

A DISSERTATION ON
“A STUDY TO ASSESS THE INCIDENCE OF INTERNAL
MAMMARY NODES IN RESPONSE TO VARIOUS QUADRANTS
AND VARIOUS STAGES BY CT SCAN IN CARCINOMA
BREAST”

Submitted to

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M.S. DEGREE - GENERAL SURGERY

BRANCH – I



GOVERNMENT MOHAN KUMARAMANGALAM

MEDICAL COLLEGE, SALEM

MAY 2020

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INTRODUCTION: Breast cancer remains the most common cancer encountered by any surgeon in his day to day practice. It is also one of the leading cancers of women with the other being cancer cervix. There has been a remarkable development in the understanding of pathology, mode of spread, surgery, adjuvant treatment modality and also various cosmetic surgery even in the presence of cancer in carcinoma breast yet recurrence remains cumbersome and is depressing to the patient and also the treating surgeon. The prognosis gradually decreases as the staging of the disease increases with the patients in stage IV of the disease having the worst prognosis of around 25 % for 5 year survival rate. The presence of internal mammary nodal metastasis in carcinoma breast elevates staging of the disease to locally advanced breast cancer stage necessitating use of neo adjuvant modality for treatment and also decreases the patient survival rate. The use sentinel lymph node biopsy for internal mammary nodes requires modified techniques. The use of radiotherapy which was usually avoided prior due to increased risk of cardiotoxicity has now being adopted with thanks to the advent of newer technologies are being employed to get effective local control. This study focuses on the incidence of internal mammary nodes in computed tomographic scan in response to various quadrants and stages of carcinoma breast.

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ABSTRACT:

The carcinoma breast is one of the most common carcinoma of the women with the other one being carcinoma cervix. The carcinoma breast usually metastasize to axillary nodes in about 75 % of the cases followed by internal mammary nodes. The involvement of internal mammary nodes is usually overlooked and PET CT, MRI are the most common investigation done to recognize the involvement. The involvement of the internal mammary nodes usually upstage the disease shifting the treatment choice from surgery to neo adjuvant chemotherapy. In this study the incidence of internal mammary nodes in response to various stage and various quadrants of carcinoma breast were studied using contrast enhanced computed tomogram and the following results was observed , the nodes were more commonly involved in upper inner / medial quadrant and in correspondence to stage it was more common in stage III disease.

Keywords: PET CT , MRI , internal mammary nodes , CECT.

AIM OF THE STUDY:

The main aim of this study is to assess the incidence of internal mammary nodes in computerized tomography scan in response to various quadrants and various stages of carcinoma breast.

MATERIALS AND METHODS:

This prospective clinical study of 30 cases of carcinoma breast admitted in Government Mohan Kumaramangalam Medical College Hospital , Salem is done in the period from DECEMBER 2017 to SEPTEMBER 2019. The cases were evaluated with through proper history taking , clinical examination, histology and radiological investigations and the findings are listed.

OBSERVATION:

Of all the 30 patients studied , the node positivity was observed more in the upper medial quadrant and in correspondence to the staging it is more common in stage III disease.

CONCLUSION:

From our study it is concluded that the incidence of internal mammary nodal metastasis is more common in the upper inner quadrant and also was observed more commonly in stage III disease. The presence of internal mammary nodal metastasis is associated with increased chance of distant metastasis, making it as one of the predictors of prognosis. Hence in carcinoma breast the imaging of internal mammary nodes must be taken into account as it provides details about the prognosis and site of recurrence.

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INTRODUCTION:

Breast cancer remains the most common cancer encountered by any surgeon in his day to day practice. It is also one of the leading cancers of women with the other being cancer cervix. There has been a remarkable development in the understanding of pathology, mode of spread, surgery, adjuvant treatment modality and also various cosmetic surgery even in the presence of cancer in carcinoma breast yet recurrence remains cumbersome and is depressing to the patient and also the treating surgeon. The prognosis gradually decreases as the staging of the disease increases with the patients in stage IV of the disease having the worst prognosis of around 25 % for 5 year survival rate. The presence of internal mammary nodal metastasis in carcinoma breast elevates staging of the disease to locally advanced breast cancer stage necessitating use of neo adjuvant modality for treatment and also decreases the patient survival rate. The use sentinel lymph node biopsy for internal mammary nodes requires modified techniques. The use of radiotherapy which was usually avoided prior due to increased risk of cardiotoxicity has now being adopted with thanks to the advent of newer technologies are being employed to get effective local control. This study focuses on the incidence of internal mammary nodes in computed tomographic scan in response to various quadrants and stages of carcinoma breast.

REVIEW OF LITERATURE:

HISTORY:

The evolution of breast anatomy , spread and treatment for carcinoma breast is given in the following table.

NAME	YEAR	CONTRIBUTION
Hippocrates	460- 322 B.C	Described in detail about carcinoma breast
Cruikshank	1786	Described about the lymphatics of breast
Cooper	1845	Described about suspensory ligament
Moore	1865	Advocated removal of breast along with surrounding tissue due to recurrence
Halsted	1882	Designed radical mastectomy
Sappey	1885	Described about the subareolar plexus
Tansini	1896	Adopted lattismus dorsi flap for reconstruction
Rotter	1899	Described inter pectoral nodal metastasis
Patey	1943	Devised modified radical mastectomy
Wangensteen	1949	Advocated intrapleural extended radical mastectomy – for removal of internal mammary nodes

Dreaver	1977	Pioneer in use of myocutaneous flap
Veronessi	1981	Established the role of breast conserving surgery

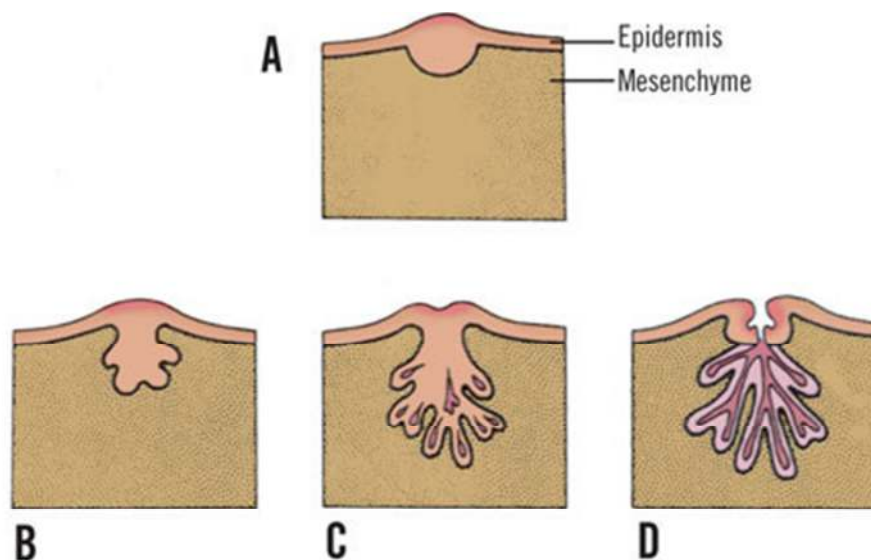
EMBRYOLOGY:

Breast is a modified sweat gland that arises about second month of gestation in the fetal life.

The embryological milk line extends from axilla to groin ,of which only the pectoral gland proliferates and enlarges.

Cells for development.

1. ECTODERM – lactiferous duct
2. MESODERM – stroma and connective tissue
3. NIPPLE – stratum spinosum of epidermis
4. AEROLA- at 5th month of gestation.



ANATOMY:

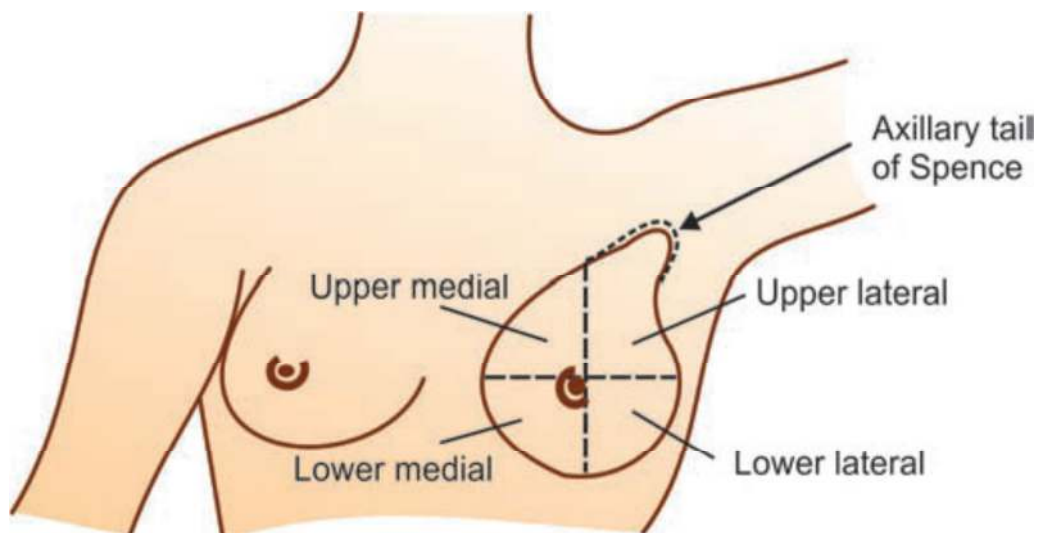
Breast is a modified sweat gland that is located within the superficial fascia of the anterior chest wall. It is composed glandular tissue and fibro fatty stroma. It is rudimentary in males.

EXTENSION:

Vertical limit – 2nd to 6th rib.

Horizontal limit – lateral border of sternum to mid axillary line.

AXILLARY TAIL OF SPENCE – a extension of breast tissue in the upper outer quadrant into the axilla piercing the deep fascia through *foramen of langer*. It is the only part of breast tissue that is located within the deep fascia.



MORPHOLOGY:

Each breast is composed of 15-20 lobes ending in the duct which is supported by a framework of fibro fatty stromal connective tissue. These lobes along with the ducts form the anatomical unit. The lobes form the secretory unit composing of columnar cells.

