

RADT-2620: ANATOMY AND PATHOLOGY OF THE BREAST

Cuyahoga Community College

Viewing: RADT-2620 : Anatomy and Pathology of the Breast

Board of Trustees:

March 2023

Academic Term:

Fall 2023

Subject Code

RADT - Radiography

Course Number:

2620

Title:

Anatomy and Pathology of the Breast

Catalog Description:

Anatomy, physiology and pathology of the breast, including benign and malignant conditions, stages of breast cancer and treatment options.

Credit Hour(s):

1

Lecture Hour(s):

1

Requisites

Prerequisite and Corequisite

Departmental approval: admission to Mammography program.

Outcomes

Course Outcome(s):

Describe breast anatomy and structure.

Essential Learning Outcome Mapping:

Not Applicable: No Essential Learning Outcomes mapped. This course does not require application-level assignments that demonstrate mastery in any of the Essential Learning Outcomes.

Objective(s):

- a. Identify breast anatomy and physiology internally and externally
- b. Discuss the factors and physiologic changes that will affect breast tissue composition.
- c. Identify physical changes in the breast.
- d. Describe breast structure, developmental stages and the differences between the male and the female breast.
- e. Identify and label the breakdown of a single lobe of the breast.
- f. Identify the three arterial branches supplying the breast and the three venous drainage channels.
- g. Describe the lymphatic system and lymphatic drainage.

Course Outcome(s):

Describe the importance of clinical and self breast examinations and mammograms.

Essential Learning Outcome Mapping:

Not Applicable: No Essential Learning Outcomes mapped. This course does not require application-level assignments that demonstrate mastery in any of the Essential Learning Outcomes.

Objective(s):

- a. Compare and contrast clinical and self-breast examinations and explain current evidence-based data regarding each practice.
 - b. Identify the significance of breast cancer detection through patient screening and diagnostic mammograms.
 - c. Explain the components and importance of a correlative physical breast assessment.
 - d. Correlate clinical breast changes with imaging findings and comparison with previous mammograms.
 - e. Identify and label mammographic anatomical structures when presented with a mammographic image.
 - f. Evaluate a digital breast tomosynthesis (DBT)/3D image and describe the structures represented.
 - g. Correlate breast anatomical structures to mammographic and DBT anatomical structures.
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Course Outcome(s):

Explore breast pathologies, detection and diagnosis.

Essential Learning Outcome Mapping:

Not Applicable: No Essential Learning Outcomes mapped. This course does not require application-level assignments that demonstrate mastery in any of the Essential Learning Outcomes.

Objective(s):

- a. Identify the mammographic appearance of pathologies.
 - b. Identify the DBT appearance of pathologies.
 - c. Describe the etiology, mammographic appearance, DBT appearance, diagnosis and treatment of benign breast pathologies.
 - d. Describe the etiology, mammographic appearance, DBT appearance, diagnosis and treatment of malignant breast pathologies.
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Course Outcome(s):

Identify breast cancer risks, treatment and staging.

Essential Learning Outcome Mapping:

Not Applicable: No Essential Learning Outcomes mapped. This course does not require application-level assignments that demonstrate mastery in any of the Essential Learning Outcomes.

Objective(s):

- a. Identify the high and low risk factors limited to breast cancer.
 - b. Describe assessment categories and the recommended clinical follow up.
 - c. Describe treatment options for breast cancer.
 - d. Explain breast cancer stages 0 to IV and stage characteristics.
 - e. Explain tumor node metastasis (TNM) classifications of breast cancer.
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Methods of Evaluation:

- a. Participation and discussion
- b. Written assignments
- c. Case studies
- d. Exams
- e. Quizzes
- f. Other methods deemed appropriate by department

Course Content Outline:

- a. Definition of the Breast
 - i. Male vs. female
 - ii. Developmental stages
 1. Fetal
 2. Puberty
 3. Menstruation
 4. Pregnancy
 5. Lactation

