Incidence and pattern of rare tumors of breast in patients attending a tertiary care hospital in North India

Aneeta Singh Malhotra¹*, Bawana Raina², Swati Gupta³, Arvind Khajuria⁴, Kuldeep Chander Goswami⁵

¹²Associate Professor, ³Assistant Professor, ⁴Professor & HOD, ⁵Professor, Dept. of Pathology, ASCOMS, J&K

*Corresponding Author:
Email: aneetasinghmalhotra@gmail.com

Abstract

Introduction: Breast tumors comprise a vast collection of different entities characterized by varied biological and pathological features, clinical profile and behaviour. Breast lesions are diverse and vary from simple fibroadenomas to various common carcinomas like infiltrating ductal carcinomas to rarer entities such as angiosarcoma, pleomorphic variant of lobular carcinoma, medullary carcinoma, tubular carcinoma, malignant phylloides etc.

Aim and Objectives: To study the incidence of neoplastic breast lesions and to evaluate the incidence of rare breast lesions in a tertiary care hospital along with the clinicopathological co-relation of the same.

Materials and Method: A three year prospective as well as retrospective study of all breast specimens received during the period from June 2013 to June 2016 was carried out. The necessary information and clinical data was obtained from the concerned sections.

Results: A few rare entities like malignant phylloides, schwannoma, leiomyosarcoma, angiosarcoma, lymphoma were identified.

Keywords: Breast, Lobular Carcinoma, Medullary Carcinoma.

Introduction

The breast is an important organ in the female body because of the psychological impact it has on an individual’s mind. Almost all women experience breast changes which could be subtle to alarming at some point in their lives. Lesions in the breast vary from the most common and benign conditions such as fibroadenomas to various common carcinomas such as infiltrating ductal carcinomas to rarer entities like angiosarcoma, malignant phylloides tumor, leiomyosarcoma etc.¹

Aims and Objectives

1. To study the incidence of various neoplastic lesions of the breast.
2. To evaluate the incidence of rare breast entities in a tertiary care hospital along with clinicopathological correlation of the same.

Materials and Method

The present study was prospective as well as retrospective which included – cases from June 2013 to June 2016, i.e.; a period of three years. All the breast cases, irrespective of the sex and age of the patient were included. There were no exclusion criteria. Specimens were received and preserved in 10% formalin. Detailed gross examination was done for each specimen and histopathological features were studied to classify neoplasms according to the WHO classification 2003.² For the retrospective cases we identified blocks and got fresh sections cut. Clinical details were retrieved from our records section for every case. Sections were stained with hematoxylin and eosin. A morphological diagnosis was arrived at, based on the microscopic analysis.

Results

A total of 225 breast specimens received in different forms such as excisional biopsies, modified radical mastectomies, simple mastectomies and tru-cut biopsies were included in the present study. Total 210 breast neoplasms were studied, where the incidence of benign neoplasms was 56.19% (118 cases) and of malignant neoplasms was 43.8% (92 cases). The most common benign neoplasm was fibroadenoma (81.3%) while invasive ductal carcinoma not otherwise specified (85.8%) was the most common malignant tumor.

Among the benign lesions fibroadenoma, benign phylloides, tubular adenoma, lipoma, leiomyoma and neurofibroma were seen.

While invasive ductal carcinoma not otherwise specified was commonest malignancy (85.8%) as expected, three cases of invasive lobular carcinoma (ILC) were also seen. All were of classic type. Two cases of medullary and one case of mucinous carcinoma were reported. One case each of tubular carcinoma, apocrine carcinoma and papillary carcinoma were also encountered. Two cases of occult breast carcinoma were identified wherein no tumor was detected in the mastectomy specimens but lymph nodes showed metastatic deposits. Among the stromal tumors, one case of leiomyosarcoma, one of malignant phylloides, and a case of angiosarcoma were also encountered. Also a case of primary breast lymphoma was reported.
Table 1: Year wise distribution of breast biopsy cases with incidence of benign and malignant neoplasms

<table>
<thead>
<tr>
<th>Year</th>
<th>Total breast biopsies</th>
<th>Benign neoplasms</th>
<th>% of total biopsies</th>
<th>Malignant neoplasms</th>
<th>% of total biopsies</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013-14</td>
<td>79</td>
<td>42</td>
<td>53.16</td>
<td>36</td>
<td>45.5</td>
</tr>
<tr>
<td>2014-15</td>
<td>70</td>
<td>34</td>
<td>48.57</td>
<td>32</td>
<td>45.7</td>
</tr>
<tr>
<td>2015-16</td>
<td>76</td>
<td>42</td>
<td>55.26</td>
<td>24</td>
<td>31.57</td>
</tr>
<tr>
<td></td>
<td>225</td>
<td>118</td>
<td>52.4</td>
<td>92</td>
<td>40.88</td>
</tr>
</tbody>
</table>

