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Detecting & Treating Ductal Carcinoma in Situ

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Detecting & Treating Ductal Carcinoma in Situ

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Did you know...

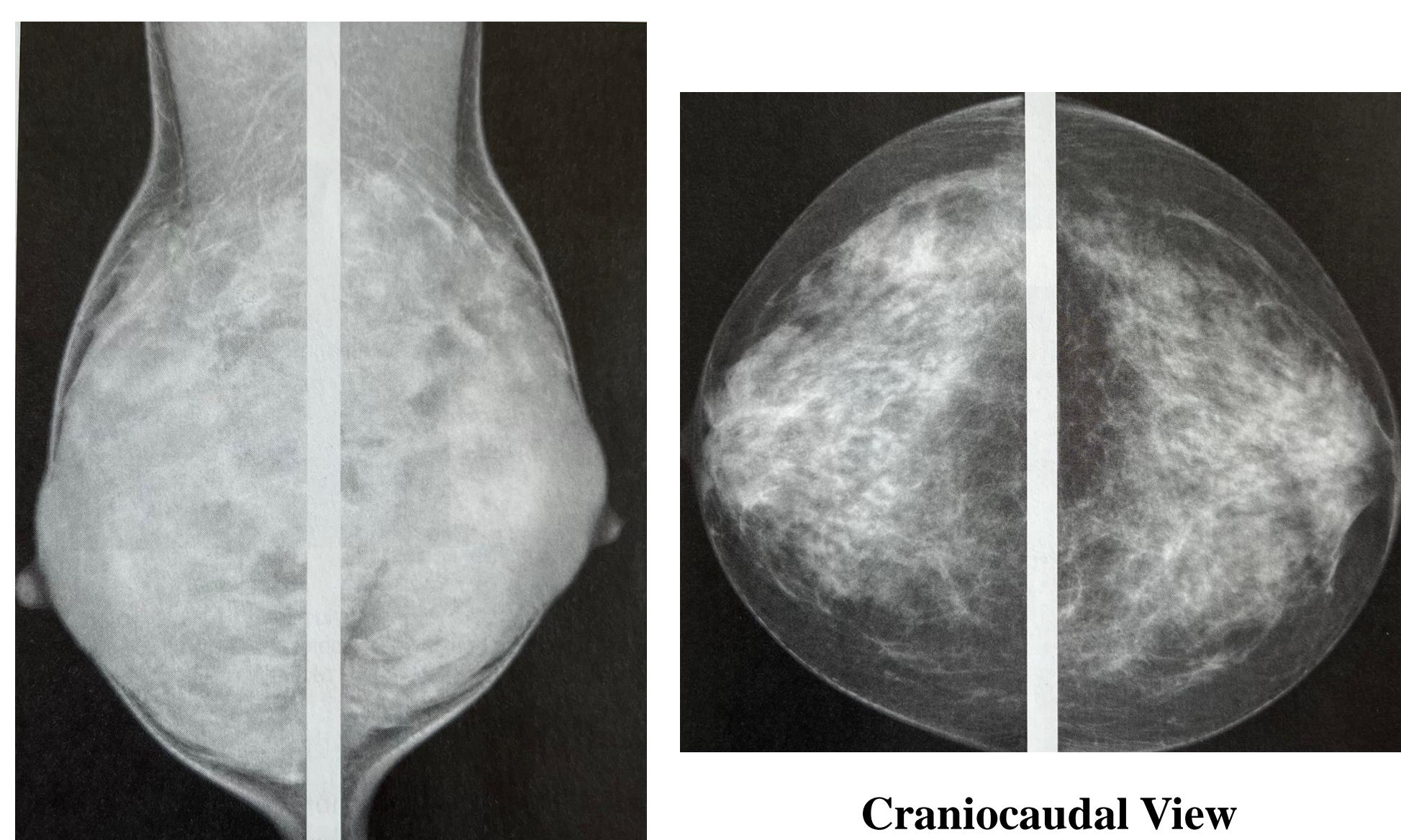
Mammography is an imaging technique used to visualize breast tissues, primarily for the early detection of breast cancer. It employs low-energy x-rays to detect changes in breast tissue that may indicate the presence of cancer or other abnormalities (din et al., 2022, p. 2).

Screening mammogram & views

“The American College of Radiology (ACR) and Society of Breast Imaging recommend annual mammography screening beginning at age 40, which provides the greatest mortality reduction, diagnosis at an earlier stage, better surgical options, and more effective chemotherapy”

(Monticciolo et al., 2021, p. 1280).

The typical views done for a screening mammogram are right craniocaudal (RCC), left craniocaudal (LCC), right mediolateral oblique (RMLLO), left mediolateral oblique (LMLLO) (Peart, 2022, p. 113).



