World Health Organization 5th ed Breast Tumours

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Introduction

The World Health Organization (WHO) establishes the standard for histopathologic diagnoses, defining diagnoses on a per organ system basis.

The most recent classification of breast tumors is the 5th edition published in November 2019. The publication reflects the views of the WHO Classification of Tumours Editorial Board that convened at MD Anderson Cancer Center, Houston, USA December 9-11, 2018. 153 authors from 21 countries contributed. The end result is an authoritative reference book that serves as the international standard for oncologists and pathologists.

This exhibit is designed to increase radiologists' and technologists' understanding of breast pathology, ie to enhance CME and CEU at this conference.

WHO Classification of Tumours Editorial Board. Breast tumours. Lyon, (France): International Agency for Research on Cancer, 2019.

WHO 5th ed Broad Categories

Epithelial tumours
Fibroepithelial tumours and hamartomas
Tumours of the nipple
Mesenchymal tumours
Haematolymphoid tumours
Tumours of the male breast
Metastases to the breast
Genetic tumour syndromes of the breast

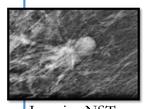
Invasive Breast Carcinoma (IBC)

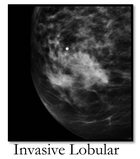
Breast Cancer 2019

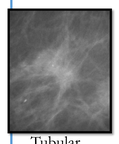
Estimated new cases and deaths from breast cancer in the US

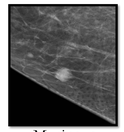
New cases: 268,600 15.2 % of all new cancer cases
Deaths: 41,760 6.9 % of all cancer deaths

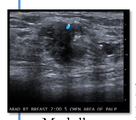
Invasive Breast Carcinoma (IBC) refers to a large and heterogeneous group of malignant epithelial neoplasms of breast glandular elements. IBCs are classified by morphology (below). All IBCs are grouped into biomarker-defined subtypes for treatment, based on estrogen receptor (ER) and human epidermal growth factor receptor 2 (HER2).

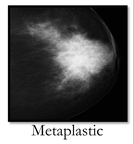

Invasive NST

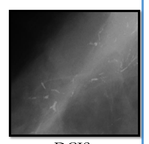

Invasive Lobular


Tubular


Mucinous

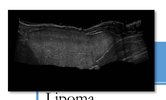

Medullary

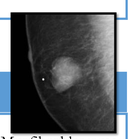

Metaplastic


DCIS

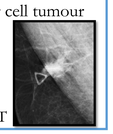
Epithelial Tumours
Invasive breast carcinoma
Invasive carcinoma of no special type
Microinvasive carcinoma
Invasive lobular carcinoma
Tubular carcinoma
Cribriform carcinoma
Mucinous carcinoma
Mucinous cystadenocarcinoma
Invasive micropapillary carcinoma
Carcinoma with apocrine differentiation
Metaplastic carcinomas
Rare and salivary gland-type tumours
Acinic cell carcinoma
Adenoid cystic carcinoma
Secretory carcinoma
Mucoepidermoid carcinoma
Polymorphous adenocarcinoma
Tall cell carcinoma with reversed polarity
Neuroendocrine neoplasms
Ductal carcinoma in situ
Non-invasive lobular neoplasia
Papillary neoplasms
Epithelial-myoepithelial tumours
Adenomas
Tubular adenoma
Lactating adenoma
Ductal adenoma
Adenosis and benign sclerosing lesions
Benign epithelial proliferations

Mesenchymal tumours


Lipoma


Myofibroblastoma

Vascular tumours: haemangioma, angiomatosis, atypical vascular lesions, postradiation angiosarcoma, primary angiosarcoma
Fibroblastic and myofibroblastic tumours: nodular fasciitis, myofibroblastoma, desmoid fibromatosis, inflammatory myofibroblastic tumour
Peripheral nerve sheath tumours: schwannoma, neurofibroma, granular cell tumour
Smooth muscle tumours: leiomyoma, leimyosarcoma
Adipocytic tumours: lipoma, angiolipoma, liposarcoma
Pseudoangiomatous stromal hyperplasia


GCT

Fibroepithelial tumours and hamartomas

Fibroadenoma
Phyllodes tumour: Benign, Borderline, Malignant
Hamartoma

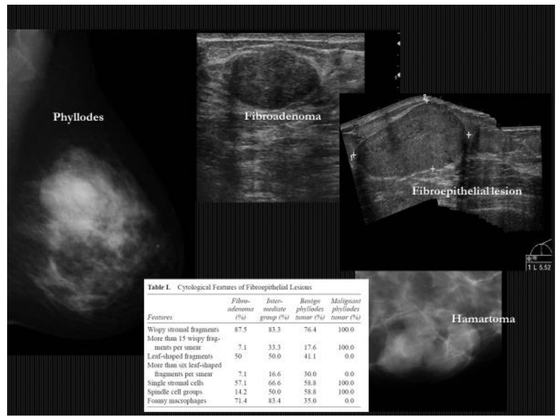
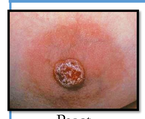


