



Mucinous Carcinoma of the Male Breast: A Case Series

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Abstract

Mucinous carcinoma is a rarely encountered breast cancer type in women and men alike. Histologically, mucinous cancers are identified as clusters of neoplastic cells within extracellular mucin. The prognosis of mucinous carcinoma varies depending on whether a patient has the pure or mixed subtype. The prognosis for patients with pure mucinous carcinoma is good with high survival rate, whereas patients with mixed mucinous carcinoma have higher rates of metastasis. Due to the rarity of this type of breast cancer, very little information is known regarding risk stratification and disease management especially within the male population. This series presents three cases of male patients diagnosed with mucinous carcinoma of the breast.

Keywords

Male breast cancer, Oncology, Mucinous carcinoma

Introduction

Male breast cancer is a rare condition which accounts for less than 1% of all breast cancers [1]. As a result, it has been challenging for clinicians and researchers to characterize the disease presentation and management strategies for the male population. The majority of data regarding the diagnosis and therapeutics are based on female breast cancer patients [2]. However, some key differences that are well documented are that male breast cancer typically occurs at a later age and presents at a more clinically advanced stage than female counterparts. In terms of molecular profile, male breast cancer is almost always Estrogen Receptor (ER) positive (82% compared to 69% in females), likely to be Progesterone Receptor (PR) positive (75% compared to 56% in females), and unlikely to be Human Epidermal Growth Factor Receptor (HER-2) positive (34% compared to 25% in females) [3]. Further, the majority of male breast cancers are ductal carcinoma in origin [4].

Mucinous carcinoma is an uncommon histological subtype of breast cancer. It accounts for approximately 2% of the female breast cancer population and is thought to be even rarer within the male breast cancer population [5]. Mucinous carcinoma, also known as colloid carcinoma or gelatinous carcinoma is characterized on histopathology by clusters of neoplastic cells that are suspended in extensive extracellular mucin [6]. Histopathological-

ly, mucinous carcinoma is sub-classified into two types: Pure and mixed. The pure form is defined as a lesion where rich extracellular mucin constitutes 90% of the tumor area, whereas the mixed type is defined as having a mucinous and invasive ductal carcinoma component [6,7]. Pure mucinous carcinoma is generally benign, with a lower incidence of metastatic nodal involvement and a higher survival rate than mixed mucinous carcinoma, which is known to be more aggressive in nature.

This case series documents the case history and discussed the diagnostic and therapeutic modalities used for mucinous carcinoma in the male breast.

Case Presentation

Case 1

A 74-year-old gentleman presented with a slow grow-

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Received: October 03, 2017; **Accepted:** November 04, 2017;
Published online: November 06, 2017

Citation: Kulshreshtha A, Wan BA, Yee C, et al. (2017) Mucinous Carcinoma of the Male Breast: A Case Series. Ann Breast Cancer Ther 1(1):15-17

ing, painful swelling in the right lower axilla. He had no family history of breast or ovarian cancer. His past medical history was significant for intracardiac thrombus, hypertension and dyslipidemia. There was no history of breast trauma or hormone use. A bilateral mammogram revealed benign densities, but no evidence of primary breast cancer. The patient had a right lumpectomy. The tumor was 5.5 × 2.4 cm extending to the deep margin. He underwent a re-excision of the area, and there was no evidence of any residual disease. Eight lymph nodes were also excised and were all found to be negative. Pathology of the tumor provided a diagnosis of grade 1 mucinous adenocarcinoma, Estrogen Receptor (ER) positive and Progesterone Receptor (PR) positive. Post-operative examination revealed no palpable nodes or abnormal masses. The patient was started on tamoxifen and received adjuvant radiotherapy to the right breast to a dose of 4256 cGy in 16 fractions. At his most recent follow-up appointment, 6 months after his definitive treatment, he was with no obvious signs of recurrence.

Case 2

A 63-year-old gentleman noticed a painful, mobile, lump in the outer lower quadrant of his right breast. He had no personal or family history of breast cancer. His past medical history was significant for diabetes, coronary heart disease, hypertension, dyslipidemia and osteoarthritis.