The ducts finally converge into the nipple with dilation at the distal part known as *lactiferous sinus*. It is the only storage part of the duct. The duct is most narrower at its insertion into the nipple. The duct arrangement from the nipple is like *spoke wheel alignment*. The ducts are usually surrounded by the connective tissue from the upper papillary layer of dermis. The lining of the duct is simple columnar and at lactiferous sinus it is stratified squamous epithelium. The myoepithelial cells are located between the epithelium and the basement membrane , that facilitate the contraction during milk secretion

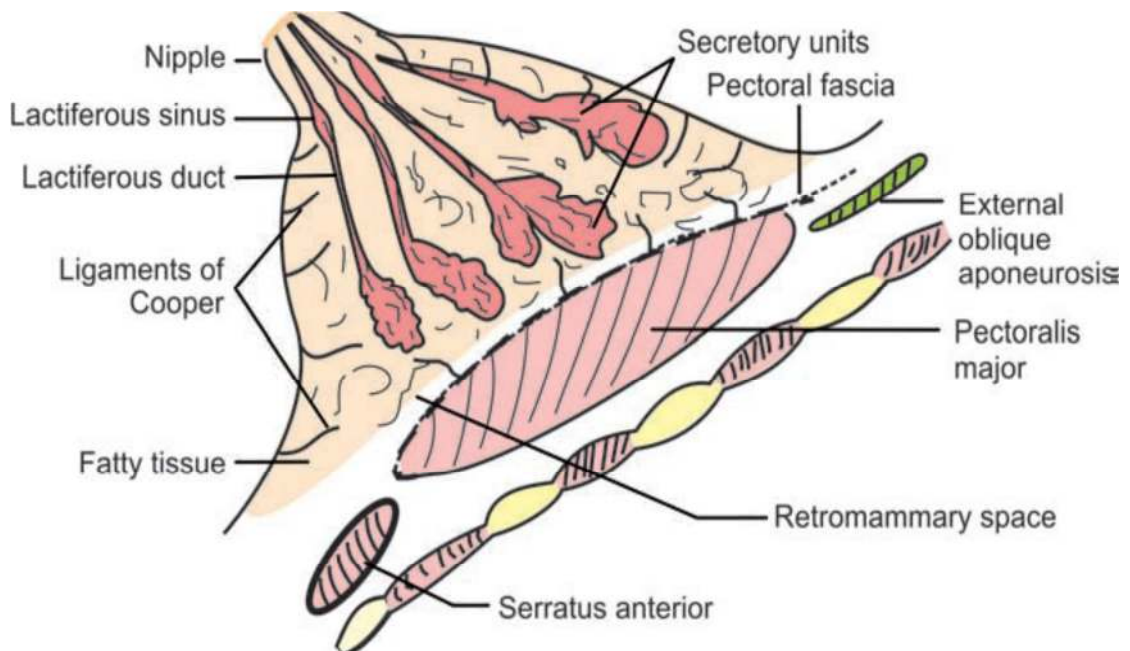
The *Suspensory ligaments of Cooper* are formed by condensation of stromal tissue extending from the skin to deep pectoral fascia. It passes in between the lobes and play a vital role in anchoring the breast tissue.

PARTS OF BREAST:

1. Base
2. Apex

Base – it is found in relation to the retro mammary space which is a loose areolar connective tissue and is rich in lymphatics.

Apex – it is pointed and contains nipple and areola. The nipple is located at the 4th intercostal space and is pierced by 15 – 20 ducts. The areola contains involuntary muscles, sebaceous glands and sweat glands. These sebaceous glands get enlarged during pregnancy as *Montgomery tubercles*. These glands secrete an oily secretion which helps in lubrication during lactation.



RELATED STRUCTURES:

I. FASCIA

II. MUSCLES.

I.FASCIA:

It includes the superficial pectoral fascia, deep pectoral fascia and clavipectoral fascia

- Superficial pectoral fascia:

It is anteriorly fixed with dermis of skin and is continuous with fatty layer of camper below and superficial cervical fascia below

- Deep pectoral fascia:

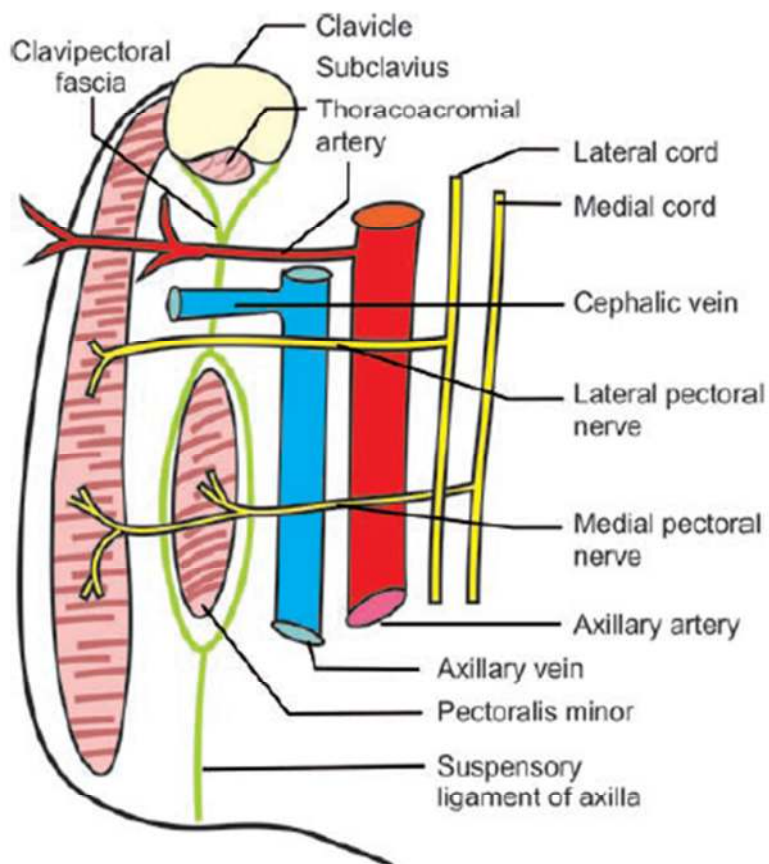
It is attached to the sternum medially, clavicle superiorly, axilla laterally and below it is continuous with the deep fascia of the abdomen. It send strands into the axilla forming the *suspensory ligament of axilla* along with the fascia covering the latissimus dorsi. It is also in relation to the retro mammary space.

- Clavipectoral fascia:

It is the fascia covering the pectoralis minor muscle and subclavius muscle . It is attached above to the clavicle where it encloses the subclavius muscle by splitting into two layers. Laterally it is thickened between the first rib and the coracoid process named as costocoracoid

ligament. The gap between the pectoralis minor and subclavius is referred to as costoclavicular membrane.

ATTACHMENT	MUSCLE ENCLOSED	STRUCTURES PIERCING
Clavicle	Pectoralis minor	Cephalic vein
First rib	Subclavius	Lateral pectoral nerve
Coracoid process		Thoracoacromial artery
Axilla		Lymphatics



II MUSCLES RELATED:

1. Pectoralis major
2. Pectoralis minor
3. Serratus anterior
4. Rectus abdominis
5. Latissimus dorsi
6. External oblique

1. PECTORALIS MAJOR:

It has two heads and is the largest muscle of the pectoral region.

Origin	Clavicular head – from medial half of the clavicle Sternal head – from the manubrium sternum and 2- 6 intercostal spaces
Insertion	Lateral lip of the bicipital groove
Innervation	Medial and lateral pectoral nerves

ACTION:

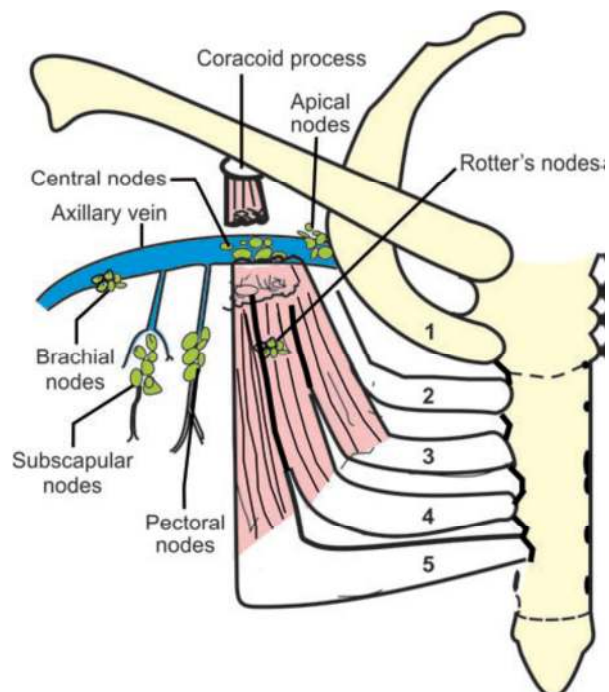
- As a whole it does adduction and medial rotation
- Clavicular head – flexion of arm.
- Sternal head – extension of flexed arm against resistance.

2. PECTORALIS MINOR:

It is one of the important muscle in breast surgery in correspondence with the lymphatics of the breast.

- ORIGIN – From 3,4,5 intercostal spaces near the costal margin.
- INSERTION – at the coracoid process
- Innervation – medial pectoral nerve.
- ACTION – it protracts and also depresses the scapula.

It is in relation to rotter's node, level 2 and level 3 group of the axillary nodes.



3. SERRATUS ANTERIOR:

It is also known as the boxer's muscle. It is in close relation to the breast and its covering fascia to be removed along with the pectoral fascia during mastectomy.

