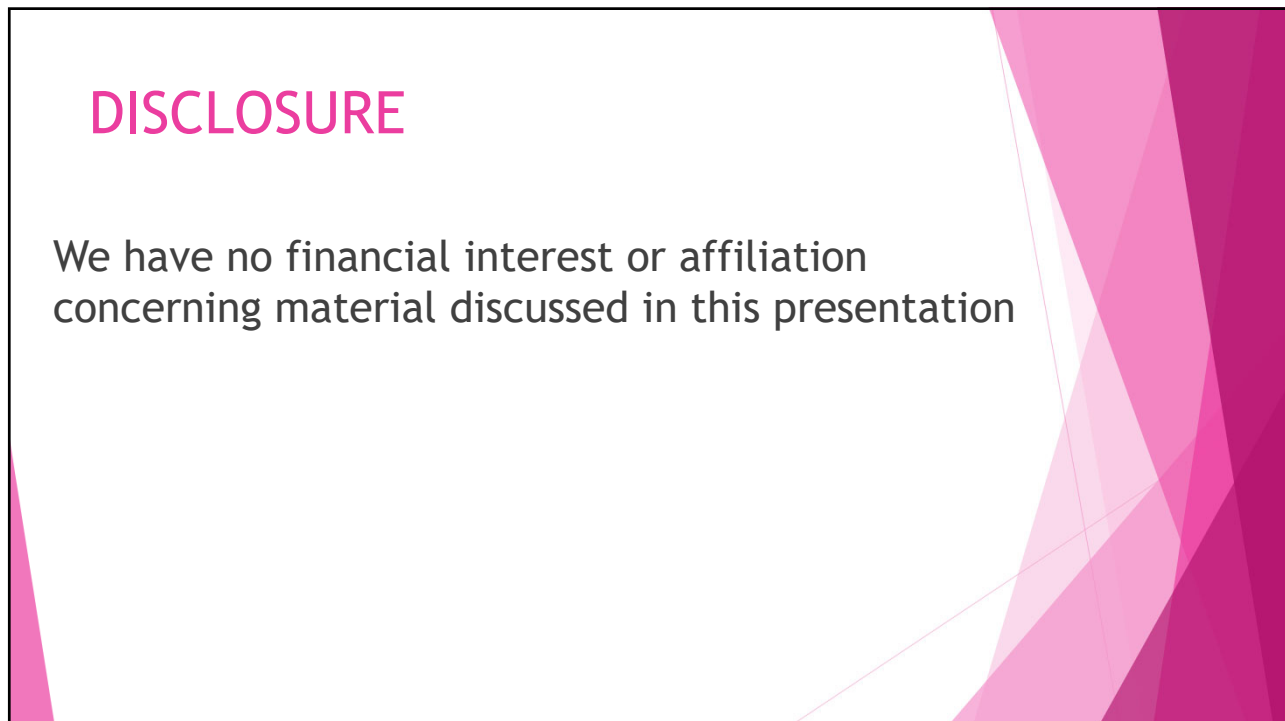




1



2

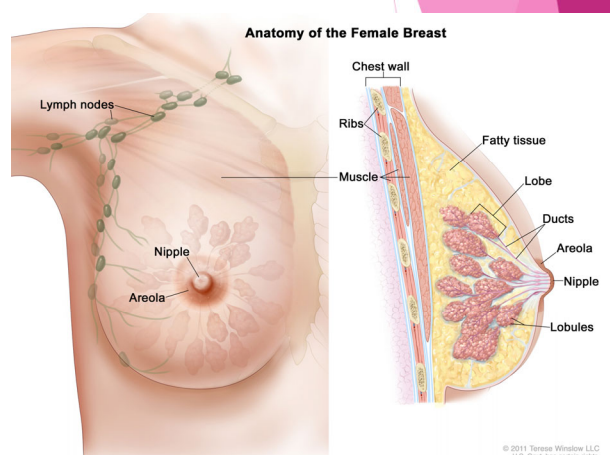
OBJECTIVES

- × Anatomy of the breast
- × Common types of breast cancer
- × Breast pathology
- × Common surgical interventions & potential complications
- × Radiation therapy & potential side effects
- × Common medical therapies & potential side effects

