

Case Report

Solid Papillary Carcinoma with Invasion in the Male Breast: A Case Report and Literature Review

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Keywords

Invasive solid papillary carcinoma · Solid papillary carcinoma with invasion · Male breast cancer · Neuroendocrine differentiation

Abstract

Introduction: Solid papillary carcinoma (SPC) accounts for approximately 1% of all breast cancer cases and occurs primarily in postmenopausal women. We report a rare SPC with invasion in the male breast.

Case Presentation: A 73-year-old Japanese man presented with bloody nipple discharge and a palpable left breast mass. Mammography revealed a well-defined high-concentration mass. Ultrasonography scans demonstrated an intracystic 10 mm mass under the left nipple without enlarged axillary lymph nodes. A core needle biopsy revealed a ductal carcinoma with nuclear grade 1, which excluded an invasive carcinoma. Magnetic resonance imaging exhibited a 7 mm intense early enhancement in the left breast. A left mastectomy and sentinel lymph node biopsy were performed. The patient was diagnosed with pathological stage IA (T1b N0 M0) breast carcinoma, an invasive pure SPC type without neuroendocrine markers. The patient was treated with oral tamoxifen and survived without any recurrence for 12 months. **Conclusion:** Invasive SPC of the male breast may occur as a palpable mass or nipple discharge in older men and has a good prognosis.

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Introduction

Solid papillary carcinoma (SPC) was first reported in 1995, accounting for approximately 1% of all breast cancers [1]. In the 5th edition of the 2019 World Health Organization (WHO) classification, the papillary neoplasms are divided into five categories: intraductal papilloma;

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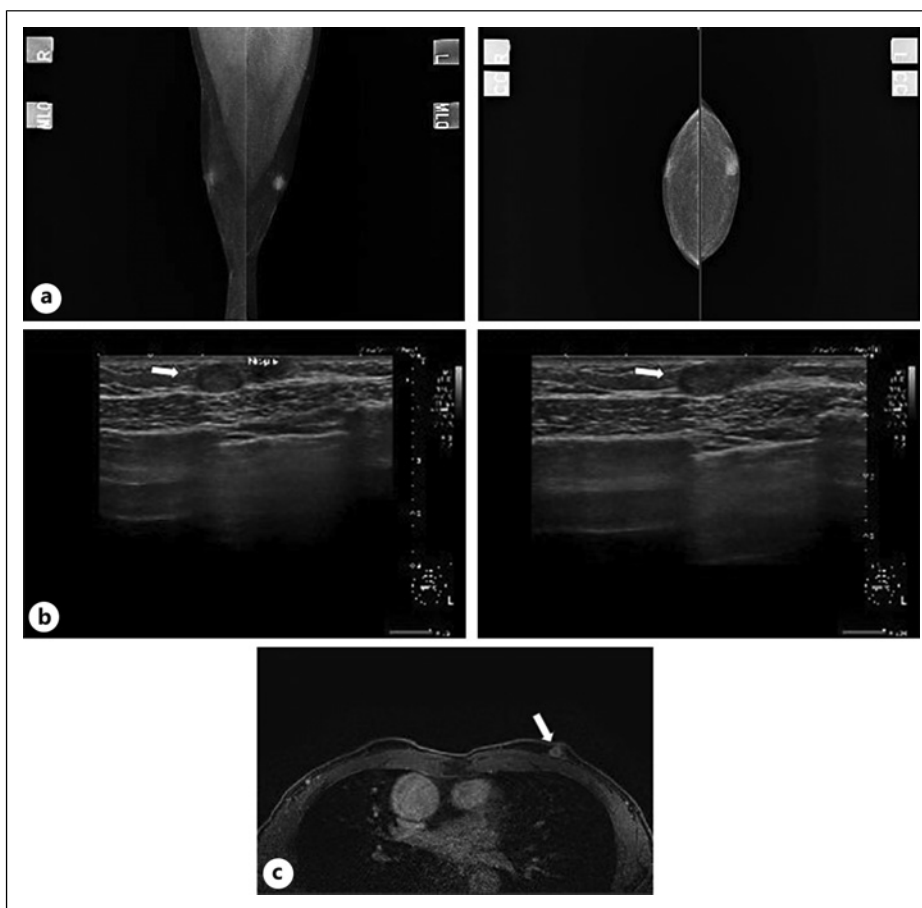