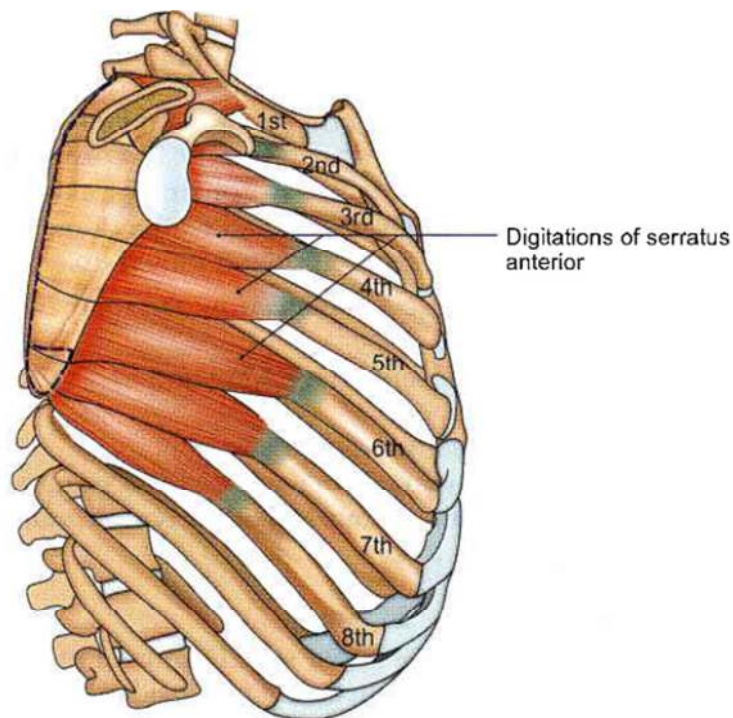
- ORIGIN – 1 TO 8 ribs by 8 individual digitations.
- INSERTION – all the digitations are inserted into the scapula

First digitation – to the superior angle

Second and third – lower in the medial border.

Following five – over the inferior angle.

- NERVE SUPPLY – nerve to serratus anterior.
- ACTION – steadies the scapula , also helps in punching and pushing movements.



4. LATISSMUS DORSI:

It connects the pelvis and the vertebral column with the upper limb.

It has extensive origin and narrow insertion.

It is responsible for formation for two triangles – triangle of auscultation and triangle of petit.

It also forms the posterior wall of axilla.

➤ ORIGIN – 1. OUTER LIP OF ILIAC CREST.

2. Posterior layer of lumbar fascia.

3. spines of T7-T12

4. Lower four ribs

5. inferior angle of scapula.

➤ INSERTION – Into the floor of intertubercular sulcus.

➤ NERVE SUPPLY – thoracodorsal nerve C6,C7,C8

➤ ACTION – climbing

Adduction, extension , medial rotation.

5. RECTUS ABDOMINIS:

It is important muscle in respect to both chest and abdomen. It has covered by rectus sheath.

- ORIGIN – it has two heads.

Medial head – anterior pubic ligament.

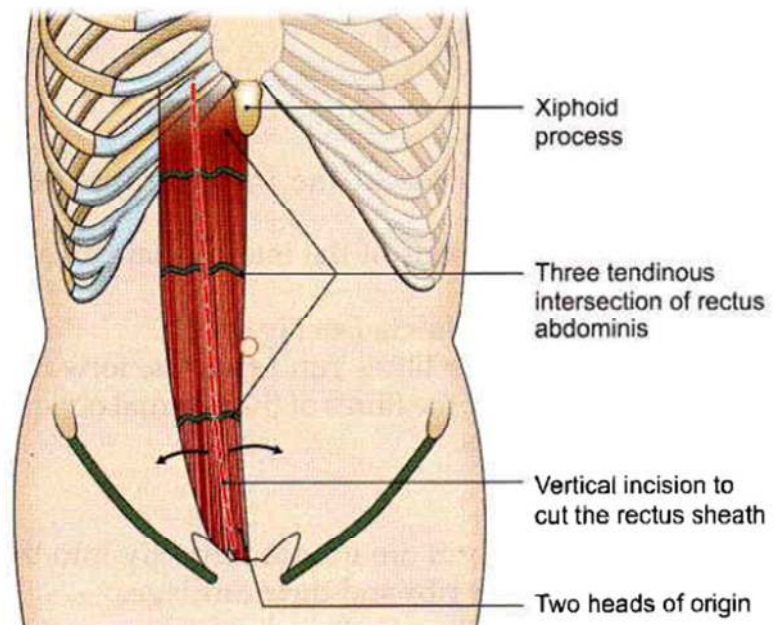
Lateral head – pubic crest.

- INSERTION – xiphoid process along the cutting in the order of 5,6,7 costal cartilages.

- ACTION – 1. Flexion of trunk.

2. rotation and lateral flexion of trunk.

- NERVE SUPPLY – Lower seven thoracic nerves.

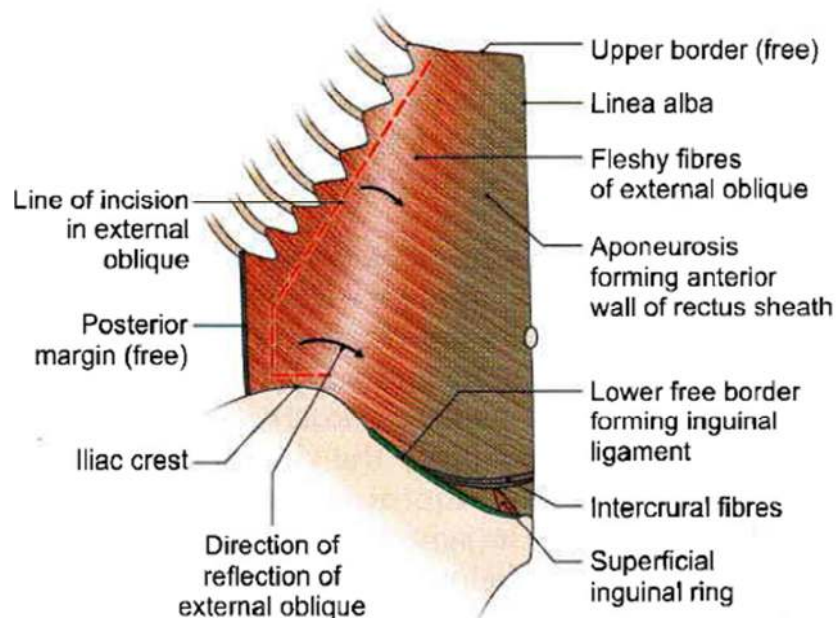


6. EXTERNAL OBLIQUE:

It is partly muscular and partly aponeurotic.

It forms the superficial inguinal ring , inguinal ligament and the anterior layer of the rectus sheath.

- ORIGIN – from the middle of shaft of lower eight ribs.
- INSERTION –
 1. as broad aponeurosis into xiphoid process, pubic symphysis, pubis crest, pectineal line of pubis.
 2. lower fibers are inserted into the outer lip of iliac crest.
- ACTION – same as that of rectus abdominis.
- NERVE SUPPLY – Lower six thoracic nerves.



II) RELATED NERVES:

1. Medial pectoral nerve
2. Lateral pectoral nerve
3. Nerve to serratus anterior
4. Thoracodorsal nerve
5. Intercostobrachial nerve

Medial pectoral nerve	C8 – T1	Supplies pectoralis major and minor
Lateral pectoral nerve	C5,C6,C7	Supplies pectoralis major and minor
Nerve to serratus anterior	C5,C6,C7	Supplies serratus anterior
Thoracodorsal nerve	C6,C7,C8	Supplies latissimus dorsi
Intercostobrachial nerve	Lateral branch of second intercostobrachial nerve	A small part of arm

➤ ARTERIAL SUPPLY:

The breast is mainly supplied by 3 arteries.

1. Internal mammary artery – 60%
2. Pectoral branches of axillary artery. – 30%
3. Intercostal arteries
4. Unnamed mammary branches.

1. Internal mammary artery:

It arises from the first part of subclavian artery.

It runs parallel along the lateral border of the sternum giving of the branches along the intercostal spaces and finally terminates as superior epigastric artery and musculophrenic artery.

Of these first three branches are larger compared to other perforator branches.

It is of importance in case of arterial supply of breast as it supplies 60% of the breast tissue mostly on the medial aspect.

It also plays an important role in micro anastomosis of free flaps for breast reconstruction and also as substitute vessel graft in CABG.

2. Axillary artery:

It continues from the subclavian artery.

It extends from the outer border of the first rib to lower border of teres minor.

After exiting the lower border of teres minor it continues as branchial artery.

It is divided into three parts by pectoralis minor.

First part – located proximal to the muscle.

Second part – located behind the muscle.

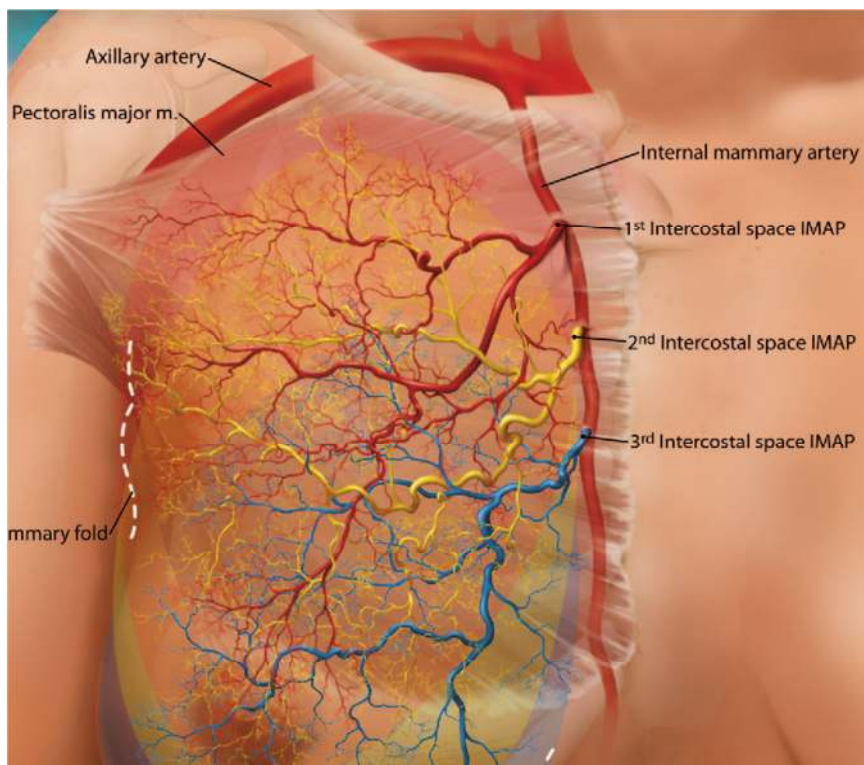
Third part – located distal to the muscle.

