

RADT-2620: ANATOMY AND PATHOLOGY OF THE BREAST

Cuyahoga Community College

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

Board of Trustees:

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Academic Term:

Fall 2019

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):

1. Identify breast anatomy and physiology internally and externally
2. Discuss the factors and physiologic changes that will affect breast tissue composition.
3. Identify physical changes in the breast.
4. Describe breast structure, developmental stages and the differences between the male and the female breast.
5. Identify and label the breakdown of a single lobe of the breast.
6. Identify the three arterial branches supplying the breast and the three venous drainage channels.
7. 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):

1. Compare and contrast clinical and self-breast examinations and explain current evidence-based data regarding each practice.
 2. Identify the significance of breast cancer detection through patient screening and diagnostic mammograms.
 3. Explain the components and importance of a correlative physical breast assessment.
 4. Correlate clinical breast changes with imaging findings and comparison with previous mammograms.
 5. Identify and label mammographic anatomical structures when presented with a mammographic image.
 6. Correlate breast anatomical structures to mammographic 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):

1. Identify the mammographic appearance of pathologies.
 2. Describe the etiology, mammographic appearance, diagnosis and treatment of benign breast pathologies.
 3. Describe the etiology, mammographic 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):

1. Identify the high and low risk factors limited to breast cancer.
 2. Describe assessment categories and the recommended clinical follow up.
 3. Describe treatment options for breast cancer.
 4. Explain breast cancer stages 0 to IV and stage characteristics.
 5. Explain tumor node metastasis (TNM) classifications of breast cancer.
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Methods of Evaluation:

1. Participation and discussion
2. Written assignments
3. Case studies
4. Exams
5. Quizzes
6. Other methods deemed appropriate by department

Course Content Outline:

1. Definition of the Breast
 - a. Male vs. female
 - b. Developmental stages
 - i. Fetal
 - ii. Puberty
 - iii. Menstruation
 - iv. Pregnancy
 - v. Lactation
 - vi. Menopause
 - vii. Post-menopause
 - c. Breast landmarks

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

- a. Lumps
 - i. Pain
 - ii. Mobility
 - iii. Other associated indications (e.g. trauma, fever, antibiotics)
- b. Thickening
- c. Swelling
- d. Dimpling
- e. Skin irritation and lesions (e.g. moles, keratosis, cysts, ulcers, blisters, scaling)
- f. Pain
 - i. New onset
- g. Discharge
 - i. New onset
 - ii. Color of discharge
 - iii. Ipsilateral or bilateral
 - iv. Single duct or multiple ducts
 - v. Spontaneous vs. expressed
- h. Nipple retraction, inversion and areolar changes
 - i. New onset
- i. Edema
- j. Erythema
- k. Mammoplasty
 - i. Breast Augmentation
 - 1. Types
 - a. Silicone
 - b. Saline
 - 2. Location
 - a. Subglandular
 - b. Subpectoral
 - ii. Breast lift
 - iii. Breast reduction
 - iv. Other
- l. Reconstructive surgery
 - i. Autologous (e.g. TRAM flap, DIEP flap, latissimus dorsi flap)
 - ii. Tissue expander
 - iii. Implant
 - iv. Other
- m. Postsurgical excision
- n. Radiation changes
- o. Other
- 6. Correlative Physical Breast Assessment
 - a. Breast examination findings reported by patient or physician
 - i. Normal breast examination features
 - 1. Consistent features
 - 2. Variations in parenchyma
 - 3. Fibrocystic changes
 - ii. Characteristics of abnormal findings
 - 1. Redness
 - 2. Infection
 - a. Antibiotic treatment
 - 3. Abscess
 - 4. Nipple discharge
 - 5. Mass
 - 6. Breast pain
 - a. New onset
 - 7. Skin findings
 - 8. Nipple findings
 - 9. Previous surgeries
 - b. When to perform
 - c. Visual inspection

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

- iv. Lipoma
- v. Hamartoma (fibroadenolipoma)
- vi. Papilloma
- vii. Ductal ectasia
- viii. Breast infection/abscess
- ix. Hematoma
- x. Fat necrosis
- xi. Radial scar
- xii. Lymph node
- xiii. Gynecomastia
- 10. High Risk Breast Pathology
 - a. Etiology, mammographic appearance, diagnosis and treatment
 - i. Atypical ductal hyperplasia
 - ii. Papilloma with atypia
 - iii. Papillomatosis
 - iv. Atypical lobular hyperplasia
 - v. Lobular carcinoma in-situ
 - vi. Phyllodes tumor
- 11. Malignant Breast Pathology
 - a. Etiology, mammographic appearance, diagnosis and treatment
 - i. Ductal carcinoma in-situ
 - ii. Invasive/infiltrating ductal carcinoma
 - iii. Invasive lobular carcinoma
 - iv. Pagets disease
 - v. Sarcoma
 - vi. Tubular
 - vii. Medullary
 - viii. Mucinous
 - ix. Papillary
 - x. Metastatic carcinoma
- 12. Breast Cancer Classifications
 - a. Stage Characteristics
 - i. Description
 - 1. Size
 - 2. Invasive vs. noninvasive
 - 3. Lymph node involvement
 - 4. Spread beyond the breast
 - ii. Stages
 - 1. Stage 0
 - 2. Stage I
 - 3. Stage II
 - 4. Stage III
 - 5. Stage IV
 - b. TNM classification characteristics
 - i. TNM description
 - 1. Size
 - 2. Lymph node involvement
 - 3. Metastasis
 - ii. T-size
 - 1. TX
 - 2. T0
 - 3. Tis
 - 4. T1, T2, T3, T4
 - iii. N-lymph node involvement
 - 1. NX
 - 2. N0
 - 3. N1, N2, N3
 - iv. M-metastasis

- 1. MX
- 2. M0
- 3. M1
- c. Cell grade
 - i. Definition
 - ii. Grade 1
 - iii. Grade 2
 - iv. Grade 3
- d. Multifocal
- e. Multicentric
- f. Hormone receptors and HER2
 - i. Importance of tests
 - ii. Estrogen
 - iii. Progesterone
 - iv. HER2
- 13. Hormonal Influences
 - a. Birth control pills
 - b. Estrogen
 - c. Progesterone
 - d. Prolactin
 - e. Testosterone
 - f. 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). (2018) *Mammography Curriculum*, Albuquerque, NM. <https://www.asrt.org/docs/default-source/educators/curriculum/mammography/2018-adopted-mammography-curriculum.pdf>

Cardenosa, Gilda. (2018) *Breast Imaging Companion*, Philadelphia: Wolters-Kluwer.

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

Peart, Olive. (2018) *Mammography and Imaging Prep: Program Review and Exam Prep*, New York: McGraw-Hill.

Peart, Olive. (2018) *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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