BREAST

Fundamentals of Surgery Course

Objectives

- Risks for breast cancer
- Routine screening mammography
- Describe the diagnostic workup and management for breast conditions.
- Describe workup for breast mass or nipple discharge.
- Describe the preop evaulation with breast cancer.

Objectives

- Know differential diagnosis of a breast lump.
- Explain breast conservation treatment
- Describe adjuvant therapy, radiation therapy, and hormonal therapy.
- Describe the expected survival and local recurrence rates.

Breast

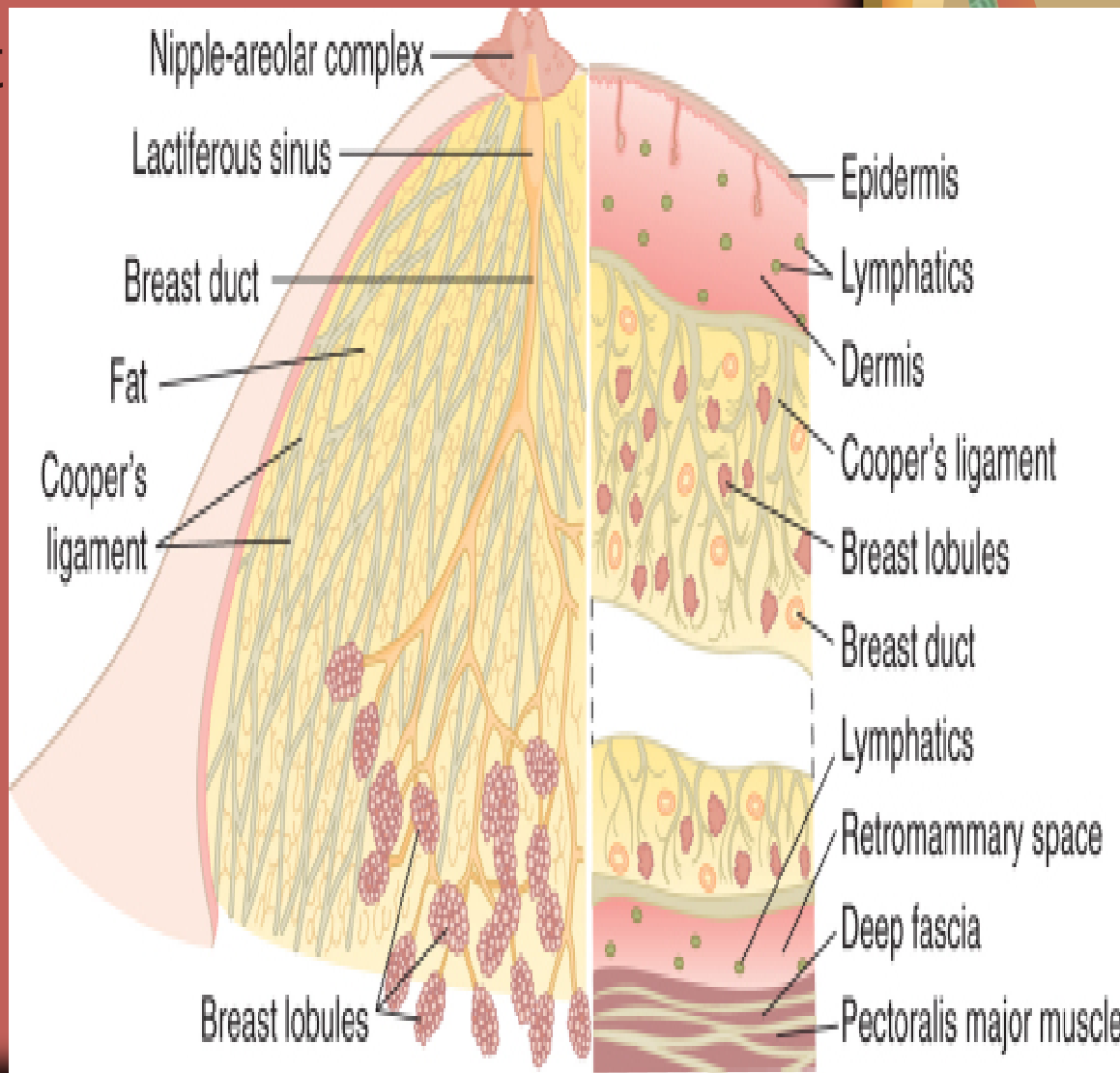
- 211,300 women and 1300 men diagnosed 2003 with breast cancer.
- 58,000 cases of in-situ breast cancer.
- 40,000 women die each year.
- One in eight women develop breast cancer.
- 10% are related to genetic factors.
- 1% occur in men

Anatomy

- Glandular, ductal, connective and adipose tissue
- Location superficial to pectoralis major muscle.
- Extends from clavicle superiorly to sixth rib inferiorly.
- Midsternal line medially into the axilla laterally.

Anatomy

- 15 to 20 lobes that radiate from the nipple area.

