Breast Surgery

Prognostic Markers in Breast Cancer

Good Prognostic Markers

- Estrogen receptor (ER) positive
  - Indicates need for endocrine therapy

Poor Prognostic Markers

- C-ERB-B2 (HER2) positivity
- Hormone receptor negative tumors
- Triple negative tumors

Prognostic Factors

- Stage at diagnosis “most important factor”(earlier the better)
- Lymphatic spread (axillary lymph node involvement is most important)
- Histological tumor grade (higher grade = poorer prognosis)
- Receptor status
- Positive circumferential margin (closest distance between radial resection margin and tumor tissue)

Epidemiology and Risk Factors

Invasive breast cancer

- Invasive ductal carcinoma is the most common cancer in females accounting for 70-80% of all cases
- 2nd most common cause of cancer death in women
- 10% are due to genetic causes

Risk Factors

- Female sex 100% higher risk than males
- Age > 50 (most important single risk factor)
- Family history (15–20% >2 in first-degree relatives)
- Ethnicity: white > black > others
- Alcohol, smoking, high-fat diet
- Previous history of breast cancer
- Early menarche (<12 years)
- Late menopause (>55 years)
- Oral contraceptive pills (OCP)
- Nulliparity
- Late first pregnancy (>30 years)

Genetic Syndromes

- BRCA1 gene
- BRCA2 gene
- Li-Fraumeni syndrome
- Cowden syndrome
- Ataxia telangiectasia

BRCA Gene Associations

- BRCA-positive women develop breast cancer earlier
- BRCA1: 55–60% risk of invasive breast cancer by age 70
- BRCA2: 45% risk by age 70
- Men with breast cancer are often BRCA2 positive

Types and Histology of Breast Cancer

Invasive Breast Cancer

- Infiltrating ductal carcinoma → worse prognosis

- Invasive lobular carcinoma → increased incidence of bilateral breast cancer
- Mixed histologies behave like invasive ductal carcinoma

Special Types

Medullary carcinoma

- Often large
- Better prognosis than invasive ductal carcinoma
- Lymphocytic infiltration
- Usually triple negative
- Associated with BRCA1

Inflammatory Breast Cancer

- Poor prognosis
- Rapidly growing
- Can mimic breast abscess
- Treatment: neoadjuvant chemotherapy → mastectomy → radiation

Carcinoma In Situ

- Ductal carcinoma in situ (DCIS) (Comedo and non-comedo types)
- Lobular carcinoma in situ (LCIS) (diffuse type)
- Paget's disease of the nipple (without invasive carcinoma)
- Bowen disease
- Erthyroplasia of queyrat

Clinical Features of Breast Cancer

- Breast lump

- Nipple retraction or inversion
- Nipple discharge
- Increase in breast volume
- Breast/nipple pain
- Redness and thickening of skin
- Peau d'orange
- Axillary lymphadenopathy
- Skin tethering and dimpling
- Excoriation of nipple epidermis

Skin Changes in Breast Cancer

- Dimpling/retraction → due to Cooper ligament tightening
- Peau d'orange → lymphatic obstruction
- Dimpling may indicate invasive lobular carcinoma

Locally Advanced Breast Cancer

Symptoms

- Edema of breast skin
- Skin ulceration
- Arm edema
- Dermal lymphatic invasion
- Nipple retraction is an exception

Breast Cancer Staging and Imaging (BI-RADS)

- 0: Incomplete – needs additional imaging
- 1: Negative
- 2: Benign (risk equivalent to 0)
- 3: Probably benign – 6-month follow-up

- 4: Suspicious – biopsy required
- 5: Highly suggestive of malignancy – biopsy required
- 6: Biopsy-proven malignancy – surgery/excision

Imaging Modalities

Mammography

- Preferred in postmenopausal women and age >30
- Improves detection of early and non-invasive carcinoma

Ultrasound

- Preferred in premenopausal women and age <30

MRI

- Screening for high-risk young patients
- Detects primary lesion with positive axillary nodes and negative mammogram
- Sensitivity >90%
- More accurate in invasive lobular carcinoma

Metastasis of Breast Cancer

Common Sites (in order)

1. Bone
2. Liver
3. Lung
4. Brain

Spread

- Vertebral metastasis via intercostal veins → Batson plexus

Symptoms

- Bone: pain, pathological fractures, ↑ ALP, ↑ calcium
- Liver: abdominal pain, distention, jaundice, abnormal LFTs
- Lung: cough, hemoptysis, chest pain
- Brain: headache, cognitive deficits, focal deficits, seizures
- Pulmonary metastasis is the most common initial site of distant recurrence
- Breast cancer is the most common metastatic tumor to the stomach

