

## Carcinoma of Breast with Neuroendocrine Differentiation: A rare challenging entity

Dr. Neha Rajput<sup>1</sup>, Dr. S. C. Puranik<sup>2</sup>, Dr. S. H. Khaparde<sup>3</sup>

<sup>1</sup>Resident, <sup>2</sup>Professor, <sup>3</sup>Professor & Head, Department of Pathology, DVVPFs Medical College & Hospital, Ahilyanagar - 414111, Maharashtra, India

### Abstract:

Neuroendocrine breast carcinoma (NEBC), another name for breast carcinoma with neuroendocrine differentiation, is a heterogeneous collection of uncommon tumors that make about 2-5% of all invasive breast carcinomas. Neuroendocrine tumors (NETs) originate in neuroendocrine cells. These cells combine the characteristics of endocrine cells, which produce hormones, and nerve cells. We report a rare case of carcinoma of breast with neuroendocrine differentiation. On microscopy the section of breast tumour specimen showed infiltrating duct carcinoma with area of 50% neuroendocrine differentiation.

**Key words:** Neuroendocrine differentiation, Breast carcinoma, Neuroendocrine tumors

### Introduction:

Neuroendocrine tumors (NETs) originate in neuroendocrine cells. These cells combine the characteristics of endocrine cells, which produce hormones, and nerve cells. Malignant neuroendocrine tumors predominate.[1] The most common types include: Gastrointestinal neuroendocrine tumours, Lung neuroendocrine tumours, Pancreatic neuroendocrine tumours.

Neuroendocrine tumour affects about 6 in 100,000 people worldwide. The majority of those with diagnoses are typically between 50 and 60 years old.[2] Neuroendocrine differentiation carcinoma (NEDC) refers to a type of cancer where the tumor cells display features of both neuroendocrine and epithelial differentiation. Depending on the location and size of the tumor, the symptoms and clinical presentation of NEDC can differ significantly. Abdominal pain, gastrointestinal bleeding, coughing, and dyspnea are typical symptoms. To confirm neuroendocrine distinction, a combination of imaging investigations (such as CT scans or MRIs), a biopsy for histological evaluation, and occasionally specific markers like chromogranin A or synaptophysin,

neuron specific enolase are used in the diagnostic process.[1] Primary neuroendocrine tumours of breast are rare tumours with incidence rate of only 0.3%-0.5%. accounting for 0.1%-5% of breast cancers.[2]

Neuroendocrine breast carcinoma (NEBC), another name for breast carcinoma with neuroendocrine differentiation, is a heterogeneous collection of uncommon tumors that make about 2-5% of all invasive breast carcinomas. NEBC is a rare entity. The reported prevalence of NEBC among breast cancers varies from 0.1 to 18% [3]

### Case Report:

We received a Modified radical Mastectomy (MRM) specimen of 60 year old female who had lump in the left breast. Specimen received was examined for gross findings (Fig. 1) and sections from representative lesional tissue were taken. Slides were stained by hematoxylin and eosin, which on microscopy shows infiltrating duct carcinoma with area of 50% neuroendocrine differentiation.(Fig. 2 & 3) The final diagnosis was given after confirmation on Immunohistochemical staining. (Fig. 4 & 5)

**Corresponding Author:** Dr. Neha Rajput

**Email ID:** nehasanjayrajput181995@gmail.com

**Address:** Department of Pathology, DVVPFs Medical College & Hospital, Ahilyanagar -414111, Maharashtra, India

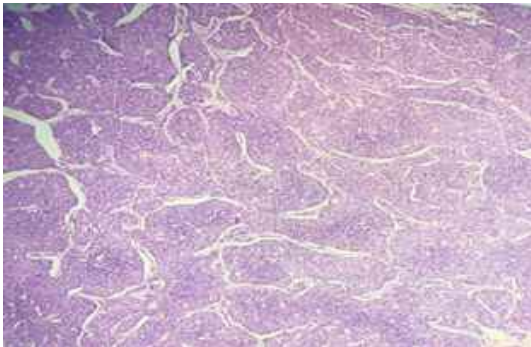
**ISSN No. :** (p) 2348-523X, (o) 2454-1982

**DOI:** 10.46858/vimshj.110307

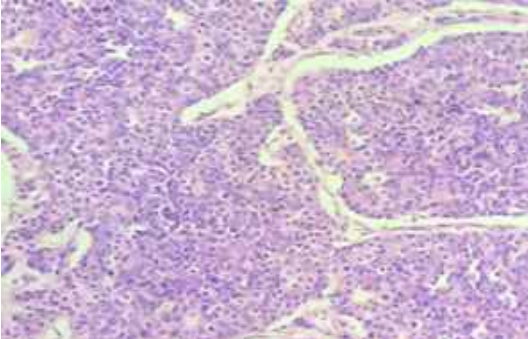
**Date of Published :** 30<sup>th</sup> September 2024



**Fig. 1:** Gross Photograph: MRM specimen - greyish-white firm to hard tumour



**Fig. 2:** Low power Photomicrograph showing Infiltrating duct carcinoma breast with neuroendocrine features. (H & E)

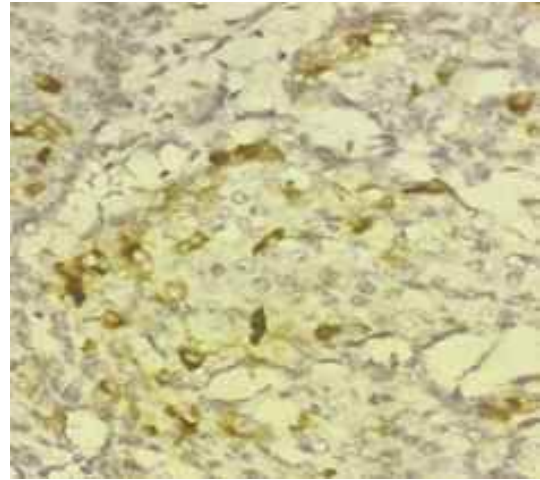


**Fig. 3:** High power photomicrograph showing monotonous regular cells with round nuclei with salt & paper chromatin & moderate eosinophilic granular cytoplasm, tumour cells arranged in nests - Infiltrating duct carcinoma breast with neuroendocrine features. (H & E)

