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INSIGHTS INTO PRIMARY BREAST ENDOCRINE CARCINOMA: A CASE STUDY.

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ABSTRACT

A 75-year-old **woman** with a medical history of **hypothyroidism** presented to the triple assessment breast clinic with a **2 weeks** history of right sided breast lump, no history of pain or nipple discharge with no significant family history of breast cancer. Her clinical **examination** revealed 4 x 4 cm hard, nonmobile right upper outer quadrant (10 O'clock) breast mass with multiple enlarged right axillary lymph nodes. No evidence of skin or underlying muscle involvement. No nipple discharge **was noted**. **Her radiological assessment with** mammogram and ultrasound showed two supicious masses; occupying the right upper outer and central outer breast, one **at** 9 O'clock and the second at 11-12 O'clock (the largest), with suspicious pleomorphic microcalcification in mammogram. Multiple significant axillary **lymphadenopathies are also detected**.

Ultrasound-guided core biopsy **was performed** and the histopathology was in favor of a triple negative neuroendocrine carcinoma in keeping with small cell carcinoma with axillary metastasis. **An extensive** work-up was done for the patient to detect distant metastasis (PET/CT scan) versus other primary tumor. Her PET scan demonstrated multicenteric breast tumor with uptake in the splenic flexure, therefore gastrocolposcopy were performed and showed adenoma with low grade dysplasia on final histopathology.The tumor was **staged** as cT2N2M0

The patient started on neoadjuvant chemotherapy and on further follow up the tumor size had regressed completely, and the patient will be scheduled for surgery upon finishing her chemotherapy.

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Imaging findings:

Mammogram:

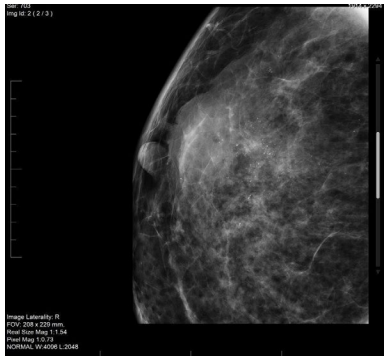


Image A.

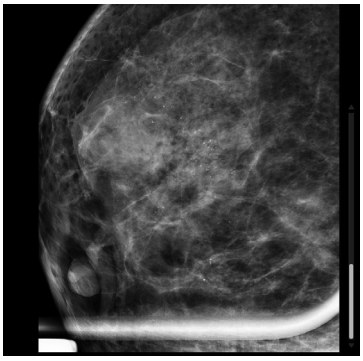
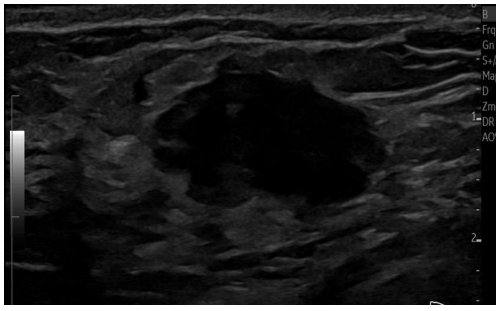


Image B.

Image A and B are magnification view of the concerning area in the right breast, shows irregular opacities with obscured margin in the right retroareolar slightly outer upper (image A and central quadrant (image B) with regional distribution of pleomorphic calcifications.

Right breast ultrasound:



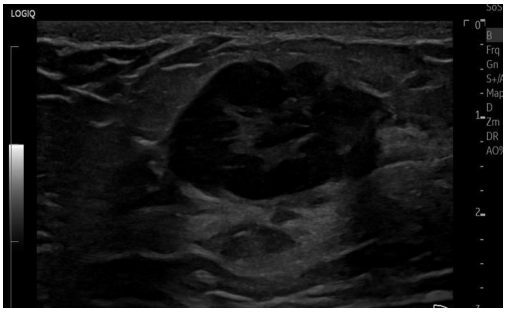


Image C

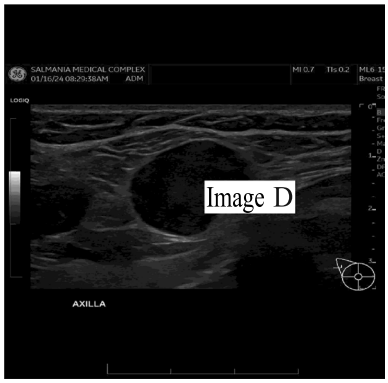


Image E

At Right 9' O'CI0Ck, an irrBgul8r, hypoechoic mass with angular/indistinctand some miCr0l0bulatedmaqins (Image C) is noted.AI Right 11-12 O'CI0Ckposition, an irrgulạr, hypoechomicass with angular and some distinct margins showing some internal echogenoic foci (image D). Image E shows muItipIP, SU5gcious right axillary adenopathy.

Breast MRI:

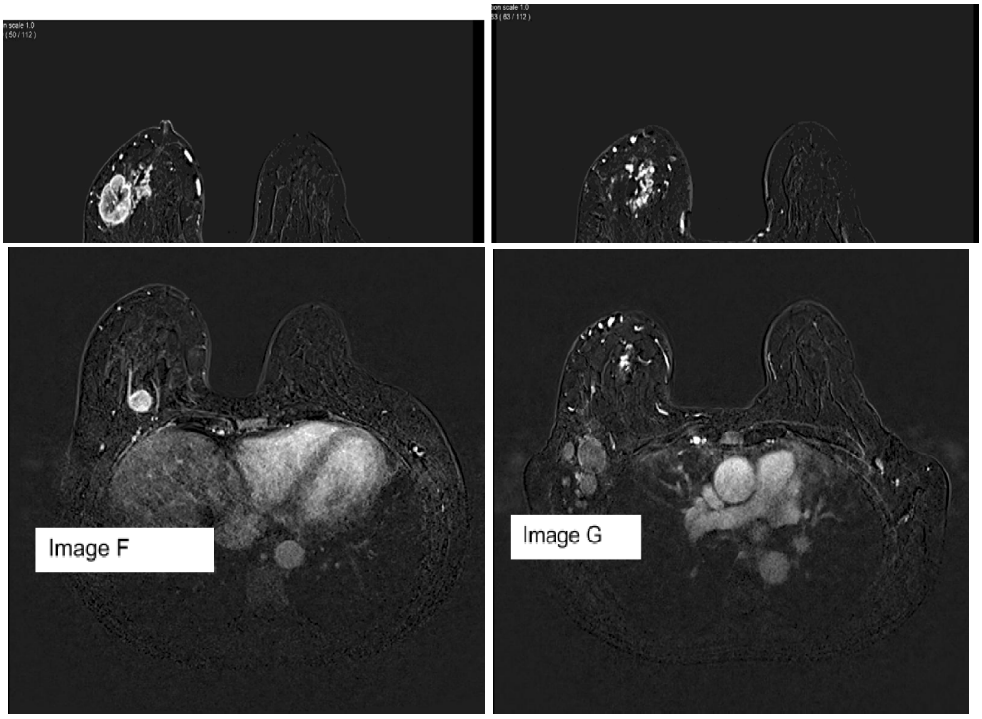


Image H Image I

Dynamic subtraction axial ViRW MRI: Image G, F, H and I Image. Suspicious enhancing mass is seen in the right upper outer quadrant (Index tumor mass) (Image F). Regional of non mass enhancement with cluster ring and heterogenous enhancement noted medial to the index tumor along with small suspicious lesions and foci (Image G and I). Similar features of the index tumor, situated central slightly outer which corresponds to the lesion seen in the ultrasound at 9 O'clock. Image I shows enlarged right axillary lymph nodes that were noted on ultrasound and biopsy proven metastasis.