Fig. 1. Mammography, ultrasonography, and magnetic resonance imaging (MRI) demonstrating the left breast tumor. **a** Mammography revealed a well-defined and high-concentration mass. **b** Ultrasonography scans exhibited an intracystic 10 mm mass under the left nipple without enlarged axillary lymph nodes. **c** MRI demonstrated a 7 mm intense early enhancement in the left breast.

papillary ductal carcinoma in situ; encapsulated papillary carcinoma; SPC (in situ and invasive); invasive papillary carcinoma [2]. SPC was initially named breast tumor resembling the tall cell variant of papillary thyroid carcinoma and consisted of circumscribed solid nodules of epithelial cells arranged in nests or papillae and the lack of myoepithelial cells between fibrovascular cores and epithelial cells [3]. SPC has been reported to have an excellent prognosis [2, 4] and occurs primarily in postmenopausal women during or after the seventh decade of life [1, 2] but rarely in men. Male breast cancer accounts for less than 1% of male cancers and 0.6–1.0% of all breast cancer cases, which has recently increased [5]. We report a rare invasive SPC case in a male patient who presented with bloody nipple discharge.

Case Report

A 73-year-old Japanese man visited the outpatient clinic complaining of left nipple bleeding 3 days before presentation and a palpable left breast mass. He had no relevant medical history. The mother of the patient had been treated for breast cancer. Upon clinical examination, a palpable elastic hard left breast mass without nipple discharge was noted, with no other identifiable abnormal findings in either breast. Mammography revealed a well-

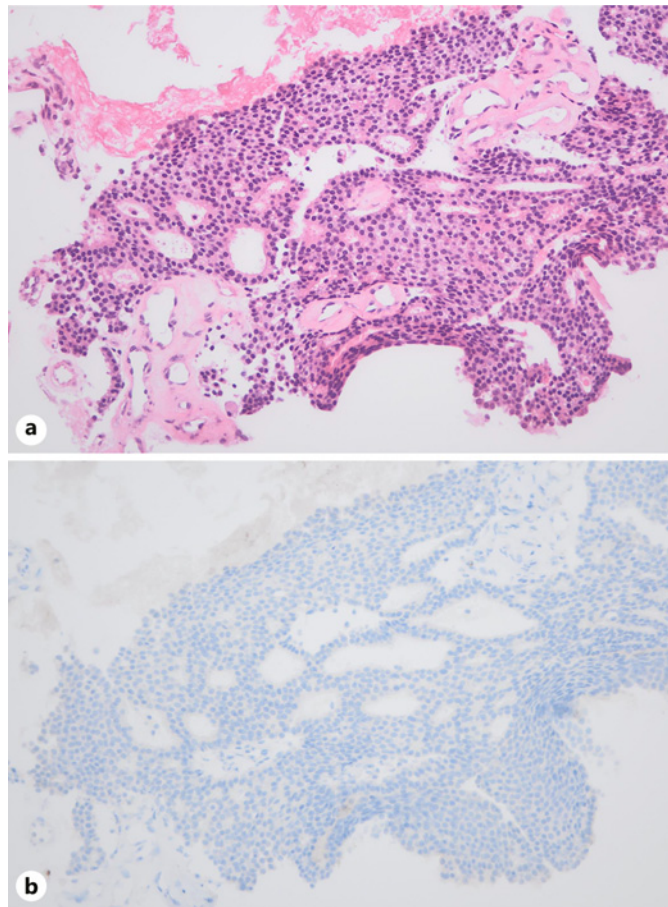


Fig. 2. Pathology of core needle biopsy. **a** Hematoxylin and eosin stains revealed small round cancer cells. It is unknown whether there was infiltration at this time. **b** CK14 expression was negative for cancer cells.

