
Breast Cancer
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Introduction

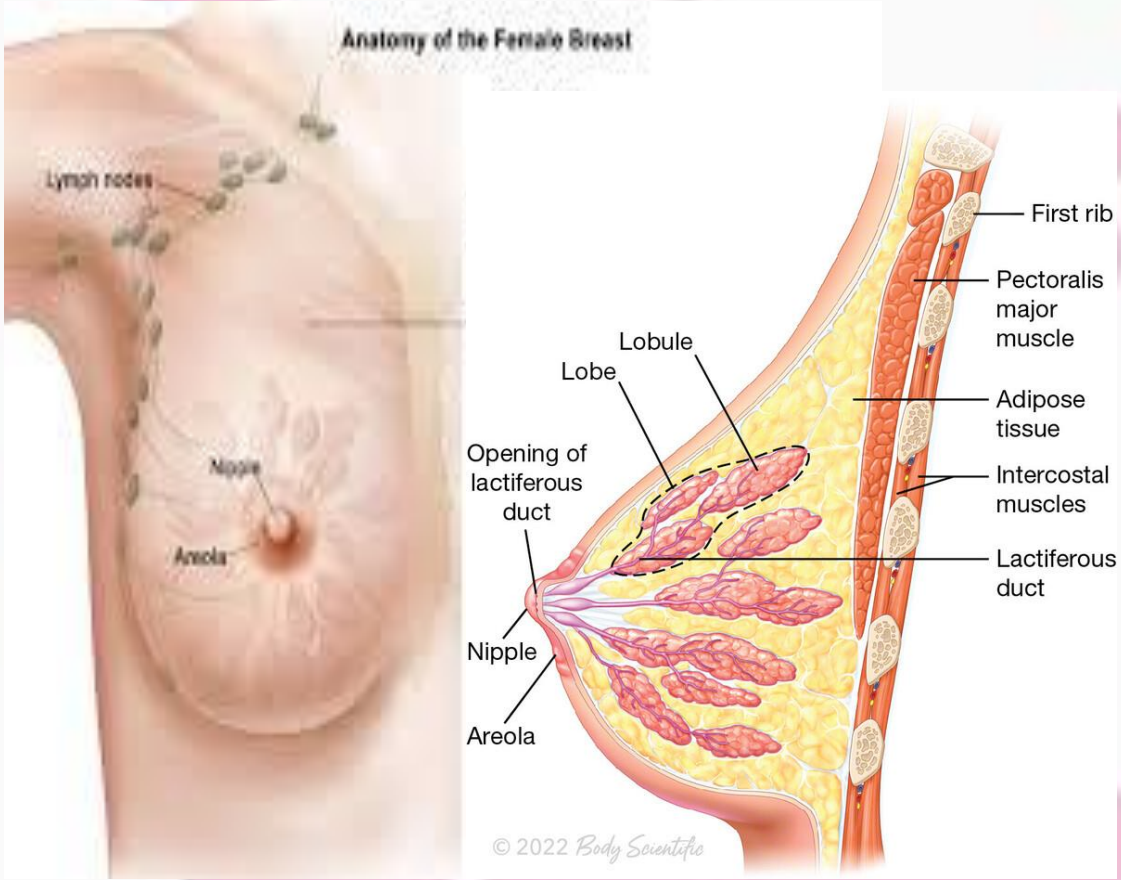
Breast cancer starts when cells in the breast begin to grow out of control

These cells usually form a tumor that can often be seen on an x-ray or felt as a lump

The tumor is malignant (cancer) if the cells can grow into (invade) surrounding tissues or spread (metastasize) to distant areas of the body

Breast cancer occurs almost entirely in women, but men can get breast cancer

Anatomy & Physiology



1- The breasts are made of fat, glands, and connective (fibrous) tissue

2- The breast has several lobes, which are divided into lobules and end in the milk glands

3- Tiny ducts run from the many tiny glands, connect together, and end in the nipple

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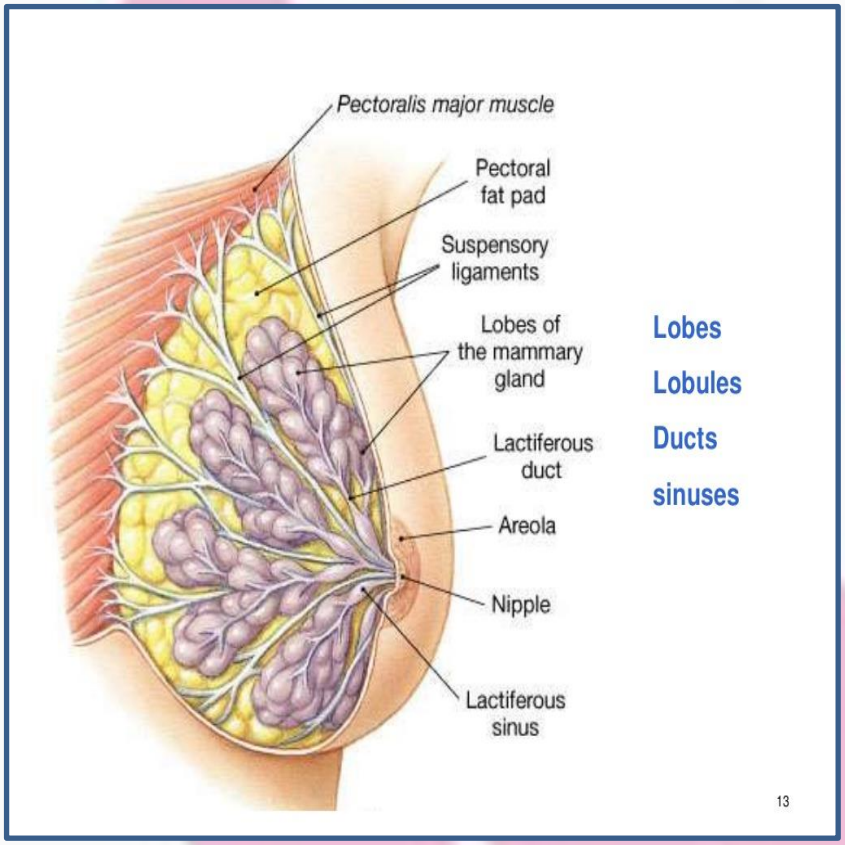
Anatomy & Physiology