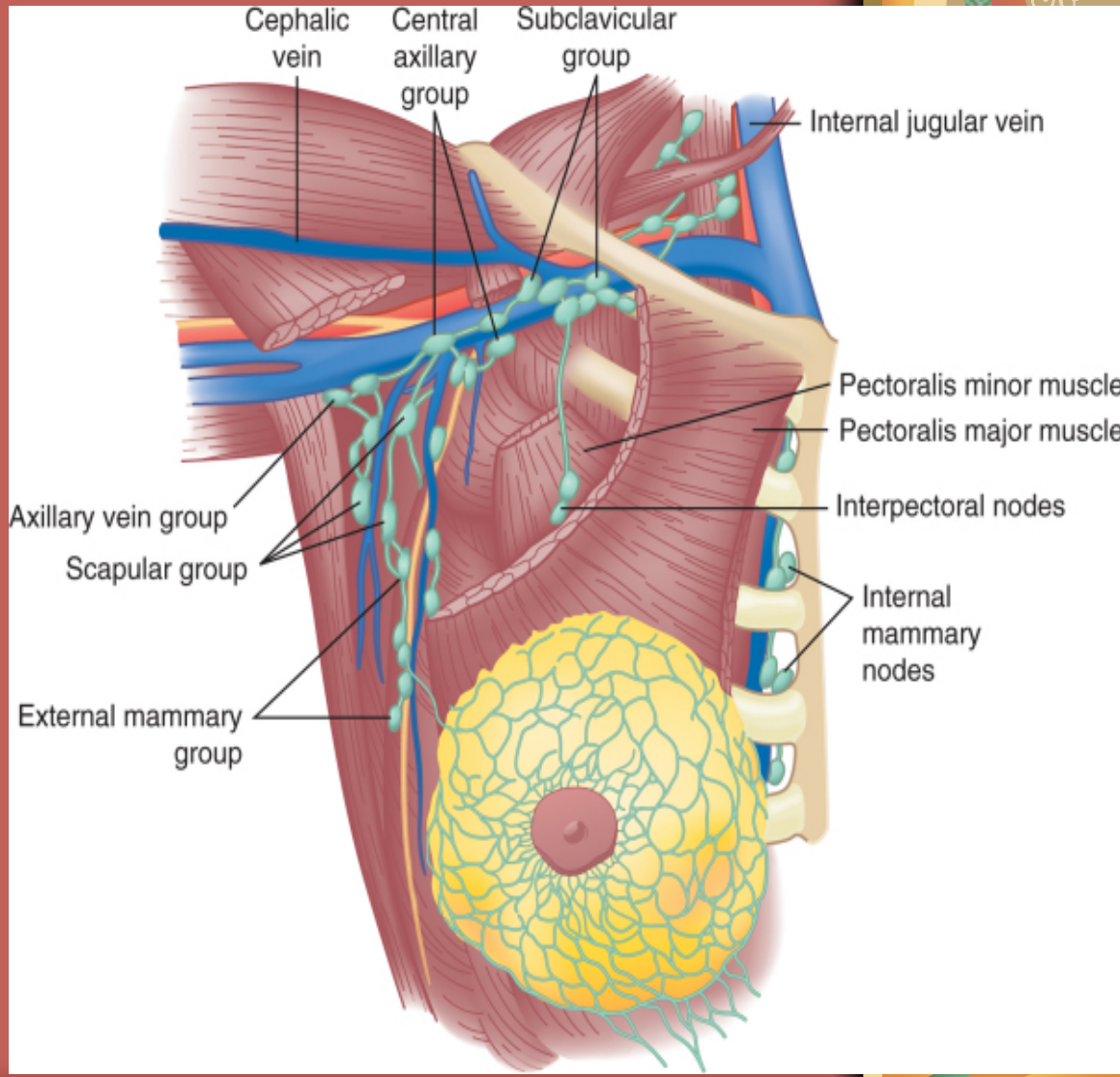


Blood supply Arteries

- Perforating branches of paired internal mammary arteries.
- Lateral thoracic artery

Blood supply veins

- Axillary, subclavian, and intercostal veins



Nerves

- Long thoracic- surface of serratus anterior muscle and motor innervation to serratus anterior muscle.
- Abducts and laterally rotates the scapula and holds against the chest wall.

Nerves

- Thoracodorsal nerve is located posteriorly in axillary space
- Innervates the latissimus dorsi muscle
- Adducts, extends and medially rotates the arm.

