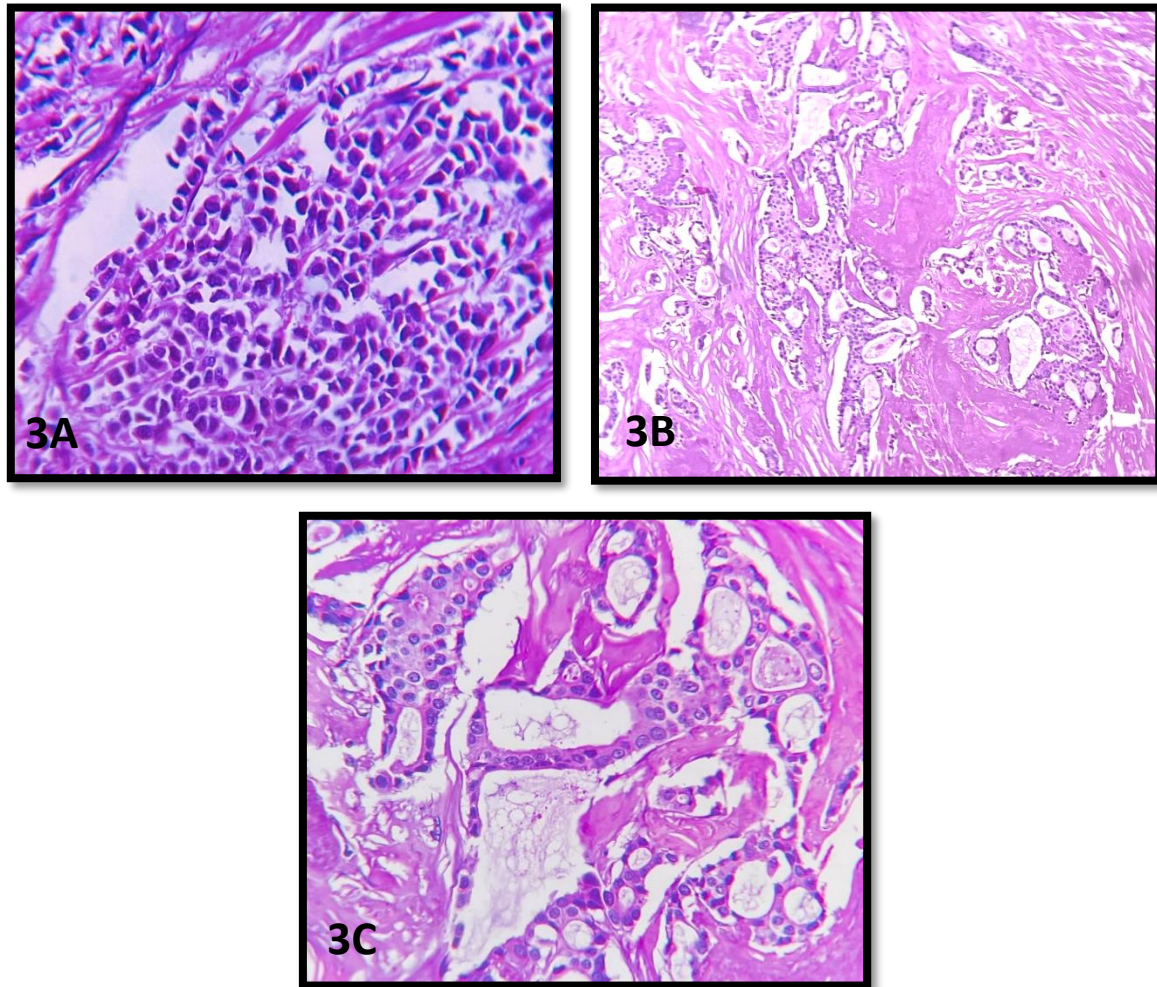
Contrast-enhanced computed tomography (CECT)of the abdomen and pelvis was performed which was unremarkable. CECT of lung showed bilateral parenchymal lung nodular lesions, the largest measuring 4.6mm in right lower lobe posterior basal segment suggestive of metastasis.

A core needle biopsy was performed from the multiple lesions and showed an invasive tumor composed of dyscohesive to poorly cohesive tumor cells arranged in cords, trabeculae, and singles having a high nuclear-cytoplasmic ratio, a hyperchromatic nucleus with indistinct nucleoli, and eosinophilic to vacuolated cytoplasm. Focal areas showed a mucin pool with a nest of tumor cells. Histopathological features were suggestive of invasive carcinoma with lobular features. Immunoprofile showed positivity for estrogen receptor with progesterone receptor and HER2 /neu being negative favoring lobular carcinoma. Ki - 67 was found to be 50%. In view of the biopsy and immunohistochemistry diagnosis, it was decided to proceed with the right breast-modified radical mastectomy.