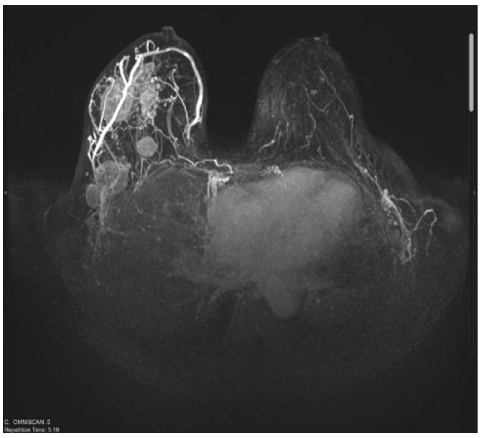


Image J

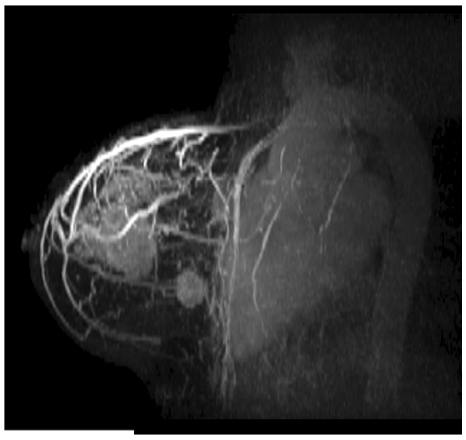


Image K

MRI indicative lymphadenopathy axillary with quadrants one than more in enhancement

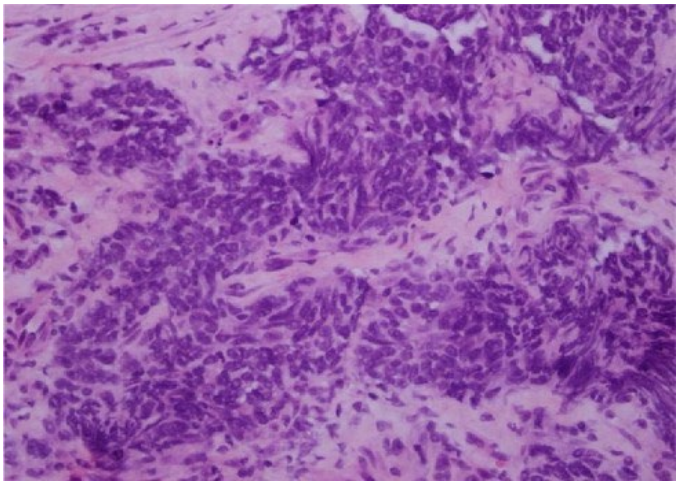


Image A

Image A: The tumor shows sheets of malignant neoplastic epithelial cells, which have uniform small dark hyperchromatic cells with a high N:C ralio, scant cytoplasm, and necrosis.