Nerves

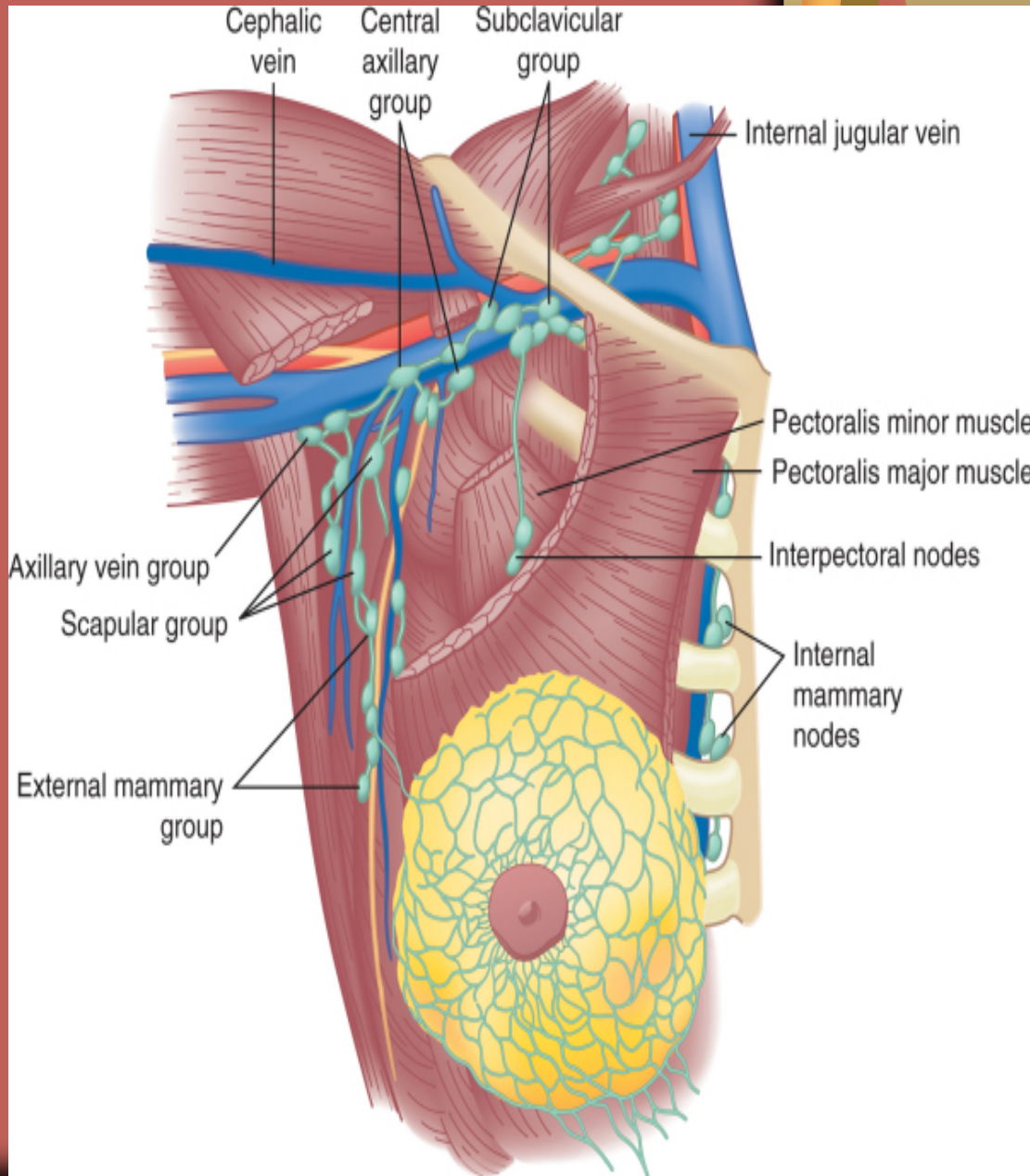
- Medial pectoral nerve pierces pectoralis minor en route to pectoralis major innervates both.

Nerves

- Intercostobrachial nerves are lateral cutaneous branches of the first and second intercostal nerves.
- Innervation to inner aspect of upper arm and axilla

Anatomy

- Primary drainage (75%) is to axilla.
- Internal mammary nodes.
- Level I- lateral to pectoral minor
- Level II- central
- Level III- medial



Physiology

- Modified apocrine gland
- Estrogen stimulates proliferation of the breast ductal system.
- Postmenopausal- breast tissue is replaced with adipose tissue.

Gynecomastia

- Enlarged tender breasts in males.
- Physiologic/pubertal gynecomastia occurs in over 50% adolescent males.
- Physiologic/senescent gynecomastia in elderly.
- Bilateral or unilateral
- Digoxin, estrogens, thiazides and theophylline

Diagnosis

- Complete history
- Physical
- Diagnostic studies

History

- Current problems
- History of biopsies
- Mammography
- Family history cancer.
- Age at onset menses and natural or surgical menopause.

History

- Age at first full-term pregnancy, number pregnancies
- Use of birth control pills, hormone replacement therapy
- Current medications

Risk Factors

- Female sex
- Increasing age
- Family history- BRCA-1 and BRCA-2
- Proliferative pathology with atypia on biopsy.

Physical

- Inspection and palpation
- Sitting arm at side, elevated, on waist.
- Inspect nipples
- Palpate breast and axillae.
- Palpate from sternum to the axilla and from the clavicle to below the inframammary crease.

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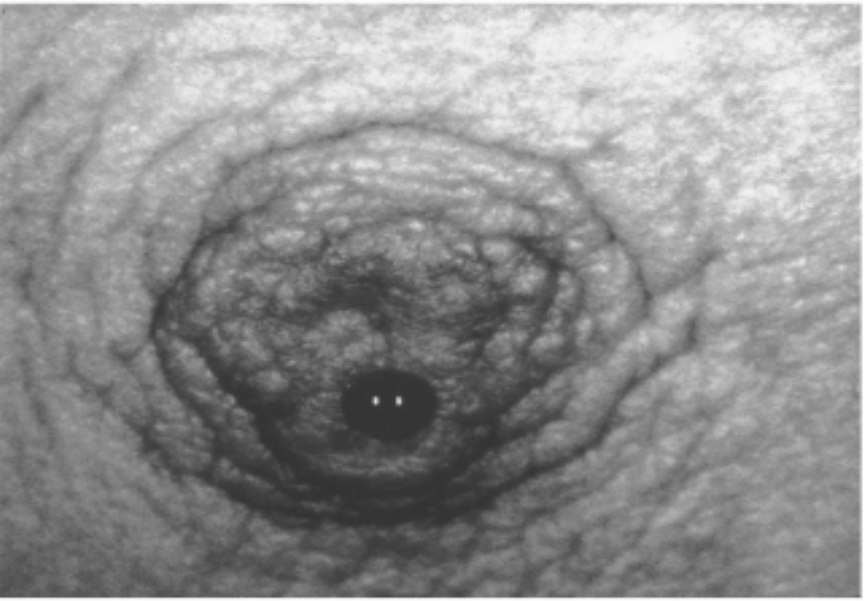

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Physical

- Strip method, “spokes of a wheel” or a spiral pattern.
- Mass size
- Tender or nontender
- Mobile or nonmobile
- Texture
- Nipple discharge: color, spontaneous, bloody, or bilateral.

