



## Papillary Carcinoma of the Male Breast: A Case Series

Caitlin Yee, Bo Angela Wan, Leah Drost, Justin Lee, Vithusha Ganesh, Akanksha Kulshreshtha, Danny Vesprini, Henry Lam and Edward Chow\*

Department of Radiation Oncology, Odette Cancer Centre, Sunnybrook Health Sciences Centre, University of Toronto, Toronto, Ontario, Canada

### Abstract

Papillary carcinoma and papillary carcinoma *in situ* refer to histological groups of invasive and pre-invasive breast cancers. Although papillary carcinoma of the breast is very rare overall, it appears a relatively more common subtype within diagnoses of male breast cancer compared to diagnoses within female breast cancer. Epidemiological data suggest that survival of papillary carcinoma may be better compared to the most common form of breast cancer, invasive ductal carcinoma. However, due to the limited number of reported cases and the wide range of specific diagnoses with regards to the sub-type of papillary carcinoma, there is a lack of standardization of treatment and high variability in treatment plans. This series presents the cases of five men, each diagnosed with papillary carcinoma of the breast.

### Keywords

Male breast cancer, Papillary carcinoma

### Introduction

Male Breast Cancer (MBC) is very rare, accounting for just 1% of all breast cancer cases [1-4]. As with Female Breast Cancer (FBC), there are a variety of forms that the disease can take. However MBC and FBC are thought to be distinct diseases with different forms and presentations [3,5]. MBC is generally diagnosed later in life and at more advanced stage of disease than FBC; there are many factors that may contribute to this discrepancy, including the unique diagnostic challenges that MBC poses [2,5]. The validity of FBC diagnostic techniques in the context of MBC has been questioned, but because the literature on MBC remains very limited, it is difficult to determine the optimal approach for identification of MBC [1,6].

According to the World Health Organization, papillary carcinoma of the breast is a uniquely differentiated adenocarcinoma with a papillary morphology, but otherwise has no clinical, genetic, or prognostic feature [4,7,8]. However, certain studies suggest that papillary carcinoma may have a better prognosis than Invasive Ductal Carcinoma (IDC) [6]. The relative incidence of papillary carcinoma of the breast appears to be higher in men with breast cancer than women with breast cancer, accounting for 2.6% of cases in men compared to 0.5% of

cases in women [1]. Papillary carcinoma often presents as a painless, subareolar mass that may be accompanied by nipple discharge [1,2,8,9]. Diagnosis of papillary carcinoma can be challenging as these symptoms are associated with a wide variety of male breast diseases such as gynecomastia, which is far more common than MBC [1,10]. Because of the range of characteristics associated with the various forms of papillary carcinoma, accurate diagnosis is key to determine the appropriate course of treatment.

This series describes the cases of five men diagnosed with some form of papillary carcinoma. Their diagnoses include: Encapsulated papillary carcinoma, which generally has good prognosis; invasive papillary carcinoma, which is very rare; and papillary carcinoma occurring

**\*Corresponding author:** Edward Chow, Department of Radiation Oncology, Odette Cancer Centre, Sunnybrook Health Sciences Centre, 2075 Bayview Avenue, Toronto, Ontario, Canada, Tel: 416-480-4974, Fax: 416-480-6002, E-mail: Edward.chow@sunnybrook.ca

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with the most common form of MBC, Invasive Ductal Carcinoma (IDC) [11].

## Case Presentation

### Case 1: Invasive papillary carcinoma

The first patient, a 61-year-old male, presented with a large, palpable lump in his left breast measuring approximately 10 cm in diameter. He had no significant past medical history, and although his father had died of prostate cancer at the age 53 years there was no known history of breast or ovarian cancer in the family. The patient had first noticed the lump four years prior, at which point an ultrasound was performed and nothing of concern was identified. After having remained stable for several years, the lump began to grow rapidly and the patient sought further medical attention. The patient did not experience any pain related to the mass in his breast. A biopsy revealed papillary cells and atypia. This was followed by ultrasound-guided biopsy which showed invasive papillary carcinoma of both the left breast, and a 2.6 cm enlarged axillary lymph node. Staging investigations revealed the presence of pulmonary metastases. Unfortunately, a complete pathology report with the tumor's Estrogen Receptor (ER), Progesterone Receptor (PR), and Human Epidermal growth factor Receptor 2 (HER2) status was not available for this patient.

The patient received ten cycles of palliative chemotherapy with 5-fluorouracil, epirubicin, and cyclophosphamide, followed by docetaxel; the docetaxel was subsequently replaced with paclitaxel after he experienced a severe infusion reaction. Prior to his final cycle of chemotherapy, the patient experienced progression of the left breast mass, and an open fungating region developed centrally at the nipple. Upon completion of chemotherapy the mass had reduced in size. Four months after his initial diagnosis, the patient received 5000 centigray (cGy) in 25 fractions to the left breast, axilla, and supraclavicular region. The patient later had a left sided mastectomy and reconstruction of the thoracic wall with a latissimus flap. The patient responded well to surgery and continued to lead a very active lifestyle while continuing on tamoxifen. Other than the pulmonary metastases that had been present at diagnosis, the patient showed no other signs of metastatic disease.

