Pathology

- Cancer histology
  - Invasive ductal
  - Invasive lobular
  - Other invasive
  - DCIS

<table>
<thead>
<tr>
<th>Distribution of Histologic Types of Breast Cancer</th>
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<tbody>
<tr>
<td>Total Cancers</td>
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<tr>
<td>In Situ Carcinoma</td>
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<tr>
<td>Ductal carcinoma in situ</td>
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<tr>
<td>Lobular carcinoma in situ (nb. Not considered a breast malignancy, but rather a high-risk lesion)</td>
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<tr>
<td>Invasive Carcinoma</td>
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<tr>
<td>Invasive ductal carcinoma</td>
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<tr>
<td>Lobular carcinoma</td>
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<tr>
<td>Tubular/cribriform carcinoma</td>
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<td>Mucinous (colloid carcinoma)</td>
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<tr>
<td>Medullary carcinoma</td>
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<tr>
<td>Papillary carcinoma</td>
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<tr>
<td>Metaplastic carcinoma</td>
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Pathology

• **Cancer histology**
  – **Invasive ductal carcinoma**
    • Firm/hard with irregular borders & occasionally calcifications
    • Arises from terminal duct lobular unit
    • 5 year survival (Am Cancer Society)
      – Overall: 75%
      – Localized: 91%
      – Regional: 69%
      – Distant: <19%
      (Based on TNM staging)
Pathology

• Cancer histology
  – Invasive ductal carcinoma
    • Marked increase in dense, fibrous desmoplastic stroma
    • Accompanied by varying amounts of DCIS
Pathology

• Wide spectrum of appearances:
  – Well-differentiated tumors (low grade)
    • Tubules lined by minimally atypical cells
    • Typically express hormone receptors
    • Often do not over express HER2/neu
  – Poorly differentiated tumors (high grade)
    • Anastomosing sheets of pleomorphic cells
    • Less likely to express hormone receptors
    • Most often over express HER2/neu
  – Majority somewhere in between (intermediate grade)
Pathology

• Cancer histology
  – Invasive lobular carcinoma
    • Firm/hard with irregular margins, or occasionally diffuse thickening without a distinct tumor mass
    • Minimal or absent desmoplastic response
    • Hallmark pathology: single infiltrating tumor cells in single file or in loose clusters or sheets
    • Signet-ring cells common
    • Tumor cells frequently arranged in concentric rings surrounding normal ducts
Pathology

- **Cancer histology**
  - Invasive lobular carcinoma
    - Can present as palpable mass or mammographic density; however, 25% have diffuse pattern of invasion presenting as a vaguely thickened area of the breast or subtle architectural changes on mammography
    - Incidence increasing in postmenopausal women
    - Same prognosis as invasive ductal
  - Well-differentiated & moderately differentiated:
    - Usually diploid, express hormone receptors, are assoc. with LCIS; HER2/neu overexpression rare
  - Poorly-differentiated:
    - Usually aneuploid, lack hormone receptors, often overexpress HER2/neu

- Most show loss of 16q22.1: cluster of cell adhesion genes including e-cadherin & β-catenin
- Unique pattern of metastasis:
  - Mets to peritoneum & retroperitoneum, leptomeninges, GI tract, ovaries & uterus more frequently observed
Pathology

• Cancer histology
  • Other invasive carcinomas
    – Tubular carcinoma
      • Typically detected as irregular mammographic densities
        – Common presentation in late 40’s
      • Well-differentiated by definition
      • Metastasis in <10% of cases
      • Excellent prognosis
    • Morphology: well-formed tubules lined by single layer of cells on background of desmoplastic stroma
Pathology

• Cancer histology
  – Medullary carcinoma
    • Typically presents as well-circumscribed mass
    • Disproportionate representation in BRCA1 carriers (13%)
    • High nuclear grade, aneuploidy, absence of hormone receptors, high proliferative rates; yet better prognosis than invasive ductal carcinoma ("looks bad, may act good")
      – Infrequent lymph node metastasis
      – Typically ER-, PR-, Her2-
    • Morphology: solid syncytium-like sheets of large cells with pleomorphic nuclei, prominent nucleoli, & frequent mitoses
      – Lymphoplasmacytic infiltrate surrounding tumor
Pathology

- Cancer histology
  - Other invasive carcinomas
    - Mucinous (colloid) carcinoma
      - Older women (>60 yrs)
        - May grow slowly over many years
      - Uncommon (1-6% of breast carcinomas)
      - Typically presents as circumscribed mass
      - May have better prognosis than invasive ductal
      - Distinctive pattern of small islands of tumor cells in sea of mucinous material
Pathology

• Cancer histology
  - Invasive papillary carcinoma
    • Typically presents like invasive ductal carcinoma, but may have better prognosis
    • Papillary architecture
    • Rare (<1% of invasive breast cancers)
  - Metaplastic carcinoma
    • Includes wide variety of rare types
Pathology

• Cancer histology
  – Ductal carcinoma in situ (DCIS)
    • Most frequently presents as mammographic calcifications; often undetectable by palpation/visual inspection
      – Represent 50% of mammographically detected cancers
    • May be multicentric
    • Malignant population of cells limited to ducts & lobules by basement membrane
Pathology

• Cancer histology
  – Ductal carcinoma in situ (DCIS)
    • Progresses to invasive carcinoma!
      – 25% of patients may develop same breast invasive carcinoma
      – Comedo pattern imparts greater risk
    • Treatment:
      – Mastectomy curative in 95% of cases
      – Breast conservation appropriate for most women with slightly higher risk of recurrence
        » Risk factors for recurrence: grade, size, margins