Diagnostic Evaluation

- Monthly self breast examination
- Yearly mammography for women aged 40 and older
- Yearly breast physical examination by a health care professional.
- Ultrasound
- MRI- BRCA early detection, sensitivity of >90% for invasive cancer.

Mammography

- 10% false-negative rate
- Suspicious mass: irregular or spiculated margins
- Microcalcifications: pleomorphic, linear, or branching

Ultrasound

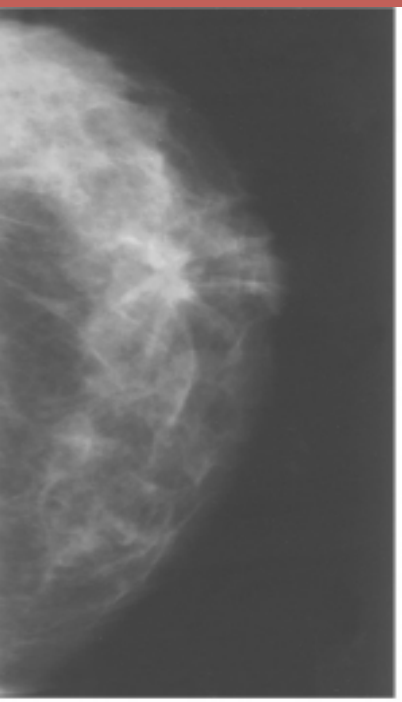
- Noninvasive
- Characterize palpable lesions or suspicious areas on mammography.
- Solid vs cystic
- Simple vs complex

Ultrasound

- Benign: sharp borders, central enhancement, absence of internal echoes.
- Suspicious: poorly defined margins, heterogeneous internal echoes, taller than wide”, irregular internal shadowing.

MRI

- High risk patients.
- Dense breast, breast implants, scars
- BRCA : early detection
- Invasive lobular carcinoma.
- Sensitivity >90% for invasive cancer, <60% for DCIS.



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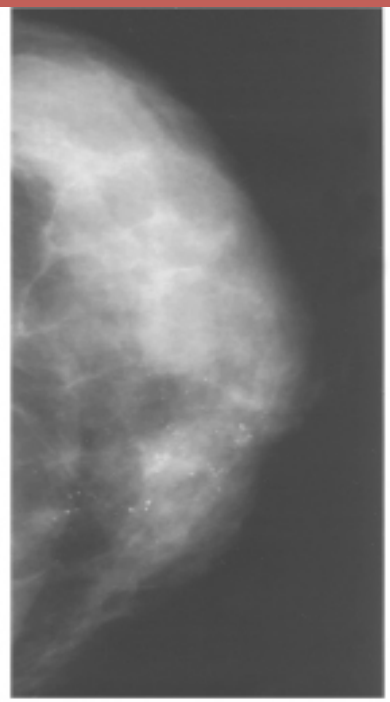

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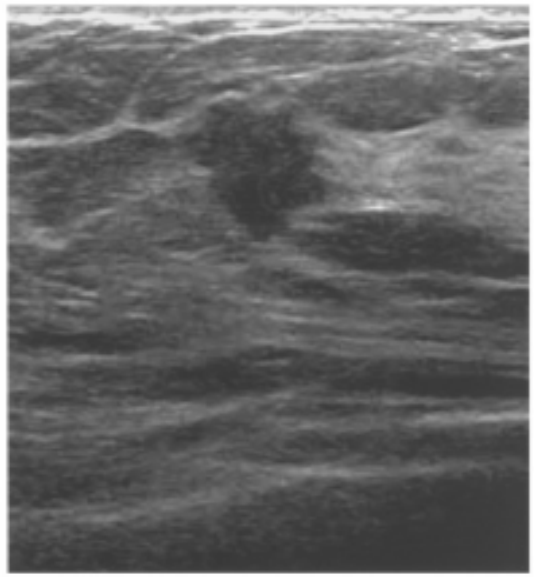

