AN OVERVIEW OF BREAST CANCER

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1. List 3 risk factors for breast cancer development
2. State 3 common signs & symptoms of breast cancer
3. Describe the ACS and NCI breast cancer screening recommendations
WHAT IS CANCER?

- Cellular & genetic changes that lead to abnormal cell growth

- Progressive changes lead to tumor formation and invasion of surrounding, then distant tissues

- Multiple sequential genetic mutations:
  - Oncogenes: regulate growth & repair
  - Tumor suppressor genes: inhibit cell division
WHAT CAUSES BREAST CANCER?

- All are due to a genetic abnormality
- BUT only 5-10 % are inherited
- 90 % “just happen”
More than 1 disease
Most common cancer in women worldwide
#2 cause of cancer death in American women
2011 (ACS):
- > 230,000 new cases of invasive breast cancer
- 40,170 women will die of breast cancer
More African-American women die of breast cancer than other races
Male breast cancer <1% of all breast cancers
# Risk Factors

- #1 female gender
- Family history - number of 1st degree relatives
- Older than 50 years
- Nulliparity
- Early menarche, late menopause
- Hormone replacement therapy
- More than 2 alcohol drinks per day
- Obesity
HIGH RISK FOR BREAST CANCER

- Mutation of BRCA1 or BRCA2 gene
- 1° relative with breast cancer before age 40
- Personal history
- Radiation to chest
- Mutation in P53 or PTEN genes

Gail Risk Model:
- [http://www.breastcancerprevention.org/breastcancerrisks.html](http://www.breastcancerprevention.org/breastcancerrisks.html)
Non-invasive

Confined to ducts or lobules

1. DCIS (ductal carcinoma in situ): can become cancerous and spread

2. LCIS (lobular carcinoma in situ): a “warning sign” of increased risk
Invasive
AKA “infiltrating”

- has spread beyond the duct or lobules
- considered systemic
- able to spread through the vascular system
# EARLY DETECTION/SCREENING

## Average Risk

<table>
<thead>
<tr>
<th></th>
<th>Komen</th>
<th>ACS</th>
<th>NCI</th>
<th>USPS</th>
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</thead>
<tbody>
<tr>
<td><strong>Mammogram</strong></td>
<td>yearly ≥ 40 yrs</td>
<td>yearly ≥ 40 yrs</td>
<td>Q1-2 yr ≥ 40 yrs</td>
<td>Q2 yrs age 50-74</td>
</tr>
<tr>
<td><strong>Clinical breast exam</strong></td>
<td>Q3yr age 20-39</td>
<td>Q3yr age 20-39</td>
<td>No recommendation</td>
<td>No recommendation</td>
</tr>
<tr>
<td></td>
<td>Yearly ≥ 40 yrs</td>
<td>Yearly ≥ 40 yrs</td>
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</tbody>
</table>
# Early Detection and Screening

## High Risk

<table>
<thead>
<tr>
<th>Risk Factor</th>
<th>CBE</th>
<th>Mammogram</th>
<th>MRI</th>
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</thead>
<tbody>
<tr>
<td>BRCA1 or BRCA2 carrier</td>
<td>q 6-12 mths</td>
<td>yearly ≥ age 25</td>
<td>yearly ≥ age 25</td>
</tr>
<tr>
<td>Strong family HX breast/ovarian cancer &lt; 25 yrs</td>
<td>Yearly</td>
<td>Not recommended</td>
<td>Not recommended</td>
</tr>
<tr>
<td>Strong family HX breast/ovarian cancer ≥ 25 yrs</td>
<td>Q 6-12 mths</td>
<td>Yearly starting at age 5-10 yr prior to youngest case</td>
<td>Yearly starting at age 5-10 yr prior to youngest case</td>
</tr>
<tr>
<td>Etc...</td>
<td></td>
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WHAT ABOUT BSE?

