The Pathology of Breast Cancer in Jamaica: The National Public Health Laboratory Study

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ABSTRACT

Objective: *To document the pathologic features of breast cancer in Jamaica.*
Methods: *The pathology reports and slides of all patients diagnosed with breast cancer at the National Public Health Laboratory between January 1999 and December 2002 were reviewed. Patient age and gender, side involved, number of tumours identified, tumour size, histologic type, histologic grade, degree of lymph node involvement and parish of origin of the specimens were documented.*
Results: *There were 772 patients, 762 females and 10 males; age range 21 to 96 (mean 57.9 ± 15.9) years. There were 778 specimens (6 bilateral cases), the majority of whom originated from Kingston and St Andrew (34.7%). Manchester (22.9%), St Catherine (13.9%) and St Ann (7.3%) were the next most common sources. The left breast was involved in 50.5% of cases. Gross tumour was identified in 641 (82.4%) specimens, the number of tumours ranging from 1 – 6 (mean 1.1 ± 0.6). The maximum gross tumour dimension ranged from 0.3 to 15 cm (mean 4.1 ± 2.7 cm). Infiltrating duct carcinoma was the predominant histologic type (69.3 %); 13.3%, 49.5% and 37.2 % of all infiltrating tumours were well, moderately and poorly differentiated respectively. In-situ lesions (7.1% of tumours) were all of the ductal phenotype. Axillary lymph nodes were submitted in 296 (38.1%) cases; metastatic disease was identified in 224 (75.7%) of these. The total number of nodes submitted ranged from 1 – 34 (mean 10.8 ± 6.7) with an average of 6.1 (± 5.8) being positive for metastases (range 1 – 29).*
Conclusions: *The pathologic features of breast cancer documented in this series including average tumour size, histologic types and grade and the degree of lymph node involvement are consistent with patient presentation at relatively advanced stages of disease and highlight the urgent need for public health intervention including a national screening programme.*

Keywords: Breast cancer, screening programme

La Patología del Cáncer de Mamas en Jamaica: Estudio del Laboratorio Nacional de Salud Pública

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RESUMEN

Objetivo: *Documentar los aspectos patológicos del cáncer de mamas en Jamaica.*
Métodos: *Se revisaron los reportes y diapositivas de patología de todas las pacientes diagnosticadas con cáncer de mamas en el Laboratorio Nacional de Salud Pública entre enero de 1999 y diciembre de 2002. Se documentaron la edad y el género de los pacientes, el lado afectado, el número de tumores identificados, el tamaño del tumor, el tipo histológico, el grado histológico, el nivel del nódulo linfático, y el distrito de origen de los especimenes.*
Resultados: *Hubo 772 pacientes (762 hembras y 10 varones); el rango de edad 21 a 96 (media 57.9 ± 15.9) años. Hubo 778 especimenes (6 casos bilaterales), la mayor parte de los cuales provenían de Kingston y St Andrew (34.7%). Manchester (22.9%), St Catherine (13.9%), y St Ann (7.3%) fueron las siguientes fuentes más comunes. La mama izquierda estaba afectada en el 50.5% de los casos. El tumor macroscópico se identificó en 641 (82.4%) especimenes, fluctuando el número de tumores de 1*

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– 6 (media 1.1 ± 0.6). La dimensión máxima del tumor macroscópico osciló de 0.3 a 15 cm. (media 4.1 ± 2.7 cm). El carcinoma ductal infiltrante fue el tipo histológico predominante (69.3%). El 13.3%, 49.5% y 37.2% de todos los tumores infiltrantes estaban bien, moderadamente y pobremente diferenciados respectivamente. Las lesiones in situ (7.1% de los tumores) fueron todas del fenotipo ductal. Nódulos linfáticos axilares fueron sometidos en 296 (38.1%) de los casos; la enfermedad metastática se identificó en 224 (75.7%) de éstos. El número total de nódulos sometidos fluctuó de 1 – 34 (media 10.8 ± 6.7) con un promedio de 6.1 (± 5.8) positivo a las metástasis (rango 1 – 29).