Mediolateral Oblique View
(Peart, 2022, p. 147)

Craniocaudal View
(Peart, 2022, p. 148)

How common is breast cancer?

Breast cancer is the most prevalent cancer among women in the U.S., excluding skin cancers, constituting approximately 30% of new female cancers yearly (1 in 3).

- It predominantly affects middle-aged and older women, with a median diagnosis age of 62.
 - This indicates that half of the women diagnosed with breast cancer are 62 years old or younger at diagnosis.
- Very few women under the age of 45 are diagnosed with the disease
(American Cancer Society, 2024).

The American Cancer Society (ACS) projected the following breast cancer statistics for the U.S. in 2024 as:

- Roughly 310,720 new cases of invasive breast cancer will be diagnosed in women
- About 42,250 women are expected to die from breast cancer

(American Cancer Society, 2024, “How common is breast cancer?” section)

Ductal Carcinoma in Situ (DCIS)

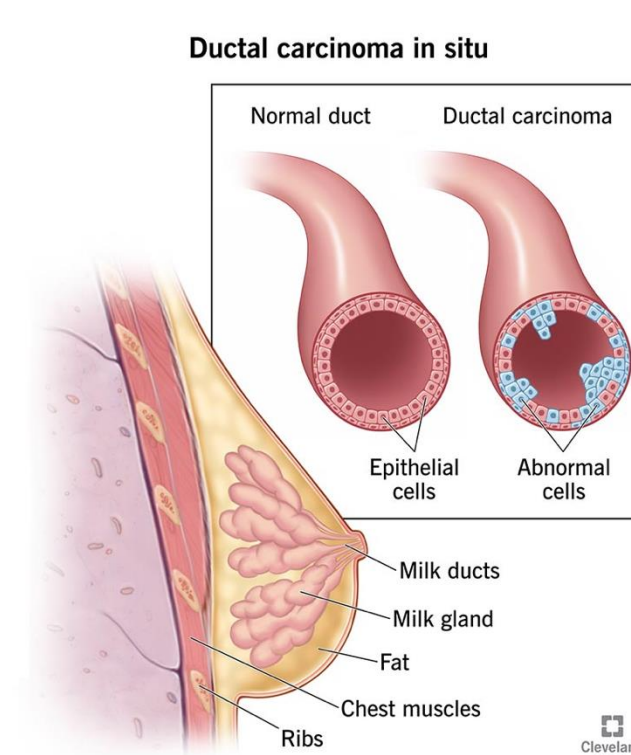
DCIS is a non-invasive cancer where abnormal cells are found in the lining of the breast ducts. It is often considered a precursor to invasive breast cancer, meaning that while it has the potential to develop into a more aggressive form, it is currently localized and has not spread. “Situ” means it stays in its original place (Tomlinson-Hansen et al., 2023).

Pathology

- Breast duct cells undergo changes that may lead to cancer & can be seen as calcifications on a mammogram.

Symptoms

- Most cases do not present as signs or symptoms and are typically found during routine breast screenings. Other symptoms are a breast lump, itchy skin, or bloody nipple discharge (Cleveland Clinic, 2024).



DCIS precancerous cells normal vs. abnormal
(Cleveland Clinic, 2024)

Risk factors of DCIS

- Biological family/personal history of breast cancer
- Being assigned female at birth
- Menstrual cycle begins before age 12
- Being over 30 or having a baby after 30
- Having dense breast tissue
- Having gene mutations associated with increased cancer risk (BRCA 1 and BRCA 2)
- Starting menopause after age 55

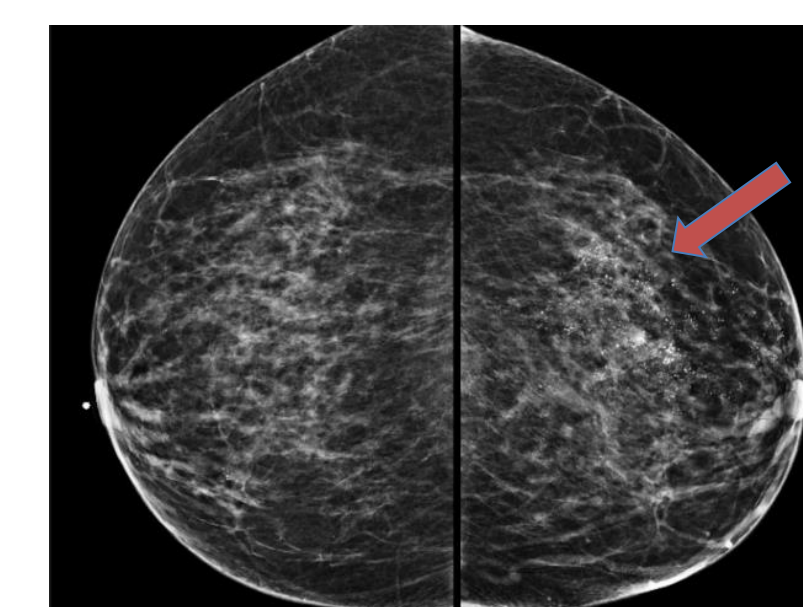
(Cleveland Clinic, 2024)

What leads to the diagnosis of DCIS?