Approximately six years after his diagnosis of invasive papillary carcinoma, the patient was diagnosed with advanced prostate cancer which was treated with a radical prostatectomy. At last follow up seven years after the initial diagnosis of breast cancer, the patient's breast cancer had not progressed.

### Case 2: Large papillary carcinoma with Ductal Carcinoma *In Situ* (DCIS)

A 77-year-old man presented with substantial bloody nipple discharge on several occasions. He reported no

family history of breast or ovarian cancer, although he did have a brother with esophageal carcinoma. The patient's own medical history included psoriasis, basal cell carcinoma to the nose, and benign prostatic hypertrophy. In addition, the patient had a history of smoking 65 packs per year.

Upon inspection, thickening of the right breast at approximately 10 o'clock relative to the areola was noted. The left breast appeared normal. A bilateral mammogram and right breast ultrasound were suggestive of breast cancer. The patient continued to experience bloody discharge from the nipple and underwent a right lumpectomy. Surgery revealed papillary carcinoma with DCIS. The mass was much larger than anticipated, and given positive margins seen on the initial pathological specimen a second surgery was required to remove the entire tumor. Pathological analysis concluded that the mass was a grade 2 tumor measuring 2.2 cm, ER 95%, PR 100%, and HER2 negative. There was no evidence of lymphovascular invasion, and a sentinel node biopsy was therefore not performed.

The patient went on to have adjuvant radiotherapy, receiving 4256 cGy in 16 fractions to the right breast. Other than skin reaction, which was treated with hydrocortisone cream, the patient tolerated radiotherapy well. At his last follow up, more than two years after his initial diagnosis, the patient remained free of breast cancer recurrence.

### Case 3: Invasive Ductal Carcinoma (IDC) with papillary cores

This 61-year-old patient first experienced bloody discharge from the right nipple. There was no medical history related to cancer and no family history of breast or ovarian cancer. A mammogram revealed a soft tissue density behind the right nipple, and ultrasound findings were compatible with fibroadenoma. Approximately six months later, a second ultrasound was conducted and a hypoechoic area measuring 0.8 × 0.4 cm and extending into the nipple was identified.

A right breast subcutaneous mastectomy, conducted six months later, confirmed the presence of grade 2 invasive duct cancer measuring 0.5 cm, and an adjacent papillary mass, which was ER 100%, PR 95%, and HER2 negative. Three sentinel lymph nodes from the right axilla were removed, and none showed signs of involvement. There was no involvement of the skin. All of the margins for the mastectomy were negative. The patient received 4256 cGy in 16 fractions of adjuvant radiotherapy to the right chest wall. This was followed by treatment with tamoxifen.

At the patient's most recent follow up, approximately three years after his initial treatment, the patient showed no signs of recurrence.

#### **Case 4: Encapsulated papillary carcinoma with DCIS**

A 53-year-old man presented with a lump in the left breast at approximately 3 o'clock relative to the areola, measuring approximately 1.5 cm in diameter. He reported no other symptoms. The patient had no personal history of cancer and no family history of breast or ovarian cancer. A left breast ultrasound revealed a 1.3 cm hypoechoic mass adjacent to the nipple, and biopsy confirmed the diagnosis of grade 2 encapsulated papillary carcinoma. Staging investigations including a bone scan, abdominal ultrasound, and x-ray showed no evidence of metastatic disease.

Approximately 5 months later, the patient had a left lumpectomy and sentinel node biopsy. The mass was an encapsulated papillary carcinoma measuring 1.3 cm, with ductal carcinoma *in situ*. All margins were negative, and all three sentinel lymph nodes removed were negative. The tumour was ER/PR 100%, and HER2 negative. The patient received 5000 cGy in 25 fractions of adjuvant radiotherapy, in addition to a five-year course of tamoxifen.

At his most recent follow up, more than seven years after his initial diagnosis, the patient showed no signs of recurrence.

#### **Case 5: Invasive papillary carcinoma**

The patient was a 67-year-old male who discovered a lump in his right breast. He had a history of dyslipidemia and gastroesophageal reflux disease, and had been a smoker until 20 years prior, with a 50-pack-year history. One of his brothers had been treated for breast cancer, and his father and another brother had been diagnosed with lung cancer. The patient was referred for genetic testing, but refused.

