SOLID PAPILLARY CARCINOMA OF THE BREAST: A REVIEW

Zackariah VK Clement[*,1] **and Martin Jones**[**]
[*]The Liverpool Hospital, Sydney, Australia., [**]Shoalhaven District Memorial Hospital, Nowra, New South Wales, Australia.

ABSTRACT

Solid papillary carcinoma of the breast is a low-grade tumor originating in the ductal epithelium. It is commonly seen in post-menopausal women and accounts for <1% of all breast cancers. Patients can be asymptomatic, have nipple discharge or present with abnormal mammographic findings. Despite of some radiological features solid papillary carcinoma cannot be accurately diagnosed by imaging alone. The most important characteristic of this tumor is its behavior and unusual pathological feature of lack of myoepithelial cells at the periphery. Its diagnosis can be challenging, and its management is still debated. Management varies from breast conserving surgery to mastectomy. Currently there is no evidence to support the role of sentinel lymph node biopsy, radiotherapy and hormonal therapy. Therefore, accurate diagnosis with adequate local excision with breast-conserving surgery is the optimal treatment.

KEYWORDS Papillary, Solid papillary lesions, breast carcinoma

Introduction

Papillary lesions of the breast consist of complex group of lesions ranging from benign to malignant and can be challenging for the pathologist to diagnose [1,2]. Among this group of lesions, solid papillary carcinoma (SPC) constitutes an interesting clinicopathological and morphological entity [3,4]. SPC are low-grade tumors originating from large dilated ducts and usually seen in elderly women. It accounts for less than 1% of breast carcinomas. It is also known as endocrine DCIS as it frequently demonstrates neuroendocrine differentiation [4]. According to World Health Organisation classification, this tumor is considered in situ carcinomas, but there has been controversy and some authors suggest that they represent invasive carcinoma [6,7]. It is poorly recognized, and the diagnosis, investigation, and management are still debated [5]. In this review, we analyze the diagnosis and management of solid papillary carcinoma.

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[1]Zackariah VK Clement, The Liverpool Hospital, Sydney, Australia.
Email:zackariahc@yahoo.com

Epidemiology

SPC are commonly seen in post-menopausal women, and it is rare in men [2-4,7]. It constitutes 0.5-1% of all breast cancers. At the time of diagnosis, approximately 90% of the cases have localized involvement, and 8% have the regional disease, with local spread to axillary lymph nodes, and less than 0.4% presents with distant metastases [4,5,7-10].

Risk factors

The reported risk factors include age, family history and genetic predisposition, diet, and obesity. It is known that the incidence gradually increases with age and mean age at the time of diagnosis is 63 to 67 [4,5,7,10]. Family history is an important risk factor. Women with one or more first-degree relatives with breast cancer have increased the risk for SPC [4,7,10]. Dietary risk factors such as a diet low in phyto-oestrogens and high alcohol intake can predispose to SPC. Dietary fibers have been shown to be protective. Excessive estrogen synthesis in obesity is a major contributing factor. Genetic predisposition also plays an important role, and approximately 5-10% of SPC are associated with genetic mutations such as BRCA1, BRCA2, p53, and PTEN [4,5].

Clinical features

SPC is an uncommon, rare and primarily affects postmenopausal women with a mean age at the time of diagnosis between 63 to 67 years of age. However, rarely this tumor can affect patients younger than 50 years old [3,4,5,12]. Nearly 95% of cases are unilaterally, and the majority of tumors arise in the central area of the breast. There are no specific clinical features of these tumors at presentation. More than half of SPC occur in the retro-areolar area of the breast. Patients can present with a benign palpable mass with or without bloody nipple discharge. They can also be asymptomatic and an abnormal mammographic density on the breast screening mammogram. Axillary lymphadenopathy is uncommon [4,5,7,12].

Radiological features

The radiologic features of SPC have not been clearly defined. The most common mammographic finding of SPC is usually a round, oval or lobulated density with microcalcifications. The margin of the mass is usually well circumscribed, but can also be obscured or indistinct at places indicating inflammation or invasion [2-5].

As SPC are relatively vascular lesions Ultrasound with color Doppler is the most sensitive methodology for the evaluation of solid papillary breast lesions. Ultrasound may reveal a hypoechoic and solid frond-like mass within a dilated duct, a complex cystic lesion, or a homogeneous solid lesion. It may also often show associated posterior acoustic enhancement and microcalcifications. These features can be associated with invasive carcinoma [5,7,9].

MRI with contrast enhancement can give detailed morphologic features. MRI is sensitive but not specific in detecting papillary carcinoma. The lesions can appear as round or oval mass with well-defined margins. Other morphological features such as septations, enhancement of cyst wall, and mural nodules can also be seen [2,4,5].