3

Anatomy of the Breast

- × Borders of the breast
 - × Clavicle, sternum, inframammary fold, mid axillary line
- × Epithelial elements
 - × Lobules - milk production
 - × Ducts - lobules to nipple
- × Stromal elements
 - × Adipose
 - × Connective tissue, cooper's ligaments
- × Lymphatic system
 - × Nodes and ducts
 - × Sentinel lymph node - ipsilateral axilla
- × Blood vessels



4

Most Common Types of Breast Cancer

Carcinoma = Arise from epithelial lining of organs

- Ductal carcinoma in situ
- Invasive ductal carcinoma (70%)
- Invasive lobular carcinoma
- Rare carcinoma subtypes
 - Mucinous, tubular, medullary, papillary, etc
- Paget disease (1-3%)
- Inflammatory breast cancer (1-5%)
- Phyllodes tumor

5

Breast Pathology

- Type of cancer
- Grade
- Size
- Margins
- Hormone receptor
 - Estrogen, Progesterone, HER2
- Sentinel lymph node

Final Diagnosis

A) RIGHT BREAST, WIRE-LOCALIZED LUMPECTOMY:

1. Invasive lobular carcinoma, Nottingham grade II of III
 - a. Size: 8 mm
 - b. Core biopsy site is associated with tumor
2. Lobular carcinoma in-situ: Present, classic type
3. Margins:
 - a. Invasive carcinoma is 3 mm from the posterior margin
4. Breast Ancillary Testing: Performed on prior case (S23-11560)
 - a. Hormone Receptors:
 - Estrogen receptor: Positive (95%, strong staining)
 - Progesterone receptor: Positive (72%, moderate staining)
 - b. HER2 by IHC: Negative (1+ by manual morphometry)
 - c. Ki-67: 9%

B) RIGHT AXILLARY SENTINEL LYMPH NODE #1, EXCISION:

1. One benign lymph node (0/1)
2. Negative for malignancy

C) RIGHT AXILLARY SENTINEL LYMPH NODE #2, EXCISION:

1. One benign lymph node (0/1)
2. Negative for malignancy

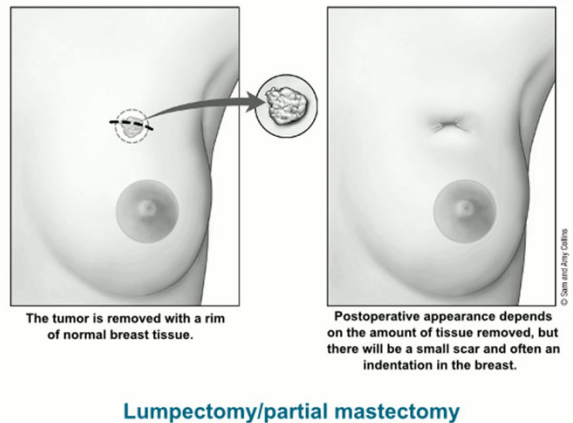
D) RIGHT AXILLARY SENTINEL LYMPH NODE #3, EXCISION:

1. One benign lymph node (0/1)
2. Negative for malignancy

6

Lumpectomy

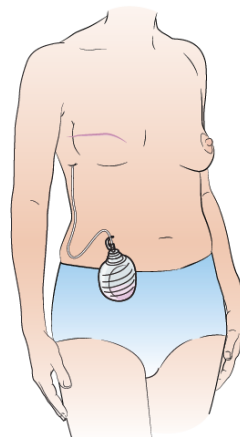
- × Breast conserving surgery
- × Localized tumor removal
- × Seed vs wire vs palpable
- × Benefits
 - × Less invasive, quicker recovery, maintain breast tissue
- × Potential risks
 - × Usually require radiation, hard scar tissue and/or dimple at surgical site, seroma



7

Mastectomy

- × Complete removal of the breast tissue
- × Considerations
 - × Large tumor or small breast
 - × pathogenic gene carrier
 - × contraindication to radiation therapy
 - × personal preference
- × Drains
- × Recovery time ~ 6 weeks (recon)
- × Reconstruction vs Going Flat
- × Complications - hematoma, skin necrosis/flap death



8

Node Sampling

- × Sentinel lymph node biopsy
- × Complete axillary lymph node dissection
- × Lymphedema Risk
- × Node mapping
 - × Isosulfan blue (visual tracer)
 - × Technicium 99 (radioactive tracer)
 - × Iron oxide (magnetic tracer)