These ducts are where 78% of breast cancers occur

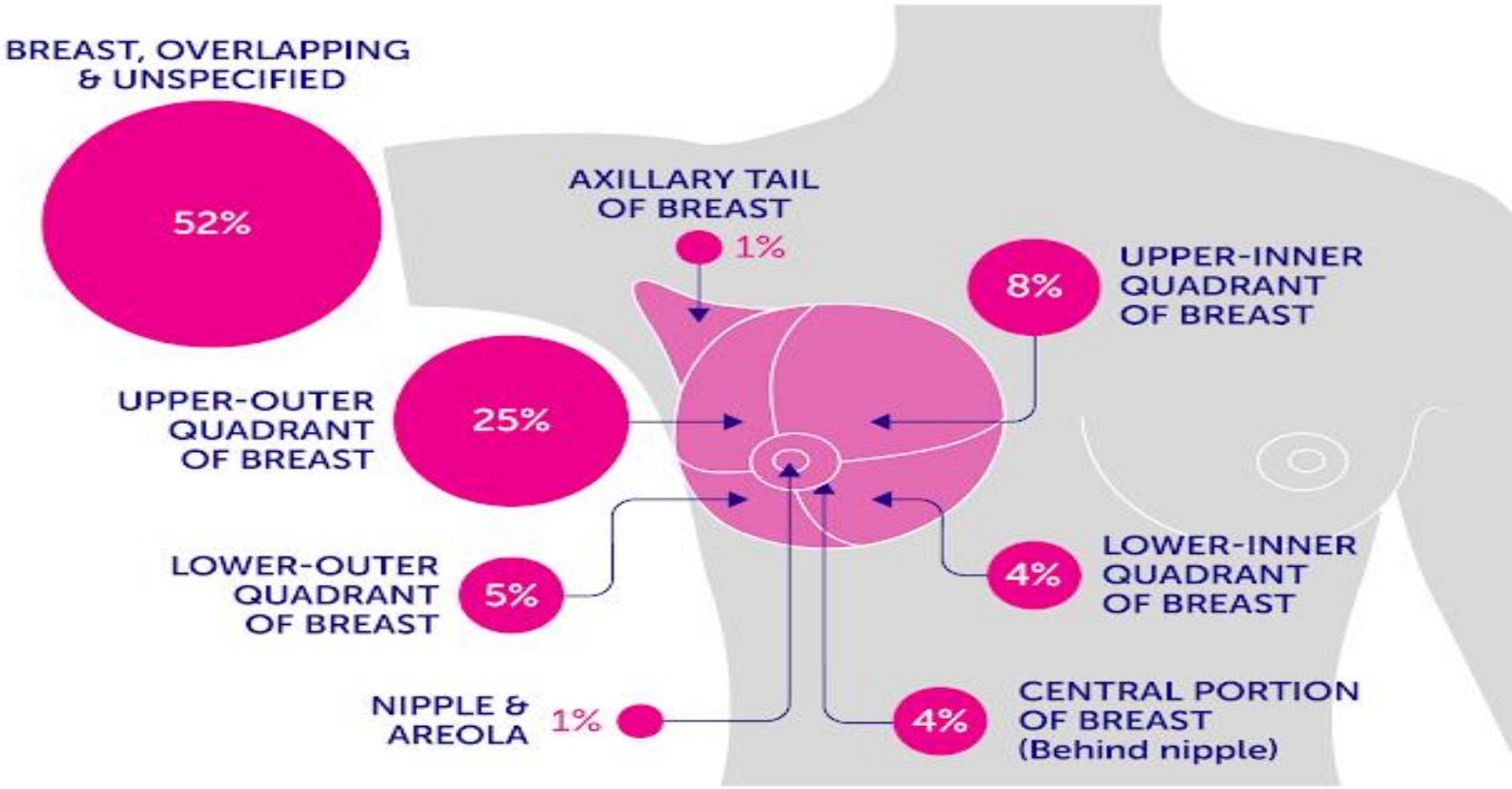
This is known as infiltrating ductal cancer

4- Cancer developing in the lobules is termed infiltrating lobular cancer

About 10-15% of BC are of this type

Another type of breast cancer is inflammatory breast cancer (Often Misdiagnosed and dangerous)

INVASIVE BREAST CANCER CASES: PERCENTAGE DISTRIBUTION BY ANATOMICAL SITE

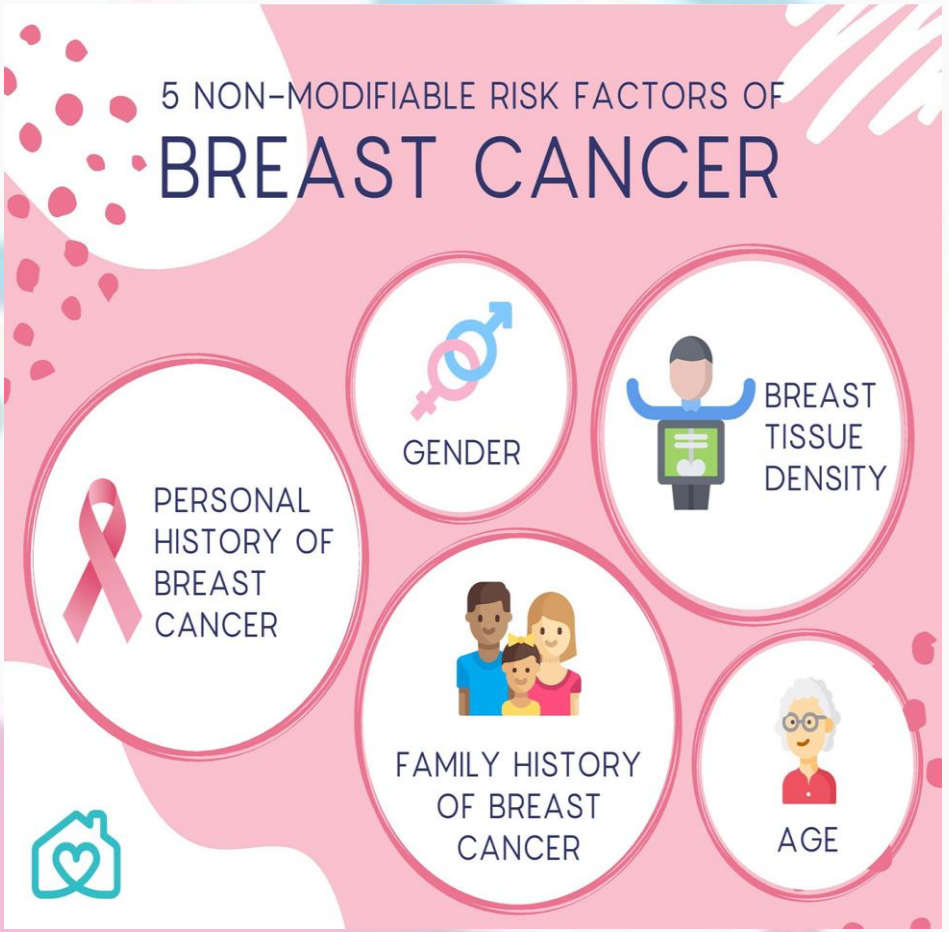


LET'S BEAT CANCER SOONER
cruk.org/cancerstats

CANCER RESEARCH UK

Causes & Risk Factors

1- Personal or family history
2- Radiation therapy to chest/upper body
3- Overweight or obese
4- Age
5- Late menopause
6- Diets high in saturated fat
7- Sex
8- ERT
9- Not having children
10- Having first child after age 30