Table 2: Age and Sex distribution in Benign Neoplasms

<table>
<thead>
<tr>
<th>Age in years</th>
<th>Female</th>
<th>Male</th>
<th>Total Cases</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No. of cases</td>
<td>%</td>
<td>No. of cases</td>
</tr>
<tr>
<td>0-10</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>11-20</td>
<td>3</td>
<td>2.5%</td>
<td>-</td>
</tr>
<tr>
<td>21-30</td>
<td>35</td>
<td>29.6%</td>
<td>-</td>
</tr>
<tr>
<td>31-40</td>
<td>32</td>
<td>27.1%</td>
<td>-</td>
</tr>
<tr>
<td>41-50</td>
<td>30</td>
<td>25.4%</td>
<td>-</td>
</tr>
<tr>
<td>51-60</td>
<td>12</td>
<td>10.16%</td>
<td>-</td>
</tr>
<tr>
<td>61-70</td>
<td>6</td>
<td>5.08%</td>
<td>-</td>
</tr>
<tr>
<td>71-80</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Total</td>
<td>118</td>
<td>100%</td>
<td></td>
</tr>
</tbody>
</table>

Table 3: Age and Sex distribution in malignant neoplasms

<table>
<thead>
<tr>
<th>Age in years</th>
<th>Female</th>
<th>Male</th>
<th>Total Cases</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No. of cases</td>
<td>%</td>
<td>No. of cases</td>
</tr>
<tr>
<td>0-10</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>11-20</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>21-30</td>
<td>03</td>
<td>3.3%</td>
<td>-</td>
</tr>
<tr>
<td>31-40</td>
<td>04</td>
<td>4.4%</td>
<td>-</td>
</tr>
<tr>
<td>41-50</td>
<td>22</td>
<td>24.7%</td>
<td>1</td>
</tr>
<tr>
<td>51-60</td>
<td>32</td>
<td>35.9%</td>
<td>-</td>
</tr>
<tr>
<td>61-70</td>
<td>24</td>
<td>26.9%</td>
<td>2</td>
</tr>
<tr>
<td>71-80</td>
<td>04</td>
<td>4.4%</td>
<td>-</td>
</tr>
<tr>
<td>Total</td>
<td>89</td>
<td>100%</td>
<td>03</td>
</tr>
</tbody>
</table>

Table 4: Incidence of various histological types of malignant breast neoplasms

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Type of Neoplasm</th>
<th>Sex</th>
<th>Total Cases</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Male</td>
<td>Female</td>
<td></td>
</tr>
<tr>
<td>I. Epithelial tumors</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a)</td>
<td>Invasive ductal carcinoma:NOS</td>
<td>3</td>
<td>76</td>
<td>79</td>
</tr>
<tr>
<td>b)</td>
<td>Invasive lobular carcinoma</td>
<td>-</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>c)</td>
<td>Tubular carcinoma</td>
<td>-</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>d)</td>
<td>Apocrine</td>
<td>-</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>e)</td>
<td>Medullary</td>
<td>-</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>f)</td>
<td>Mucinous</td>
<td>-</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>g)</td>
<td>Papillary</td>
<td>-</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>II. Mesenchymal tumors</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>h)</td>
<td>Leiomyosarcoma</td>
<td>-</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>i)</td>
<td>Angiosarcoma</td>
<td>-</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>III. Fibroepithelial tumors</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>j)</td>
<td>Malignant Phyllodes</td>
<td>-</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>IV. Malignant Lymphoma</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Discussion

Worldwide breast cancer is the most common invasive cancer in women with approximately 1.5 lakh new cases and 70,218 deaths being reported annually in India.\(^{(3)}\)

In the present study 210 cases of breast neoplasm were reported during the three year period from June 2013 to June 2016 in the department of pathology. A total of 225 breast biopsy specimens were received that also included some non-neoplastic and inflammatory conditions. Among the neoplasms, 118 were benign and 92 were malignant. The incidence of various histological types of malignant neoplasms was 43.8%.

Breast cancer is strongly related to age with only 5% of all breast cancers occurring in women under 40 years of age. In our study the incidence of breast cancer in women below 40 years was 7.7%, while it increased as the age of women increased.