defined high-concentration mass (Fig. 1a). Ultrasonography revealed an intracystic mass measuring 10 mm under the left nipple without enlarged axillary lymph nodes (Fig. 1b). A core needle biopsy revealed a ductal carcinoma with nuclear grade 1, excluding an invasive carcinoma (Fig. 2). The tumor cells were positive for estrogen and progesterone receptors and negative for human epidermal growth factor receptor 2. The Ki67 labeling index was 10%. Magnetic resonance imaging revealed a 7 mm intense early enhancement in the left breast (Fig. 1c). The radiographic test results were negative for distant metastases. The clinical stage was 0 (Tis N0, M0). The patient declined genetic screening.

A left mastectomy and sentinel lymph node biopsy were performed. The patient was diagnosed with a pathological stage IA breast carcinoma (pT1b N0 M0). The pathology revealed a 7-mm invasive solid papillary carcinoma (Fig. 3a) with a high hormone receptor level and no human epidermal growth factor receptor 2. The Ki67 labeling index was determined to be 20%. The neuroendocrine markers were all negative, including CD56, chromogranin A, and synaptophysin, confirming the SPC pure type with invasion (Fig. 3b–e). The patient was treated with oral tamoxifen and survived without recurrence for 12 months.

Discussion

SPC demonstrates cellular proliferation within multiple circumscribed solid nodules and intervening small, round, delicate fibrovascular cores. Additionally, the condition tends to be multinodular, which resembles duct clusters expanded by a solid papillary

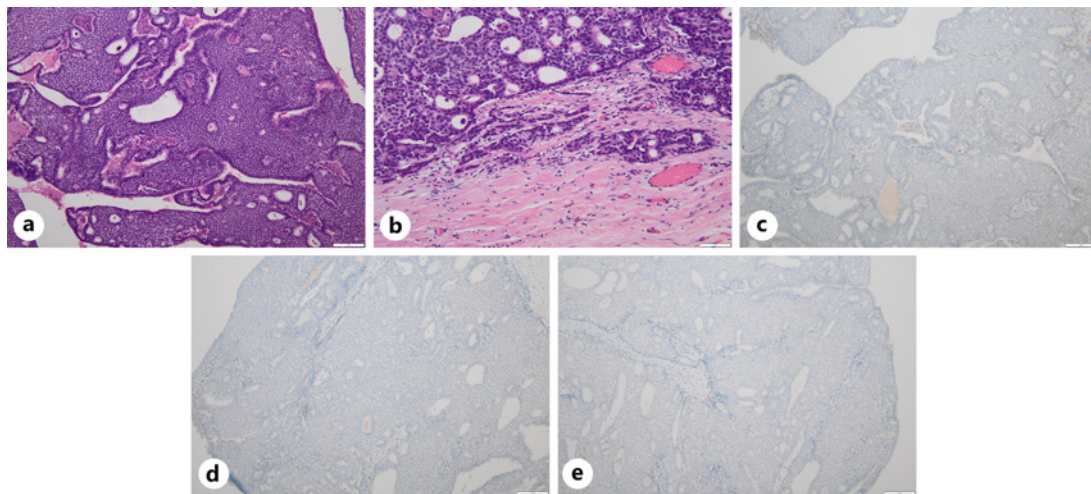


Fig. 3. Pathology of mastectomy. **a** Hematoxylin and eosin stains revealed multiple circumscribed solid nodules and intervening small round delicate fibrovascular cores without surrounded fibrous capsule. **b** The cancer cells infiltrated into stromal tissue. **c** CD56 expression was negative. **d** Chromogranin A expression was negative. **e** Synaptophysin expression was negative.

pattern. In some cases, extracellular mucin may exist [4], and a somatic mutation of the isocitrate dehydrogenase 2 (IDH2) is identified [3]. Macroscopic and microscopic features overlap between SPC and encapsulated papillary carcinoma. Myoepithelial cells can be detected at the perimeter in approximately 25% of cases using immunohistochemistry, and there is no intra-tumor invasion [6]. Most SPCs express hormone receptors, but some express human epidermal growth factor receptor 2 [2, 7]. SPC frequently exhibits neuroendocrine differentiation [6]. As neuroendocrine markers, chromogranin and synaptophysin are expressed in over half the cases, and insulinoma-associated protein 1 and CD56 are expressed in nearly all cases regardless of the staining intensity [7]. However, if more than half the cancer cells in the tumors express neuroendocrine markers, the pathological diagnosis is a mixed neuroendocrine carcinoma type with SPC. The present case had no neuroendocrine markers and was diagnosed as an invasive pure SPC type.