Causes & Risk Factors

Relative risk <2	Relative risk 2 – 4	Relative risk >4
Early menarche Late menopause Nulliparity Estrogen plus progesterone HRT Alcohol use Postmenopausal obesity	One of the first degree relative with breast cancer CHEK2 mutation Age >35 y for first birth Proliferative breast disease Mammographic breast density	BRCA1 or BRCA2 mutation LCIS Atypical hyperplasia Radiation exposure before 30

Symptoms

1- Early breast cancer has little or no symptoms

It is not painful

2-Breast discharge, especially if only from one breast

3-Sunken nipple

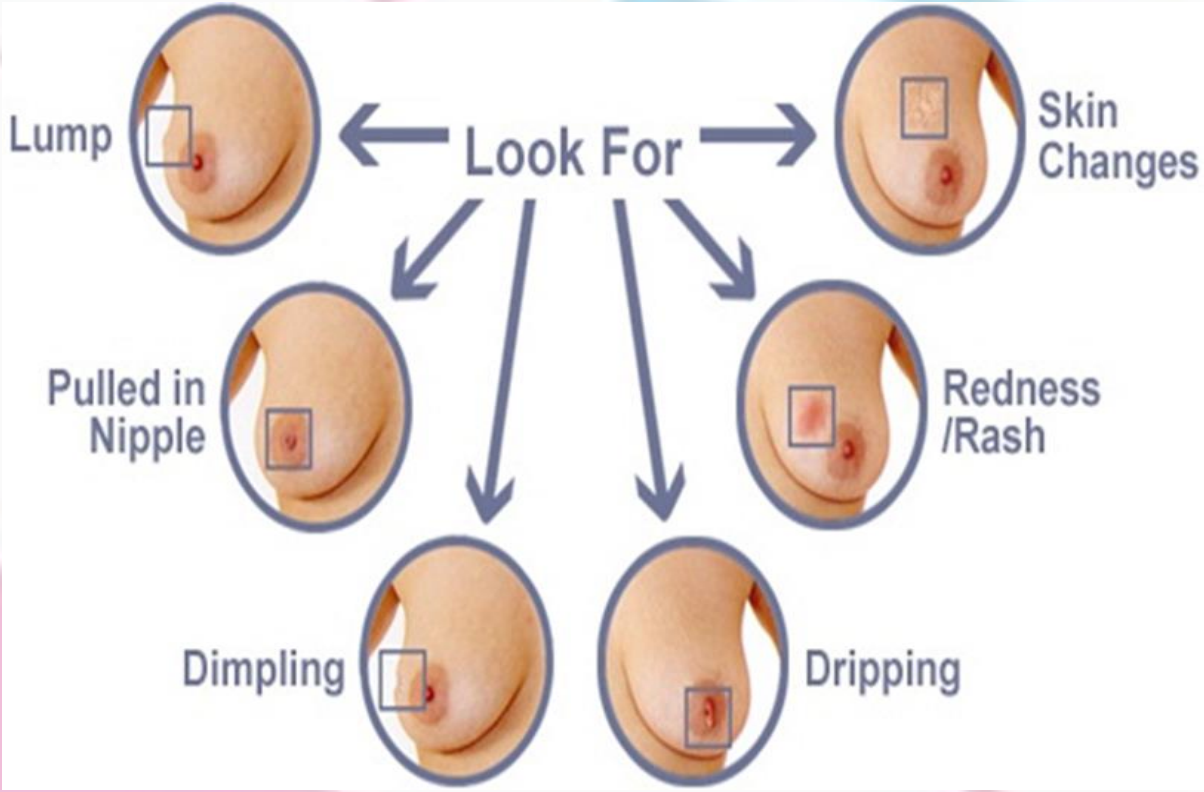
4-Redness, changes in texture, and puckering

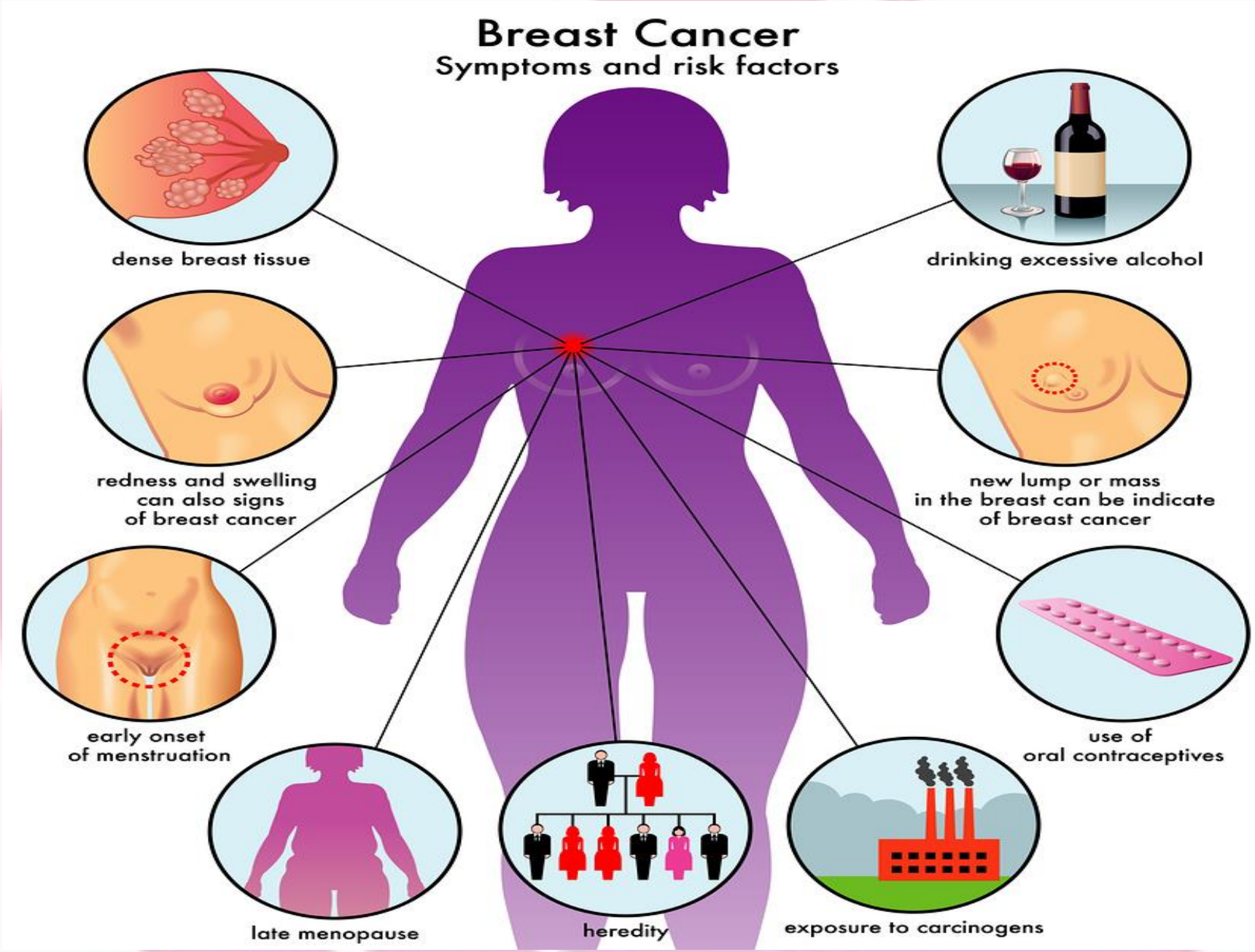
Usually caused by skin disease but sometimes can be associated with breast cancer