Despite the above features, the radiologic appearance cannot accurately predict the behavior of papillary lesions, and histological evaluation is necessary [2,12].

Fine needle aspiration (FNA) and Core biopsy

FNA can be very cellular and often show discohesive fragments of cells with varying size. Cellular atypia is often mild to moderate but can also be severe. Mucin, irregular nuclei can be present with occasional necrosis [2,11]. Ultrasound-guided core biopsy is preferable to FNA. Some authors suggest that pick up the rate of invasive carcinoma is better with core biopsy when compared to FNA. Others report that core has a low accuracy as most biopsies are taken centrally while the invasion is usually found in the periphery [4,5,16,17]. Therefore, surgical excision is recommended after especially when there are cellular atypia, high-risk lesions on imaging or imaging-histological discordance. Excision biopsy also allows pathological classification of the lesion with various immunohistochemistry stains and can also assess invasion [5,17].

Pathological features

Pathological and cytological diagnosis of SPC can be challenging. SPC originate in the ductal epithelium. The tumor size can vary and range from less than 1 cm to 15 cm [2,4,9]. Macroscopically the tumors can be solitary or multiple and are well-circumscribed, nodular and soft masses with hemorrhagic and cystic components. Gelatinous appearance may be grossly appreciated in tumors with mucinous differentiation [3-5,11]. Large tumors can be associated with invasive carcinoma [5,9,12,13]. Microscopically, these tumors appear as multiple nodules, each representing a duct filled with neoplastic cells. The neoplastic cells can be either ovoid or spindle-shaped, and rarely streaming in appearance mimicking ductal hyperplasia. Nuclear palisading and pseudorosette formation around capillary vessels and mitotic figures are also standard features. An organoid pattern with microcystic spaces, foamy macrophages, and microcalcifications can also be seen, but these features are less common [11,13,14-17].

About 40-50% of the cases are associated with invasive carcinoma. The invasion can be multifocal and may have a pure or mixed colloid, neuroendocrine-like, invasive ductal, or rarely lobular or tubular pattern. They may also express one of the myoepithelial markers including P63, CK 5/6, CD10 and the proliferative tumor marker of Ki 67 are usually low (less than 10%) [9,12,13].

Discussion and recommendation

The most important issue in the management of SPC is its behavior and the unusual pathological feature of lack of myoepithelial cells at the peripheral stromal interface. There are currently no evidence-based guidelines for the treatment of SPC. Whether it is in situ or invasive or intermediate grade, the management remains controversial. Hence its management is still debated [5,7,12].

In the absence of invasive carcinoma, SPC in situ has an excellent overall prognosis. In patients with SPC associated with invasive carcinoma, the prognosis will depend upon the invasive component of the tumor. Distant metastasis can occur without axillary lymph node involvement [7,9]. Some authors have suggested that the invasive tumors associated with SPC are morphologically similar to the SPC, which makes it is hard to ascertain if the metastasis originated from the SPC itself or its invasive component [2].

Management of SPC varies from breast conserving surgery to mastectomy. Most authors suggest complete excision of the lesion or total/partial mastectomy. The role of sentinel lymph node biopsy is not clear. Some authors recommend sentinel lymph node biopsy because SPC can be associated with an invasive component and therefore axillary lymph node metastasis could be present in approximately 3-5% of the cases [2,12].

Given the low incidence of local recurrence and metastasis, breast-conserving surgery is the optimal treatment. However, it is reported that the management of solid papillary breast carcinoma varies considerably, with mastectomy rates from 7% to 88% [4,5]. This data suggest inadequate pathological recognition of the nature of the tumor, and this influences the management decisions among the health professionals. In a well circumscribed localized tumor with no evidence of invasion and a negative ultrasound of the axilla performing a mastectomy and axillary clearance is unnecessary and in fact an over-treatment [5,12]. The role of postoperative radiotherapy and endocrine therapy in SPC remains controversial. It is reported that the use of radiation did not influence recurrence or survival. Some authors suggest that these treatment modalities may play a role in the treatment of younger patients [5,12,14].

In conclusion, there has been no evidence in the literature to show any association between the rate of SPC recurrence and the type of surgery. There is not yet enough evidence to

recommend the routine use of sentinel lymph node biopsy during breast conserving surgery for SPC [2,5,12]. Although the incidence of low local nodal metastasis has been reported in some series, suggest that extensive biopsy practice may not be necessary [3,10,12]. Therefore, accurately diagnosing this uncommon tumor is crucial for the successful management of SPC. Adequate local excision with breast-conserving surgery is the optimal management in the current environment. Further research and randomized controlled trials are needed to shed evidence on the role of sentinel lymph node biopsy, radiotherapy, and hormonal therapy.

Authors' Statements

Competing Interests

The authors declare no conflict of interest.

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