PARTS	BRANCHES
First part	Supreme thoracic artery
Second part	Thoracoacromial artery Lateral thoracic artery
Third part	Anterior circumflex humeral Posterior circumflex humeral Subscapular

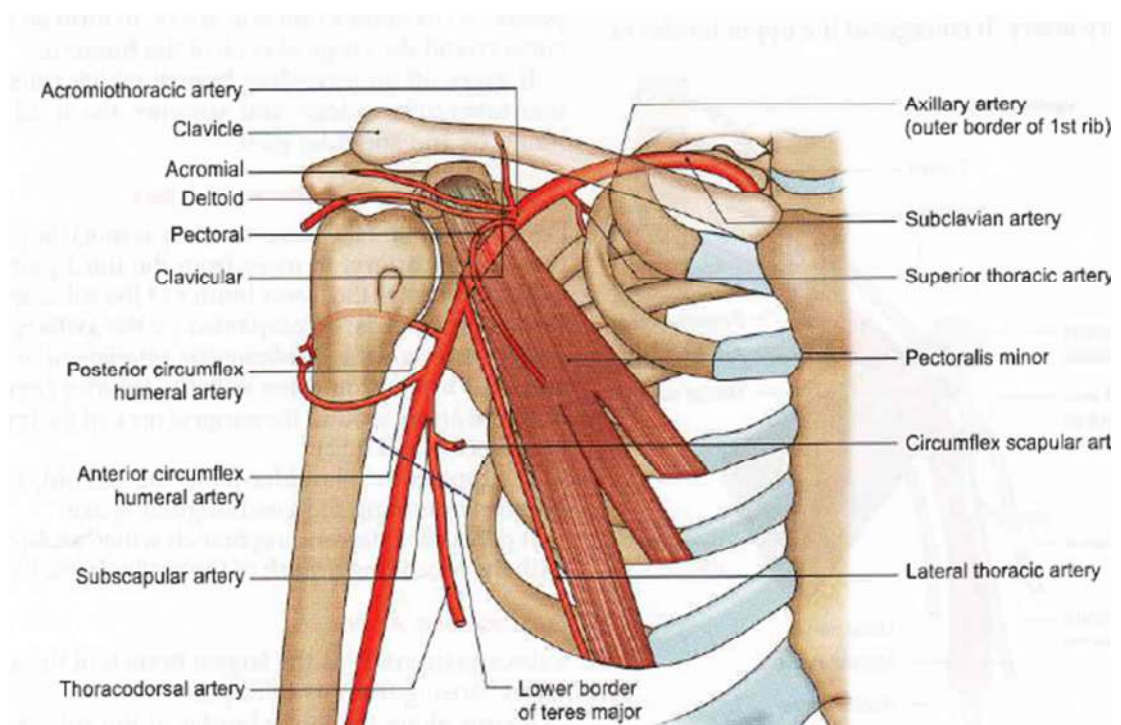
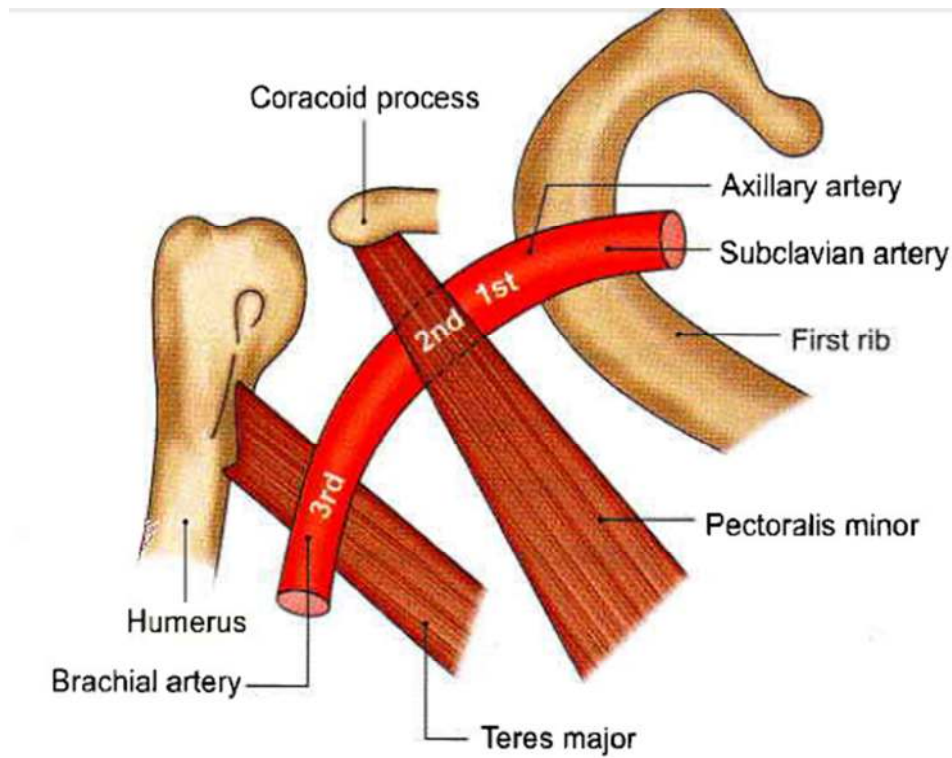
Of these branches the thoracoacromial artery is further divided into 4 branches

- a) Pectoral branch – supplies the lateral part of the breast.
- b) Deltoid branch – runs in the deltopectoral groove along with the cephalic vein.
- c) Acromial branch – forms anastomosis around acromian process.
- d) Clavicular branch – supplies the sternoclavicular joint and subclavius.

The second part of axillary artery further specific branches such as *pectoral branch of thoracoacromial and lateral thoracic artery* mainly supplies the breast.



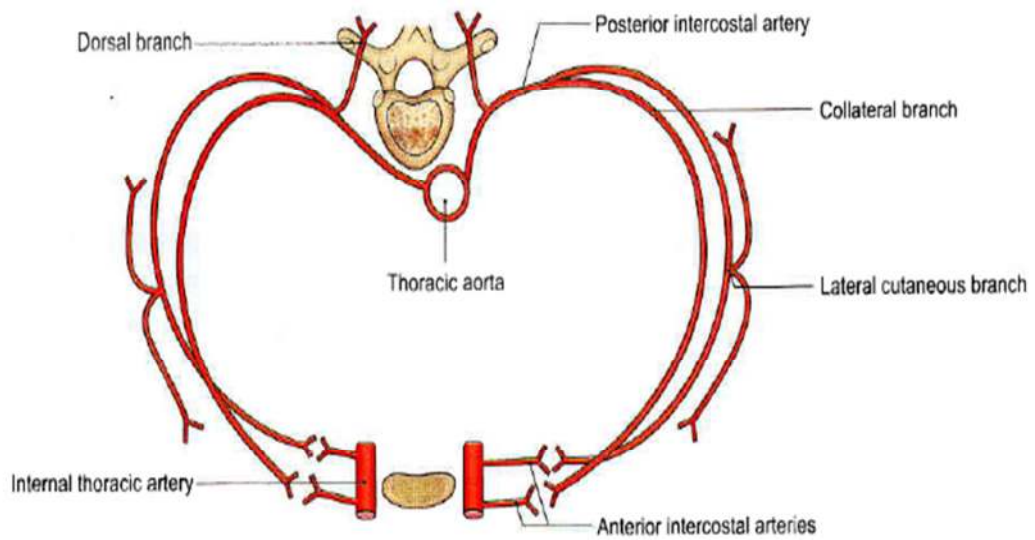
- a) Internal mammary artery



b) Axillary artery with its branches

III) Intercostal arteries:

It supplies the lateral part of the breast mainly by 3rd, 4th, 5th intercostal arteries. It is the lateral branch of the posterior intercostal arteries which supplies the breast.

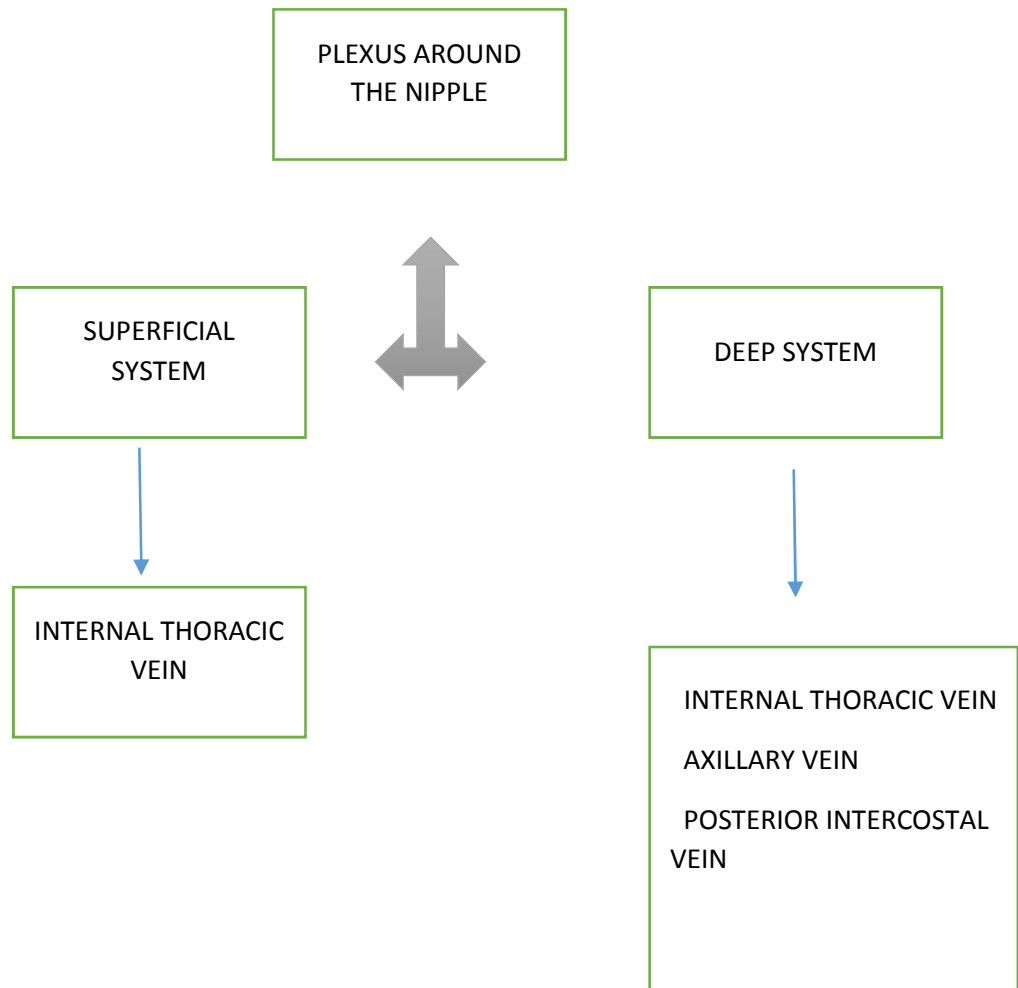


❖ VENOUS DRAINAGE:

The breast is drained by veins as follows:

- Into the Internal thoracic vein via perforating branches.
- Axillary vein
- Posterior intercostal vein

The venous system of the breast forms plexus around the base of the nipple which further divides into superficial and deep system.