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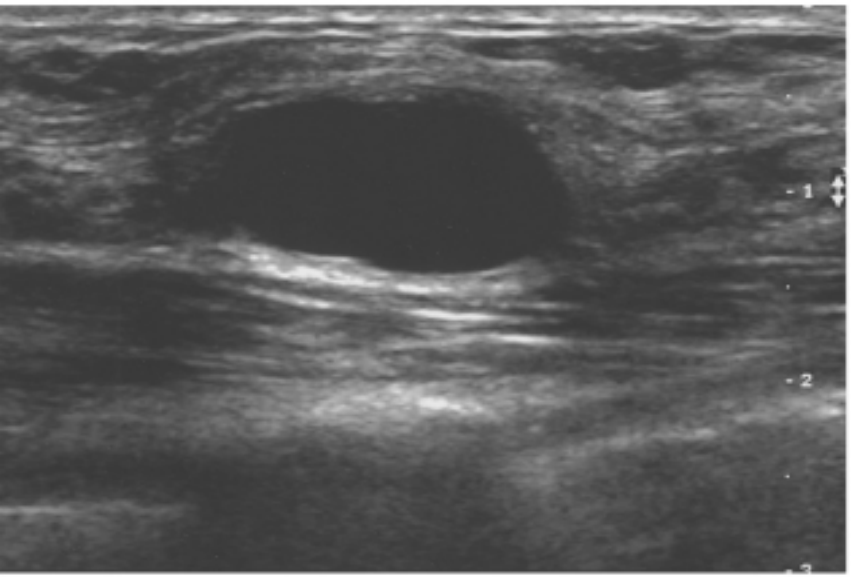

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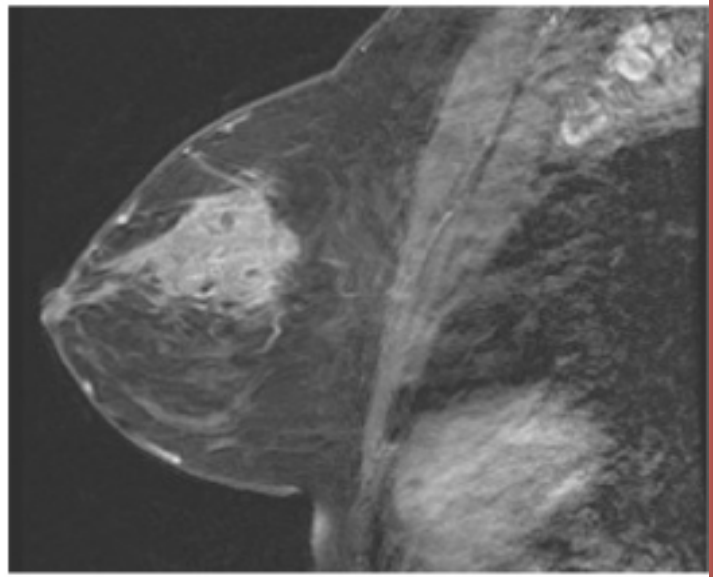

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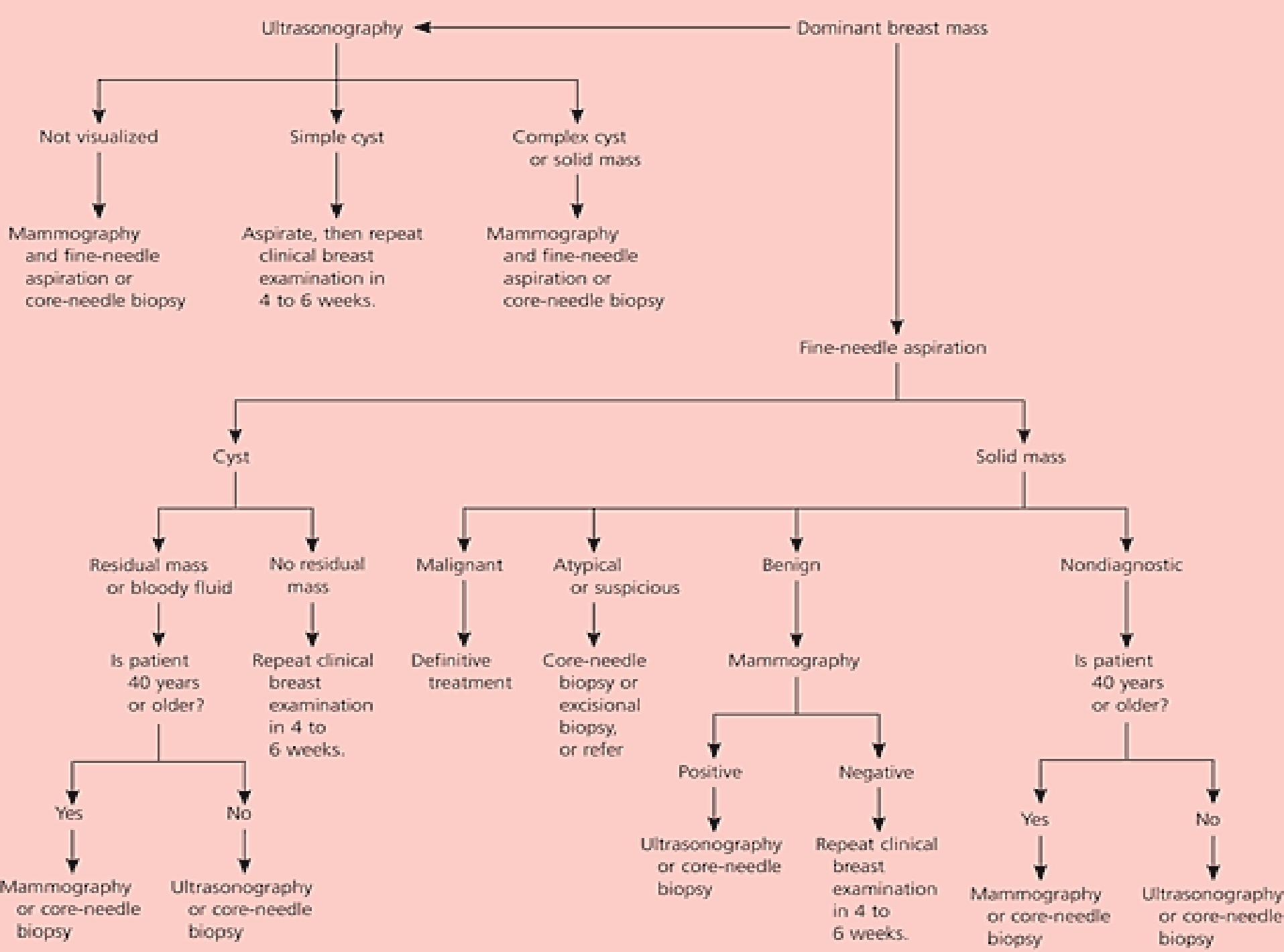
Tissue-sampling techniques