9

Radiation Therapy

- × Lumpectomy
 - × Over 70
 - × Previous radiation
- × Mastectomy
 - × Tumor >5 cm
 - × Axillary mets
 - × Close margins
 - × Inflammatory
- × Side effects
 - × Fatigue, burn
 - × Lymphedema
 - × Underlying organ complications are rare with current technologies

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Survival rates for
lumpectomy + radiation
are the same as mastectomy

11

Medical Oncology

- × Medical therapy for treatment of breast cancer is tailored to the individual person's tumor and risk profile
- × Comprised of four main types of treatments in the curative setting
 - × Endocrine therapy
 - × Chemotherapy
 - × Targeted therapy
 - × Immunotherapy

12

Endocrine Therapy

- × Medication given to prevent growth of hormone sensitive cancers
- × Two main categories
 - × Tamoxifen
 - × Aromatase inhibitors
- × Typically administered as a pill once daily for 5-10 years in the curative setting
- × Side effects can cause significant quality of life concerns
 - × If not treated appropriately, can lead to early cessation of treatment

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Tamoxifen

- × Oral selective estrogen receptor modulator (SERM)
 - × Selectively binds to estrogen receptor sites (such as in breast tissue)
 - × Agonistic effects in other parts of the body (bone)
 - × Can improve bone density by stimulating estrogen receptor sites in bone
 - × Typical dose is 20mg daily for 5-10 years
- × Side effects
 - × Hot flashes, leg cramps, cognitive changes, mood changes, increased vaginal discharge
 - × Increased risk of blood clots, uterine cancer, and cataracts
 - × Drug/drug interactions

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Aromatase inhibitors

- ✖ Blocks conversion of androgens to estrogen by inactivating the enzyme responsible for this (aromatase)
 - ✖ Non-steroidal- letrozole and anastrozole
 - ✖ Steroidal- exemestane
- ✖ Need to either be post-menopausal or have ovarian function suppressed
 - ✖ Given in conjunction with either goserelin or leuprolide in premenopausal women
- ✖ Typically given as a pill once daily for 5-10 years
- ✖ Side effects
 - ✖ Musculoskeletal pain, hot flushes, genitourinary syndrome of menopause, cognitive changes, sleep difficulty, increased cholesterol

15

Chemotherapy

- ✖ Chemotherapy is a type of anticancer treatment that targets fast growing cells
 - ✖ According to NCCN, the goal of chemotherapy administration in breast cancer is to "control or eradicate undiscovered distant metastases."
 - ✖ Impacts tumor cells but also many other cells in the body
 - ✖ Typically given intravenously or orally for breast cancer treatment
 - ✖ Can be given in conjunction with endocrine therapy, immunotherapy, targeted therapy

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Chemotherapy

- × Can be given prior to surgery (neoadjuvant) or after surgery (adjuvant)
- × Neoadjuvant chemotherapy
 - × Can help promote optimal surgical outcomes
 - × Facilitates breast conserving surgery
 - × Decreases nodal disease- allows for sentinel node biopsy vs axillary node dissection
 - × Can offer prognostic information based on response to treatment
- × Adjuvant chemotherapy
 - × Given after surgery to reduce risk of developing metastatic disease
 - × Indicated in people who received neoadjuvant chemotherapy and had residual cancer burden

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TEO

Chemotherapy

- × Decision to use chemotherapy based on multiple factors
 - × Stage (TNM)
 - × Biomarkers (ER, PR, HER2)
 - × Oncotype DX RS
 - × Predictive and prognostic tool to determine benefit to chemotherapy for people with hormone receptor positive, HER2 negative disease
 - × Age
 - × Menopausal status
 - × Functional status
 - × Surgical indications

18

Slide 18

TE0 [@Thersleff, Ashley] do you mean preference of the surgeon?
Toffoli, Abigail E, 2023-09-14T16:56:24.430

TA0 0 I'm trying to say that if someone wants a lumpectomy but the tumor is too big?
Thersleff, Ashley, 2023-09-15T01:49:14.642

Chemotherapy

- × Common regimens
 - × Doxorubicin + cyclophosphamide + paclitaxel (AC/Taxol)
 - × Docetaxel + cyclophosphamide (TC)
 - × Docetaxel + carboplatin + trastuzumab + pertuzumab (TCHP)
 - × Carboplatin + paclitaxel + pembrolizumab followed by doxorubicin + cyclophosphamide + pembrolizumab (Carbo/Taxol/pembrolizumab + AC/pembrolizumab)

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Chemotherapy side effects

- × Acute effects
 - × Nausea/vomiting
 - × Diarrhea/constipation
 - × Mouth sores
 - × Low blood counts
 - × Alopecia
 - × Fatigue
 - × Anorexia
 - × Skin/nail changes
- × Long term and late effects
 - × Peripheral neuropathy
 - × Cardiotoxicity
 - × Risk of secondary cancers
- × And many more not listed...