In the present study 92 cases of malignant breast neoplasms were studied. A histomorphological diagnosis was established for each case based on the microscopic features. Invasive (or infiltrating) ductal carcinoma was the most common type of carcinoma reported, occurring in 79 out of the 92 cases and thereby accounting for an incidence of 85.8% which is comparable to other reported studies.\(^{(4)}\) Other histological variants of invasive breast carcinoma that we encountered were medullary carcinoma, mucinous carcinoma, tubular carcinoma, apocrine carcinoma, papillary carcinoma, metaplastic carcinoma, secretory carcinoma, inflammatory carcinoma and carcinoma with neuroendocrine features.\(^{(1)}\)

We now discuss the rare cases that we encountered with a very brief review of the published work.

Invasive lobular carcinoma: Three cases of invasive lobular carcinoma were reported accounting for 3.25% of the incidence amongst all breast neoplasms. The incidence of invasive lobular carcinoma is approximately 10% in the published series.\(^{(5)}\) The most common type is classic lobular carcinoma while the other types are pleomorphic, signet ring, tubulolobular. Classic type is characterized by the presence of small and uniform tumor cells, growing singly in Indian file and in concentric fashion around lobules involved by the in situ lobular neoplasia.\(^{(1)}\)

Medullary carcinoma: Medullary carcinomas account for less than 5% of invasive breast carcinoma.\(^{(6)}\) Two cases of Medullary carcinoma were encountered in the present study (2.17%).

The first case that we reported was a 65 year old woman with lump in the left breast for which she underwent simple mastectomy. Grossly, it was well circumscribed, measured 6 x 5 cm in diameter. Its cut surface was solid, homogeneous and gray with a small foci of necrosis. No lymph node was resected. The other case was a 50 year old woman who presented with a lump in right breast. Grossly, the mass we received was 3x4cm with 5 lymph nodes. Microscopic examination revealed metastatic deposits in two lymph nodes. Microscopically the borders are always of the “pushing” type. The pattern of growth is diffuse with ductal differentiation or intra ductal growth and absence of mucin secretion. The tumor cells are large, pleomorphic, with large nuclei, prominent nucleoli and numerous mitosis. The cell borders are indistinct hence this gives a syncytial or sheet like appearance. A very important component is lymphoplasmacytic infiltration at the periphery of the tumor which is basically a reaction of the host to the neoplasm. Medullary carcinoma appears mostly in patients under 50 years of age and is common in Japanese women.\(^{(1,7)}\) It is also said to be commonly associated with BRCA1 mutations. The prognosis for medullary carcinoma is better than for ordinary invasive ductal carcinoma.\(^{(1)}\) While in one study\(^{(7)}\) the authors concluded that there was no overt favourable prognosis of medullary carcinoma when compared to invasive ductal carcinoma. Prognosis is more closely related to stage than histological subtyping.

Mucinous carcinoma: Mucinous carcinoma usually occurs in post-menopausal women.\(^{(1)}\) It is a rare type of invasive breast tumor formed by mucus secreting glands. We reported one case of mucinous carcinoma accounting for an incidence of 1.086%. It accounts for 1% to 7% of all breast cancers and generally bears better prognosis than other types of breast cancer.\(^{(8)}\) Our case presented with a lump in her left breast measuring 5x5cm. On cut section of the received specimen cystic areas were
present filled with mucoid material, eight lymph nodes were sampled however no lymph node involvement was
seen. Grossly, the mucinous carcinoma is well circumscribed and crepitant to palpation. Foci of
hemorrhage are frequent. Microscopically the classical
description is of small clusters of tumor cells “floating in
a sea of mucin”. The mucin is extracellular, and may be
of acid or neutral type. Pure mucinous carcinoma is
associated with a very low incidence of nodal metastases
and has an excellent short term prognosis, especially
when the tumor measures less than 3 cm in diameter. Pure mucinous carcinoma generally has a less aggressive
growth pattern.

Invasive papillary Carcinoma: We reported one case
of invasive papillary carcinoma in a 70 year old woman
(1.086%). Invasive papillary carcinoma of breast
represents approximately 0.5% of all the newly
diagnosed cases of breast cancer. Our findings
correlated with a study which reported a somewhat
similar incidence of percentage. Microscopically, there
were dilated ducts which were lined by neoplastic cells
arranged in papillary pattern of growth.

