VIA MEDICA

CASE REPORT

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Breast apocrine carcinoma: a case report and review of literature

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Medical Research Journal 2023; Volume 8, Number 4, 312–316
10.5603/mrj.96297

ISSN 2451-2591
e-ISSN 2451-4101

ABSTRACT

Breast cancer is known to be the most common malignancy in women worldwide, the spectrum of the histological type varies from common types as invasive ductal carcinoma, of no special type to a rare variety as apocrine breast carcinoma. This study reports a case of apocrine carcinoma in a 60-year-old female patient, exploring the diagnosis strategies and management of this case.

Key words: breast apocrine carcinoma, androgen receptors, chemotherapy, radiotherapy

Med Res J 2023; 8 (4): 312–316

Introduction

Apocrine carcinoma is a very rare type of breast cancer with an incidence of < 1% of female invasive cancer. The clinical presentations as well as the radiological features are not different from other common types of breast cancer, the diagnosis is mainly through histo-pathological examination. Microscopically, breast apocrine carcinoma demonstrates the same architectural growth pattern seen in invasive ductal carcinoma [1]. The apocrine epithelium has a characteristic steroid receptor profile that is oestrogen and progesterone receptor-negative and androgen receptor-positive [2].

Case presentation

A female patient aged 60 years, presented with a recent history of left breast lump, unremarkable past medical history and no family history of malignancy. Mammogram (Fig. 1, 2) and breast ultrasound (Fig. 3) revealed a 30 × 25 mm suspicious lesion in the lower central part of the left breast. The core biopsy confirmed

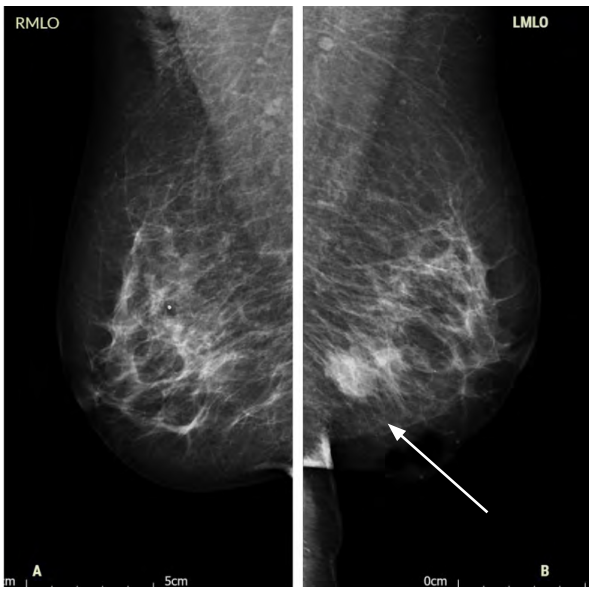

Figure 1. Mammogram (MLO view): Soft tissue density lesion in the lower medial posterior left breast (arrow) with another small area of density anterior to the index mass

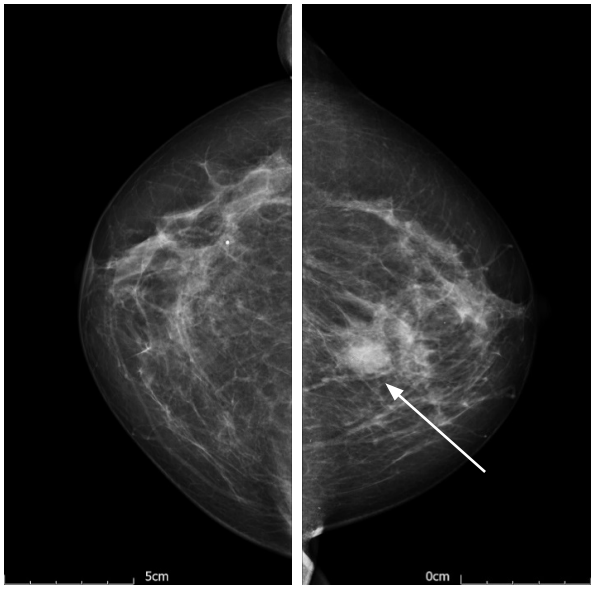

Figure 2. Mammogram (CC view): Soft tissue density lesion in the lower medial posterior left breast (arrow) with another small area of density anterior to the index mass