20

TEO

Targeted therapy

- × Targeted therapies are anti-cancer medications that target certain proteins, receptors, or pathways in a tumor
- × HER2
 - × Trastuzumab and pertuzumab
 - × Given intravenously or as a subcutaneous injection, typically in the neoadjuvant setting with chemotherapy
 - × Associated with cardiotoxicity- requires monitoring LVEF during therapy
- × BRCA mutation-
 - × PARP inhibitors- Olaparib
 - × Pill taken 1-2 times daily
 - × Fatigue, nausea, cytopenias. Risk of secondary AML.
- × CDK4/6 inhibitors
 - × Abemaciclib, ribociclib, palbociclib
 - × Given in maintenance and in metastatic setting
 - × Used in conjunction with aromatase inhibitor or fulvestrant
 - × Diarrhea, cytopenias, fatigue

21

TEO

Immunotherapy

- × Immune checkpoint inhibitors are drugs that mobilize the person's own immune system to recognize and attack cancer cells
- × Most common drug in breast cancer care is pembrolizumab
 - × Administered intravenously every three weeks
- × Typically given in triple negative breast cancer in conjunction with chemotherapy
- × Can cause immune related adverse events, or "itis-es"
 - × Rash, colitis, hepatitis, thyroiditis, hypophysitis, adrenal insufficiency, myositis, type I diabetes

22

Slide 21

TE0 [@Thersleff, Ashley] i love this and it is very helpful for me and my practice haha, I think if you are short on time in your section it would be appropriate to essentially voice the first sentence and then leave it as simple as these are some examples

Toffoli, Abigail E, 2023-09-14T16:57:24.588

Slide 22

TE0 [@Thersleff, Ashley] love the itis-es.. did you have a little spasm at the end there :)

Toffoli, Abigail E, 2023-09-14T16:58:07.917

REFERENCES

- × American Cancer Society 2023, *Types of Breast Cancer*, accessed 9 September 2023 <[Types of Breast Cancer | About Breast Cancer | American Cancer Society](#)>
- × American Cancer Society, 7 July 2023, *Your Breast Pathology Report*, accessed 9/12/23, <[Understanding Your Pathology Report: Breast Cancer | American Cancer Society](#)>
- × American Cancer Society, 27 Oct 2021, *Breast Conserving Surgery*, accessed 9/12/23, <[Breast-conserving Surgery \(Lumpectomy\) | Treating Breast Cancer | American Cancer Society](#)>
- × American Cancer Society, 17 Nov 2022, *Immune Checkpoint Inhibitors and Their Side Effects*, accessed 9/10/23 <[Immune Checkpoint Inhibitors and Their Side Effects | American Cancer Society](#)>
- × Chu E, Devita VT. *Physicians' Cancer Chemotherapy Drug Manual*. Burlington, MA: Jones and Bartlett Learning; 2023.

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References Continued

- × Masoud V, Pagès G. Targeted therapies in breast cancer: New challenges to fight against resistance. *World J Clin Oncol*. 2017;8(2):120-134. doi:10.5306/wjco.v8.i2.120
- × Memorial Sloan Cancer Center, JP Drain, 29 Mar 2023, Accessed 14 Sept 2023, <[About Your Mastectomy | Memorial Sloan Kettering Cancer Center \(mskcc.org\)](#)>
- × National Comprehensive Cancer Network, 23 Mar 2023, *NCCN Clinical Practice Guidelines in Oncology: Breast Cancer, V4.2023*, accessed 9/6/23, <[breast.pdf \(nccn.org\)](#)>
- × National Comprehensive Cancer Network, 24 Mar 2023, *NCCN Clinical Practice Guidelines in Oncology: Survivorship, V4.2023*, accessed 9/12/23, https://www.nccn.org/professionals/physician_gls/pdf/survivorship.pdf
- × Winslow T 2011, *Your Breasts*, American College of Surgeons, accessed 5 Sept 2023, <[Your Breasts | ACS \(facs.org\)](#)>

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