LYMPHATIC DRAINAGE:

It is most important for the spread of carcinoma.

The nodal station that are involved in the lymphatic drainage of breast includes

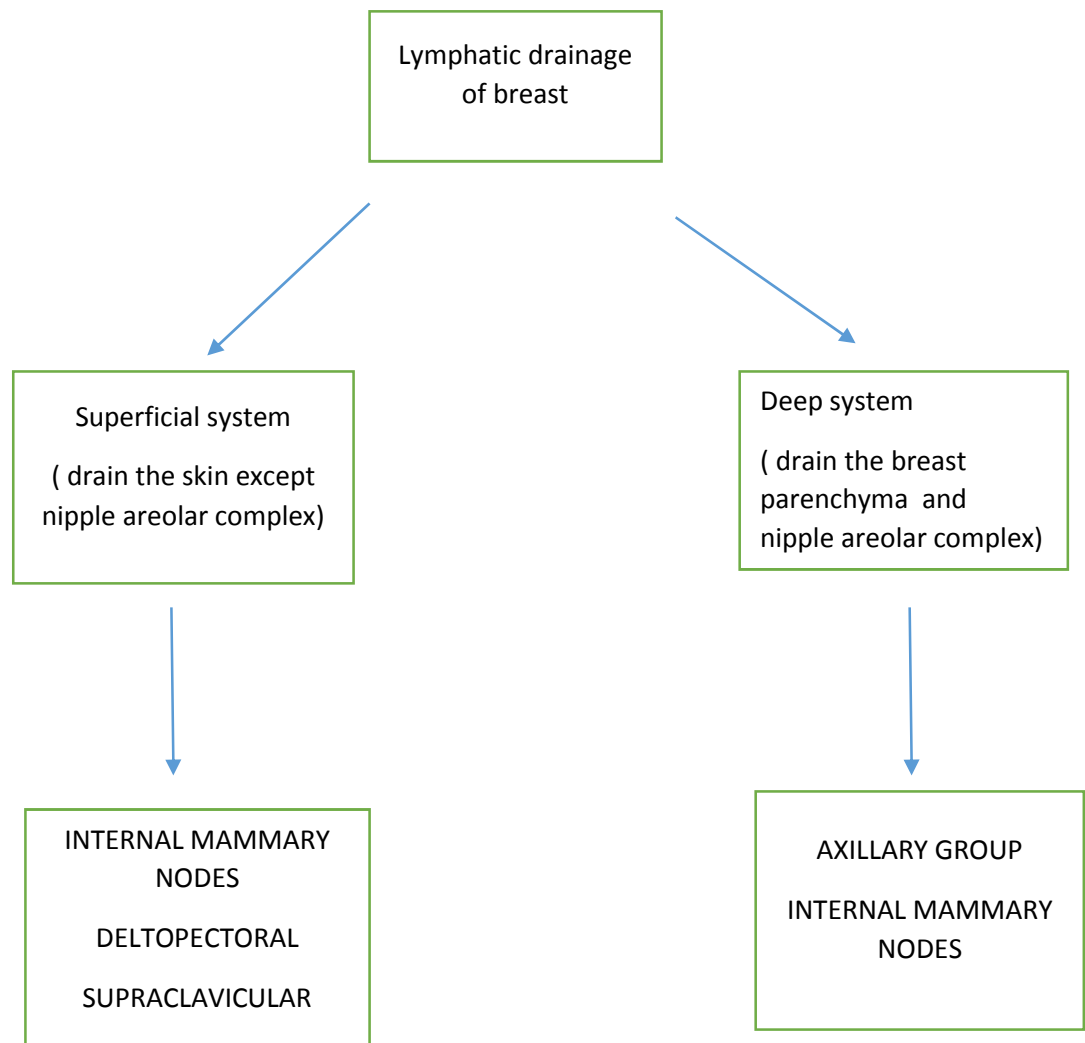
1. Axillary nodes.
2. Internal mammary group
3. Deltopectoral group
4. Supraclavicular group
5. Posterior intercostal group

Some of the lymphatic drainage of surgical importance:

- ❖ *Sub areolar plexus of Sappey:* they lie beneath the nipple areolar complex and drains into the axillary nodes. It is of surgical importance in case of sentinel lymph node biopsy.
- ❖ *Rotters node:* it is also known as interpectoral nodes. For staging purpose it is included in the axillary group. As the name indicates it is located between the pectoralis minor and major. It is one of the common nodes of recurrence.
- ❖ *Lake of Stiles:* it is the lymphatic plexus along the deep pectoral fascia. It receives communications from sappey lymphatic plexus.

❖ *Sub peritoneal plexus*: it is from the base of the breast which communicates with the lymphatic plexus of rectus sheath and also responsible for liver metastasis.

The lymphatic drainage of breast is further divided into superficial and deep lymphatic system.



1. INTERNAL MAMMARY NODES:

It is located in the parasternal region along the course of the internal mammary artery.

It is located from first to five intercostal region and are more concentrated in the first three intercostal spaces.

The nodes are fixed between the intercostal and pectoral muscles anteriorly and parietal pleura posteriorly.

Surface marking: within 2-3 cm of the lateral margin of the sternum.

Diagnosed clinically by widening of the mediastinum.

It receives lymphatic supply from central and medial quadrant of the breast and accounts for lymphatic drainage by 25%.

Causes of internal mammary node enlargement:

Carcinoma breast and lung.

Granulomatous lesions like silicosis.

Reactive adenitis.

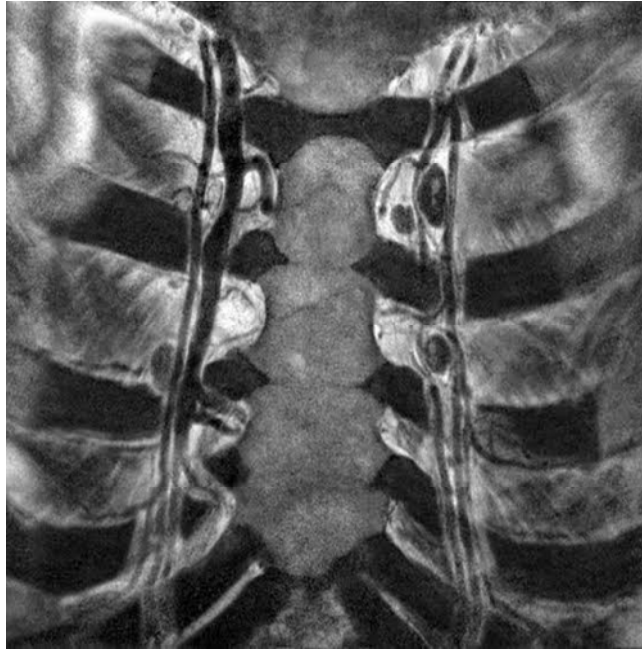
The nodal enlargement is better visualized by imaging modalities like contrast enhanced computed tomography scan , PET scan , MRI scan.

The node size of >5 mm in CECT is considered to be significant.

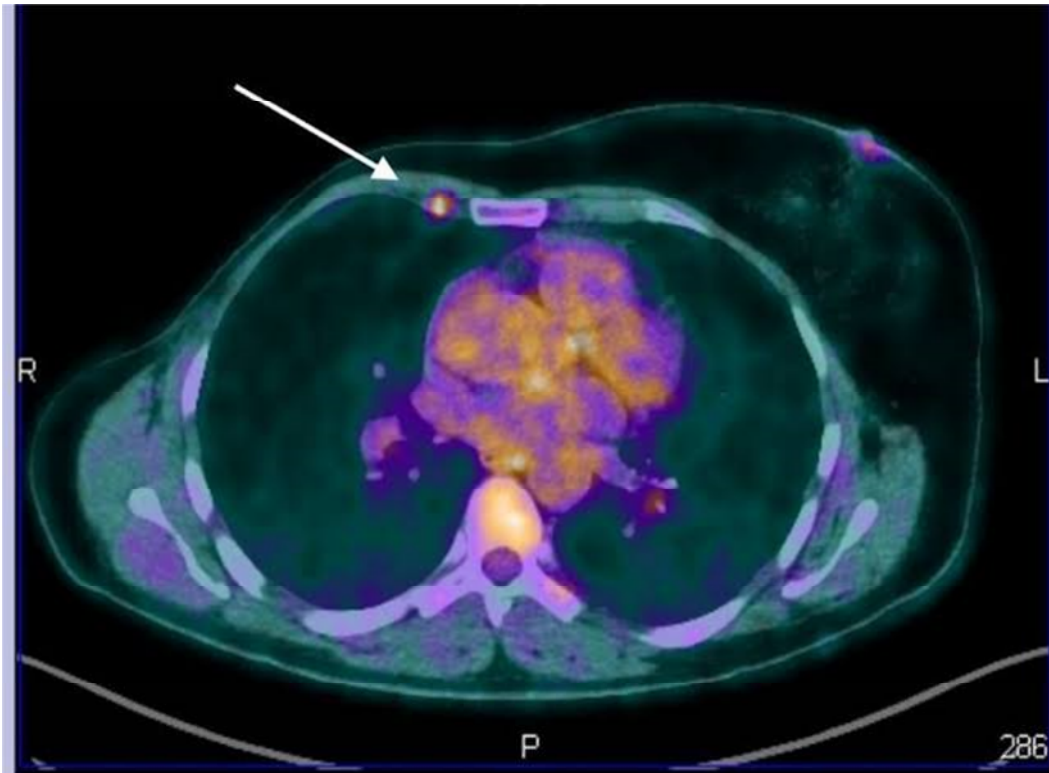
ULTRASONOGRAM	Hypoechoogenic lesion in parasternal area
CECT SCAN	Soft tissue enhancing lesion
MRI scan	Hyperintense lesion in the parasternal lesion
STIR imaging	short T inversion recovery
PET CT scan	Best modality for imaging



a) CT scan showing internal mammary nodes



b) MRI showing internal mammary nodes



c) PET CT showing internal mammary nodes.