Discussion

Apocrine glands are a subcategory of exocrine glands [3], release their secretions by "decapitation or pinching-off their apical portion (Fig. 5). The breast apocrine glands secrete fat droplets into breast milk where those in the skin and eyelid are sweat glands. Apocrine carcinoma of the breast is a rare form of malignancy mainly affecting women, however, it can develop in men also [4]. It is seen more frequently in the age group (50–79), some studies indicated a higher rate of apocrine carcinoma (and AR expression) in the elderly and also a tendency of lower rates seen in white women [5]. It has been reported that between 0.5–4% of all breast cancers belong to this type, however, Malley and Bane in 2012, stipulated that such variability is likely to be due to a lack of well-defined diagnostic criteria. Currently, it is regarded as a specific form of breast invasive ductal carcinoma of no special type that primarily involves the milk ducts and migrates to other parts of the breast [4]. The characteristic apocrine pattern of the tumour cells may show abundant

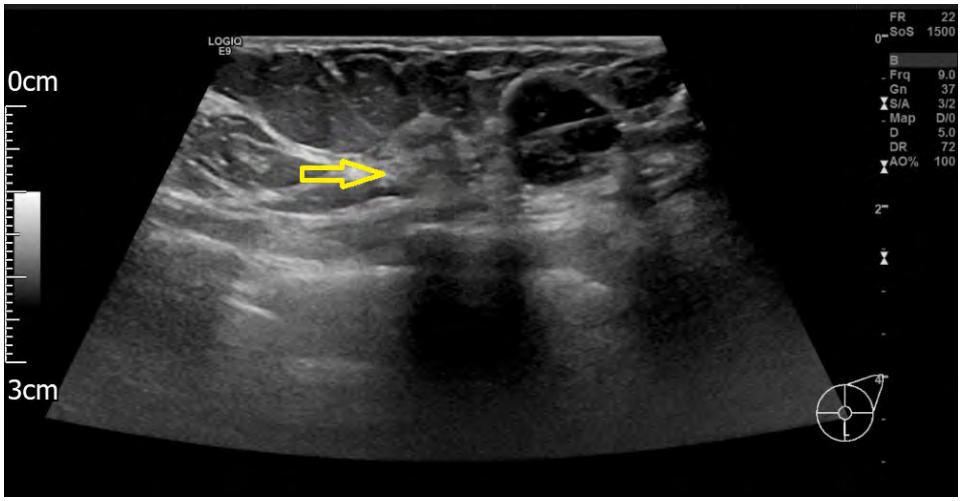

Figure 3. Left breast irregular mass lesion in the lower central part of the left breast (arrow), there is an anterior component continuous with the main mass, the total dimension measures 30 × 25 × 18 mm

triple negative apocrine invasive breast carcinoma. The patient underwent wide local excision with sentinel lymph node biopsy. The post-operative histology revealed triple negative, node-negative 35 mm breast apocrine carcinoma admixed with high nuclear grade DCIS, Ki67 10%, and the tumour cells staining showed a positive expression to AR (Androgen receptors) (Fig. 4).

The patient has been offered postoperative adjuvant chemotherapy (has 7% survival benefit at 10 years) in addition to radiotherapy to the left breast.

eosinophilic granular cytoplasm and prominent multiple nucleoli.

UK Cancer Research data shows 56,000 new breast cancer cases in the UK every year, which is more than 150 every day. This puts breast cancer as the most common malignancy in the UK for both women and men, it is responsible for 15% of all newly diagnosed cancer cases, followed by prostate cancer which accounts for 14%, lung 13%, where bowel cancer is the 4th most frequent cancer in the UK, accounting for 11% of all newly diagnosed cancer cases. The