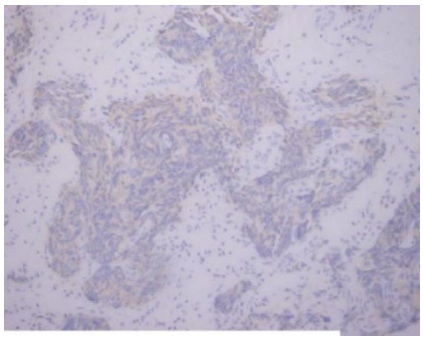


Image B

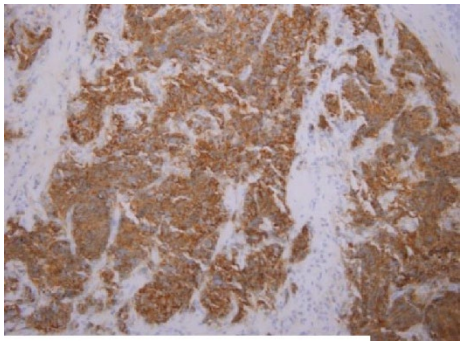


Image C

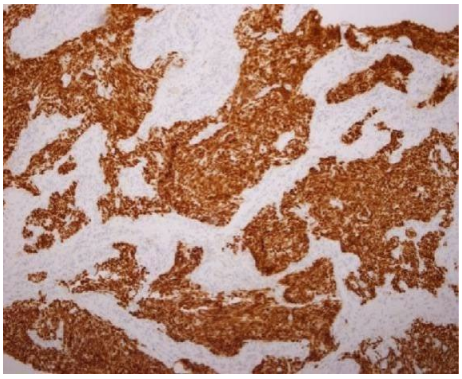


Image D

The tumor cells are positive for synaptophysin (locally) (Image B), chromogranin (Image C), and TTF1 (Image D). They were locally positive for CK7 and negative for CK20. GATA3 was completely negative in the tumor cells.

The histologic and immunohistochemical findings are diagnostic of a high-grade neuroendocrine carcinoma, in favor of small cell carcinoma.

As primary breast neuroendocrine carcinomas are rare, it is recommended to rule out a metastatic tumor from any other primaries.

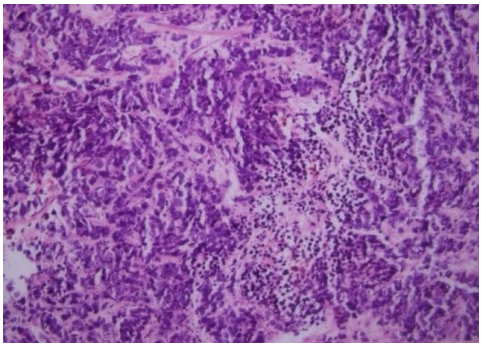


Image E

The lymph node biopsy reveals necrosis of the lymph nodes with metastatic small cell carcinoma (Image E).

Discussion:

Neuroendocrine tumors originate from the neuroendocrine cells which are usually found throughout the body but most commonly **found throughout the gastroenterology and bronchopulmonary systems**. Primary neuroendocrine carcinoma of the breast is extremely rare.

The imaging features of neuroendocrine breast tumor are nonspecific. [8]

The radiological features of breast neuroendocrine tumor include, a high-density oval or irregular mass in mammogram with predominantly spiculated or lobulated margins on mammography and mostly irregular or microlobulated, irregular homogeneously hypoechoic masses with normal sound transmission on sonography. [9] However, the number of cases with radiology findings has been too small to allow generalization of the imaging features.

They may also show circumscibed margins and associated lymphadenopathy, with MRI revealing hypervascularity or necosis. Accurate diagnosis requires correlating imaging findings with biopsy results, making radiologists essential in identifying these rare tumors and guiding treatment.

Grossly, they may present as any other high-grade tumors, with a poorly circumscribed margins, fleshy cut surface with areas of necrosis.

Histologically, they look like their pulmonary counterparts, with infiltrative growth patterns and composed of packed, fairly uniform, small cells with dark hyperchromatic nuclei that have a high N/C ratio, a small amount of cytoplasm, and poorly defined cell borders. Usually, they have necrotic areas with an increase in mitotic activity. Lymphatic tumor emboli are common to be noted in those tumors.

Immunohistochemically, those tumors are positive for neuroendocrine markers, CD56, and NSE in the majority of the cases. Estrogen receptor positivity has been reported in about half of the cases [2] and progesterone receptor positivity in a smaller proportion. TTF is usually positive, but not as strong as positivity in pulmonary tumors. GATA3 has been reported to be positive in those tumors.

The treatment of primary neuroendocrine tumors is highly variable, although

surgery should always be considered as the first line of treatment.

Prognosis-wise, small cell carcinoma of the breast has a poor prognosis. However the outcomes of patients with small cell neuroendocrine carcinomas of the breast have a better prognosis with staged-matched small cell carcinomas of the lung.

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