2. AXILLARY NODES:

It is the main lymphatic drainage system of the breast. It accounts for about 75% of the lymphatic drainage. The axillary group is further divided on the basis of anatomy and surgical into the following groups

ANATOMICAL	SURGICAL - BERG'S LEVEL
<ul style="list-style-type: none">• Pectoral• Lateral• Central• Posterior• Apical	<ul style="list-style-type: none">• Level I• Level II• Level III

Anatomical groups:

1. *Anterior / pectoral group:*

These lie along the lateral thoracic vessels, along the lower border of pectoralis minor. They receive lymphatics from the upper half of anterior wall of trunk and majority of the breast.

2. *Lateral group:*

They lie along the upper part of humerus and is located medial to the axillary vein. They drain the upper limb.

3. *Posterior group:*

They lie along the subscapular vessels in the posterior fold of axilla. They drain the posterior wall of upper half of the trunk and from the axillary tail of breast.

4. *Central group:*

They lie in fat of axilla. They are in close relation to intercostobrachial nerve. They receive lymph from the preceding group into the apical group.

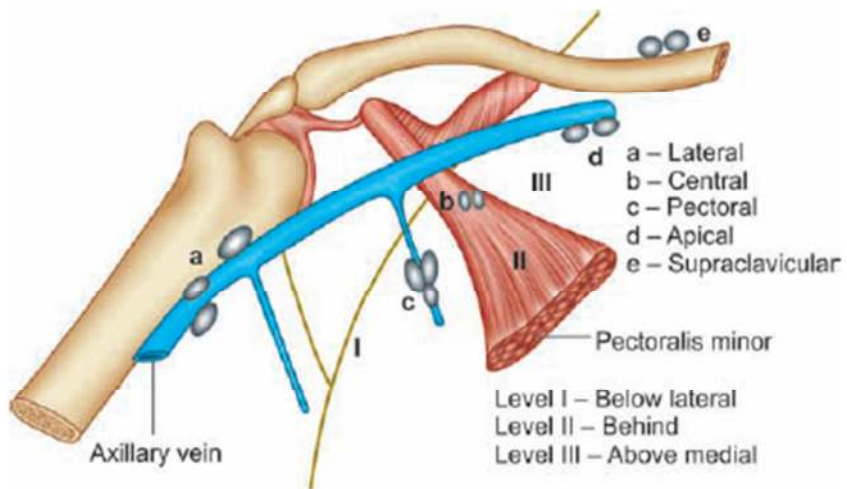
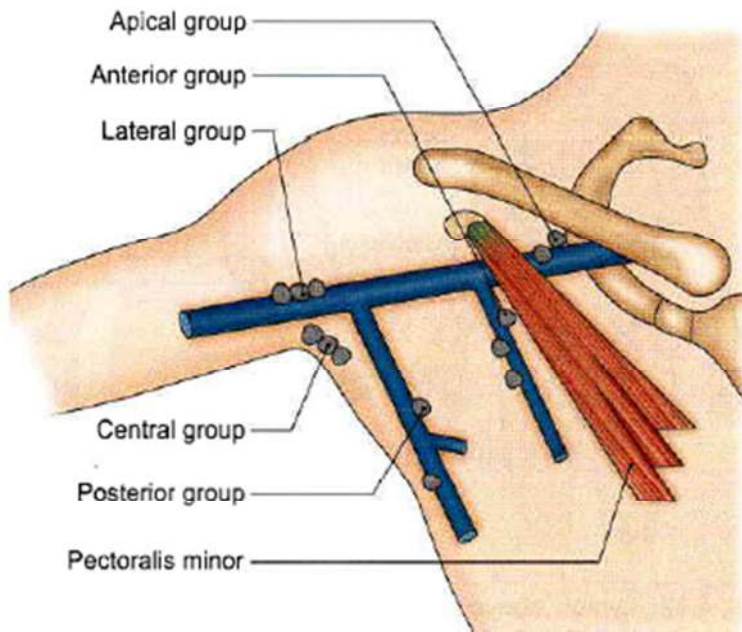
5. *Apical group:*

They lie deep to Clavipectoral fascia along the axillary vessels. They receive breast from the central group, from the upper part of breast and also from the thumb.

BERG'S level:

The nodal groups of axilla is divided by the pectoralis minor muscle into three groups.

LEVEL	RELATION TO PECTORALIS MINOR	NODES INCLUDED
I	Below and lateral	Anterior , lateral , posterior
II	Behind	Central
III	Above and medial	Apical (Halstead)



a) Axillary lymph nodes with levels

AXILLA:

It is a pyramidal shaped structure between the lateral chest wall and upper end of arm. It is important because it provides gateway through which the neurovascular bundles enter the upper limb from the neck. In case of carcinoma breast it is essential in case of enlarged lymph nodes due to lymphatic spread and also for dissection.

Parts of axilla:

- Apex
- Base
- Anterior wall
- Posterior wall
- Lateral wall
- Medial wall

❖ ANTERIOR WALL:

The anterior wall is made by the pectoralis major and deeper to it, pectoralis minor, clavipectoral fascia (the fascia covering of the muscle) and subclavius muscle in the order from below upward. The lateral thoracic vessels and anterior or pectoral group of lymph nodes are present inside this wall. The anterior axillary fold formed by lower margin of

pectoralis major muscle becomes prominent, when the arm is adducted against resistance.

❖ POSTERIOR WALL:

The posterior wall of axilla is made by subscapularis, teres major and latissimus dorsi muscles from above downwards. However, as the teres major and latissimus dorsi twist around each other, they come to lie in the same plane. The important relations of the posterior wall are subscapular vessels, subscapular and thoracodorsal nerves and posterior or subscapular lymph nodes. The posterior axillary fold is formed by the teres major and latissimus dorsi muscles and it becomes prominent, when the arm is adducted against resistance.

❖ MEDIAL WALL:

The medial wall of axilla is made by first four ribs with intervening intercostal muscles and the upper four digitations of serratus anterior muscle. The long thoracic nerve descends along the surface of serratus anterior muscle. The intercostobrachial nerve (lateral cutaneous branch of second intercostal nerve) pierces the serratus anterior to enter the axilla. As the nerve passes from medial to lateral side of axilla, it passes through the central group of axillary lymph nodes to join the medial cutaneous nerve of arm. Compression of intercostobrachial nerve due to enlarged

central lymph nodes gives rise to pain in its area of supply (upper medial side of arm including the floor of axilla).

❖ LATERAL WALL:

The lateral wall of axilla is the narrowest of all the walls and is formed by the bicipital groove of the humerus along with tendon of long head of biceps brachii and the conjoint tendon of coracobrachialis, short head of biceps brachii. The axillary vessels are closely related to this wall.

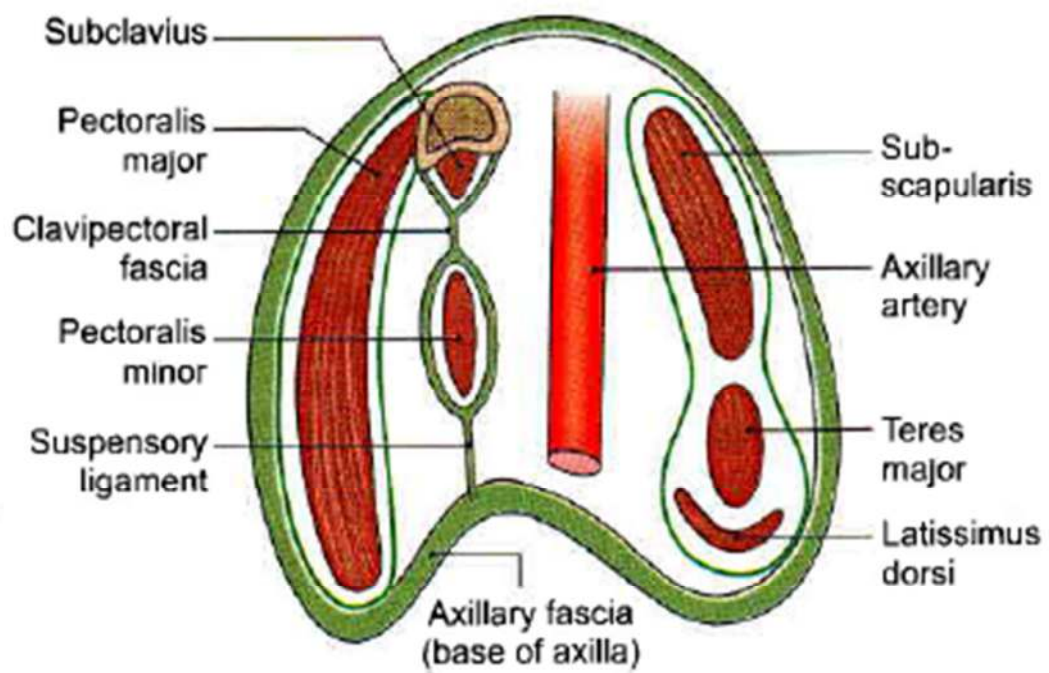
❖ BASE:

The base or the floor of axilla is composed of (from below upwards) the skin, superficial fascia and the dome-shaped axillary fascia. The axillary fascia is formed by the continuation of deep pectoral fascia. The axillary tail of Spence passes through the foramen of Langer in the medial part of axillary fascia to enter into the axilla. The suspensory ligament formed by the clavipectoral fascia keeps the base taut forming the contour.