Management of Breast Cancer

- T4 disease: neoadjuvant chemotherapy → mastectomy → radiation
- Trastuzumab: monoclonal antibody for HER2-positive cancer

Benign Breast Conditions

Fibroadenoma

- Most common breast tumor in women <35
- Peak age: 20–30 years
- Polyclonal cell proliferation
- Extremely low malignant potential
- Managed conservatively

Phyllodes Tumor

- 1 in 5 associated with fibroadenoma
- Usually unifocal
- Axillary lymph nodes rarely involved
- 25% malignant
- Treatment: wide excision or mastectomy

Proliferative Breast Disease

Non-Proliferative

- Cysts dilated,fluid filled ducts (blue dome cysts)
- Apocrine metaplasia
- Stromal fibrosis
- No malignant potential

Proliferative Without Atypia

- Sclerosing adenosis (proliferation of small ductulus & acini in lobules,calcification)
- Ductal hyperplasia
- papillomatosis
- Epithelial hyperplasia of terminal duct cell and lobular epithelium
- Slight increase in cancer risk

Proliferative With Atypia

- Atypical ductal hyperplasia
- Atypical lobular hyperplasia
- Strong association with malignancy

Breast Cysts Management

- First-line: fine needle aspiration
- Clear fluid + resolution → no further workup
- Bloody, recurrent, or persistent → mammogram/ultrasound

Duct Ectasia (Plasma Cell Mastitis)

- Strongly associated with smoking
- Associated with aerobic and anaerobic bacterial infection
- Presents with green or brown nipple discharge
- Most common cause of green discharge
- Nipple inversion
- Histology: chronic inflammation with plasma cells
- Treatment: excision of major duct system

Lactational Mastitis and Breast Abscess

Lactational Mastitis

- Occurs ~6 weeks postpartum
- Due to milk stasis
- Symptoms: fever, redness, tenderness, fatigue
- Management: **continue breastfeeding**, drainage, analgesics
- Antibiotics if >1 day (cover Staphylococcus aureus)

Breast Abscess

- Analgesics
- Broad-spectrum antibiotics
- Continue breastfeeding
- Ultrasound-guided aspiration

- Incision and drainage if failure
- Rule out inflammatory breast cancer if resistant

Nipple Conditions

- Most common cause of inverted nipple: congenital
- Cancer-related inversion: Paget's disease
- Paget's disease: eczema-like lesion of nipple

Accessory Breast Tissue

- Found along milk line (axilla to groin)
- Most common site: axilla

Neonatal Breast Enlargement

- Normal response to falling maternal estrogen
- Occurs in first 2 months of life

Breast Cancer Recurrence

- 40% are local (chest wall, lymph nodes)
- Occur within first 5 years after treatment

Gynecomastia

Causes

1. Decreased testosterone
2. Increased estrogen
3. Drugs

Increased Estrogen Causes

- Tumors: Leydig cell, Sertoli cell, hCG-producing tumors
- Lung cancer
- Hepatocellular carcinoma
- Adrenocortical tumor
- Liver cirrhosis
- Hyperthyroidism

Decreased Testosterone Causes

- Mumps orchitis
- Klinefelter syndrome
- Chronic kidney disease
- Castration

Drugs

- **Inhibitors of testosterone receptor**
- Antiandrogens
- Cimetidine
- **Inhibitors of testosterone synthesis**
- Spironolactone
- Ketoconazole
- Chemotherapy

Evaluation

- Testis exam
- Liver function, urea, creatinine
- Thyroid function tests
- Hormonal profile (testosterone, prolactin)

Tumor Markers

- ↑ hCG, α-fetoprotein → testicular germ cell tumor
- ↑ DHEA → adrenal tumor

Treatment

- Testosterone (if deficiency)
- Tamoxifen for pseudo gynecomastia

Other Relevant Conditions

Bowen Disease

- **Squamous cell carcinoma** in situ of skin
- Associated with sun exposure, HPV 16/18, arsenic

Erythroplasia of Queyrat

- Bowen disease of glans penis
- **Squamous cell carcinoma** in situ
- Associated with chronic irritation, lack of circumcision, HPV 16/18

Basal Cell Carcinoma

- **Malignant neoplasm**
- Most common skin cancer
- Does not metastasize
- Risk factors: sun, genetics, arsenic

- Good prognosis

Additional Notes

- Presence of in situ component in invasive ductal carcinoma does not affect prognosis
- Gynecomastia increases risk of cancer
- Dimpling and peau d’orange are key skin signs
- Nipple retraction may be early sign in Paget disease