5-Lumps on or around breast

Most lumps are not cancerous

6-Other lumps around the under arm or collarbone which don't go away




Breast Cancer
Symptoms and risk factors
dense breast tissue
drinking excessive alcohol
redness and swelling
can also signs
of breast cancer
new lump or mass
in the breast can be indicate
of breast cancer
early onset
of menstruation
use of
oral contraceptives
late menopause
heredity
exposure to carcinogens

Various Types of Carcinomas

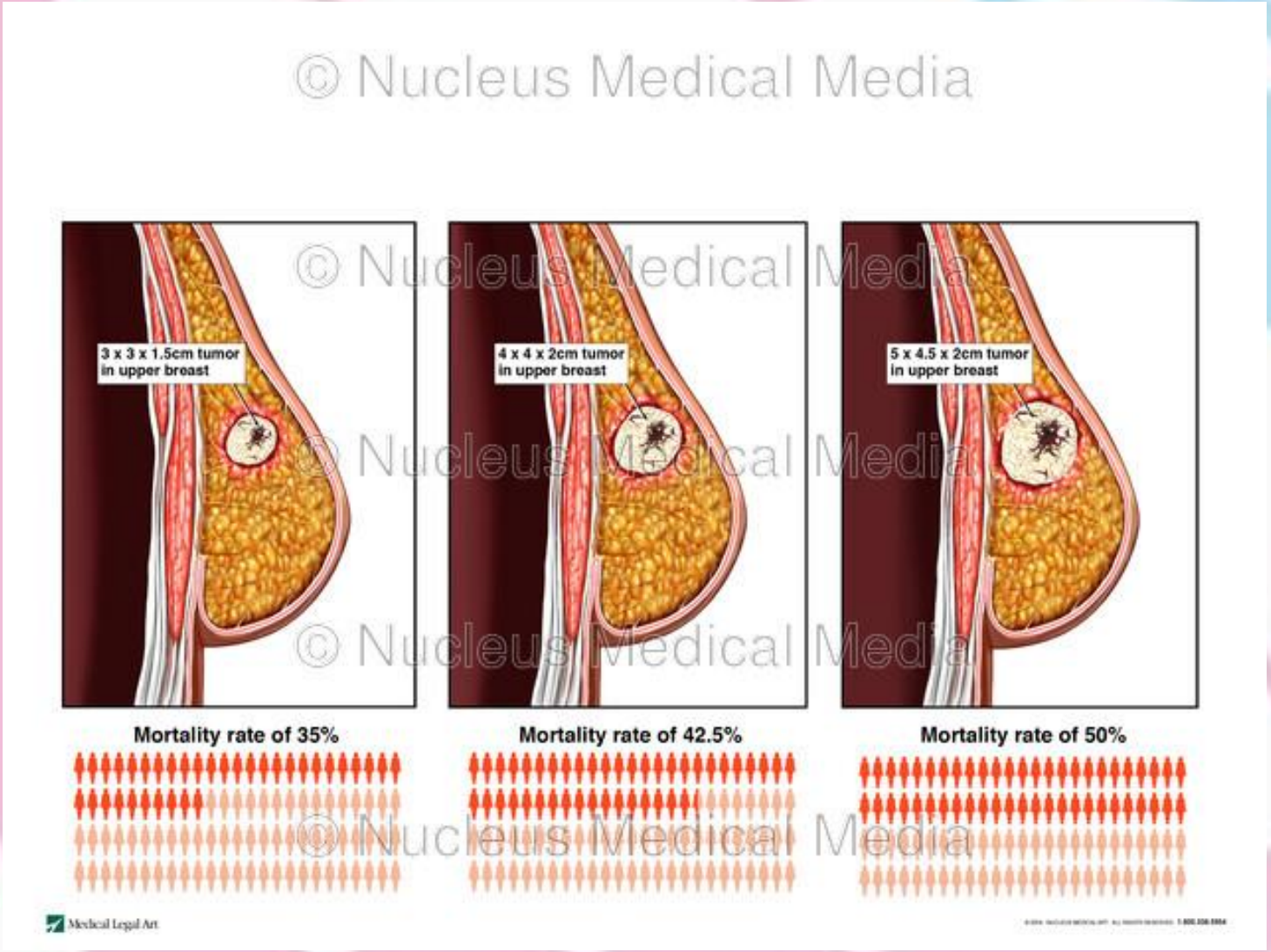
Scirrhous carcinoma-with nipple retraction