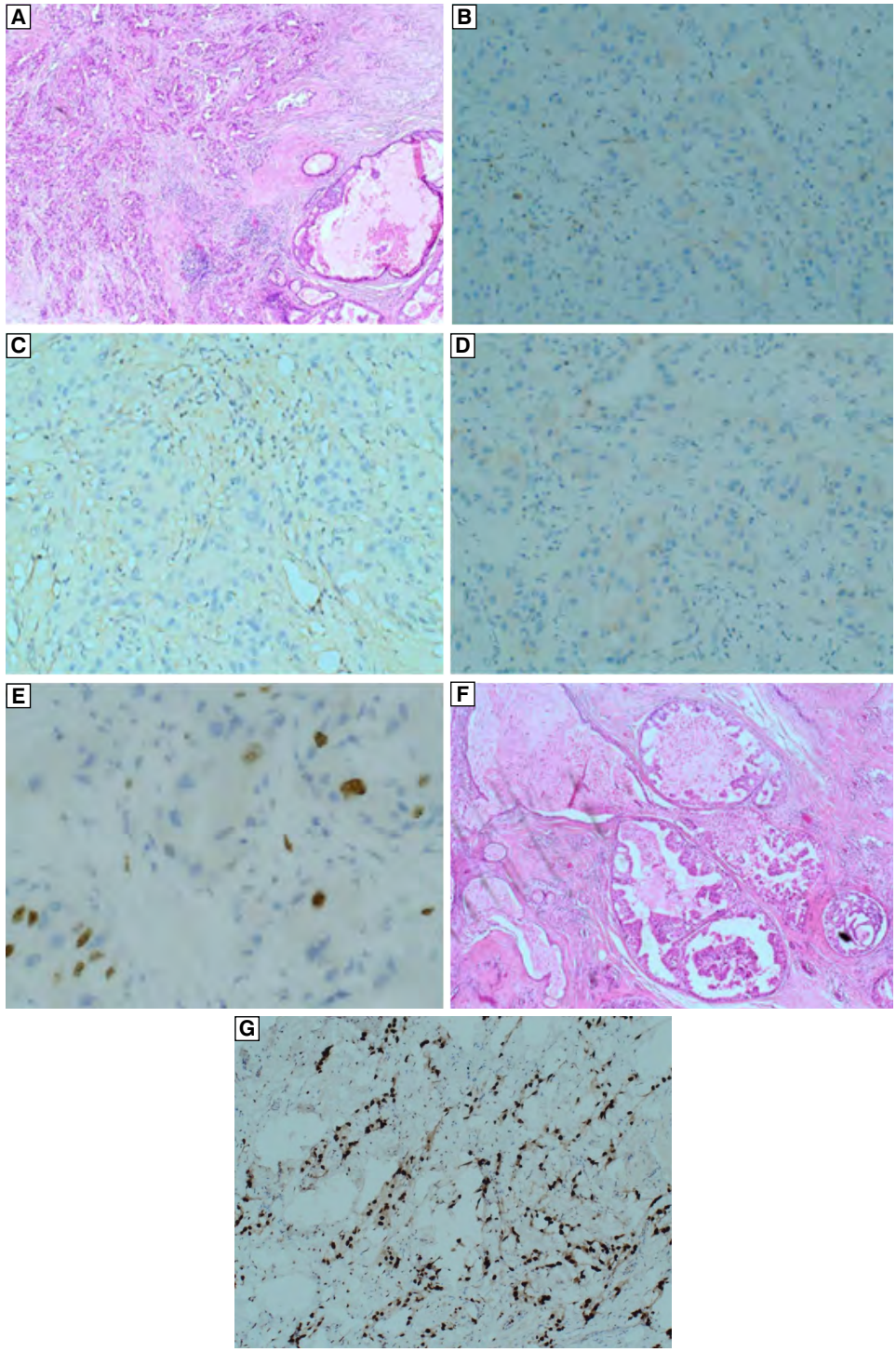

Figure 4. (A) H&E ×40 Breast lesion showing primary apocrine carcinoma (In-situ component lower right; (B) ×200 , ER –VE; (C) ×200, PR –VE; (D) ×200, Her-2, -VE; (E) ×400, Ki67 –10%; (F) Part of the tumour shows predominant DCIS section; (G) Androgen receptors +VE

GLOBOCAN (World Health Organization Global Cancer Institute) also reports that breast cancer has replaced lung cancer and became the most frequently encountered cancer globally with 2.3 million breast cancer new cases in both genders every year (11.7% of total newly diagnosed cancers). In regard the mortality, in the UK, lung cancer is the most frequent cause (21% of all cancer deaths), bowel cancer comes in second place (10%) and prostate cancer comes in third (7.3%). There are around 11,500 breast cancer deaths in the

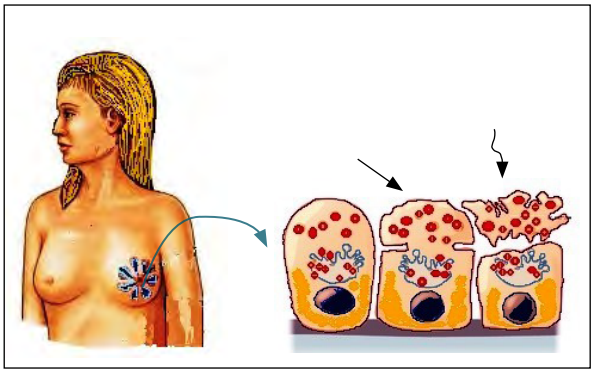

Figure 5. Mechanism of apocrine secretion where the apical part of the cell is pinched-off and transported into the milk duct to be part of the milk

UK every year, that is 32 every day, with those figures breast cancer is recognised as the 4th most common cause of cancer death in the UK, accounting for 6.8% of all cancer-related deaths [5–7].