He had a mammogram which was negative. A year later, after a second mammogram came back negative, the patient had an excisional biopsy of the painful lump, which confirmed invasive mucinous carcinoma in the right breast. He then underwent a right mastectomy, with dissection of 14 lymph nodes. Invasive ductal carcinoma with mucinous features was present as well as Ductal Carcinoma *In Situ* (DCIS). The tumor was 2.1 cm, grade 2 ER positive 95%, PR positive 85%, Human Epidermal Growth Factor Receptor (HER-2/neu) negative, with no lymphovascular invasion. All 14 resected lymph nodes were clear of disease. Because the patient had a small, localized tumour and no lymph node involvement, adjuvant radiation or endocrine therapy was not considered necessary.

The patient was last seen 5 months after his definitive surgery, and remained disease free at that time.

Case 3

This patient, a 54-year-old male, discovered a slow growing lump in his right breast over 2 years. On examination, he had a 3 × 3 cm mass within the right breast, as well as multiple palpable mobile axillary lymph nodes. A core biopsy was done revealing grade III invasive ductal carcinoma. He was an otherwise healthy man with no

significant comorbidities and no family history of breast, prostate or ovarian cancer.

The patient had a right mastectomy and axillary node dissection. Pathology revealed a 2.3 cm, grade III mucinous carcinoma that was ER and PR positive but with unknown HER2/neu status. Eighteen out of 27 lymph nodes were involved, with multiple extranodal extensions.

Adjuvant anthracycline based Cyclophosphamide, Epirubicin, 5-Fluorouracil (CEF) chemotherapy was started. However, the chemotherapy was not well-tolerated, and after two cycles of CEF chemotherapy, the patient was switched to 5-Fluorouracil, Epirubicin, Cyclophosphamide (FEC) chemotherapy for six cycles. He was then started on tamoxifen and underwent adjuvant radiotherapy to the chest wall and regional lymph node bearing areas at a dose of 5,000 cGy in 25 fractions.

Seven years later, the patient presented to the emergency department with gait instability and a history of falls. He had stopped taking tamoxifen 2 years prior, of his own accord. Imaging revealed metastatic disease to the brain, skull, lungs, and bone. He received palliative whole brain radiation followed by paclitaxel chemotherapy. His metastatic disease remained fairly stable.

A year later, the patient underwent resection of his brain metastases, which were causing weakness in the left side of his body. Post-operatively, he had significant decline. He was last seen in clinic a few months afterwards, with stable intracranial disease and on tamoxifen therapy and dexamethasone.

Discussion

Male breast cancer accounts for less than 1% of all cancers in men and the incidence increases with increasing age [8]. Invasive ductal carcinoma is the most common type of MBC [6]. Over the years, very few cases of primary mucinous carcinomas in the male breast have been reported and the presentation is thought to be extremely rare [6,9-11]. Other than mucinous carcinoma, various histologically rare types such as medullary, tubular, apocrine, adenoid cystic and secretory carcinomas have been reported in the male breast [12]. Most mucinous carcinomas present as a palpable mass; however, this is the case for various conditions, including benign diseases of the breast such as gynecomastia or desmoid tumors [1-4].

It has previously been suggested that prognosis in male breast cancer is poor as a result of the size of the tumor and the probability of involvement of surrounding structures. Therefore, prognosis has been largely dependent on the stage at diagnosis determined by tumor size and nodal metastasis [13]. The first two patients in

this case series remained disease free from breast cancer perspective. However their follow up was limited. The patient in Case 3 developed brain metastasis from his breast cancer, and received palliative treatment for his cancer recurrence including chemotherapy, radiation and surgery.

Conclusion

Mucinous carcinoma is an uncommon variant of breast cancer and rarely encountered in clinical practice [1]. The majority of information regarding the treatment and prognosis for mucinous carcinoma of the breast are based on case series and reports [14]. In order to devise clear guidelines and recommendations about the clinical management of this condition, especially within the male population, more information and research is needed.

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