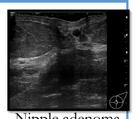
Table I. Cytological Features of Fibroepithelial Lesions

Features	Fibro-adenoma (%)	Inter-mediate group (%)	Benign phyllodes tumour (%)	Malignant phyllodes tumour (%)
Wispy stromal fragments	87.5	83.3	76.4	100.0
More than 15 wispy fragments per smear	7.1	33.3	17.6	100.0
Leaf-shaped fragments	50	50.0	41.1	0.0
More than six leaf-shaped fragments per smear	7.1	16.6	30.0	0.0
Single stromal cells	57.1	66.6	58.8	100.0
Spindle cell groups	14.2	50.0	58.8	100.0
Foamy microphages	71.4	83.4	35.0	0.0

Tumours of the nipple


Paget

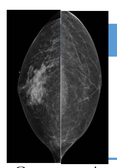
Paget Disease
Nipple adenoma
Syringomatous tumor of the nipple (SyT)


Nipple adenoma

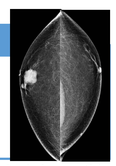
Metastases to the breast

Defined: malignant tumours originating from an extramammary organ or site
Mammography and ultrasound most commonly shows relatively small, irregular superficial masses, rarely spiculated. These require CNB for diagnosis, and comparison of mammary and extramammary malignant tissue is essential
Most common sources of breast metastases
In adults: lymphoma/leukemia, melanoma, pulmonary, ovarian, gastric, prostatic, renal cell, colorectal, mesothelioma, neuroendocrine, cervical CA.
In children: rhabdomyosarcoma

Tumours of the male breast


Gynecomastia

Gynecomastia
Ductal carcinoma in situ
Invasive carcinoma


Male breast CA

Acknowledgements

Joanna Schneider MD UNC SOM Class of 2019
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North Carolina Radiological Society

Genetic tumour syndromes

NEW! in this WHO edition

is a section delineating the familial predisposition to breast cancer, specifically the established and emergent genes that are a source of discussion. BRCA1 and BRCA2 are well-established, and increasingly PALB2, as important predisposition genes that merit testing in all patients with suspicion of familial predisposition. Many other genes (two examples are ATM, CHEK2) have been identified in familial syndromes though there is limited data on frequency and absent data on ethnic variations. Detailed familial syndromes with breast CA relevance are included:

BRCA 1/2-associated hereditary breast and ovarian cancer syndrome
Cowden syndrome
Ataxia-telangiectasia
Li-Fraumeni syndrome, TP53-associated
Li-Fraumeni syndrome, CHEK2-associated
CDH1-associated breast cancer
PALB2-associated cancers
Peutz-Jeghers syndrome
Neurofibromatosis type 1
The polygenic component of breast cancer susceptibility

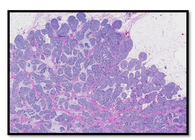
Notes on core needle biopsy

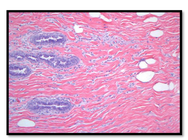
5% of patients with screen-detected abnormalities typically undergo immediate excision, with 3:1 benign-to-malignant final diagnoses. Most patients with atypical breast lesions diagnosed on core biopsy are referred for surgical excision. However, recent studies indicate the rate of upgrade to carcinoma is lower than initially reported. Assure careful clinical-pathologic and radpath correlation in:

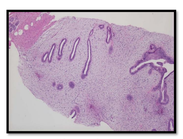
ADH: All patients should be referred for surgical consultation and excision
ALH: Surveillance may be appropriate if incidental
LCIS: Surveillance may be appropriate if incidental classic LCIS
FEA: Surveillance may be appropriate for FEA if all calcifications removed
Papilloma: Surveillance may be appropriate for benign solitary and incidental papillomas
Radial scar: Surveillance may be appropriate for incidental radial scars without atypia

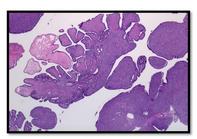
References

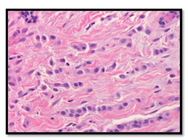
- https://seer.cancer.gov/statfacts/html/breast.html
- WHO Classification of Tumours Editorial Board. Breast tumours. Lyon, (France): International Agency for Research on Cancer, 2019.
- Calhoun BC. Core needle biopsy of the breast: an evaluation of contemporary data. Surg Pathol Clin 2018 Mar; 11(1):1-16. PMID 29413652.

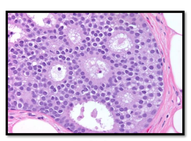

Mucinous Carcinoma

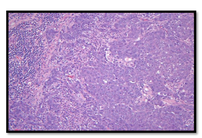

PASH

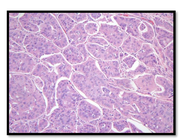

Fibroadenoma

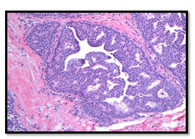

Phyllodes

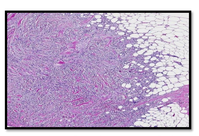

Invasive Lobular


DCIS


Medullary Carcinoma


Invasive Micropapillary


Papilloma with DCIS


Invasive Carcinoma NST

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