Elston-Ellis modification of the Bloom and Richardson grading system (also knowns as Nottingham histologic grade) are used to grade apocrine carcinoma as well as other types of breast cancer [8, 9], this used the tubule formation, nuclear pleomorphism and mitotic activity to assess the tumour grade. The majority of apocrine carcinomas are grade 2 and 3, where the mitotic activity is usually moderate to high in triple-negative apocrine carcinomas [10]. Invasive apocrine carcinoma may be associated with an in situ apocrine component as in other invasive breast cancer subtypes [11]. Majorities of studies have revealed that the radiological and clinical presentations of apocrine carcinomas are identical to invasive ductal carcinomas [2, 11]. Also, microscopically, apocrine carcinomas demonstrate the same architectural growth pattern as invasive ductal carcinomas of no special type, differing only in their cytological appearances [12]. The cells will demonstrate typical apocrine features of abundant eosinophilic granular cytoplasm and prominent multiple nucleoli. Areas of apocrine differentiation have been reported in other special-type cancers, particularly lobular carcinomas [12].

Generally, the benign apocrine lesions have shown oestrogen (ER) and progesterone receptors (PR) negative, however, show androgen receptors (AR) positive. This unique receptor profile will be retained in apocrine DCIS but can be variable in invasive tumours. It could be argued that the difference in variability is due to diagnostic criteria differences, usage of different antibody clones and cut-off levels. Nevertheless, the presence of high rates of AR positivity in these invasive tumours could perhaps expand the future therapeutic options for these patients [12]. A study conducted by Tsutsumi identified the importance of adding androgen receptors to immune-histochemical panels, to differentiate apocrine carcinoma from triple-negative breast cancer [10].

Triple-negative Apocrine Carcinoma (TNAC) is a rare pathological sub-type of breast cancer and is associated with AR-positive expression. Another immuno-histo-chemical marker used for apocrine breast carcinoma is GCDPF-15 (Gross Cystic Disease Fluid-15, this is to confirm the breast origin of the tumour [1].

Breast apocrine carcinomas are usually managed in ways similar to other breast cancer subtypes, the mainstay treatment option is surgery, which involves breast conservation surgery, mastectomy and axillary surgery when indicated, in addition to adjuvant treatment with hormonal manipulation, radiotherapy or chemotherapy. The clinicopathological features and prognosis of those tumours have been published in a limited number of studies recruiting a small number of patients [13]. As a result, the clinicopathological features, prognosis and management plan in these patients are unclear.

Mills et al. reported a cohort of 46 patients with breast apocrine carcinoma, they concluded that apocrine carcinoma is more frequently seen in the older age group with smaller tumour size and lower histological grade when compared with triple-negative other subtypes of breast cancer, however, there were some cases of non-triple negative breast apocrine cancers included [14]. The triple-negative apocrine breast carcinoma has a favourable OS (overall survival) outcome in comparison to other types of breast triple-negative cancers [15]. However, other researchers claimed that there is no OS difference between breast apocrine carcinoma and other breast cancer subtypes, this is why larger cohort studies are recommended to learn more about clinic-pathological aspects and disease prognosis in breast apocrine carcinoma [16–18]. Another useful predictive and prognostic indicator for breast cancer is the Ki-67 proliferative index, in the breast apocrine carcinoma Ki-67 expression is regarded as one of the most crucial biomarkers influencing patients' survival [19, 20].

Conclusions

Breast apocrine invasive carcinoma is a rare entity of breast malignancy, mainly encountered in the older age group, high index of suspicion and immunohistochemistry including AR study are required to confirm the diagnosis.

Article information

Ethics statement: *Hereby, on behalf of the authors I, Dr Abdalla Saad Abdalla Al-Zawi, consciously assure that for the manuscript titled "Breast apocrine*

carcinoma: a case report and review of the literature"/ the following is fulfilled:

1. *This material is the authors' own original work, which has not been previously published elsewhere.*
2. *The paper is not currently being considered for publication elsewhere.*
3. *The paper reflects the authors' own research and analysis truthfully and completely.*
4. *The paper properly credits the meaningful contributions of co-authors and co-researchers.*
5. *The results are appropriately placed in the context of prior and existing research.*
6. *All sources used are properly disclosed (correct citation).*
7. *All authors have been personally and actively involved in substantial work leading to the paper and will take public responsibility for its content.*

Author contributions: *All authors have been personally and actively involved in substantial work leading to the paper, and will take public responsibility for its content.*
The paper properly credits the meaningful contributions of co-authors and co-researchers.

Acknowledgements: *None.*

Conflict of interest: *None.*

Supplementary material: *None.*

Funding: *None.*

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