

Available online at [www.sciencedirect.com](http://www.sciencedirect.com)

ScienceDirect

journal homepage: [www.elsevier.com/locate/radcr](http://www.elsevier.com/locate/radcr)

## Case Report

# Neuroendocrine breast carcinoma: The importance of the correlation between histological and radiological findings <sup>☆</sup>

Najwa Amsiguine\*, Hatim Essaber, Assaad Elbakkari, Soukaina Alliouj, Hounaida Jerguigue, Youssef Omor, Rachida Latib

Radiology Department, National Institute of Oncology, Ibn Sina Hospital, Mohammed V University, Rabat, Morocco

## ARTICLE INFO

## Article history:

Received 20 June 2023

Revised 12 October 2023

Accepted 19 October 2023

Available online 17 November 2023

## Keywords:

Breast

Neuroendocrine carcinoma

Ultrasound

Mammography

## ABSTRACT

Neuroendocrine breast carcinoma (NEBC) is an uncommon and malignant breast lesion. The absence of proper testing for this type of breast cancer carcinoma exacerbates this paucity. Additionally, only scant evidence of these tumors is present because of the repeated revisions in their diagnostic criteria throughout time. This case report highlights the importance of the correlation between histological and radiological findings in the diagnosis and treatment of neuroendocrine breast cancer. We describe the clinical, radiological, and histological characteristics of a patient diagnosed with neuroendocrine carcinoma. The breast parenchyma was penetrated by a carcinomatous tumor growth that contained trabeculae and lobules, exhibiting mild cytonuclear atypia, and having a low mitotic index. This report emphasizes the value of a multidisciplinary strategy for precise diagnosis and treatment planning.

© 2023 The Authors. Published by Elsevier Inc. on behalf of University of Washington.

This is an open access article under the CC BY-NC-ND license

(<http://creativecommons.org/licenses/by-nc-nd/4.0/>)

## Introduction

Neuroendocrine carcinomas (NECs) of the breast are uncommon malignancies that account for 2%-5% of all breast cancers [1]. Neuroendocrine carcinomas include a heterogeneous group of tumors with diverse characteristics and prognosis.

Accurate diagnosis and appropriate treatment planning are essential due to the aggressive nature of these tumors, yet to this date, there is no conventional therapy that has been tried and evaluated in NEBC [2]. The association of histopathological and radiological findings plays a crucial role in establishing an accurate diagnosis, determining tumor characteristics, and guiding therapeutic decisions.

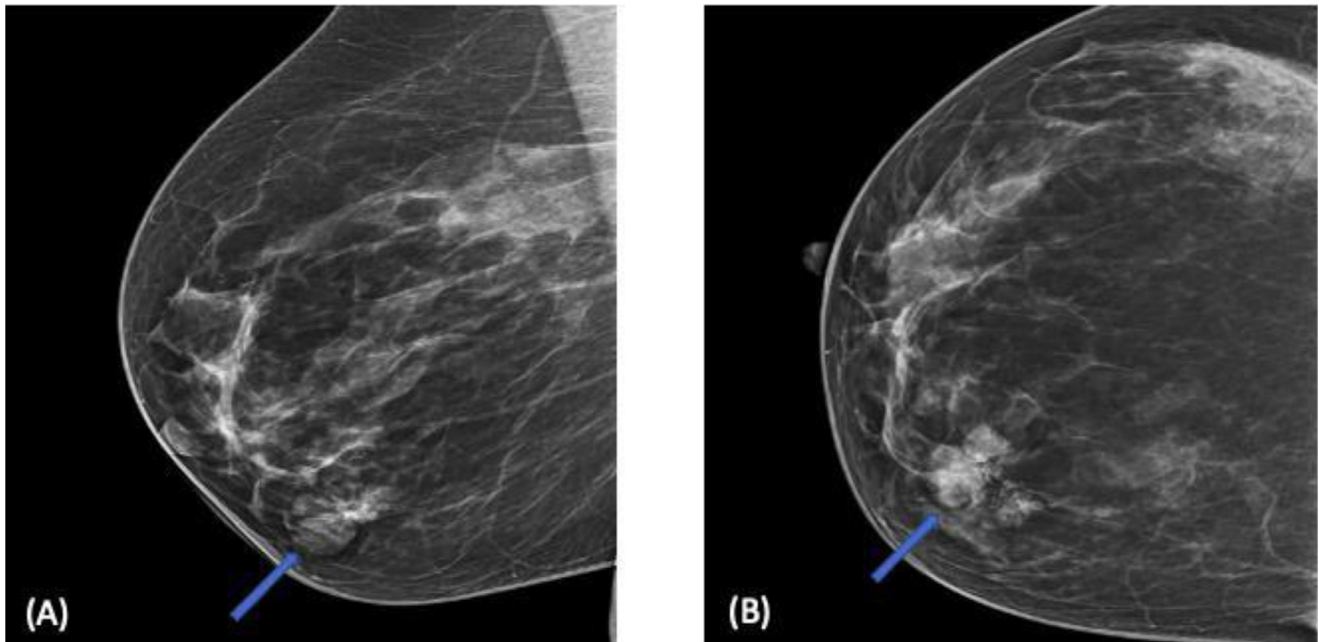
<sup>☆</sup> Competing Interests: The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