❖ APEX:

It is also known as *cervicoaxillary canal*. It is the communicating passage between the axilla and the posterior triangle of the neck. The boundaries of the apex are the middle-third of clavicle anteriorly, the superior margin of scapula posteriorly and the outer margin of the first rib medially. The

structures like axillary vessels, cords of brachial plexus, long thoracic nerve and the subclavian lymph trunk pass through the apex into the upper limb.



a) Axilla with its boundaries.

THEORIES INVOLVING CARCINOMA BREAST:

There are three concepts of spread in the carcinoma breast.

1. Halstedian concept:

The spread of carcinoma in breast is in an orderly fashion from tumor to the nodes and then to the system. Hence he brought forth the theory that radical surgery initially may prevent the spread and recurrence.

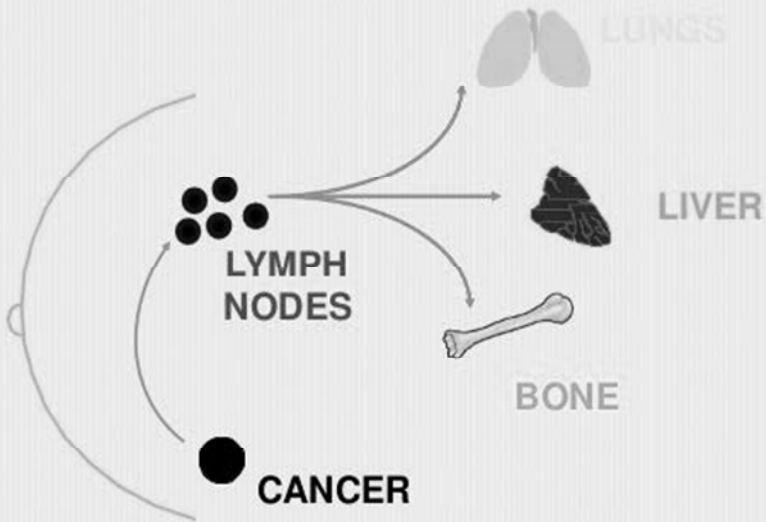
2. Fischer concept:

The spread is apparently systemic in the form of *micrometastasis* mostly. The nodal metastasis is most common in tumor < 1 cm.

3. Hellmann's spectrum concept:

The spread of carcinoma is in either ways i.e. it is both loco regional as well as systemic at the time of diagnosis.

HALSTED THEORY



RISK FACTORS OF CARCINOMA BREAST:

1. Positive family history – increases the breast cancer risk by 2- 3 folds.
2. Mammographic breast density of > 75 % - independent risk factor.

❖ DIETARY AND LIFE STYLE RISK FACTORS:

3. Obesity.
4. Alcohol consumption.
5. Diet poor in Vitamin C, folate, beta carotene.

❖ HORMONAL RISK FACTORS (RR < 2)

6. Early menarche.
7. Late menopause.
8. Late age at first term pregnancy.
9. Use of hormone replacement therapy.

❖ ENVIRONMENT RISK FACTORS (risk equal to BRCA mutations)

10. History of multiple X ray exposures.
11. History of irradiation for Hodgkin lymphoma.
12. History of area in atomic accidents.

❖ PRE MALIGNANT DISORDERS (RR 4-5)

13. Atypical ductal hyperplasia.
14. Atypical lobular hyperplasia.

❖ GENETIC PREDISPOSITION (RR 4-5)

15. BRCA mutations. – BRCA 1 and 2.

16. p53 mutation – Li Fraumeni syndrome.

17. PTEN mutation – Cowden syndrome.

BRCA mutations:

INHERITANCE – autosomal dominant

MOLECULAR SUBTYPE – triple negative cancer

<p>BRCA 1</p> <p>CHROMOSOME – 13</p>	<p>Breast</p> <p>Ovary</p> <p>Fallopian tube</p> <p>Pancreatic tumors</p> <p>Fanconi anemia</p> <p>Childhood solid tumors</p>
<p>BRCA 2</p> <p>CHROMOSOME – 17</p>	<p>Breast</p> <p>Ovaries</p> <p>Prostrate</p> <p>Increased incidence of male breast carcinoma</p>

Factors predicting increased risk of carcinoma:

- ❖ GAIL model.
- ❖ CLAUD model.
- ❖ BRCAPRO model.
- ❖ Tyrer – Cuzick model.

These models are used to predict the risk of occurrence of carcinoma in case of high risk patients.

Relative risk of risk factors:

RR < 2	RR 2- 4	RR >4
Early menarche	CHEK gene mutation	BRCA mutations
Late menopause	Proliferative breast	Proliferative breast
Nulliparity	disease	disease with atypia
Obesity	Mammographic breast	History of irradiation
Hormone replacement therapy	density	

HISTOLOGICAL SUBTYPES:

1. *Infiltrating ductal carcinoma:*

It is the most common subtype of carcinoma breast forming 75% of total carcinoma. It usually associated with ductal carcinoma in situ. It most commonly spread to axillary nodes and also systemic dissemination to bones, lungs, brain.

2. *Infiltrating lobular carcinoma:*

It is seen in around 5 – 10 % cases. The characteristics features of this variant is increased tendency for bilaterality, multicentricity. The characteristic histological feature is India file pattern. They mostly grow around lobes. These are known to spread to unusual sites of metastasis (meninges, serosal surface) in comparison to other variants. The prognosis is similar to that of ductal carcinoma.

3. *Tubular carcinoma:*

It is 2% common. It is diagnosed when the histology shows more than 75% tubule formation. It rarely metastasize to axillary nodes and is associated with good prognosis overall.

4. *Medullary carcinoma:*

It forms around 5-7%. The characteristic histology is syncytial growth pattern with lymphocytic infiltration. It has got no association with ductal carcinoma in situ. It has got favorable prognosis.

5. Colloid carcinoma:

It accounts for 3%. It is characterized by abundant mucin production.

They are usually slow growing and end in a bulky disease. It also has got a favourable prognosis.

The other rare variants include squamous cell carcinoma, apocrine,

The mixed variant has same prognosis that of invasive ductal carcinoma.

MOLECULAR SUBTYPES:

BASAL LIKE	ER / PR / Her2 neu - negative Commonly associated with BRCA 1 associated with poor prognosis
LUMINAL A	ER / PR - positive Her2 neu – negative Low Ki 67 proliferative index
LUMINAL B	ER/PR – positive Her2 neu – negative High Ki 67 proliferation index
Her 2 neu rich	ER / PR – negative Her 2 neu positive Higher chance for brain metastasis
LUMINAL ER - / AR +	Androgen receptors positive Responds to bicalutamide
CLAUDIN LOW	Triple negative with low e cadherin expression

SKIN INVOLVEMENT:

Peau d orange – due to obstruction of cutaneous lymphatics with ligament of Cooper attached to skin creating the dimpling representing orange peel skin.

Ulceration

Satellite nodules.

INFLAMMATORY CARCINOMA BREAST:

- Usually seen in pregnancy and lactation.
- Associated with poor prognosis.
- D/D – ACUTE MASTITIS.
- It is painful, with warmth and tenderness, ill defined margins.
- >33% / one third of skin involvement (*peau d orange*).
- Lymph node metastasis is more than 75 % at the presentation and distant metastasis with more than 25 % presentation.
- There is diffuse tumour embolization causing obstruction of subdermal lymphatics.

PAGET'S DISEASE:

PAGETS	ECZEMA
Unilateral	Bilateral
Post menopausal	Child bearing age
Itching absent	Itching present
Vesicle absent	Vesicle present
Underlying mass + in 30 %	No underlying mass
Nipple destruction +	No nipple destruction
Treatment is usually surgical	Treatment is usually medical

DUCTAL CARCINOMA IN SITU:

- It is labelled under **Tis**.
- Usually present as microcalcifications in mammogram and sometimes clinically as a mass.
- Only 4 % chance of lymph node metastasis.

LOW GRADE	Papillary, cribriform
HIGH GRADE	Solid , comedo

- They usually show high expression of e-cadherin.
- It may or may not associated with invasive carcinoma.
- *VAN NYHUS PROGNOSTIC INDEX* – used for treatment.
- The treatment options include:
 1. Breast conserving surgery.
 2. Total mastectomy.
- The indications of total mastectomy include:
 1. Score of 8 and above
 2. In pregnancy.
 3. Recurrent positive margins
 4. Larger tumour to breast ratio

LOBULAR CARCINOMA INSITU:

It is considered as a precursor lesion.

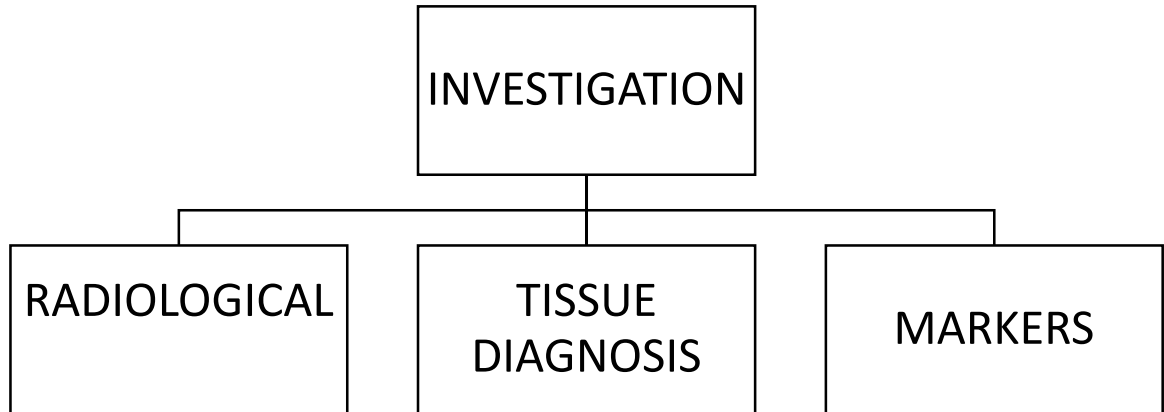
The characteristics features of LCIS are

1. Bilaterality
2. Increased incidence of multicentric and multi focal pattern.
3. INDIAN FILE PATTERN in histology.
4. Mammographically not detected with exception of *neighboring calcification* reported in few cases.