Medullary carcinoma-common in middle age

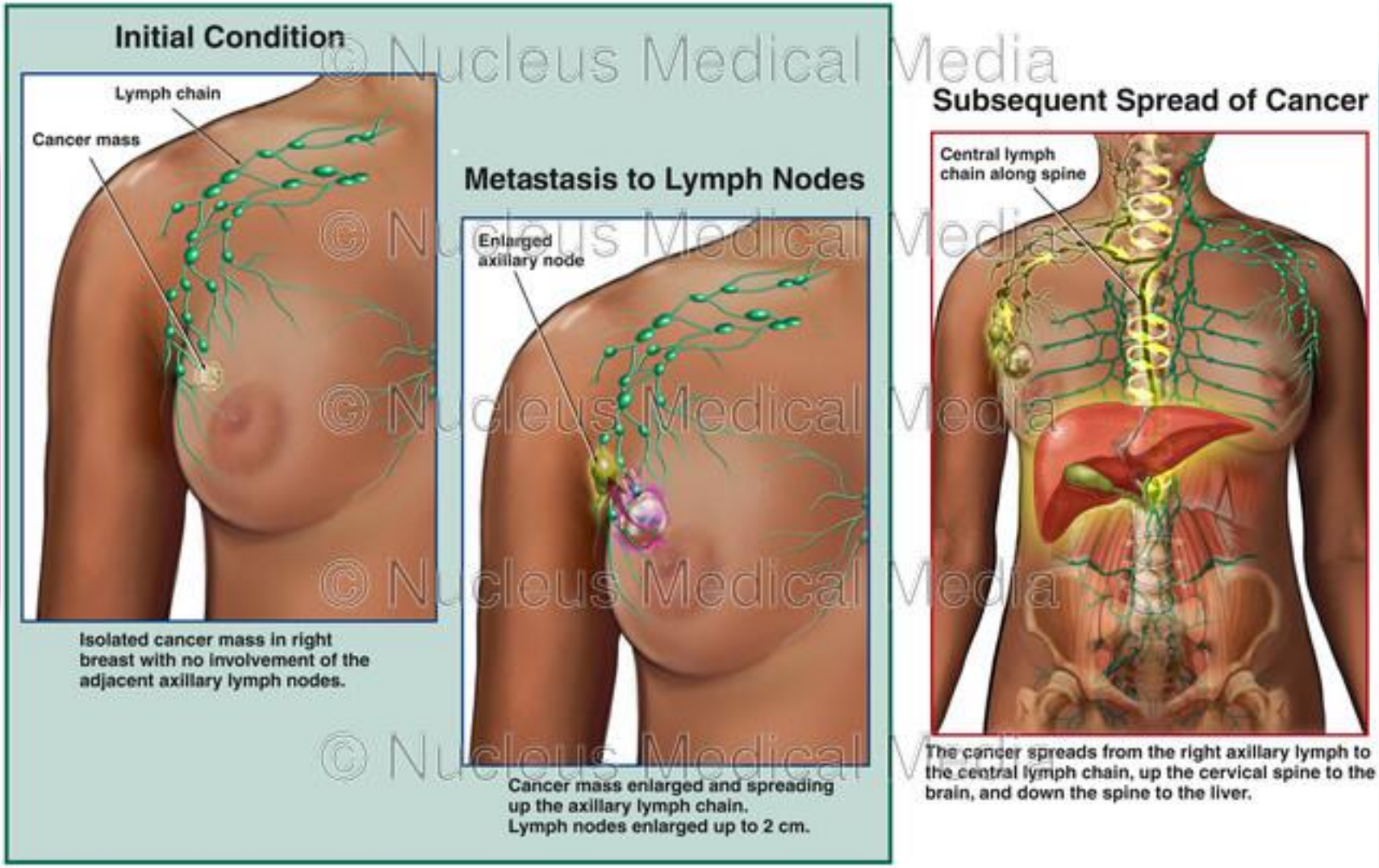
Inflammatory carcinoma-stage T4D

Another case of Inflammatory carcinoma

Progression of Breast Cancer



Progression of Breast Cancer



Stages of breast Cancer

The stages 0-IV

Stage 0 is noninvasive breast cancer, that is, carcinoma in situ with no affected lymph nodes or metastasis. This is the most favorable stage to find breast cancer.

Stage I is breast cancer that is less than three quarters of an inch (2 cm) in diameter & has not spread from the breast.

Stage II is breast cancer that is fairly small in size but has spread to lymph nodes in the armpit OR cancer that is somewhat larger but has not spread to the lymph nodes

Stages of breast Cancer

Stage III is breast cancer of a larger size (greater than 2 inches [5 cm] in diameter), with greater lymph node involvement, or of the inflammatory type. Spreading to other areas around the breast.

Stage IV is metastatic breast cancer: a tumor of any size or type that has metastasized to another part of the body (ex. bones, lungs, liver, brain). This is the least favorable stage to find breast cancer.

Stages of Breast Cancer

0

Abnormal cells in duct lining or sections of the breast. Increased risk of developing cancer in one or both breasts.

100%
SURVIVAL RATE

1

Cancer in breast tissue. Tumor is less than one inch across in size.

98%
SURVIVAL RATE

2

Cancer in breast tissue. Tumor is less than two inches across in size. Cancer may spread to the auxiliary lymph nodes.

88%
SURVIVAL RATE

3

Tumor is larger than two inches across in size and cancer has spread to auxiliary lymph nodes. Possible dimpling, inflammation or skin color change.

