Breast Cancer Screening

Juhi Asad, DO FACOS
Breast Surgeon
Surgical Specialists of Colorado
Outline

- Mammogram
  - Digital
  - 3-D mammogram
- Ultrasound
- MRI
- Diagnostic Workup
- Genetic Screening
Mammogram

- Xray of the breast
- Two Views
  - CC
  - MLO
- Calcifications, masses, asymmetry
Screening vs Diagnostic

• Screening
  • Asymptomatic

• Diagnostic
  • Symptomatic
    • palpable mass
    • nipple discharge
    • skin changes
    • breast pain
  • Additional views +/- Ultrasound
  • Radiologist views imaging
Radiation Exposure

- Average radiation exposure per year
  - 3msV

- 2 view mammogram
  - 0.4msv

- Comparable Exposure
  - driving 300 miles
  - riding 10 miles on a bike
  - breathing 2 days of Boston air

- Induces 1-3 cancers/million patients
Effectiveness of Mammogram

- Sensitivity — 84%
- True positive rate
- Specificity — 90.8%
- True negative rate
- Recall Rate — 10%
- Cancers and PPV
  - 23%
  - number of screening exams and % of screening exams were biopsy was recommended that result in a cancer diagnosis
# BI-RADS

<table>
<thead>
<tr>
<th>BI-RADS Classification</th>
<th>Features</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Need additional imaging</td>
</tr>
<tr>
<td>1</td>
<td>Negative – routine in 1 yr</td>
</tr>
<tr>
<td>2</td>
<td>Benign finding – routine in 1 yr</td>
</tr>
<tr>
<td>3</td>
<td>Probably benign, 6mo follow-up</td>
</tr>
<tr>
<td>4</td>
<td>Suspicious abnormality, biopsy recommended</td>
</tr>
<tr>
<td>5</td>
<td>Highly suggestive of malignancy; appropriate action should be taken</td>
</tr>
</tbody>
</table>
BI-RADs 0

- Needs additional imaging
  - Old films
  - additional views
  - ultrasound
BI-RADs 3

• Short term follow-up
  – 6 months

• Possible benign finding
  – Stability

• Management
  – Follow-up imaging
  – Repeat Clinical Breast Exam
BI-RADs 4

• 4A – low suspicion for malignancy
• 4B – intermediate suspicion for malignancy
• 4C – moderate concern (but not classic for malignancy)
BI-RADs 5

- >95% malignancy
- Classic presentation
Biopsy

- Fine needle aspiration
  - Cytology
- Core biopsy
  - Image guided
  - Stereotactic
- Excisional biopsy
  - Surgery
Fine Needle Aspiration

- Fast, inexpensive
- 96% accuracy
- Institution dependent
- Benign vs. Malignant
Core Needle Biopsy

- Gauge spring loaded needle - vary in size
- Tissue
- Multiple
Vacuum-Assisted

- 6-14 gauge core
- Large samples
- Single insertion
Stereotactic Biopsy

- Suspicious mammographic abnormalities
- Patients lay prone
Excisional Breast Biopsy

• Surgical procedure
  – Outpatient

• Removal of suspicious area
Needle Localization
Excisional Breast Biopsy

- Inability to do core needle biopsy
- Patient refuses needle biopsy
- Radiologic and pathologic discordance
Excisional Breast Biopsy

- Abnormal findings on needle biopsy
  - Atypical lesions
    - Atypical ductal hyperplasia
    - Atypical lobular hyperplasia*
    - Atypical papilloma
  - LCIS*
  - Papilloma
  - Radial scar
  - Phyllodes
Surgical Consult

- Abnormal findings on core biopsy
- Worrisome exam with normal imaging
- Unable to perform core biopsy
What to Bring...

- Imaging and reports
- Pathology reports
What to expect...

• Review HPI

• Review all imaging and pathology reports

• Review medical history
  – GYN history
  – Family History
  – History of prior breast biopsies

• Clinical Breast Exam
What to expect...

- Review pathology and symptoms
- Discuss surgery vs observation
Questions??
The work-up of a suspicious mass
Algorithm 2: New Palpable Mass

CBE & Hx

New Discrete Palpable Mass

Mass Appears Solid?

Yes: Solid or Indeterminate

No: Simple Cyst Suspected

Cyst Aspiration Performed?

Yes: No

Fluid Bloody or Mass persists?

Yes: No

Repeat CBE 4-6 weeks

Mass Recurred?

Yes: No

Consult Radiologist

Diagnostic Imaging Evaluation*

- Negative
- Benign
- Probably Benign
- Suspicious
- Highly Suspicious of Malignancy

Repeat CBE within 30 days

Mass Persists?

Yes: No

F/U CBE 3-6 mo.

Refer to Specialist

Routine Screening

Mass Recurred on CBE?

Yes: No

Correlate:
- Physical Findings
- Diagnostic Imaging

Do findings from both modalities agree?