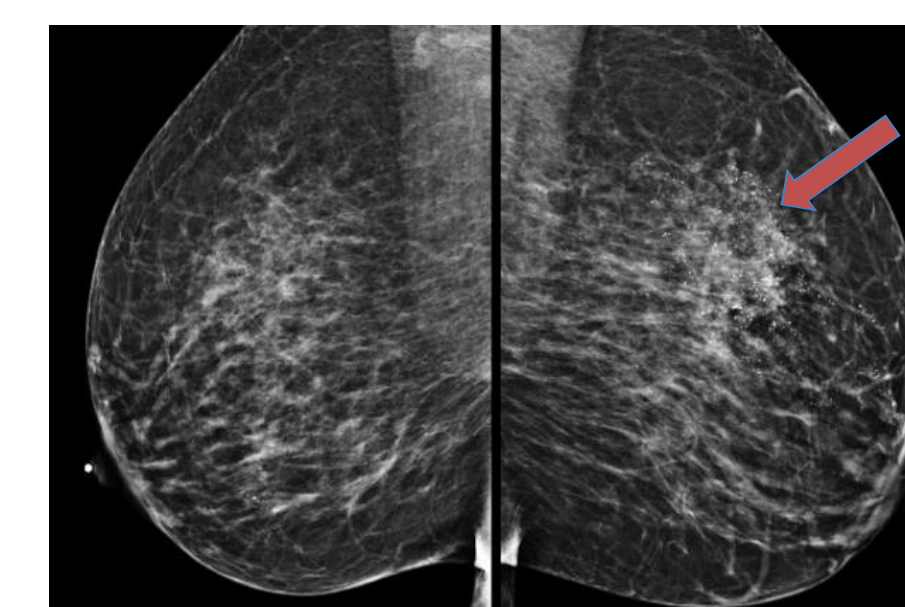
Diagnosis typically follows the detection of a suspicious area on a mammogram, where a Breast Imaging Reporting and Data System (BI-RADS) category of 3 or higher is assigned and a tissue biopsy confirms the presence of abnormal cells (Cleveland Clinic, 2024). “About 56,500 new cases of DCIS will be diagnosed” (American Cancer Society, 2024, “How common is breast cancer?” section).

Presentation of DCIS?

Clustered macrocalcifications shown on a mammogram with RCC, LCC, RMLLO, LMLLO views are typically linked to DCIS. Calcifications indicative of malignancy are generally smaller, ranging from 0.1 to 1 mm, and usually appear in clusters (Tomlinson-Hansen et al., 2023).



Craniocaudal View
(Lee & Feger, 2023)



Mediolateral Oblique View
(Lee & Feger, 2023)

Does the size of DCIS matter?

The size does matter. The larger the tumor, the higher the risk of reoccurrence. Size can also aid in predicting if the cancer will become invasive. DCIS is classified into three nuclear grades: low, intermediate, and high.

- Low nuclear grade: small, uniform cells with inconspicuous nucleoli.
- High nuclear grade: larger cells with pleomorphic nuclei, prominent nucleoli, and frequent mitosis & more likely to progress to invasive breast cancer.
- Intermediate nuclear grade: mild to moderate nuclear changes and variable mitotic activity.

(Tomlinson-Hansen et al., 2023).

BI-RADS categories

6 different categories:

- Category 0: findings unclear; more images are needed
- Category 1: findings are negative & breast tissue appears normal
- Category 2: findings are benign, also negative for cancer
- Category 3: findings are probably benign, most likely noncancerous but another mammogram is needed in six months to check for changes
- Category 4 (three subcategories): findings suspect cancer, to be monitored and possibly biopsied to determine whether the abnormality is cancerous
 - 4A: low chance of cancer
 - 4B: moderate chance of cancer
 - 4C: high chance of cancer
- Category 5: finding highly suspect cancer & follow-up biopsy strongly recommended
- Category 6: already diagnosed as cancer with a biopsy

(Barazi & Gunduru, 2023, para. 7)

Role of biopsy in confirming DCIS:

An image-guided core needle biopsy of a suspicious area provides a histological diagnosis and allows for better tissue sampling than fine-needle aspiration, helping to distinguish between invasive breast cancer and noninvasive forms of DCIS.