52%
SURVIVAL RATE

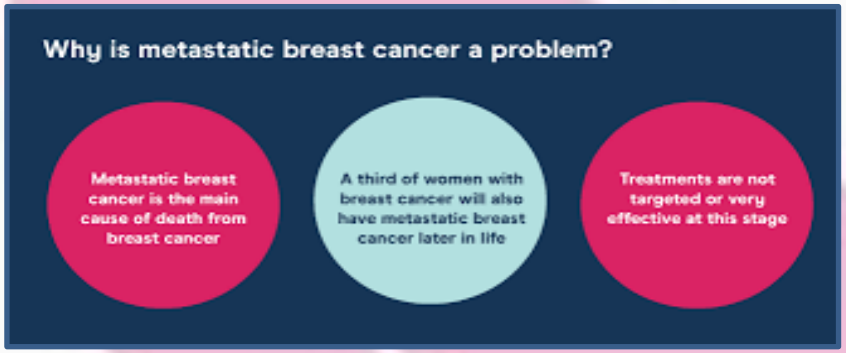
4

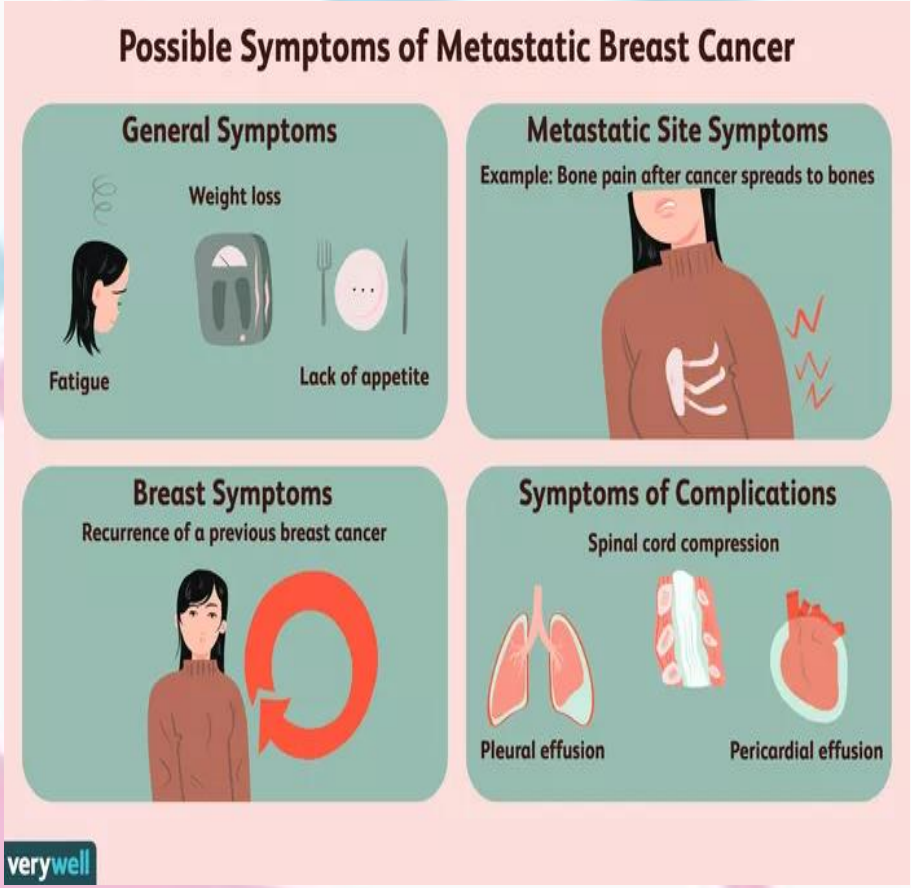
Cancer has spread beyond the breast to other nearby areas of the body.

16%
SURVIVAL RATE

Metastasis

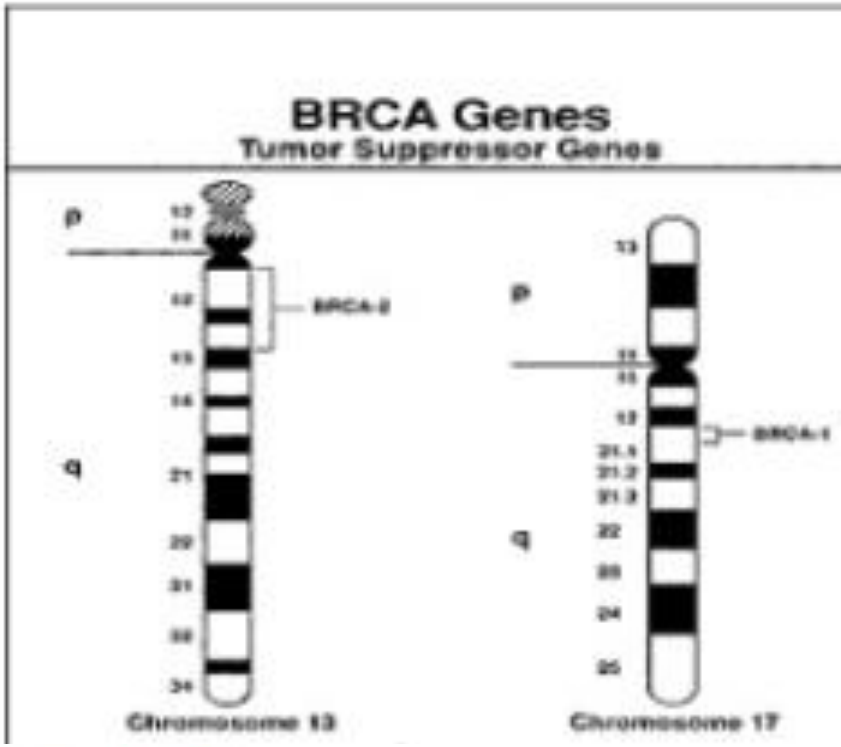
- Lymph nodes under the arm or above the collarbone on the same side as the cancer
- Brain, Bones, liver





BRCA1/BRCA2

- BRCA1 is located on chromosome 17
- BRCA2 is located on Chromosome 13
- Having a single copy of either mutated gene appears to confer about an 80% chance of developing breast cancer.

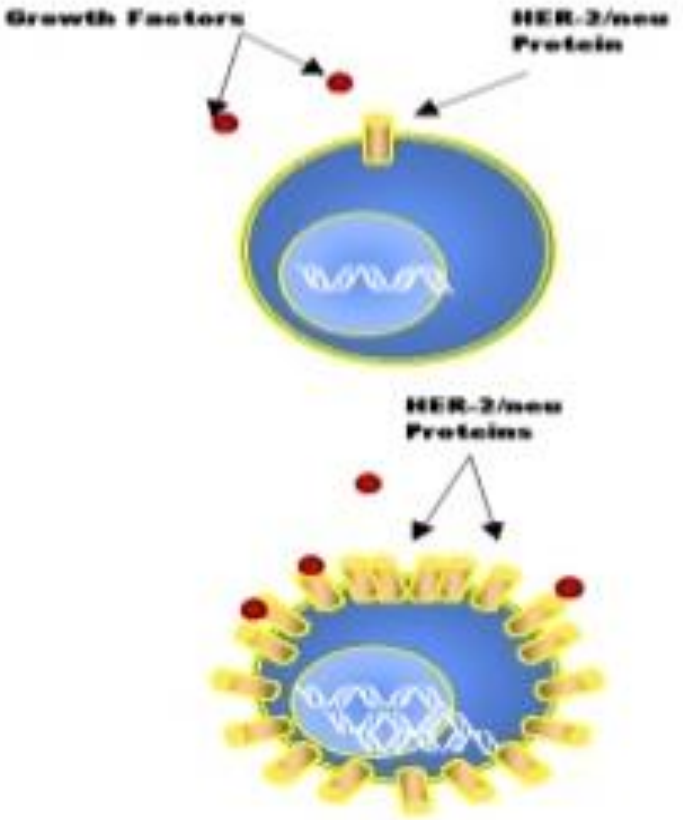


What does BRCA1 & BRCA2 do?

