

Pure Invasive Apocrine Carcinoma of the Breast: A Rare Entity

Sayeedul Hasan Arif, Nazima Haider, Hena A. Ansari*, Suhailur Rehman, Mohammad Habib Raza

Departments of Pathology and General Surgery, Jawaharlal Nehru Medical College, Aligarh Muslim University, Aligarh, India

Abstract

Pure apocrine carcinoma of the breast is one of the rare variants of invasive breast carcinoma. Significant research has been conducted on cases of apocrine carcinoma, and the results may help in development of new therapies and assessing prognosis. We hereby present a case of pure invasive apocrine carcinoma in a 50-year old female, with a short review of recent developments with regard to this lesion.

Keywords: Pure apocrine carcinoma, Breast, Molecular research

Introduction

Apocrine carcinoma is a rare variant of invasive ductal carcinoma (IDC) with distinctive cytohistological features. Apocrine change is frequently encountered as a part of pregnancy and lactational changes as well as in benign lesions in the female breast, most commonly in fibrocystic breast disease. Although the prognosis does not differ from that of classical infiltrating ductal carcinoma, understanding the molecular changes that result in this morphologically unique tumor, may be helpful in development of better therapeutic options. We hereby present a case of invasive apocrine carcinoma (IAC) of the right breast in a 50-year old female.

Case Report

A 50-year-old female presented with a mass in her right breast, which rapidly increased in size over a one-year period. Local examination revealed a firm to hard, non-tender mass in the upper outer quadrant of the right breast, 2 x 2 cm in size. The mass was attached to the skin but not to the deeper structures. Right axillary lymph nodes were palpable. On general examination, the patient was anemic (hemoglobin: 8 g/dl). There were no other significant systemic findings. Other routine investigations were within normal limits. Modified radical mastectomy of the right breast was performed after confirmation of the diagnosis of IAC following a biopsy of the mass.

♦Corresponding Author:

Hena A. Ansari, MD
Department of Pathology
Jawaharlal Nehru Medical
College Aligarh Muslim
University, Aligarh 202002,
Uttar Pradesh, India
Email: y_ans18@yahoo.com



There was no history of previous or pre-existent breast disease. Family history was also negative.

On gross examination, a firm solid white growth of 3×2.5×2 cm was seen that involved the outer and upper quadrants of the resected mastectomy specimen. On cut surface examination, the growth was solid and homogenous. Microscopic examination of hematoxylin and eosin stained sections showed large polygonal cells with pleomorphic nuclei, a high nuclear/cytoplasmic ratio, prominent nucleoli, and abundant eosinophilic granular cytoplasm in sheets, cords, and ducts that infiltrated the stroma of the breast (Figures 1 a, b).

These malignant cells with apocrine features were diffusely located throughout the tumor area, rather than in a focal zone as one would expect with simple apocrine change of the ductal cells. There were 2-3 mitotic figures/high power field. Vascular and neural invasion was evident in the sections examined. Of the lymph nodes sampled, there were eight nodes positive for malignant cells. On immunohistochemistry (IHC), the tumor areas were strongly positive (3+) for gross cystic disease fluid protein (GCDFP-15; Figure 2a) and Her2/neu (Figure 2b), but negative for estrogen (ER) and progesterone (PR) receptors.

The diagnosis was confirmed as IAC of the right breast with axillary lymph node, vascular and lymphatic invasion.

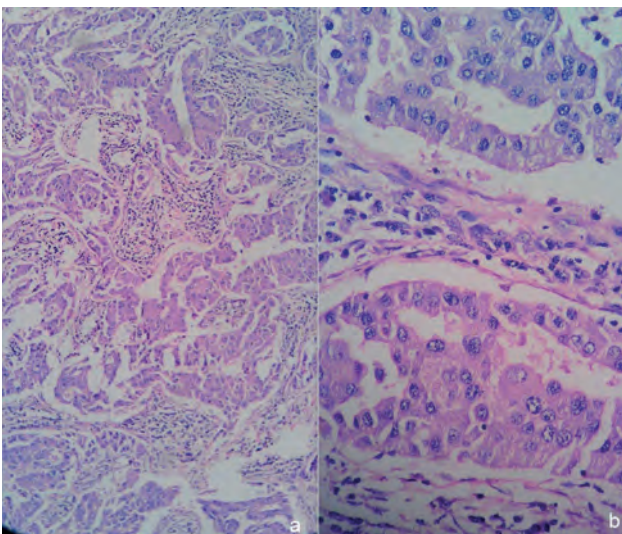


Figure 1. a: Low and b: High power view of invasive carcinoma showing typical apocrine features in all cells (H&E, 100× and 400×).