- Cytology- individual cells
- Histology- individual cells and their relationship to each other.

Biopsy

- FNA-fine needle aspiration, cells are aspirated and smeared on a slide.
- Core-needle: small thin cores of tissue.
- Open: excisional biopsy, needle localized excisional biopsy.


Dominant breast mass
Ultrasonography
Not visualized
Mammography and fine-needle aspiration or core-needle biopsy
Simple cyst
Aspirate, then repeat clinical breast examination in 4 to 6 weeks.
Complex cyst or solid mass
Mammography and fine-needle aspiration or core-needle biopsy
Fine-needle aspiration
Cyst
Residual mass or bloody fluid
Is patient 40 years or older?
Yes
Mammography or core-needle biopsy
No
Ultrasonography or core-needle biopsy
No residual mass
Repeat clinical breast examination in 4 to 6 weeks.
Solid mass
Malignant
Definitive treatment
Atypical or suspicious
Core-needle biopsy or excisional biopsy, or refer
Benign
Mammography
Positive
Ultrasonography or core-needle biopsy
Negative
Repeat clinical breast examination in 4 to 6 weeks.
Nondiagnostic
Is patient 40 years or older?
Yes
Mammography or core-needle biopsy
No
Ultrasonography or core-needle biopsy

Fibroadenoma

- Benign tumor
- Young women
- Freely movable, discrete, firm, rounded mass.
- FNA or core biopsy

Cyst

- MCC mass in women 4th and 5th decade.
- Fluctuates with the menstrual cycle
- Ultrasound
- Aspiration on large or symptomatic cysts.
- Complex – mammogram and core biopsy.

Nipple Discharge

- MCC- duct ectasia
- Color- clear, milky, or green-brown.
- 10% to 15% unilateral bloody discharge is malignant.
- Intraductal papilloma

Abscess and Mastitis

- Chronic inflammation and fistula in nonlactating women.
- Abx and drainage.
- Mastitis –pain and erythema in lactating women.
- Staphylococci or streptococci
- Tx: dicloxacillin or clinadamycin

Noninvasive Epithelial Cancers

- Lobular carcinoma insitu (LCIS)
- Ductal carcinoma in situ (DCIS) or intraductal carcinoma- papillary, cribriform, solid and comedo type.

Invasive Epithelial Cancers

- Invasive lobular carcinoma
- Invasive ductal carcinoma: IDC, tubular, mucinous or colloid, medullary, invasive cribriform, invasive papillary, adenoid cystic and metaplastic carcinoma.

Mixed Connective and Epithelial

- Phyllodes tumor
- Carcinosarcoma
- angiosarcoma

LCIS

- Marker for IDC or ILC
- Bilateral
- Incidentally identified with excision.

DCIS

- Preinvasive form of ductal carcinoma.
- Mammogram- microcalcifications.
- Types- solid, cribriform, micropapillary, and comedo-type.
- Higher- grade: solid and comedo types.

ILC

- 10% of breast cancers
- Multicentricity-contralateral breast
- Difficult to detect on mammogram and physical exam.

IDC

- 70% of breast cancers
- Firm irregular mass
- Mammogram- well defined

Paget's Disease of nipple

- <1% of breast cancers
- Nipple erythema and irritation.
- Itching, burning, or sticking pain in the nipple.
- Tx: mastectomy with axillary staging or wide excision of the nipple and areola, axillary staging, and radiation.

Inflammatory Carcinoma

- 3% of breast cancers.
- Erythema and edema (Peau d'orange)
- Tx: aggressive neoadjuvant chemotherapy, mastectomy, and radiation therapy, with hormonal therapy in estrogen-responsive tumors.
- Poor prognosis- 25% alive at 5 years.

Staging

- Tis – insitu
- T1 - <2cm
- T2 - >2cm, <5cm
- T3 - >5cm
- T4 – any size with extension to chest wall or skin.