- BSE did not produce increased survival

- Current recommendations are:
  - Know your risk
  - Follow screening guidelines
  - Confer with your provider
  - Breast awareness
  - Healthy lifestyle choices
Early:

- Palpable lumps or nodes (< 1 cm is non-palpable)
- Most palpable cancers are found by the patient
- 50% occur in the upper outer quadrant
- Painless lump or thickening (11% have discomfort)
- Nipple discharge (also seen in late stages)
**Signs & Symptoms**

- **Late**

**Tumor-related**
- Dimpling of skin
- Nipple retraction or deviation
- Asymmetry of breasts
- Peau d’orange
- Bloody nipple discharge
- Ulcerations
Signs & Symptoms

- **Late**
  - **Node-related**
    - Firm, enlarged axillary nodes
    - Palpable supraclavicular nodes
**Late Metastases**
- Common sites of metastases: liver, lungs, bone
  - Pain in shoulder, hip, lower back, pelvis
  - Persistent cough
  - Weight loss
  - Dizziness, blurred vision, headache
Local spread within the breast thru direct spread, ducts, and lymphatics
Lymph node spread, often to axillary nodes
Distant spread through blood and lymph
Metastases = “incurable”, but many survive decades, many do not
1 cancer cell takes 5 years to multiply to 1 billion cells = 1 cm
TYPES OF INVASIVE BREAST CANCER

- Invasive ductal carcinoma: 50-75%
- Invasive lobular carcinoma: 5-10%
- Medullary carcinoma: <2%
- Mucinous (colloid) carcinoma: <5%
- Papillary carcinoma: 1-2%
- Tubular carcinoma: 1-3%
- Inflammatory breast cancer (IBC): 1-5%
- Paget’s Disease: 1-3%
INFLAMMATORY BREAST CANCER

- Rare and aggressive form
- Often misdiagnosed as an infection
Paget’s Disease

- Itchy, burning, redness, scaly skin
- Often mistaken for exzema
DIAGNOSIS

- Mammogram
  - Digital
  - Tomosynthesis
- MRI
- Biopsy
- Ultrasound
- Fine needle aspiration
BIOPSY

For microscopic diagnosis, cytology and histology

- Fine Needle Aspiration (FNA)
  - “Triple test” = mammogram, physical exam, FNA
- Skin biopsy
- Needle core biopsy (large needle)
- Incisional biopsy
- Excisional biopsy
- Sentinel Lymph Node biopsy (SLN): 1st draining lymph node from cancer site
STAGING

- Uses information from CT, CXR, US, liver and abdomen imaging, bone scan, tissue, sentinel lymph node mapping (1st draining node)
- Considers tumor size, lymph node involvement, metastases
- 5 stages: 0 non-invasive
  - I
  - IIA, IIB
  - IIIA, IIIB, IIIC
  - IV distant metastases
PROGNOSIS

- Number of lymph nodes involved
- Tumor size
- Tumor grade
- Hormone receptor status
  - ER/PR negative worse
  - HER2/neu over-expression (positive) worse
  - “triple negative” (ER/PR/HER2Neu negative) worst
# Treatment

<table>
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<th>Stage</th>
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| **Stage O** (non-invasive) | Breast conservation surgery (lumpectomy) plus XRT  
Total mastectomy w/wo tamoxifen |
| DCIS                | “Watch & wait”  
Tamoxifen  
Bilateral prophylactic mastectomy wo axillary lymph node dissection |
| LCIS                | “Watch & wait”  
Tamoxifen  
Bilateral prophylactic mastectomy wo axillary lymph node dissection |
# Treatment

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| I, II, IIIA               | • Breast conserving surgery  
• Modified radical mastectomy w/wo breast reconstruction  
• XRT if > 4 positive nodes  
• Adjuvant systemic therapy with hormones and/or chemo depending on nodal status, ER/PR status, tumor grade, menopausal status, age... |
| IIIB, IV, recurrent or metastatic | Modified radical mastectomy or radical mastectomy with XRT pre/post-operatively plus chemo or hormone therapy |
Goal = kill cancer cells

- AC (Adriamycin®, Cisplatin); paclitaxel or taxotere
- Doxil
- FEC (5Fu, Epirubicin, Cytoxan)
- TAC (Taxotere, doxorubicin (Adriamycin®), Cytoxan)
- Ixabepilone (Ixempra®)
SIDE EFFECTS OF CHEMOTHERAPY

- Nausea/vomiting
- Alopecia
- Myelosuppression
- Organ damage
- Fatigue
- Sterility
- Secondary cancers
- Cognitive deficits
INDIVIDUALIZED TREATMENTS

- Testing NCCN Standard of therapy
- HER2 overexpression in 25% of breast cancer
  - Direct test IHC
  - Indirect gene amplification test: FISH or CISH
- KRAS
- BRAF
- PARP
TARGETED THERAPIES

Selectively targets specific sites or processes

- Bevacizumab (Avastin®)
- Trastuzumab (Herceptin®)
- Lapatinib (Tykerb®)
SIDE EFFECTS OF TARGETED THERAPY