In this case, the male breast cancer detection modality was a palpable mass as well as the nipple discharge and was not through cancer screening. Gynecomastia may be the most palpable mass in the male breast, which is caused by physiological (e.g., aging-related), pathological (e.g., male hypogonadism, thyroid disorders, and chronic liver dysfunction), and iatrogenic factors (e.g., antiandrogen use) [8]. SPC cases are often centrally located and cause nipple discharge revealed as intracystic lesions on ultrasonography [4]. Similarly, the present patient had bloody discharge from the left nipple, and a palpable mass was found later. Nipple discharge from the male breast, especially bleeding, should be suspected in patients with breast cancer and papillary neoplasms.

We conducted a PubMed literature search using the keywords “solid papillary carcinoma” and “breast” on July 1, 2023. Additionally, we checked case reports, clinical SPC studies, and the references cited in the original articles, excluding some articles whereby the authors confirmed other papillary neoplasms. Eleven male SPC cases have been identified, including our case [1, 7, 9–15] (Table 1). These patients were relatively older, and most had a palpable mass. Only the cases specified by nipple discharge were present, as opposed to the references. No patients reported any metastases or death. A comparison of invasive SPC and conventional

Table 1. Identified male SPC cases

Reference	Number	Age	Symptom	Size	Operation	Invasion	Neuroendocrine differentiation
Sahoo [9] (2001)	1	78	Mass	5 cm	Radical mastectomy	–	Prostate cancer with bone and hepatic metastases
Kostopoulos [10] (2003)	1	71	Mass	2.3 cm	Tumorectomy	+	Negative
Nassar [11] (2006)	1						The detail is unknown
Oh [7] (2014)	1						One of 58 SPCs study The detail is unknown One of 46 SPCs study
Ozsoy [12] (2017)	1	76	Mass	2.2 cm	Mastectomy	+	Positive
Akin [13] (2019)	1	72	Mass	4 cm	Mastectomy	–	
Tariq [14] (2020)	3						The detail is unknown Three of 65 SPCs study
Sood [15] (2020)	1	83	Mass	10 cm	Tumorectomy + Axillary dissection	+	Positive Occurred in his axilla Melanoma before 14 years
Present case	1	73	Nipple discharge Mass	1.8 cm	Mastectomy	+	Negative

invasive ductal carcinoma revealed that invasive SPC has significantly fewer positive lymph nodes and recurrences [1]. Only four cases were clearly classified as invasive. Similar to that observed in women, SPC occurred in men over seventy. Neuroendocrine differentiation was expressed in two cases with invasion.

The SPC with invasion in male breast is rare. This case confirms that SPC may occur as a palpable mass or nipple discharge in older men and typically has a good prognosis. The CARE checklist has been completed by the authors for this case report, attached as online supplementary material (for all online suppl. material, see <https://doi.org/10.1159/000536034>).

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Statement of Ethics

This retrospective review of patient data did not require ethical approval in accordance with local guidelines. We wrote the manuscript according to the CARE checklist 2013. Written informed consent was obtained from the patient for the publication of this case report and any accompanying images.

Conflict of Interest Statement

The authors have no conflicts of interest to declare.

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Author Contributions

H.H. designed the study. H.H. and K.K. diagnosed the patients and performed the surgery. K.K. and H.T. edited and supervised the manuscript. All the authors have read and approved the final version of the manuscript.

Data Availability Statement

The data that support the findings of this study are openly available in PubMed at “[http://doi.org/\[doi\]](http://doi.org/[doi]),” reference number [1, 3–15].

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