- N0 – no lymph node mets
- N1 – 1 to 3 ALN
- N2 – 4 to 9 ALN
- N3 - > 10 ALN

Staging

- M0 – no distant metastasis
- M1 – distant metastasis

Stage Grouping

0	Tis	N0	M0
I	T1	N0	M0
IIA	T0	N1	M0
	T1	N1	M0
	T2	N0	M0
IIB	T2	N1	M0
	T3	N0	M0

Stage Grouping

IIIA	T0	N2	M0
	T1	N2	M0
	T2	N2	M0
	T3	N1	M0
	T3	N2	M0
IIIB	T4	N0	M0
	T4	N1	M0
	T4	M2	M0
IIIC	Any T	N3	M0
IV	Any T	Any N	M1

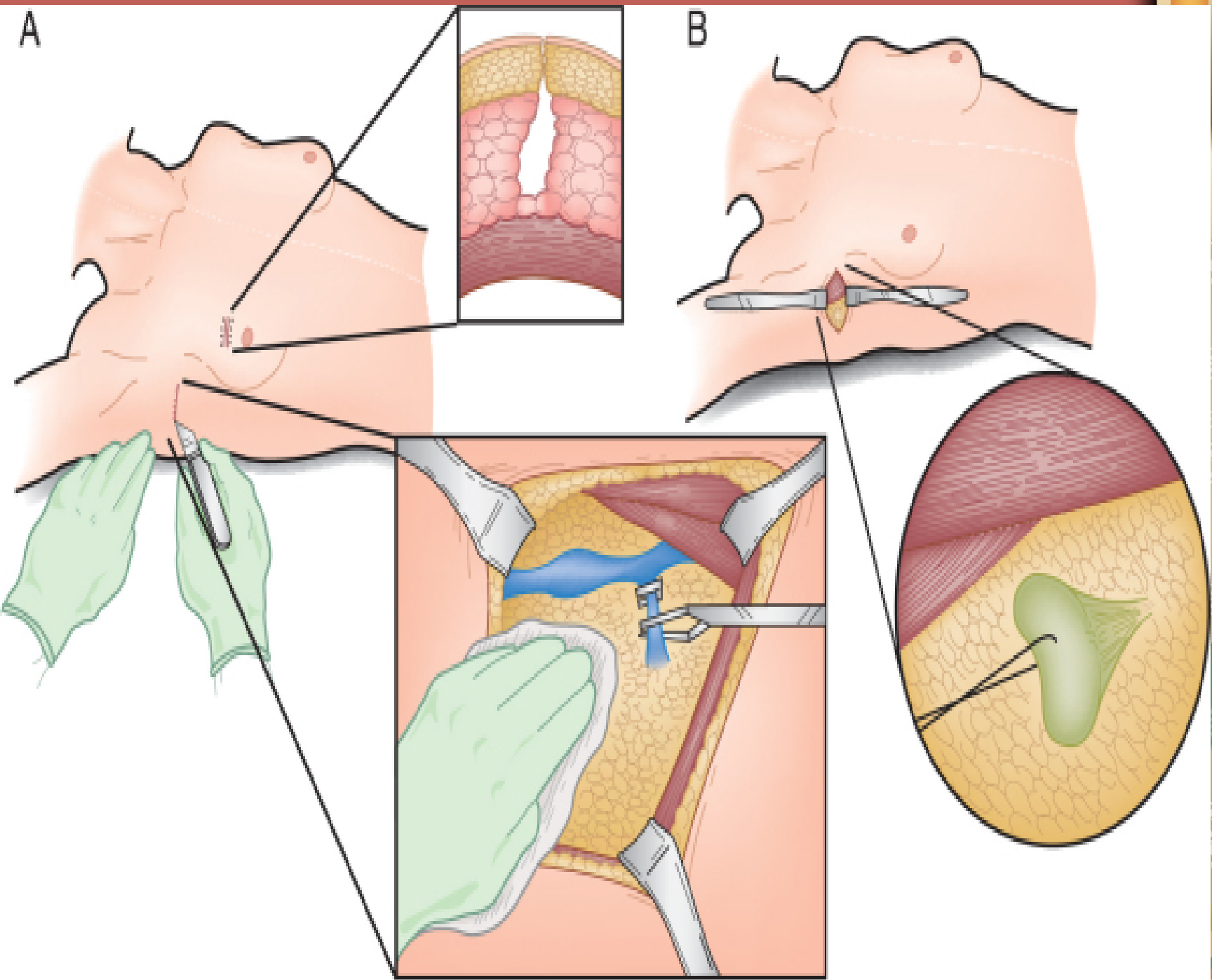
5 –Year Relative Survival Rate

0	100%
I	100%
IIA	92%
IIB	81%
IIIA	67%
IIIB	54%
IIIC	*
IV	20%

* not available

Surgical treatment

- Lumpectomy, wide local excision or partial mastectomy- excision of a malignancy with 2 to 3 mm clear margins, sentinel lymph node biopsy
- Preservation of the breast- breast conserving surgery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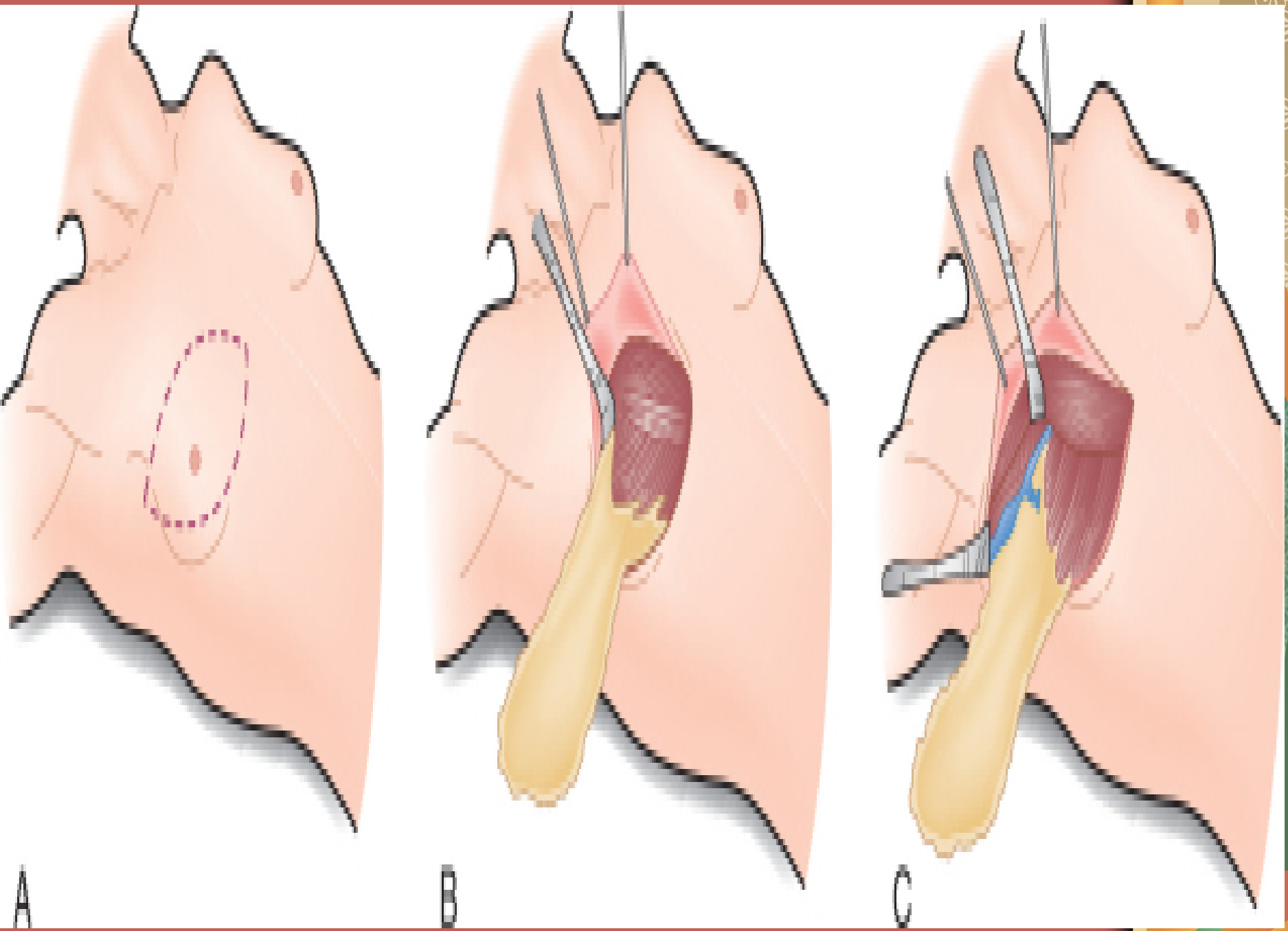
Surgical Treatment

- Simple or total mastectomy- complete removal of the mammary gland including nipple and areola.
- Modified radical mastectomy - complete removal of the mammary gland including nipple and areola with axillary dissection.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Nodal biopsy

- Axillary dissection -level I and II for presence of lymph node metastasis.
- Sentinel LNB – clinically negative axilla

Eligibility for Breast Conservation

- Tumor size: < 5 cm with clear margins and cosmetic result.
- Margins- 2 to 3 mm clear margins.
- Radiation therapy

Prophylactic Mastectomy

- Bilateral simple mastectomy
- High-risk lesions