- Both genes help mediate damage to cell's DNA.
- These genes are tentatively linked to an increased risk for also pancreatic, prostate, and ovarian cancer.
- Women who have the *BRCA1* gene tend to develop breast cancer at an early age
- Possible BRCA carriers are females whose mother and grandmother have had breast cancer

HER-2/neu

- Growth-stimulating protein
- Normal cells express a small amount on their plasma membranes
- On surface of breast cancer cells
- Sends messages from cell to "growth factors" outside cell
- Overabundant on surface of cancer cells in 30% of women with breast cancer



Scoring

Her-2/neu	Staining pattern	Her-2/neu protein overexpression
0	No reactivity seen	Negative
1	Weak incomplete staining in any proportion of tumour cells	Negative
2	Non uniform or weak to moderate complete membranous reactivity in >10% of the tumour cells OR Intense complete staining of <30% of the invasive tumour cells.	Equivocal
3	Uniform, intense, complete membranous reactivity in >30% of the invasive tumour cells.	Positive

Diagnosis-Clinical Examination

Early detection is the key!

I. **Hands by side of patient**

1. Nipple
   - Bloody discharge
   - Centrally retracted nipple
2. Areola: Presence of ***peau d' orange*** indicates the tumor infiltrating the areola
3. Skin over the breast
   - Puckering or dimpling of skin
4. Lump
5. Edema of the arm is due to lymphatic blockage caused by lymph nodes in the axilla

Diagnosis-Clinical Examination

II. **Hands raised above the head**

- Peau d' orange (on elevation of hands), becomes more prominent.

III. **Bending forward**

- In cases of carcinoma infiltrating the chest wall, the breast will not fall; forward on bending.

❖ Palpation

1. Local rise of temperature and tenderness
2. Describe the lump: hard and irregular or soft.
3. Intrinsic mobility
4. Plane of the swelling

- Pectoralis major contraction test
- Serratus anterior contraction

Diagnosis-Clinical Examination

Investigations

1. Complete blood picture: Hb% may be decreased

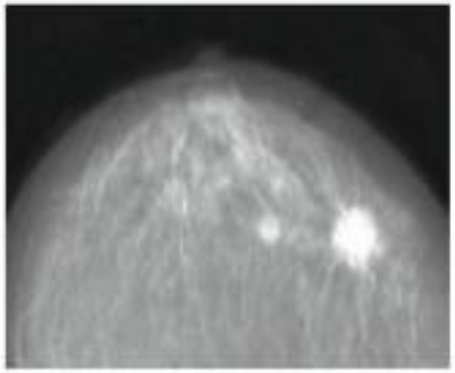
2. Increased ALP levels in the blood suggest bone metastasis or liver metastasis.

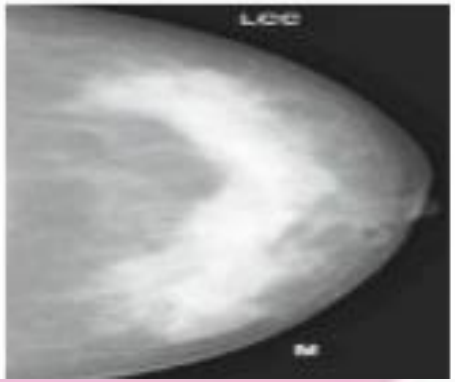
3. Mammography

4. FNAC (Fine Needle Aspiration Cytology)

5. Trucut biopsy: If FNAC is –ive, a trucut biopsy or vacuum-assisted biopsy (VAB) using 11 gauge biopsy [robe can be taken.

6. Incisional biopsy





Diagnosis-Clinical Examination

7. Image guided biopsy in indeterminate lesions

A. Ultrasound guided biopsy

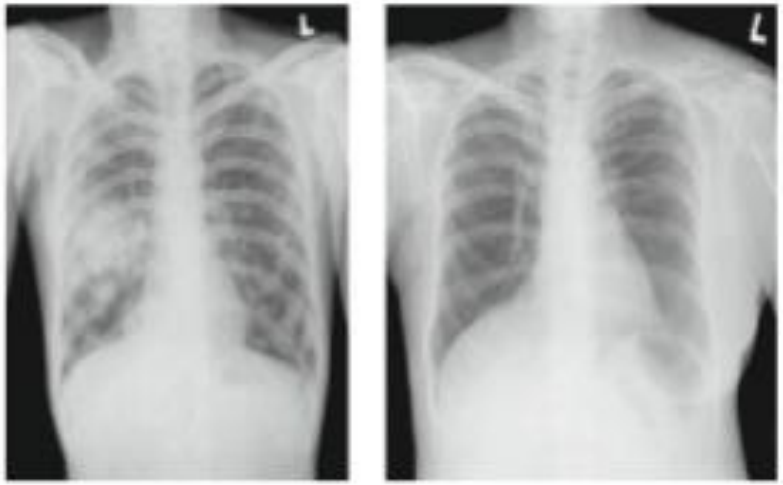
B. Wire Localisation

C. Stereotactic biopsy

D. Mammotome

8. Chest X-ray

9. Abdominal ultrasonography



Treatment

- Radiation
- Chemotherapy
- Vaccines
- Surgery
- Hormonal therapy
- Tamoxifen is the most commonly prescribed hormone treatment

HER-2/neu Vaccine

1- Targets HER-2/neu protein

2- Made from small protein pieces likely to trigger an immune response

3- Helps to increase white blood cell counts

4- Monthly shots for six months

5- No serious side effects

Trastuzumab

1- Type of biologic therapy

2-Breast cancer treatment drug

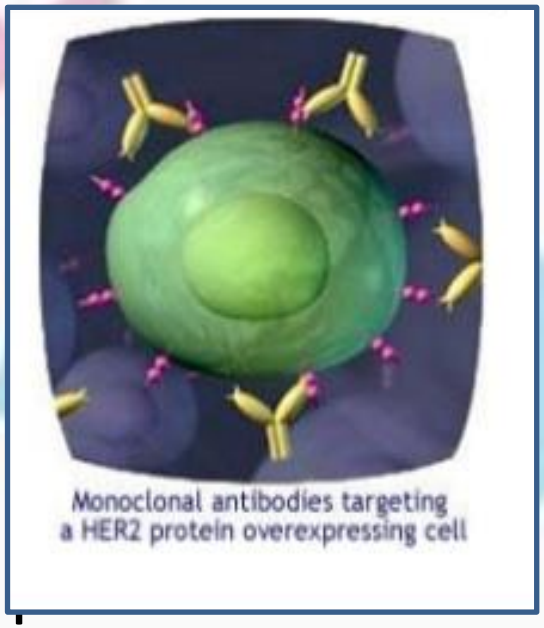
3-Monoclonal antibody therapy

4-Blocks HER-2/neu

5-Effective in metastatic HER-2/neu breast cancer

6-Little effect with HER-2/neu negative breast cancer

Trastuzumab is administered intravenously weekly or every 3 weeks



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Surgery

1- Lumpectomy, removal of the cancerous tissue and a surrounding area of normal tissue

2- Simple mastectomy, removes the entire breast but no other structures

3- Modified radical mastectomy, removes the breast and the underarm lymph nodes

4- Radical mastectomy, removal of the breast and the underlying chest wall muscles, as well as the underarm contents. This surgery is no longer done because current therapies are less disfiguring and have fewer complications.