The patient underwent treatment with chemotherapy and radiotherapy. However, she presented with a recurrent lump in the scar site one year later which was surgically removed.

Discussion

Apocrine carcinoma of the breast is clinically indistinguishable from IDC, although older age and postmenopausal status are reported to be more common.¹ Pure apocrine carcinoma or one that is composed mainly of apocrine cells is rare and the incidence is less than 0.5% of all breast carcinomas.² Microscopically, the cells are usually characterized by abundant eosinophilic granular cytoplasm, prominent, often multiple nucleoli and a sharply defined cell border, composing at least 75% of tumor cells.³ Some studies have shown pure the IAC subtype to be less aggressive than high grade IDC-NOS (Not Otherwise Specified), while other studies show no clear differentiation in prognosis compared to the usual IDC.^{3,4}

However, apocrine tumors have been reported to have an altered hormonal receptor pattern. The percentage of ER and PR positivity is low and there is an over-expression of androgen receptors which is an important feature of apocrine carcinoma.^{5,6} GCDFP-15 reactivity is strong, acting as a marker of apocrine differentiation.^{7,8}

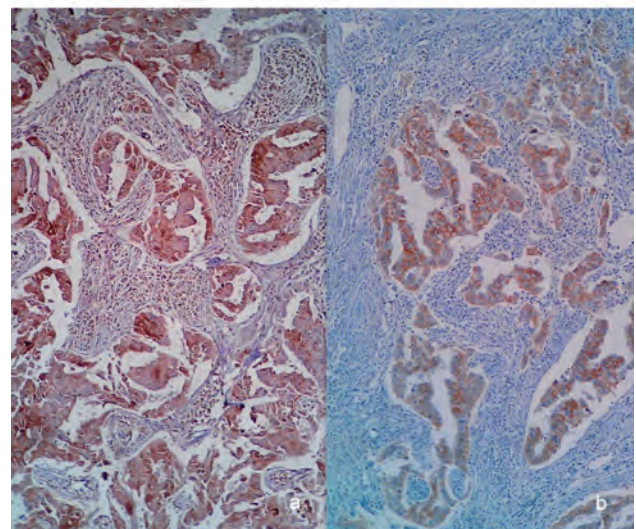


Figure 2. a: Immunohistochemistry (IHC) showing GCDFP-15 positivity. b: IHC showing strong Her 2/neu (3+) positivity.

Differential diagnoses include ductal carcinoma with apocrine changes, secretory carcinoma, histiocytoid carcinoma and lipid-cell rich carcinoma, all of which are relatively uncommon. Pure IACs need to be differentiated from IDC with focal apocrine features. The keyword is 'focal'. The sections from our case showed widespread presence of apocrine cells with malignant features and diffuse positivity for GCDFP-15, thus effectively helping with the diagnosis.

Recent studies demonstrate that apocrine carcinomas correspond to a distinct molecular subtype of breast carcinomas characterized by the expression of 15-prostaglandin dehydrogenase (15-PGDH), hydroxymethylglutaryl coenzyme-A reductase (HMG-CoA reductase), and acyl-CoA synthetase medium-chain family member 1 (ACSM1). They express the phenotype of apocrine sweat glands [15-PGDH(+), ACSM1(+), AR(+), CD24(+), ER α (-), PgR(-), Bcl-2(-), and GATA-3(-)].^{2,9,10} This assists in determining the prognosis, developing targeted therapeutics and identifying novel therapeutic targets for developing new cancer therapies.

Therefore, IAC represent a distinct subgroup of breast cancer. These findings may have potential therapeutic implications for women with IAC.

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