Mastectomy specimen showed (3) hard palpable masses in the upper outer quadrant, lower inner quadrant and central quadrant. Nipple retraction was noted along with multiple scars (Fig 1). The cut surfaces of the tumors were grey-white glistening (Fig 2A & 2B). Resected margins were free grossly.



Microscopic examination showed tumor cells arranged predominantly in single files, cords, and single cells (Fig 3A). At areas, tumor cells were arranged concentrically around ducts giving a targetoid pattern. The cells were dyscohesive and showed moderate eosinophilic cytoplasm with small, round, mildly pleomorphic nuclei. Focally solid nests of tumor cells were noted. At multiple foci, the tumor cells were seen in small clusters and single cells distributed in extracellular mucin pools (Fig 3B & 3C). Occasional mitosis noted [1-2/10 HPF]. The surrounding stroma shows fibrosis and infiltration by lymphocytes. Foci of lobular carcinoma in situ were noted and perineural infiltration was seen along with infiltration into the dermis without skin ulceration. Six lymph nodes were isolated out of which four lymph nodes showed tumor deposits with extranodal extension measuring < 2mm. Areas of lobular carcinoma in situ were noted. The final diagnosis of invasive lobular carcinoma with extracellular mucin was made.



### III. Discussion

Invasive lobular carcinoma with extracellular mucin secretion is a newly described rare variant of ILC. Invasive lobular carcinoma occurs in elderly women and constitutes 5 – 15 % of all invasive breast cancers<sup>(1)</sup>. Primary tumors most commonly present bilaterally with multifocal lesions and have high incidence of metastasis to distant sites such as bone, skin, gastrointestinal tract, uterus meninges and ovary when compared to invasive breast carcinoma – not otherwise specified. Grossly tumor appears as an irregular mass with ill-defined borders<sup>(3)</sup>. Invasive lobular carcinoma (ILC) is characterized by uniform cells which are discohesive and arranged in a single file pattern invading the breast stroma<sup>(1)</sup> and show round nuclei and inconspicuous nucleoli. Histological variants of ILC include solid, signet ring cell, alveolar, trabecular, pleomorphic, mixed, and tubulolobular. A mixed type of ILC consists of a combination of the classical variants of ILC and one or more other variants. Mitosis is infrequent and lymph vascular invasion is uncommon. The presence of intracellular mucin-producing signet ring cell morphology is seen in ILC. Invasive lobular carcinoma with Loss of E – Cadherin expression is the prime factor responsible for the discohesive nature of lobular cells and the presence of diffuse cytoplasmic staining of p120 suggests the lobular phenotype<sup>(4)</sup>. Most invasive lobular carcinomas are estrogen receptor and progesterone receptor positive and HER2 negative. In our case report, invasive lobular carcinoma with extracellular mucin production was detected. Mucin production in breast lesions can be of two types one being intracellular mucin production and the other being extracellular mucin production. Intracellular mucin production is seen in conditions like fibrocystic breast disease with luminal secretion and secretory carcinoma. Extracellular mucin production is seen in conditions like solid papillary carcinoma, ductal carcinoma, mucinous carcinoma, mucinous micropapillary carcinoma, and invasive lobular carcinoma with extracellular mucin and mucocele-like lesions<sup>(5)</sup>. In our case invasive lobular carcinoma with extracellular mucin production was detected. It is important to differentiate between lobular and ductal carcinoma as both are known for mucin production. All ductal tumors express E-cadherin and usually produce extracellular mucin production. HER 2 /neu overexpression is often seen in ductal carcinoma. Extracellular mucin production is not always persistent in ductal carcinoma. In the presence of extracellular mucin production with microscopic features of ILC, it is a must to perform an

immunohistochemical stain for E-cadherin for confirming the diagnosis as ductal carcinoma shows diffuse membranous positivity for E-cadherin. Differential diagnosis of ILC with extracellular mucin production includes pure mucinous carcinoma, solid papillary carcinoma, mixed lobular and ductal carcinoma, neuroendocrine tumor of the breast, and mucocele-like tumor<sup>(2)</sup>. In pure mucinous carcinoma, there is lack of features of ILC. In solid papillary carcinoma, tumor is composed of nodules of tumor cells with delicate fibrovascular core and extracellular mucin production and lacks morphology of ILC. Solid papillary carcinoma is positive for ER, PR, and neuroendocrine markers and absent for Her2. Mucocele-like lesions consist of benign cysts containing mucinous material. Immunohistochemistry positivity for myoepithelial cell markers aids in diagnosis<sup>(4)</sup>. In our case E- Cadherin staining was not performed due to non-availability and after extensive sampling, there were no features of invasive carcinoma NST and exclusively showed features of invasive lobular carcinoma.

#### **IV. CONCLUSION**

Here we report a case of classical invasive lobular carcinoma with extracellular mucin production with ER positivity and HER2 negativity. This case is reported due to its rarity as extracellular mucin production is a characteristic feature of ductal carcinoma .

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