Lumpectomy (Wide local excision)

Local wide excision is done-if the skin is involved, it is also removed, undermining of the flaps is not required

Local wide excision is in progress. 1cm of the normal breast tissue of the cancerous lesion is all that is necessary

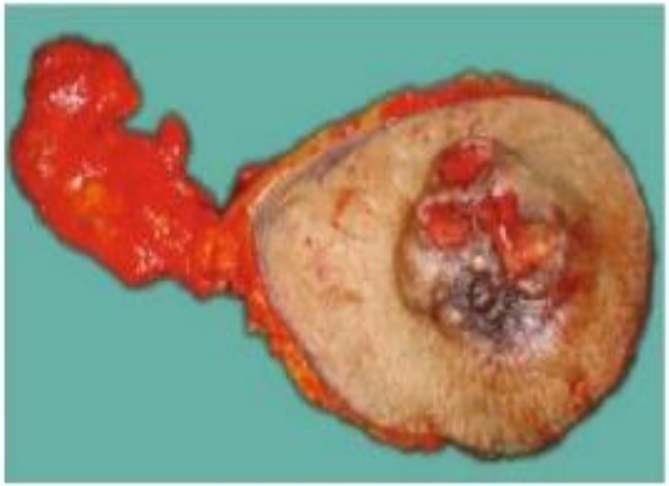
Patey Mastectomy (MRM)

This is the most acceptable and most widely practised surgery. In this , the entire breast including nipple and areola are removed with, pectoralis minor, followed by axillary block dissection should include node clearance up to level III.

- Level I: Extends from axillary tail to the lateral border of the pectoralis minor.
- Level II: Extends from lateral border of the pectoralis minor to medial border of the pectoralis minor.
- Level III: Up to the apex of axilla.

Modified Radical Mastectomy

Classical MRM incision which includes nipple areola complex and slightly extending into axilla to facilitate axillary block dissection



Patey mastectomy specimen: In this operation, entire breast including axillary tail with all the axillary group of lymph nodes and pectoralis minor are removed

Surgery

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Complications of MRM

1. ***Seroma/lymph collection***: (30 -50%) in spite of adequate drainage of the cest wall and axilla, drainage occurs for about 5-10 days.
2. ***Secondary infection***: It manifests as redness, discharge, fever, etc. Appropriate antibiotics are necessary.
3. ***Flap necrosis***: True mastectomy requires elevation of both upper and lower flaps. Thus it predisposes to flap necrosis. This requires debridement, antibiotics, suturing and rarely skin grafting also.
4. ***Haemorrhage*** (Not common)
5. ***Pain and numbness in the axilla, medial side of arm***: Due to irritation of intercostobrachial nerve. Generally subsided in few days. They requires simple analgesics.
6. ***Shoulder dysfunction*** can occur especially when the pectoral muscles are injured or retracted resulting in haematoma or when pectoralis muscles are removed. It improves over a period of time. Incidence 8-10%.
7. Injury/thrombosis of axillary veins. It manifests as severe pain in the hand and swelling. Treated by low molecular weight heparin.
8. Injury to axillary vein, needs to be repaired by 5 or 6-0 prolene sutures.
9. Winging scapula is due to injury to long thoracic nerve of bell. The good anatomical knowledge is essential to prevent this complication.
10. Lymphoedema of the arm appears a few months later.

Complications of MRM

Lymphoedema right upper limb-troublesome complication after axillary block dissection-more after radiotherapy to axilla

Postmastectomy lymphoedema

Breast Reconstruction

**The ideal candidate for breast reconstruction is a patient who has undergone modified radical mastectomy.*

Mastectomy results in following changes in woman:

- Psychological stress
- Mood disturbances and anxiety
- Increased consciousness about clothes
- Decreased sexual interest and satisfaction
- Negative body image

Reconstruction:

- Improves self confidence
- Better social life
- Decreases concern about cancer
- Better sexual life
- Feel "whole again"

Timing: Immediate or delayed.

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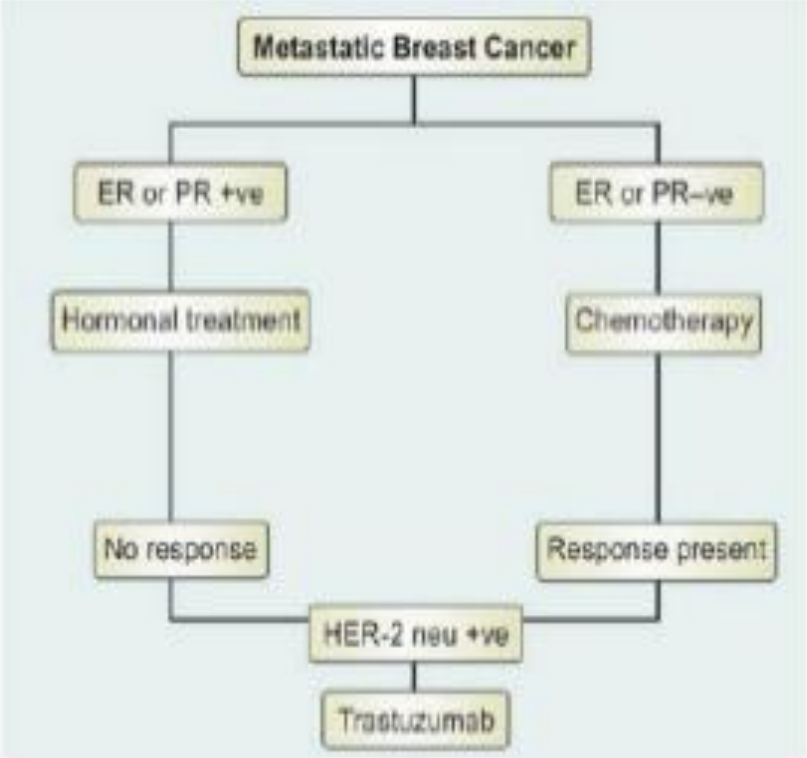
Treatment Algorithm for MBC



Videos/Animations

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- Summary: Animation - Understanding Breast Cancer