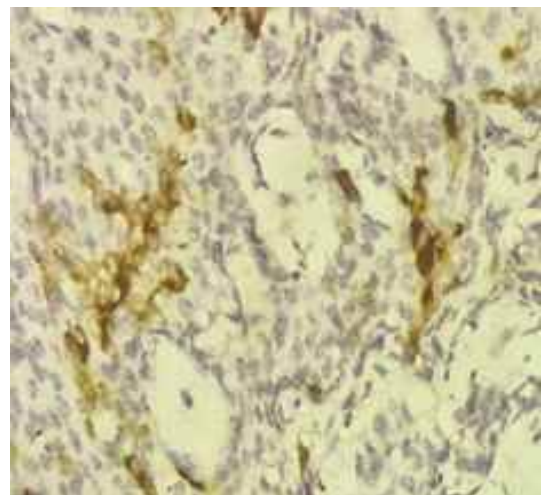
### Discussion:

Neuroendocrine carcinomas represent a heterogeneous group of tumours that have been defined in literature by morphologic and immunohistochemical features or combination of all of these. According to the WHO definition, Neuroendocrine carcinoma of breast should appear morphologically similar to neuroendocrine tumours from the gastrointestinal tract, and lung.[3]

Occasional studies have reported presence of neuroendocrine cells in normal mammary epithelium,



**Fig. 4:** IHC image- Infiltrating duct carcinoma with neuroendocrine differentiation Positive staining for synaptophysin.



**Fig. 5:** IHC image- Infiltrating duct carcinoma with neuroendocrine differentiation Positive staining for Chromogranin A

but most studies have failed to identify these cells.[3] These tumors were divided into three classes by the 2012 WHO classification: poorly differentiated NEBC/small cell carcinoma, well differentiated NEBC (NETs, which included low- and intermediate-grade tumors), and NEBC identified by histochemistry or immunohistochemistry (IHC).[3]

Based on these findings neuroendocrine carcinoma of the breast is considered to acquire neuroendocrine differentiation rather than to arise from preexisting neuroendocrine cells in breast.[4]

NEBC is more common in female patients between the sixth and seventh decade of age.[5] In comparison to invasive ductal carcinoma of no special type, NEBC was believed to have a prognosis that was comparable or even better. [6-10] The majority of recent research, however, indicated that NEBC might be linked to poorer long-term results.[5]

**Conclusion:**

NEBC encompasses a class of uncommon breast cancers that typically affect older women. The presence of neuroendocrine markers and physical characteristics resembling those of lung and gastrointestinal NETs are the basis for the diagnosis of NEBC. The present diagnosis and treatment approach is comparable to that of general invasive breast carcinomas. Because of its rarity and recent designation as a distinct entity it is important to highlight. There is an unmet need to improve the capacity to recognize this rare entity and get a deeper understanding of its biology in order to establish a more tailored treatment.

**References:**

1. Vamsi Parimi, Rajen Goyal, Kate Poropatich, Ximing J Yang *Am J Clin Exp Urol*. 2014; 2(4): 273–285. Published online 2014 Dec 9.
2. Epstein JI, Amin MB, Beltran H, et al. Proposed morphologic classification of prostate cancer with neuroendocrine differentiation. *Am J SurgPathol* 2014;38:756–67.
3. Lakhani SR, Ellis IO, Schnitt SJ, et al. WHO classification of tumours of the breast, vol. 4. 4th ed. Lyon: International Agency for Research on Cancer; 2012.
4. Aggarwal, G, Singh, S, Kataria, SP, Kalra, R, Duhan, A, and Sen, R. Primary Neuroendocrine Carcinoma of Breast. *J Cytol* (2011) 28(2):91–2.
5. Wang J, Wei B, Albarracin CT, et al. Invasive neuroendocrine carcinoma of the breast: a population-based study from the surveillance, epidemiology and end results (SEER) database. *BMC Cancer*. 2014;14:147-56.
6. Miremadi A, Pinder SE, Lee AH, et al. Neuroendocrine differentiation and prognosis in breast adenocarcinoma. *Histopathology*. 2002;40:215-22.
7. Makretsov N, Gilks CB, Coldman AJ, et al. Tissue microarray analysis of neuroendocrine differentiation and its prognostic significance in breast cancer. *Hum Pathol*. 2003;34:1001-8.
8. Van Krimpen C, Elferink A, Broodman CA, et al. The prognostic influence of neuroendocrine differentiation in breast cancer: results of a long-term follow-up study. *Breast*. 2004;13(4):329-33.
9. Rovera F, Masciocchi P, Coglitore A, et al. Neuroendocrine carcinomas of the breast. *Int J Surg*. 2008;6(Suppl. 1):S113-S11515.
10. Righi L, Sapino A, Marchio C, et al. Neuroendocrine differentiation in breast cancer: established facts and unresolved problems. *Semin Diagn Pathol*. 2010;27(1):69-766.