- 6. Menopause
- 7. Post-menopause
- iii. Breast landmarks
 - 1. Quadrants
 - 2. Clock face references
 - 3. Region references
- b. Gross Anatomy of the Normal Breast
 - i. External anatomy
 - 1. Nipple
 - 2. Areola
 - a. Montgomery's glands
 - b. Morgagni's tubercles
 - 3. Skin
 - a. Sebaceous glands
 - b. Sweat (sudiferous) glands
 - c. Hair follicles
 - 4. Axillary tail
 - 5. Breast margins
 - a. Superior-inferior
 - i. Inframammary fold
 - b. Axillary-medial
 - ii. Internal anatomy
 - 1. Fascial layers
 - 2. Retromammary (fat) space
 - 3. Breast parenchymal components
 - a. Fibrous tissues
 - b. Glandular (secretory) tissues
 - i. Glandular lobes
 - 1. Lobules
 - 2. Terminal ductal lobular unit (TDLU)
 - c. Adipose (fatty) tissues
 - d. Connective and support stroma
 - i. Cooper's ligaments
 - ii. Extralobular/intralobular stroma
 - e. Lymphatic channels and drainage from the breast
 - f. Circulatory (blood supply) system
 - i. Arteries
 - ii. Veins
 - 4. Pectoral muscle
 - a. Location
 - b. Relevance
 - 5. Histology of the breast
 - a. TDLU
 - i. Extralobular terminal duct
 - ii. Intralobular terminal duct
 - iii. Ductal sinus (acinus)
 - b. Cellular components
 - i. Epithelial cells
 - ii. Myoepithelial cells
 - iii. Basement membrane
- c. Mammographic and DBT appearance of breast anatomy
 - i. External anatomy
 - ii. Internal anatomy
 - 1. Variations
 - 2. Life cycle changes
- d. Breast anomalies
 - i. Asymmetry
 - ii. Inverted nipples
 - iii. Accessory nipples

- iv. Accessory breast tissue
- v. Other (e.g. congenital)
- e. Clinical Breast Changes (size, location, duration)
 - i. Lumps
 - 1. Pain
 - 2. Mobility
 - 3. Other associated indications (e.g. trauma, fever, antibiotics)
 - ii. Thickening
 - iii. Swelling
 - iv. Dimpling
 - v. Skin irritation and lesions (e.g. moles, keratosis, cysts, ulcers, blisters, scaling)
 - vi. Pain
 - 1. New onset
 - vii. Discharge
 - 1. New onset
 - 2. Color of discharge
 - 3. Ipsilateral or bilateral
 - 4. Single duct or multiple ducts
 - 5. Spontaneous vs. expressed
 - viii. Nipple retraction, inversion and areolar changes
 - 1. New onset
 - ix. Edema
 - x. Erythema
 - xi. Mammoplasty
 - 1. Breast Augmentation
 - a. Types
 - i. Silicone
 - ii. Saline
 - b. Location
 - i. Subglandular
 - ii. Subpectoral
 - 2. Breast lift
 - 3. Breast reduction
 - 4. Other
 - xii. Reconstructive surgery
 - 1. Autologous (e.g. TRAM flap, DIEP flap, latissimus dorsi flap)
 - 2. Tissue expander
 - 3. Implant
 - 4. Other
 - xiii. Postsurgical excision
 - xiv. Radiation changes
 - xv. Other
- f. Correlative Physical Breast Assessment
 - i. Breast examination findings reported by patient or physician
 - 1. Normal breast examination features
 - a. Consistent features
 - b. Variations in parenchyma
 - c. Fibrocystic changes
 - 2. Characteristics of abnormal findings
 - a. Redness
 - b. Infection
 - i. Antibiotic treatment
 - c. Abscess
 - d. Nipple discharge
 - e. Mass
 - f. Breast pain
 - i. New onset
 - g. Skin findings

- h. Nipple findings
 - i. Previous surgeries
 - ii. When to perform
 - iii. Visual inspection
 - iv. Palpation techniques
 - v. Documentation of findings
 - 1. In reference to breast landmarks
 - 2. Clock face description
 - 3. Accuracy of measurements
 - vi. Radiopaque marking devices (e.g. palpable vs. skin lesions)
 - vii. Mammographic correlation
 - viii. DBT/3D correlation
- g. Mammographic Appearance of Pathology (definition, location)
 - i. Masses
 - 1. Margins
 - a. Circumscribed
 - b. Ill-defined (indistinct)
 - c. Lobulated
 - d. Spiculated
 - 2. Asymmetric density
 - 3. Focal asymmetry
 - 4. Calcifications
 - a. Dermal
 - b. Internal
 - c. Causes
 - i. Cystic changes
 - ii. Sutural
 - iii. Vascular
 - iv. Malignancy
 - d. Characteristics
 - i. Number (quantity)
 - ii. Size
 - iii. Shape
 - iv. Distribution
 - 1. Clustered or grouped
 - 2. Segmental
 - 3. Regional
 - 4. Diffuse (scattered)
 - 5. Multiple groups
 - 6. Margins
 - v. Benign characteristics (typical)
 - 1. Coarse
 - 2. Rim or eggshell
 - 3. Milk of calcium (teacup-like)
 - 4. Dystrophic
 - 5. Vascular
 - 6. Skin (superficial)
 - 7. Secretory
 - 8. Fat necrosis
 - 9. Punctate
 - vi. Suspicious morphology (nondeterminate characteristics)
 - 1. Indistinct (amorphous)
 - 2. Pleomorphic, granular (clustered)
 - 3. Irregular
 - 4. Linear
 - 5. Casting
- h. Reporting Terminology (e.g. BI-RADS)