\* Corresponding author.

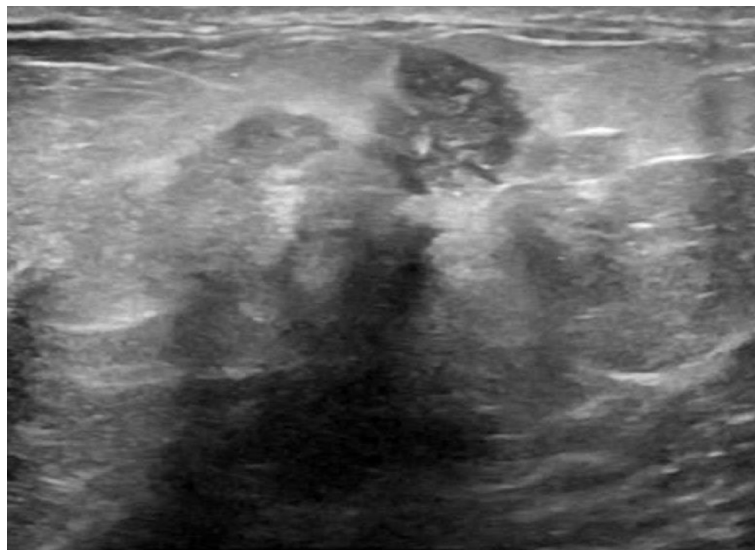
E-mail address: [malaklina.zark@gmail.com](mailto:malaklina.zark@gmail.com) (N. Amsiguine).

<https://doi.org/10.1016/j.radcr.2023.10.047>

1930-0433/© 2023 The Authors. Published by Elsevier Inc. on behalf of University of Washington. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>)



**Fig. 1** – A lateral oblique (A) and cranio caudal (B) mammography images, show a lobular-shaped mass (blue arrows) with a spiculated margin with a heterogeneous internal high-density of the right breast.

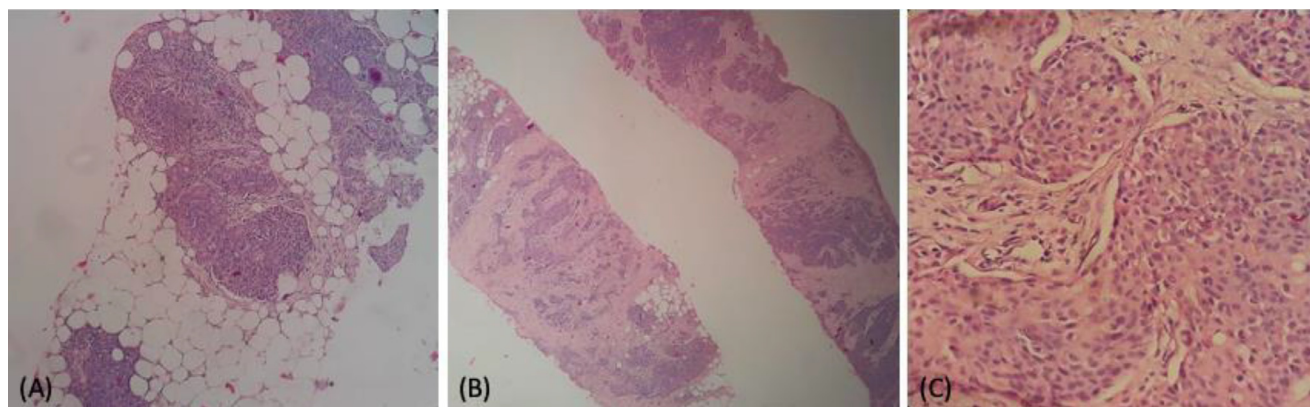


**Fig. 2** – Ultrasound showed a solid mixed hypo- and hyperechogenic mass with irregular margins and posterior acoustic shadowing.