Conclusiones: *Los aspectos patológicos del cáncer de mamas documentados en esta serie incluyendo el tamaño del tumor, el tipo histológico, y el grado y nivel de afectación del nódulo linfático, concuerdan con la presentación del paciente en etapas relativamente avanzadas de la enfermedad y subrayan la necesidad urgente de la intervención de la salud pública, incluyendo un programa nacional de pesquisaje.*

Palabras claves: Cancer de mamas, programa de pesquisaje

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INTRODUCTION

Breast cancer is the most common invasive cancer in women in Jamaica and has been for the past three decades (1). Incidence rates of breast cancer in the Caribbean are considered intermediate between those of North America and Europe and those of the Far East (2), and within the Caribbean, Jamaica has been shown to have one of the highest rates (3). The most recently reported age standardized rate for women in Jamaica is 40.1/100 000 (4). Despite this prominence among cancers occurring in the population, there are relatively few studies that have documented the pathologic features of breast cancer diagnosed in Jamaica. In 1958, Annamunthodo reported on a series of breast cancer patients treated over a five-year period at the University Hospital of the West Indies (UHWI) and included a histological classification of 105 tumours (5). The UHWI is the multidisciplinary teaching hospital attached to the Faculty of Medical Sciences at The University of the West Indies (UWI) in the parish of St Andrew. In 1977, Harris documented the gross and microscopic features of a series of cases from the parishes of Kingston and St Andrew as recorded in the Jamaica Cancer Registry between 1958 and 1970 (6), but for most of these parameters the data were incomplete, with the author acknowledging that material including histologic slides were not consistently available. In a subsequent ten-year review of breast cancer patients seen at the UHWI by Pott et al, pathologic data were again limited to a histologic classification of the tumours seen (7). In these two latter studies, the study population did not include male patients.

The pathologic features of breast cancer in Jamaica have been reported inconsistently. In this study, the objective was to document detailed gross and microscopic pathologic findings of breast carcinoma in Jamaica, in a series including patients of both genders and not limited to the urban parishes of Kingston and St Andrew.

MATERIALS AND METHODS

The pathology reports and slides of all patients diagnosed with primary carcinoma of the breast at the National Public Health Laboratory (NPHL) between January 1999 and December 2002 were reviewed. The NPHL provides laboratory services in haematology, clinical chemistry and microbiology for Jamaica's largest hospital – the Kingston Public Hospital – and also for all public hospitals in Kingston and St Andrew. In addition, the NPHL is the site of the largest surgical pathology service in the country, reporting on cases from all around the island except for specimens seen at the UHWI, the Cornwall Regional Hospital in the parish of St James and one private facility in Kingston. The NPHL service accessions approximately 75% of breast specimens from around the island annually; all specimens are preserved in formalin. Patients with a previous histologic diagnosis of breast cancer from another institution and those with recurrent tumours were excluded from this study.

The following data were extracted from the pathology reports *via* a pre-designed abstraction form:- patient age and gender, side involved, number of tumours identified, gross tumour size and parish of origin of the specimen. The histologic slides were reviewed independently by one of the study pathologists (SES) and the following data recorded for each tumour: histologic type according to the World Health Organization (WHO) classification (8), histologic grade using the modified Bloom-Richardson system (9) and the degree of lymph node involvement. Inflammatory carcinoma of the breast is not a specific histologic variant but considering that it is automatically categorized as an advanced stage tumour (10) and the incidence has never been reported from Jamaica, we have recorded these tumours as a specific category. Two more recently documented histologic variants were also recognized in our histologic categorization; invasive micropapillary carcinoma and tubulolobular carcinoma as types of invasive ductal and lobular carcinoma respectively (11, 12). Any discrepancies between the assessment of the reviewing pathologist and that made by the pathologist originally reviewing the case were resolved by slide review and discussion, and a consensus diagnosis recorded.