Tubular Carcinoma: A case of tubular carcinoma was
diagnosed in a 50 year old woman, presenting with a
lump in the left breast. Invasive tubular carcinoma is a
rare tumor of breast, having an excellent prognosis.
Grossly, the tumor was 1.5 cm in diameter, poorly
circumscribed and hard in consistency. Microscopically,
the tumor had irregular and angulated contour. Axillary
metastasis occurs in 20% patients. Breast preservation is
a safe treatment for tubular carcinoma. In a study on 105
cases of tubular carcinoma of the breast, the authors
suggested that the lesions which are composed of 90%
or more of tubular carcinoma may be treated by simple
mastectomy and axillary dissection is not necessary.
Also they concluded that there was no difference in the
presentation or outcome of pure versus mixed tubular
carcinoma, the overall mortality was 2%. The lymph
node status did not influence disease free or overall
survival.

Angiosarcoma breast: A single case of angiosarcoma
was reported accounting for 1.086% of the incidence
among all malignant breast neoplasms. Mammographically, it presented as a solitary mass.
Grossly, the tumor was soft, spongy and hemorrhagic.
Microscopically, there was presence of anastomosing
vascular channels which were lined by atypical
endothelial cells. The prognosis of angiosarcoma is poor
with most patients developing metastases through the
blood stream. A study has shown that a good correlation
exists between microscopic grade and outcome.

Schwannoma breast: A case of schwannoma breast was
reported which was initially presumed to be phyllloides
tumor. A 37 years old lady presented with a lump in right
breast that was growing slowly over a period of 8 years.
Grossly, it presented as a well encapsulated nodule.
Microscopic evaluation showed an encapsulated spindle
cell tumor with prominent nuclear palisading and
features typical of a Schwannoma. There was also strong
and diffuse positive staining of S-100, favouring the
diagnosis of Schwannoma. Schwannomas are mostly
benign tumors that tend to favour nerves in the head and
neck as well as the extremities. Schwannomas are
though the most common peripheral nerve sheath
tumors, their occurrence in the breast is rare. A review of
literature shows only 28 cases of benign breast
Schwannoma.

Primary Leiomysarcoma: Primary breast sarcomas
are very rare tumors that originate from the
mesenchymal tissue of the breast. In a study conducted
by the Mayo clinic, its prevalence among breast cancers
was found to be 0.0006%. A case of Leiomyosarcoma
in a 58 years old woman was reported in our study. A
well circumscribed nodule measuring 10 cms was
present in the upper outer quadrant of the right breast.
There was evidence of malignancy on fine needle
aspiration biopsy. The patient underwent total
mastectomy of the right breast with axillary lymph node
dissection. Grossly, we received a necrotic tumor mass
measuring 11x9x6cm in size with invasion in the
overlying skin. Microscopically, the tumor was
composed of pleomorphic spindle cells showing
frequent mitosis and necrosis. Immunohistochemical
staining was positive for smooth muscle actin (SMA).
None of the 25 excised lymph nodes exhibited tumor
metastasis, the surgical margins showed no trace of
tumor. Leiomyosarcoma of the breast is thought to
originate from the muscular blood vessels or from the
smooth muscle of the nipple. It is impossible to
diagnose leiomyosarcoma pre-operatively. The
prognosis of leiomyosarcoma is better than that of other
breast sarcomas. They require long term follow up
because local recurrence and distant metastasis can occur
long after operation.

Neoplastic Lesions of Male Breast: Four cases of
gynaecomastia were reported which is defined as the
enlargement of the male breast. Three cases of male
breast malignancies were reported in the present study.
It has been mentioned in texts that the incidence of male
breast carcinoma is less than 1% of all breast cancers.
All the cases were of invasive ductal carcinoma not
otherwise specified type. In a study of 50 cases of male
breast carcinoma, all the cases (100%) were invasive
ductal carcinoma not otherwise specified type.
Fig. 3: Phyllodes tumor: Nodules of proliferating stroma covered by epithelium. Increased stromal cellularity giving rise to typical leaf like architecture (10X, H&E)

Summary and Conclusions
1. There were a total of 225 breast biopsies in the three years. Out of these 210 were breast neoplasms. Out of which 118 were benign breast neoplasms (56.19%) while 92 were malignant breast neoplasms (43.8%).
2. The most common benign neoplasm was fibroadenoma.
3. Among the malignant neoplasms invasive ductal carcinoma not otherwise specified was the most common (85.8%).
4. We reported some rare breast lesions namely, malignant phyllodes, leiomyosarcoma, angiosarcoma, schwannoma and lymphoma.

References