- While DCIS is categorized by architectural patterns, core needle biopsies have limitations, with a 10% to 20% chance of finding invasive carcinomas in the excised specimen even when DCIS is diagnosed (Tomlinson-Hansen et al., 2023).

Role of genetic testing:

Genetic testing can assess a woman's risk of breast cancer recurrence or new breast cancers by identifying mutations in genes like BReast CAncer gene 1 (BRCA1) and BReast CAncer gene 2 (BRCA2), which increase the likelihood of breast and ovarian cancers.

- “Non-Hispanic Black (NHB) women have 40% higher breast cancer mortality than non-Hispanic white (NHW) women. Contributing factors include higher incidence of BRCA1 and BRCA2 mutations” (Monticciolo et al., 2021, p. 1284).

Treating DCIS

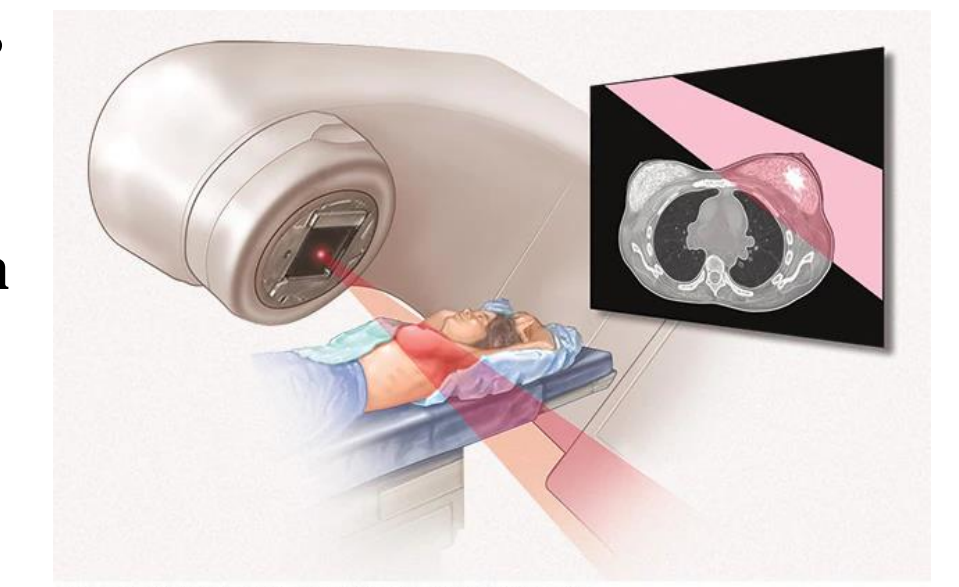
Treatment of DCIS is an important component of the management plan. “Breast cancer is the most common malignancy in women and radiation therapy (RT) is crucial in its multimodality management” (Franco et al., 2023, p. 2).

Surgery, typically a lumpectomy or breast-conserving surgery (BCS), is recommended as step 1 to treat DCIS followed by RT. A lumpectomy or BCS involves removing the cancerous tissue and a small margin of surrounding healthy breast tissue (Mayo Clinic, 2022).

Steps in Radiation Therapy for DCIS:

- Consulting and planning
 - The treatment begins with a consultation with a radiation oncologist, who reviews the patient’s medical history, imaging studies, and biopsy results
 - A personalized treatment plan based on the extent of DCIS will then be developed
- Simulation
 - A simulation session is conducted to determine the exact position the patient will be during treatment. Usually, the patient is lying on a treatment table where markings and small tattoos are made on the skin to ensure accurate targeting of the radiation
 - CT scans may be performed to help outline the treatment area and assist in planning the radiation fields
- Radiation Delivery
 - External Beam Therapy (EBRT) is commonly used for DCIS and typically involves daily sessions (Monday-Friday) that last a few minutes, for 3 to 6 weeks
 - Breast Brachytherapy is delivered in some cases, but is not common. This is where a radioactive source is placed inside or near the tumor site
- Follow-up
 - After completion of radiation therapy, patients are monitored for side effects and treatment effectiveness and may receive hormone therapy medications such as tamoxifen or aromatase inhibitors to prevent DCIS recurrence (Cleveland Clinic, 2024)
 - Follow-up appointments include physical examinations and necessary imaging tests

Radiation Therapy External Beam
(Mayo Clinic, 2022)



Conclusion

Mammography plays a crucial role in early breast cancer detection, significantly impacting survival rates and treatment options. Ductal carcinoma in situ (DCIS), often detected through routine screenings, is a non-invasive form of breast cancer that requires careful evaluation of risk factors and histological grading to guide management. Early diagnosis through mammography can lead to timely interventions, including minimally invasive biopsies and personalized radiation therapy treatment plans. By enhancing awareness and understanding, better management and treatment of DCIS can be done.