RESULTS

A total of 772 patients were diagnosed with primary breast cancer at the NPHL during the study period. The patients ranged in age from 21 to 96 (mean 57.9 ± 15.9) years, comprising 762 females and 10 males. The age distribution for the female patients is shown in Fig. 1; for 7 patients the age

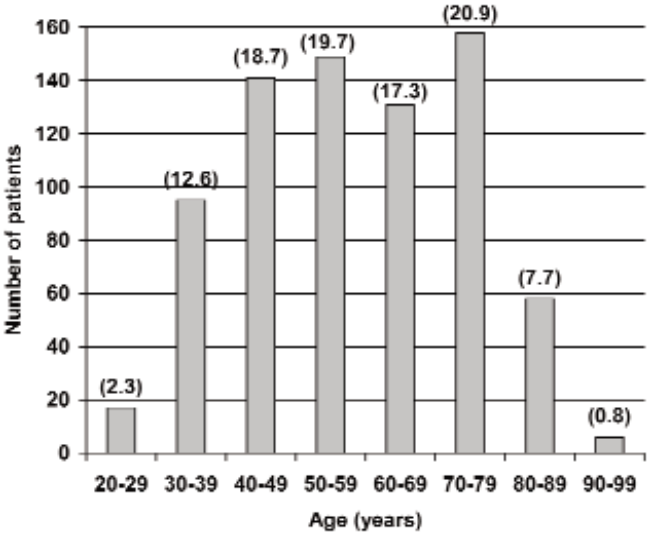

Fig 1: Age distribution of female patients (n = 755); proportions (%) in parentheses.

was unknown. Ten male patients accounted for 1.3% of cases overall, with an age range of 46 to 88 (mean 68.0 ± 13.1) years.

There were 778 specimens (6 bilateral cases), the majority of which originated from Kingston and St Andrew (34.7%); the parishes of Manchester (22.9%), St Catherine (13.9%) and St Ann (7.3%) were the next most common sources (Fig. 2). The left breast was involved in 50.5% of

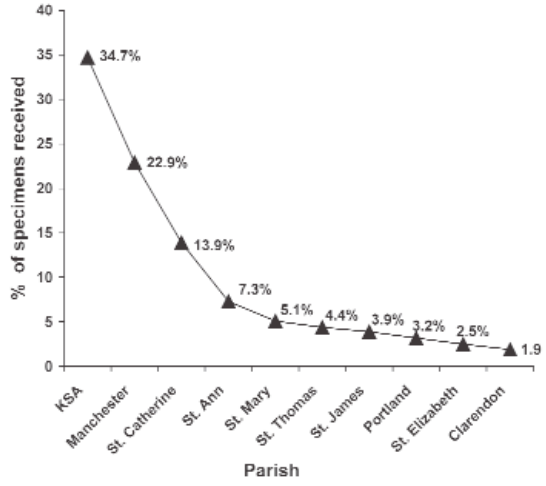

Fig 2: Distribution of breast specimens received by parish

KSA = Kingston and St Andrew

Ψ Less than 1% specimens were received from the parishes of Hanover, Westmoreland and Trelawny respectively.

cases and the right in 47.8% with the side involved not being stated in 13 (1.7%) cases. Gross tumour was identified in 641 (82.4%) specimens overall, with the number of tumours ranging from 1 – 6 (mean 1.1 ± 0.6). The maximum gross tumour dimension ranged from 0.3 to 15 cm (mean 4.1 ± 2.7 cm). Each of the 10 male patients presented with a single mass; the tumours ranged in size from 1 to 11 cm (mean 4.2 ± 3.3 cm).