### Case presentation

A 32-year-old woman presented with a palpable mass in the right breast. Mammography revealed an irregular mass with spiculated margins, raising suspicion of malignancy (Fig. 1). Subsequent ultrasound imaging demonstrated a hypoechoic mass with posterior acoustic shadowing (Fig. 2). The patient underwent a core needle biopsy, the histological study found the mammary parenchyma infiltrated by a carcinomatous tu-

mor proliferation, primarily composed of trabeculae and lobules. The tumor cells exhibited moderate cytonuclear atypia. The mitotic index, estimated at 5 mitoses per 10 high-power fields (HPF), indicated an intermediate level of cell proliferation. Based on the morphological aspect and immunohistochemical profile findings, the diagnosis was confirmed with a neuroendocrine aspect of Grade II (3+2+2) according to the Scarff-Bloom-Richardson (SBR) modified by Ellis and Elston. Furthermore, there was no intracanal component and vascular emboli further characterized the tumor (Fig. 3).



**Fig. 3 – (A) Medium-magnification microphotography x 20. (B) Microphotography at low magnification x 10 (C): High-magnification microphotography x 40**

**Breast carcinoma with grade II neuroendocrine appearance:**

**Breast parenchyma infiltrated by a carcinomatous tumor proliferation made up of trabeculae and lobules (Score 3)**

**Tumor cells show moderate cytonuclear atypia (Score 2) Mitotic index estimated at 5 mitoses/10 HPF (Score 2).**

The patient underwent a modified radical mastectomy of the right breast with axillary dissection.

## Discussion

Neuroendocrine carcinomas are an uncommon occurrence as they typically develop in organs like the lung and gastrointestinal system, and the presence of such tumors in the breast is even less common. The prevalence of NEBC has been described in the literature as between 2% and 5% [1]. Although the first 2 cases of NEBC were identified in 1963, The World Health Organization (WHO) did not recognize it as a distinct type of breast cancer until 2003 [3], and its classification has been a source of controversy. The latest 2019 WHO highlights the need to enhance the clinical relevance of these tumors, clarify the diagnostic repeatability of these tumors, and adhere to the recently implemented uniform categorization of NENs occurring in various organs [4].

Similar to other breast cancers, NEBC is more prevalent in female patients from 60 to 70 years old, but cases of younger females and males were also registered [5]. Diagnoses and treatments for neuroendocrine carcinomas might be difficult because of their unique clinicopathological characteristics.

Radiological imaging plays a vital role in the diagnosis and staging of neuroendocrine carcinoma of the breast. Their most common mammographic appearance was a hyperdense, irregularly shaped solitary mass without calcifications [6]. In our case, Ultrasound showed a hypoechoic mass with an infiltrative nature (Fig. 2). Mammography showed a shaped mass with a spiculated margin with a heterogeneous internal signal intensity, which indicates its variable cellularity and stromal components (Fig. 1), and there is no case report with radiology and pathology findings similar to ours. Günhan et al. attempted to describe the mammography features of NEBCs: high-density and spiculated or lobulated margins, and on ultrasound: homogeneously hypoechoic masse. However, in-

cluding the cases of Günhan et al. [11], the number of cases with radiology findings has been too small to allow generalization of the imaging features.

To identify distant metastases and rule out the chance that the breast tumor is a metastasis from early NETs developing in other organs, computed tomography (CT) is used. It is potent to undertake positron emission tomography (PET)-CT to check for metastases.

Since these tumors share cytological characteristics with other kinds of carcinomas, fine-needle aspiration cytology may not be sufficient for the diagnosis of NEBC. Therefore, a core needle biopsy or surgical procedure is used to get a final diagnosis [7]. The neuroendocrine markers in NEBC are frequently found via immunohistochemistry. Both sensitivity and specificity tests have demonstrated the superiority of chromogranin and synaptophysin [8].