- Atypical ductal hyperplasia, LCIS
- Strong family history
- BRCA-1 or BRCA-2
- Reduces risk of breast cancer by 90%

Chemotherapy

- MC cyclophosphamide, doxorubicin, and 5-fluorouracil
- Doxorubicin, cyclophosphamide, and taxane
- Indications- premenopausal and postmenopausal patients with node positive disease and tumors >1cm.

Hormonal Therapy

- Tamoxifen- estrogen-receptor-positive (ER+) tumors
- Decreases incidence of contralateral breast cancer by 40%
- 5 years

Treatment for Recurrent and Metastatic Breast Cancer

- Local recurrence after breast conserving surgery- mastectomy /radiation
- Local recurrence after mastectomy- local excision and radiation
- Metastatic disease- chemotherapy
- Brain metastases- radiation

Complications

- Infection, bleeding, and seroma
- Flap necrosis
- Lymphedema and decreased ROM arm.
- Winged scapula
- Loss of sensation to the skin of the inner upper arm.

Complications

- Chemotherapy- N/V, leukopenia, thrombocytopenia, and alopecia.
- Doxarubicin- cardiotoxicity
- Sepsis and hemorrhagic cystitis.
- Tamoxifen- hot flashes, fluid retention, vaginitis, and thrombocytopenia.

Complications

- Radiation- breast edema progress to fibrosis and hyperpigmentation.

Prognosis

Stage	Survival rate (%)
I	96
II	82
III	53
IV	18

Axillary lymph node status-disease-free and overall survival.

Follow Up

- Physical exam- 3 to 6 months x 3 years then yearly
- Bilateral mammogram 6 months after radiation therapy following lumpectomy.
- Mammogram yearly after mastectomy