Invasive ductal carcinoma, not otherwise specified (NOS) was the predominant histologic type, accounting for 69.3% of cases overall; the distribution of histologic diagnoses is shown in the Table. Of the invasive tumours, 13.3%,

Table: Distribution of histologic diagnoses

Tumour type	No.	%
Invasive ductal carcinoma, NOS	539	69.3
Invasive ductal carcinoma, special type	98	12.6
Mucinous	28	3.6
Papillary	27	3.5
Inflammatory	11	1.4
Carcinoma with metaplasia	10	1.3
Medullary	8	1.0
Tubular	6	0.8
Micropapillary	4	0.5
Microinvasive	2	0.3
Adenoid cystic	1	0.1
Cribriform	1	0.1
Invasive lobular carcinoma	44	5.6
Tubulolobular	4	0.5
Invasive carcinoma, NOS	41	5.3
Ductal carcinoma-in-situ	55	7.1
Paget's disease of the nipple	1	0.1
Total	**778**	**100**

NOS = not otherwise specified

49.5% and 37.2% were well, moderately and poorly differentiated (modified Bloom-Richardson grades 1, 2 and 3) respectively. In-situ lesions (7.1% of tumours) were all of the ductal phenotype (DCIS). All except one of the tumours occurring in male patients were of the invasive ductal phenotype, with the other representing DCIS; these tumours were equally divided between moderately and poorly differentiated lesions.

Axillary lymph nodes were submitted in 296 (38.1%) cases with metastatic disease being identified in 224 (75.7%) of these. The total number of nodes submitted ranged from 1 – 34 (mean 10.8 ± 6.7) with an average of 6.1 (± 5.8) being positive for metastases (range 1 – 29).

DISCUSSION

This study presents findings of the largest series of breast cancer cases reported from Jamaica to date. The focus of this paper is on the pathologic features of primary breast cancer which have been previously documented in smaller series confined to female patients from the most populous urban parishes of Kingston and St Andrew (5–7). The present

study includes patients of both genders from around the island whose breast specimens were accessioned at the island's largest surgical pathology facility, the NPHL. We have reported the parish of origin of the specimens as opposed to that of the patients, as the addresses provided on the pathology reports usually reflected the location of the clinicians' services rather than the home addresses of the patients. Pathologic examination of the specimens periodically revealed varying degrees of tissue autolysis, which we attribute to the inconsistent availability in some centres of the optimal volumes of fixative required as well as delays in transportation of some of the specimens to the NPHL. Assessment of the various histologic features, however, was usually not significantly affected.

The majority of patients in the study were female and the average age was 58 years. A changing pattern in the age distribution relative to previous local studies was observed; in our study, the most commonly affected age group was 70 – 79 years; in previous studies patients over 70 years of age accounted for less than 10% of cases (5, 7). A recent study from Trinidad reported a more similar age distribution to the present study (13), and the more current data may be reflecing the general increase in overall lifespan for women in the Caribbean, as opposed to a true increase in the incidence of breast cancer in older patients. Of note, however, is that approximately one-third of patients (33.7%) were under the age of 50 years. Recently reported data from the National Cancer Institute (NCI) Surveillance, Epidemiology and End Results (SEER) programme in the United States of America (USA) show a higher incidence of breast cancer in black women under the age of 40 years compared to white women, as well as comparatively higher stage disease and mortality rates (14–16). These results point toward racial differences in the molecular profiles of breast carcinoma, as will be discussed further on.

The age distribution of the male patients in the present study and their average age (10 years older than the female patients) are very similar to a previous report on male breast cancer in Jamaica (17). The older age amongst males has also been reported from other populations; while there are differences in postulated risk factors for breast cancer between male and female patients, it should be noted that there are also some common factors including a family history of breast cancer and increased exposure to female hormones, as in cirrhosis and Klinefelter's syndrome (18).

The parish distribution of the specimens received generally mirrors the parish distribution of the Jamaican population as reported in the most recent population census (19) with the highest percentage of specimens coming from the parishes of Kingston and St Andrew. The notable exception is the parish of Manchester which represents 6.7% of the Jamaican population but 23% of the specimens received in this study. While this finding may suggest a higher prevalence of breast cancer in this area of the island, it may also be reflecting the greater accessibility to surgical care in this parish as opposed to its neighbours. Supporting the latter observation is the low percentage of specimens from the adjoining parishes of Clarendon (1.9%) and St Elizabeth (2.5%) in which 9% and 6.1% of the population resides respectively. Nonetheless, the findings certainly warrant further investigation. The relatively low representation of patients from the Western end of the island (parishes of Trelawny, St James, Hanover and Westmoreland) most likely indicate the availability of pathology services at the Cornwall Regional Hospital in St James.