- Infusion reactions
- Nausea, vomiting, diarrhea
- Myelosuppression
- Neuropathies
- Other
Cancer treatment is expensive
- Most cancer treatments cost $6,000-$20,000/mth

↑ survival with targeted therapies such as Herceptin® and HER2 testing

Testing is expensive but eliminates useless treatments

100 times increased cost to treat breast cancer in the past 10 years with < 1% increase in survival
**Drug-Related Treatment Plans**

- Systemic therapy
- Neoadjuvant therapy
- Adjuvant therapy
- Hormone receptor status (ER, PR, HER2NEU)
- Single agent treatment
- Combination treatment
- Endocrine or hormone therapy
  - Tamoxifen (pre & post-menopause hormone dependent disease), aromatase inhibitors ("AI’s"); post-menopausal only)
“ABLATIVE THERAPY”

- **Ovarian**
  - remove source of estrogen
  - Oophorectomy or hormone treatment

- **Adrenal**
  - source of post-menopausal estrogen
  - Accomplished by surgical removal or Aromatase Inhibitors (AI’s)
Lumpectomy - small margin
Segmental resection - wide margin
Mastectomy
- Subcutaneous: tissue, not the skin
- Skin-sparing: tissue & “skin at risk”
- Total (simple): tissue, skin, glands, nipple
- Modified radical: above & axillary lymph nodes
- Radical: above & pectoral muscles
Immediate or delayed
Implants are simpler and cheaper

Flaps:
- Myocutaneous or “free”
- TRAM (transverse rectus abdominis muscle)
- DIEP (deep inferior epigastric perforator)
- Autologous

Nipple/areolar reconstruction
Option for those at high risk for breast cancer:

- Cancer in 1 breast
- Family history of breast cancer
- Positive gene testing
POST-OP CARE

- Fluid accumulation: surgical drains

- Promote lymph drainage: elevate arm, no BP, injections, blood draws

- Functional recovery: active ROM exercises, PT
Kills cancer cells and reduces recurrence
Before, during, or after chemo
Good for tumors close to the chest wall, locally advanced, inflammatory, recurrent
To treat bone metastases for palliation
Given 2-4 weeks after surgery
Side effects: hyperpigmentation, fibrosis, rib fractures, pneumonitis, arm edema, secondary malignancies
**LYMPHEDEMA**

- Surgery & radiation treatments can interrupt lymph drainage (technology is improving - better techniques)
- Edema, heaviness, firmness, achiness, numbness in affected arm, hand, breast, shoulder, upper body
- Functional changes, disfigurement, psychosocial impact
- 7-42% of women treated for breast cancer
- May be delayed even years after treatment
- Possible triggers: infection, injury, restriction, extreme temperatures
TREATMENT OF LYMPHEDEMA

- Manual drainage
- External compression (bandage/garment)
- Exercises
- Meticulous skin and nail care
- Patient education
  - Avoid injury/infection
  - Arm measurement
PATIENT EDUCATION

- “Appropriate” to the patient
- Logical timing
- Diagnosis, treatment, side effects, prognosis
- Body image, relationship issues
- Rehabilitation/prostheses
- Survivorship issues: surveillance, late effects
NCCN guidelines:
- No chemo in 1\textsuperscript{st} trimester
- No XRT in any trimester
- Blue dye (sentinal lymph node biopsy) contraindicated in pregnancy
- Weekly paclitaxel after 1\textsuperscript{st} trimester OK?
- No trastuzumab
SUMMARY

- Breast cancer requires complex, expert, multi-disciplinary treatment
- Local and systemic treatments with associated side effects
- Information changes frequently
- Ongoing research and new treatments
- Patient education key to improve adherence
Want to learn more?

- Oncology Nursing Society (ONS) online Breast Cancer Course; 20 contact hours.
- ONS Breast Care Special Interest Group (online newsletter)
  - www.ons.org
- www.breastcancer.org
- Triple Negative Breast Cancer Foundation
  - www.tnbcfoundation.org
- Susan G. Komen Foundation
  - http://ww5.komen.org/
REFERENCES

- American Cancer Society. *Can breast cancer be found early?* Retrieved January 14, 2010 from [http://www.cancer.org/docroot/CRI/content/CRI_2_4_3X_Can_breast_cancer_be_found_early_5.asp?rnav=cri](http://www.cancer.org/docroot/CRI/content/CRI_2_4_3X_Can_breast_cancer_be_found_early_5.asp?rnav=cri)