There are conflicting data regarding the prognosis of NEBC compared to other breast carcinomas [2]. In a retrospective study comparing NEBC cases with non-NEBC control cases. Patients with NEBC showed an overall lower disease-free survival linked with a larger tumor and a lack of surgical interventions [9]. Although not all NEBC prognoses are equal, the proliferative index and the histologic subtype are factors to consider [10].

Neuroendocrine breast cancer (NEBC) is a rare and poorly understood type of breast cancer, making treatment decisions challenging due to the limited available data specific to NEBC.

In early NEBC cases, the primary treatment is typically surgery. Adjuvant therapy is chosen based on general breast cancer guidelines, as there are no distinct treatments tailored specifically for NEBC, whether it's in its early stages or has metastasized.

There is no established chemotherapy regimen exclusively for NEBC, so treatment choices may depend on the histopathological characteristics of the tumor however Somatostatin analogs (SSAs) and peptide receptor radionuclide therapy (PRRT) targeting somatostatin receptors could be explored as potential options for NEBC treatment [11].

---

## Conclusion

Neuroendocrine carcinoma of the breast (NEBC) is a rare and aggressive type of breast cancer. The aggressiveness of these cancers necessitates accurate identification and therapy planning. Mammography, ultrasonography, and MRI are only a few of the radiological imaging procedures that are essential for determining the features and size of tumors. To establish the tumor's neuroendocrine origin, immunohistochemical and histopathological analyses are required. The prognosis varies depending on the tumor's size, stage, histologic subtype, and proliferative index.

Surgery, radiation therapy, chemotherapy, and targeted therapy are frequently used as treatment options. For the best management of NEBC, a multidisciplinary approach is essential. To better understand and achieve the goals for this rare subtype.

---

## Patient consent

Written informed consent was obtained from the patient for publication of this article.

---

## REFERENCES

- [1] Tavassoli FA, Devilee P. World health organization classification of tumours: pathology and genetics of tumours of the breast and female genital organs. Lyon, France: IARC Press; 2003. p. 32–4.
- [2] Inno A, Bogina G, Turazza M, Bortesi L, Duranti S, Massocco A. Neuroendocrine carcinoma of the breast: current evidence and future perspectives. *Oncologist* 2016;21(1):28–32. doi:10.1634/theoncologist.2015-0309.
- [3] Sapino A, Bussolati G. Is detection of endocrine cells in breast adenocarcinoma of diagnostic and clinical significance? *Histopathology* 2002;40:211–14.
- [4] WHO Classification of Tumours Editorial Board WHO classification of tumours of the breast, vol. 4. 5th ed. Lyon: International Agency for Research on Cancer; 2019.
- [5] Wang J, Wei B, Albarracin CT, Hu J, Abraham SC, Wu Y. 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] Gallo M, Campione S, Di Vito V, Fortunati N, Calzo FL, Messina E, et al. Primary neuroendocrine neoplasms of the breast: still open issues. *Front Endocrinol* 2020;11:610230.
- [7] Zhu Y, Li Q, Gao J, He Z, Sun R, Shen G, et al. Clinical features and treatment response of solid neuroendocrine breast carcinoma to adjuvant chemotherapy and endocrine therapy. *Breast J* 2013;19:382–7.
- [8] Righi L, Sapino A, Marchio C, Papotti M, Bussolati G. Neuroendocrine differentiation in breast cancer: established facts and unresolved problems. *Semin Diagn Pathol* 2010;27:69–76.
- [9] Bogina G, Munari E, Brunelli M, Bortesi L, Marconi M, Sommaggio M, et al. Neuroendocrine differentiation in breast carcinoma: clinicopathological features and outcome. *Histopathology* 2016;68:422–32.
- [10] Cloyd JM, Yang RL, Allison KH, Norton JA, Hernandez-Boussard T, Wapnir IL. Impact of histological subtype on long-term outcomes of neuroendocrine carcinoma of the breast. *Breast Cancer Res Treat* 2014;148:637–44.
- [11] Günhan-Bilgen I, Zekioglu O, Ustün EE, Memis A, Erhan Y. Neuroendocrine differentiated breast carcinoma: imaging features correlated with clinical and histopathological findings. *Eur Radiol* 2003;13:788–93.