The side of the tumour was documented in most cases, with a slight preponderance on the left side as has been previously noted (6). Gross tumour was identified in the majority of specimens, with a mean maximum gross dimension of 4.1 cm. Only one previous local study recorded a mean gross dimension; in the study by Harris, the mean diameter was 4.9 cm (6). Based on this parameter alone, the majority of patients in both studies would have automatically been placed in a TNM category of stage II or above (20). Similarly, relatively large average tumour sizes have been reported from other developing countries, and as with our population, most likely reflects the fact that the majority of patients are presenting with palpable tumours as opposed to lesions detected by screening mammography (13, 14). In Jamaica, there are no national screening programmes for any type of cancer.

This relative delay in clinical presentation is also evident in the range of histologic diagnoses, with 93% of our patients presenting with invasive tumours. The overall distribution of histologic diagnoses is very similar to the previous local studies, and it is sobering to note that very little has changed since the first report by Annamunthodo fifty years ago (5–7). In populations that are actively screened for breast cancer, in-situ lesions account for higher percentages of tumours on diagnosis (21), signalling a better overall prognosis for patients diagnosed at these earlier stages of disease. Early disease detection by breast cancer screening programmes has contributed to consistent reports of decreased mortality rates in screened populations (22, 23)

The preponderance of the ductal phenotype of both invasive and in-situ tumours, in patients of both genders, is a consistent finding in local studies, and those from around the region and beyond (5–7, 13–17). Of the invasive ductal tumours of special type, mucinous and papillary lesions were the most common in our study; two previous studies also found that mucinous tumours were the most common of this group (6, 7) but had higher percentages of medullary carcinoma than our study. We have documented for the first time in a series of Jamaican patients, the prevalence of inflammatory carcinoma (1.4%), carcinoma with metaplasia (1.3%) and the newer variants, invasive micropapillary and tubulolobular carcinoma (0.5% each). Although these percentages are comparatively low, the recognition of these histologic variants is important, as the prognosis is generally worse than that of invasive tumours of the usual type (11, 12, 24).

In terms of the histologic grade of the tumours seen, only Harris has previously reported any local findings (6). In comparison to those data, using the same grading system, our study showed a higher prevalence of poorly differentiated/ grade 3 invasive tumours (37.2% *versus* 19.4%) and a lower prevalence of well differentiated/grade one tumours (13.3% *versus* 20.0%). This may be due to the differences in the study population ie cases from around the island in this study compared to the previous series confined to Kingston and St Andrew or the time frame of the studies, indicating a rising incidence of high grade tumours. The degree of metastatic lymph node involvement in patients in our study for whom axillary nodes were submitted (224 of 296 cases with an average of six positive nodes) also portends a worse prognosis in this group. A higher prevalence of biologically aggressive tumours has been reported in black patients from Africa and the USA (25, 26), even after controlling for factors such as socio-economic status and body mass index (26), pointing to racial differences in the biologic behaviour of breast cancer. Differences in tumour molecular profiles between blacks and whites have been documented in studies from both the USA and Britain, including higher rates of the "triple-negative" breast cancer phenotype in blacks (27–29). Investigations of this nature would be an important line of further research in our population given the dominance of blacks amongst ethnic groups represented across the island (30).

In conclusion, the pathologic features of breast cancer documented in this series of breast cancer patients diagnosed at the NPHL in Jamaica, including average tumour size, the distribution of histologic types and grades, and the degree of axillary lymph node involvement are consistent with patient presentation at relatively advanced stages of disease. These findings underscore the need for urgent public health intervention, notably the development of a national screening programme for the most common cancer in Jamaican women. The high percentage of specimens accessioned from the parish of Manchester also warrants further investigation.

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