Mammogram and ultrasound revealed an atypical lesion (2.4 × 2 × 1.8 cm) in the retroareolar position of the right breast, at roughly 10 o'clock. A biopsy identified it as a papillary lesion. The patient reported no pain, weight loss, or loss of appetite. Three months later, the patient had a right breast lumpectomy with excision of the nipple/areolar complex, in addition to a sentinel node biopsy of the right axilla. The pathology report confirmed the presence of grade 2 invasive papillary carcinoma, ER 100%, PR 40%, and HER2 80%, with micro-metastases involving 2 sentinel lymph nodes. The patient completed 12 courses of adjuvant chemotherapy with paclitaxel and trastuzumab, despite significant chemotherapy-related side effects such as sensory deficit in the feet and dyshidrotic dermatitis. Upon completion of chemotherapy the patient was intended to continue for a year on trastuzumab, as well as adjuvant radiotherapy.

At his most recent follow up, approximately 9 months after his initial diagnosis, the patient chose to discontinue trastuzumab because of cardiac side effects. He was otherwise well, and showed no signs of recurrence.

#### **Discussion**

All of the patients described above presented with either a palpable mass or discharge from the nipple, which can be signs of several things including gynecomastia and male breast cancer [1]. No patients reported any pain, which is another very common symptom of male breast disease [1,10]. Mammography was used to obtain a diagnosis in 3 of the 5 cases described above. As is the case with female patients, mammography and ultrasound are the primary imaging techniques used in male breast patients; however, there is no standardized imaging protocol for male breast patients [1,3,10]. Some researchers challenge the frequency with which mammography is used in men, citing differences in anatomy between the male and female breast [10,12].

Cases 1 and 5 were patients who had invasive papillary carcinoma. This form of MBC consisting of invasive breast carcinoma with a purely papillary morphology is extremely rare [6]. It should be noted that invasive papillary carcinoma is clinically distinct from micropapillary carcinoma, which is an aggressive form of breast cancer often associated with lympho-vascular invasion and lymph node metastases [6]. The patient in case 1 did not pursue surgery because of his known metastatic disease, whereas in case 5 the patient had a lumpectomy for his local breast cancer. Radiation was recommended for both patients. In case 1, the patient exhibited no signs of recurrence 6 years after his initial diagnosis, although he did develop prostate cancer. Nine months after his diagnosis, the patient in case 5 had not experienced progression or recurrence of his breast cancer.

The patient in case 2 was diagnosed with invasive papillary carcinoma and DCIS. He presented with bloody discharge from the nipple and agreed to a lumpectomy to remove the mass, followed by adjuvant radiation. The patient did not show any signs of recurrence, 2 years after his diagnosis. These results again support the literature that papillary carcinoma occurring with DCIS is associated with positive outcomes [6,8].

In case 3, the patient was diagnosed with IDC, with papillary cores present. IDC is the most common form of breast cancer, accounting for up to 85% of breast cancer cases [4]. The patient in this case opted for a subcutaneous mastectomy, in addition to adjuvant radiotherapy and endocrine therapy. The 5-year disease-free survival for IDC in males is approximately 72%, and the 5-year overall survival for invasive papillary carcinoma regardless of sex is approximately 75% [13,14]. At his most

recent follow up, 3 years after his diagnosis, the patient showed no signs of recurrence.

The patient in case 4 was diagnosed with encapsulated papillary carcinoma with DCIS. This form of papillary carcinoma accounts for up to 7.5% of all male breast cancers [2]. The patient opted for a lumpectomy rather than mastectomy, with adjuvant radiotherapy and endocrine therapy without chemotherapy. This is in agreement with recommended treatments outlined in the literature [8]. The favourable outcome of this case also supports the literature, as encapsulated papillary carcinoma is considered non-invasive and slow to metastasize, with reports of disease-free survival rates after 10 years as high as 91% [2,8].

## Conclusion

This report aimed to describe the presentation, management, and outcome of five cases men diagnosed with varying forms of papillary carcinoma of the breast. All of the patients presented with either a palpable mass or discharge from the nipple, but none reported any pain, which is often a symptom of breast disease [1,10]. Each of the above patients had some combination of surgery, chemotherapy, radiation, and hormone therapy, the most common treatments for MBC and FBC [15]. One of the patients developed prostate cancer several years after his diagnosis of breast cancer, though none of the patients experienced local recurrence of their breast cancer. These outcomes support studies that suggest papillary carcinoma has a relatively high survival rate and low rate of recurrence when compared to infiltrating ductal carcinoma, although other studies have found no significant difference between the two forms of breast cancer [2-4,6-9,12,13]. Mammography is a standard imaging tool in breast cancer; however, two of the five patients discussed in this series were diagnosed without the use of mammography. There is currently no standard protocol for diagnostic imaging in male breast patients; investigation is typically based on the treatment of female patients [10]. The rarity of male breast cancer certainly represents a challenge, but in order to offer male breast patients the best treatment possible, diagnostic and treatment methods that are optimized for men should be further investigated.

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