- i. Assessment categories
- ii. Recommendations
- i. Benign Breast Pathology
 - i. Etiology, mammographic appearance, diagnosis and treatment
 - 1. Cyst
 - 2. Galactocele
 - 3. Fibroadenoma
 - 4. Lipoma
 - 5. Hamartoma (fibroadenolipomaj)
 - 6. Papilloma
 - 7. Ductal ectasia
 - 8. Breast infection/abcess
 - 9. Hematoma
 - 10. Fat necrosis
 - 11. Radial scar
 - 12. Lymph node
 - 13. Gynecomastia
 - j. High Risk Breast Pathology
 - i. Etiology, mammographic appearance, diagnosis and treatment
 - 1. Atypical ductal hyperplasia
 - 2. Papilloma with atypia
 - 3. Papillomatosis
 - 4. Atypical lobular hyperplasia
 - 5. Lobular carcinoma in-situ
 - 6. Phyllodes tumor
 - k. Malignant Breast Pathology
 - i. Etiology, mammographic appearance, diagnosis and treatment
 - 1. Ductal carcinoma in-situ
 - 2. Invasive/infiltrating ductal carcinoma
 - 3. Invasive lobular carcinoma
 - 4. Pagets disease
 - 5. Sarcoma
 - 6. Tubular
 - 7. Medullary
 - 8. Mucinous
 - 9. Papillary
 - 10. Metastatic carcinoma
- I. Breast Cancer Classifications
 - i. Stage Characteristics
 - 1. Description
 - a. Size
 - b. Invasive vs. noninvasive
 - c. Lymph node involvement
 - d. Spread beyond the breast
 - 2. Stages
 - a. Stage 0
 - b. Stage I
 - c. Stage II
 - d. Stage III
 - e. Stage IV
 - ii. TNM classification characteristics
 - 1. TNM description
 - a. Size
 - b. Lymph node involvement
 - c. Metastasis
 - 2. T-size
 - a. TX
 - b. T0

- c. Tis
- d. T1, T2, T3, T4
- 3. N-lymph node involvement
 - a. NX
 - b. N0
 - c. N1, N2, N3
- 4. M-metastasis
 - a. MX
 - b. M0
 - c. M1
- iii. Cell grade
 - 1. Definition
 - 2. Grade 1
 - 3. Grade 2
 - 4. Grade 3
- iv. Multifocal
- v. Multicentric
- vi. Hormone receptors and HER2
 - 1. Importance of tests
 - 2. Estrogen
 - 3. Progesterone
 - 4. HER2
- m. Hormonal Influences
 - i. Birth control pills
 - ii. Estrogen
 - iii. Progesterone
 - iv. Prolactin
 - v. Testosterone
 - vi. Other

Resources

American College of Radiology (ACR). *ACR Mammography Manual*, Reston, VA.

American Registry of Radiologic Technologists (ARRT). (Current) Content Specifications for Mammography. St. Paul, MN. https://www.arrt.org/docs/default-source/discipline-documents/mammography/mammography-content-specifications.pdf?sfvrsn=8a6303fc_8

American Society of Radiologic Technologists (ASRT). (Current) *Mammography Curriculum*, Albuquerque, NM. <https://www.asrt.org/docs/default-source/educators/curriculum/mammography/2018-adopted-mammography-curriculum.pdf>

Cardenosa, Gilda. (2017) *Breast Imaging Companion*, Philadelphia: Wolters-Kluwer.

Lille, Shelly L. Marshall, Wendy. (2019) *Mammography Imaging—A Practical Guide*, Philadelphia: Wolters-Kluwer.

Peart, Olive. (2022) *Mammography and Imaging Prep: Program Review and Exam Prep*, New York: McGraw-Hill.

Peart, Olive. (2022) *Lange Q and A: Mammography Examination—A Practical Guide*, New York: McGraw-Hill.

Resources Other

U. S. Department of Health and Human Services. *Quality Determinants of Mammography Clinical Practice Guidelines*.

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