Yes: Concorant

Routine Screening

No: Discordant

Refer to Specialist

Refer for Biopsy

*Diagnostic Imaging Evaluation should be accompanied by standard screening mammography of both breasts if screening mammography has not been conducted within the recommended timeframe. Diagnostic Imaging Evaluation will often include diagnostic mammogram and breast ultrasound, but can also include any radiographic imaging procedure recommended by the radiologist. A final BI-RADS category will be assigned to the case based on the results of all diagnostic imaging procedures. Women should return to routine screening once the diagnostic and/or treatment cycle is completed.
Cyst

- Simple cyst
  - Benign finding
  - Does not require needle aspiration, only if symptomatic
  - Fluctuates with menstrual cycle
Worrisome Cyst

- Cyst
  - Persistent
    - Needs excision
  - Bloody aspiration
    - Needs excision
  - Rapid Recurrence
    - Needs excision
Solid Mass

- Solid mass
  - Biopsied
    - Needle Biopsy
    - Excisional biopsy
      - Patient unable to get needle biopsy
      - Refuses core biopsy
      - Not amenable for radiologic biopsy
Benign Findings

- Fibroadenoma
  - Observation
    - Imaging and clinical exam for 2 years twice a year
      - Increases in size needs excision
  - Excision

- Phyllodes
  - Excision
Fibrocystic Disease

• Histology
  - Adenosis
  - Apocrine metaplasia
  - Fibrosis
  - Duct ectasia
  - Mild ductal hyperplasia
Fibrocytic Disease

- Clinical, mammographic and histologic findings

- Exaggerated response from hormones and growth factors
  - Cyclical pain
  - Nodularity – upper outer quadrants
Discordant

- Clinical exam
  - Irregularity
  - Not seen on imaging
  - Refer to specialist
Nipple Discharge

- Physiologic
  - Bilateral
  - Non-spontaneous
  - Multiple ducts
  - Heme (-)
Nipple Discharge

• Pathologic
  – Unilateral
  – One duct
  – Clear, bloody
  – Spontaneous

• Workup
  – Imaging
  – Ductogram
  – Excision
Intraductal Papilloma

- Single duct
- Benign
- 4% of intraductal ca
Breast Imaging
Breast Ultrasound

- Sound Waves
- Adjunct to mammogram
  - palpable mass
- Solid vs. cystic
Breast Screening Ultrasound

- Some studies have shown it to be helpful in dense tissue
- Lead to more biopsies
Breast MRI

- Magnetic Resonance Imaging (MRI)
  - diagnostic exam using large magnet, radio waves and computer to generate images of the organs and body structures
Breast MRI

- Patient is prone
- IV contrast — gadolinium
- Time — 45 minutes
Breast MRI Indications

- Not a routine screening tool
- Too expensive
- Unable to see calcifications
Breast MRI Indications

- High Risk Screening
  - Lifetime risk of breast cancer of about 20-25% according to a risk assessment tool
  - Known BRCA1 or BRCA2 gene mutation carrier
  - 1st degree relative with a known BRCA gene mutation and they themselves have not been tested
  - History of chest radiation between the 10-30 years of age
  - Li-Fraumeni, Cowden syndrome or PTEN mutation
3D - Mammogram
3D-Mammogram

- Tomosynthesis, Breast CT
- First developed in the 80s
- Feasible in the 90s
- FDA approved February 2011
3D- Mammogram

- Analogous to CT in its image acquisition
- Decreases superimposition, increases lesion conspicuity
3D- Technique

- 2-D images and tomo projectional images acquired using the same digital mammography station, same compression
- 4 second sweep
- 15 low dose projections continuously obtained
Cost

- Longer interpretation time, learning curve, decreases with interpreter experience
- Increased storage space, dependant on breast size, DBT increases storage requirements by a factor of 3, average of 400 MB
- No current CPT code for billing
- Currently an optional service: $50 charge covering the technical and professional fee
Questions — so far
Genetics Testing
Hereditary Breast Cancer

- 10% of all breast cancer and ovarian cancer diagnosis is considered to be hereditary

- **Hereditary Cancer**: Inherited genetic change that causes cancer predisposition

- **Familial Cancer**: More cancer in a family than we might expect, but no identifiable inherited genetic change. May be due to an unknown gene or genes, a shared environment, or both
Red Flags for Hereditary Breast Cancer

- Breast cancer diagnosed at age 50 or younger
- Ovarian cancer at any age
- Bilateral breast cancer or more than one breast cancer diagnosis
- Male breast cancer
- Triple negative breast cancer
  - ER negative, PR negative, Her2neu negative
- Ashkenazi Jewish ancestry
- Certain patterns of cancer types in a family
- More than one type of cancer in a single person
- Each generation of a family affected by cancer
BRCA1 and BRCA2: Hereditary Breast and Ovarian Cancer Syndrome

- BRestead CAncer Genes 1 and 2
- Women with a BRCA mutation have a...
  - 60-87% lifetime risk for breast cancer
  - 20-54% lifetime risk for ovarian cancer
  - Up to a 60% risk for developing a second breast cancer in their lifetime
- Other cancers: male breast cancer, pancreatic, prostate, and melanoma
What other genes are related to breast and ovarian cancer?

<table>
<thead>
<tr>
<th>Breast Cancer</th>
<th>Ovarian Cancer</th>
</tr>
</thead>
<tbody>
<tr>
<td>ATM</td>
<td>BRIP1</td>
</tr>
<tr>
<td>BARD1</td>
<td>EPCAM</td>
</tr>
<tr>
<td>BRIP1</td>
<td>MLH1</td>
</tr>
<tr>
<td>CDH1</td>
<td>MSH2</td>
</tr>
<tr>
<td>CHEK2</td>
<td>MSH6</td>
</tr>
<tr>
<td>NBN</td>
<td>PMS2</td>
</tr>
<tr>
<td>PALB2</td>
<td>RAD51C</td>
</tr>
<tr>
<td>PTEN</td>
<td>RAD51D</td>
</tr>
<tr>
<td>RAD51C</td>
<td>STK11</td>
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<tr>
<td>STK11</td>
<td>TP53</td>
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<tr>
<td>TP53</td>
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Genetic Counseling

- Help identify potential genetic health risks
- Help make informed, personalized decisions about genetic health
- Discuss prevention strategies, screening and treatment options
- Discuss genetic testing options and whether genetic testing is indicated
- Help understand genetic test results and explain what they mean for the patient and relatives
- Provide emotional and psychological support throughout the process
Questions???