The treatment options include

- Life long surveillance.
- Prophylactic mastectomy
- Anti estrogen therapy.

INVESTIGATIONS:



I) RADIOLOGICAL:

1. MAMMOGRAM:

It differs from the normal X ray that is low voltage and high amperage.

The dose equals 0.1 Gy.

The voltage and amperage are 25 kV & 100 mA.

It is used both as a screening and diagnostic tool.

The hidden area is the retro areolar area in the mammogram.

TIMING – 5-7 DAYS AFTER MENSTRUATION

The various views taken in the mammogram are

Craniocaudal

Mediolateral

Mediolateral oblique

Modified Craniocaudal view (Cleopatra view).

The newer advancements in mammogram include

Digital mammogram – it gives clear images in comparison to conventional one.

3 D mammogram – provides a 3 D reconstruction.

Spot view mammogram – it is useful in stereotactic biopsy

Xero mammogram- it is taken over selenium plates, provides edge enhancement and is useful in dense breast.

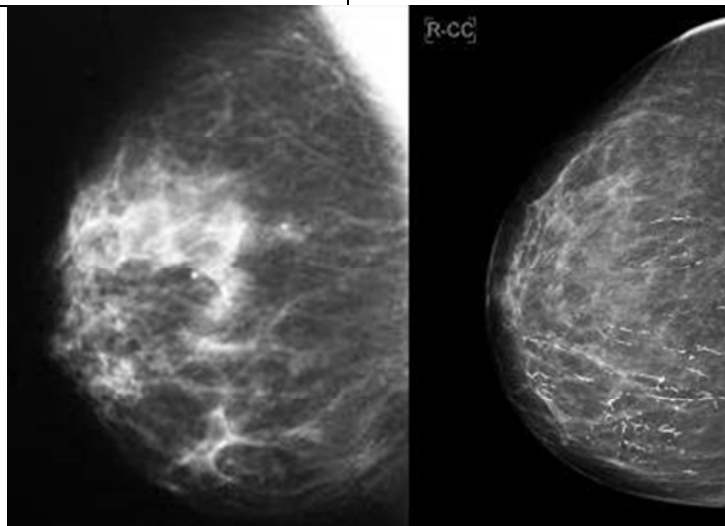
MAMMOGRAPHIC FINDINGS in CARCINOMA BREAST

Opacity	Ill-defined margins ,speculated margin, Comet tail , wide halo
Calcification	Micro calcification < 0.5 mm
Parenchyma	Architectural distortion
Nipple/ areola	Retracted / normal
Skin	Thickened
Cooper ligaments	Thickened, increased number
Retro mammary space	Obliterated

BIRADS – BREAST IMAGING REPORTING AND DATA SYSTEM

It is the worldwide accepted terminology for providing detailed evaluation and treatment protocol.

0	Need additional imaging
1	Negative
2	Benign
3	Probably benign Needs regular follow up 6 months
4	Suspicious of malignancy Biopsy is a must
5	Highly suggestive of Malignancy >95 % likelihood of cancer
6	Malignancy



ULTRASONOGRAM:

It is a non invasive tool providing many useful information with the experienced hands.

It is also used to detect the lesion's benign or malignant or cystic.

It is also used for guided tissue biopsy procedures.

It is the preferred early and easily available investigation in case of pregnancy and early lactation.

The features of

- *Malignancy* – irregular, ill defined, taller than wide, hypoechoic, non-compressibility, irregular posterior shadowing and the ratio of anteroposterior to mediolateral >1 .
- *Benign* – they are well defined, compressible, smooth, rounded with weak internal echoes.

MAGNETIC RESONANCE IMAGING:

It is the investigation of choice in the following conditions

- BRCA mutations.
- Positive family history
- Young female in whom the breast is more glandular.
- In case of breast implants.
- In case of scar to differentiate from recurrence.

➤ Pregnancy

POSITION – PRONE with both breast placed over the breast coils.

In case of gadolinium contrast the typical feature of carcinoma is rapid wash in and

Rapid wash out.

CONTRAST ENHANCED COMPUTED TOMOGRAPHY:

It is done for both chest and abdomen to rule out

1. Lung parenchymal involvement
2. Pleural involvement.
3. Muscle involvement.
4. Abdominal visceral involvement
5. Ovary and adrenal involvement.

PET CT :

It uses 18 FDG and is used to assess the treatment response following neoadjuvant chemotherapy and also recurrence and detects all metastasis.

THERMOGRAPHY:

It is not a very sensitive test and is based on the concept that the tumour has high basal metabolic rate compared to normal. The temperature readings are taken using various probe and report is arrived.

The other radiological investigations include

Ductogram – here only 0.2 ml dye is used.

Duct endoscopy – used in case of DCIS and invasive ductal carcinoma and is very difficult.

II) TISSUE BIOSPY:

These include

1. FNAC
2. CORE NEEDLE BIOPSY

1. Fine needle aspiration cytology (FNAC):

It was first devised by Martin and Ellis in the year 1930.

It mainly uses negative pressure for aspiration.

➤ PROCEDURE:

It is done with 23 gauge needle using a simple syringe under suction or FNAC aspiration special syringe (aspiration gun).the lump is being held firmly and the needle is inserted into the lesion to be diagnosed and with negative pressure being maintained continuous aspiration is done till adequate material for study is obtained. The suction pressure of 40 cm of H₂O is usually made for adequate aspiration. Needle with syringe is removed without negative pressure is considered the most important end step as it more prone for technical error. The material is smeared on a slide; the smear that is obtained is fixed using 100% alcohol. Cytology is studied after staining under low power and high microscopy.

The stains used for study are Papanicolaou , hematoxylin and eosin, Giemsa stains.

Up to a maximum of 2 repeat sample can be taken.

To ensure that the smear is adequate there must be at least six passes.

Advantages:

Results can be easily obtained in a short duration.

Disadvantages:

It cannot distinguish between in situ and invasive lesions.

Receptor status could not be obtained.

Hence now it is not used as a tool for diagnosis in the evaluation of carcinoma breast.

If FNAC repeated still remains inconclusive one must opt for tissue diagnosis like core needle biopsy and excision biopsy.

2. CORE NEEDLE BIOPSY:

It is currently the investigation of choice in the evaluation of carcinoma breast.

It has several advantages in comparison to FNAC

Advantages:

It provides tissue sample for detailed information.

It can distinguish between invasive and in situ lesion.

The receptor status can also be studied.

Disadvantages:

It takes time to obtain results.

It is painful procedure and requires local anesthesia.

➤ Procedure:

After obtaining consent from the patient about the procedure, the lesion to be biopsied is identified and fixed using hands. The skin is anaesthetized using local anesthesia most commonly used is 2% lignocaine. Using trucut gun or metal tissue biopsy needle after making a skin incision of around 3-5 mm the tissue is taken and is sent to the pathology for tissue biopsy and further study of receptor study. Usually after obtaining tissue it is localized with titanium wires and I¹²⁵ for visualizing under mammography.

For nonpalpable lesions the tissue sampling is done by :

1. Stereotactic guided biopsy:
2. MRI guided biopsy.
3. USG guided biopsy.

In the first two scenarios the patient is usually placed in the *swimmer's position* (prone position).

III) MARKERS:

1. Receptor status:

The receptor status that are commonly looked for is

- Estrogen receptor (ER)
- Progesterone receptor (PR)
- Her 2 neu

They are usually identified by immune histochemistry methods.

The tissue sample obtained is usually fixed with formalin or paraffin embedded.

If these are positive it implies that the hormonal treatment is beneficial to the patient.

The scoring systems of the IHC for ER/PR status includes:

1. H score – the cut off point is made >100 .
2. Quick score – a score 1 to 3 is given and then it is summed to maximum of 7.
3. Allred score – positive is $>10\%$

The Her 2 /neu status is assessed by IHC / FISH / insitu hybridization.

The score made

0 to 1+ - negative

2 + - borderline

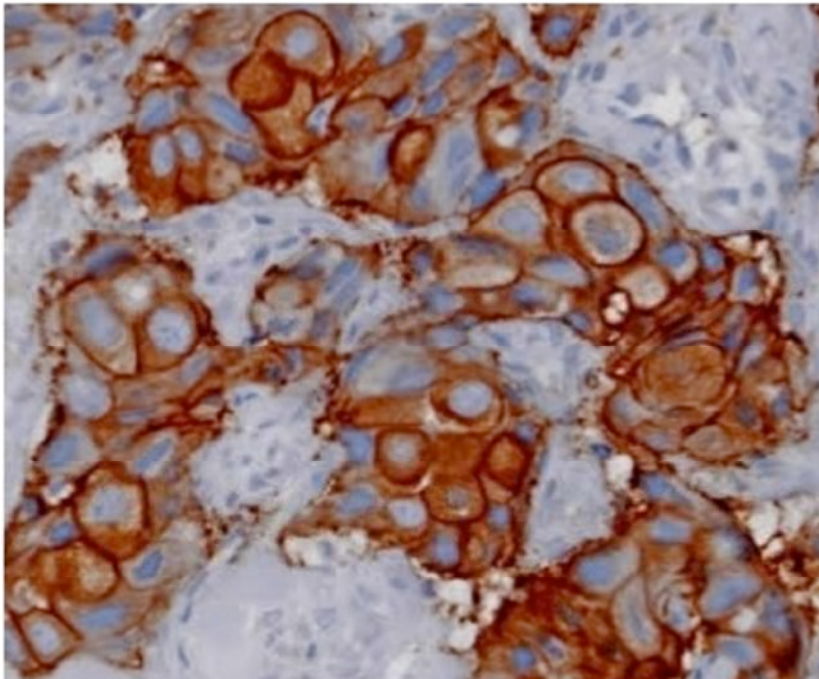
3+ - positive

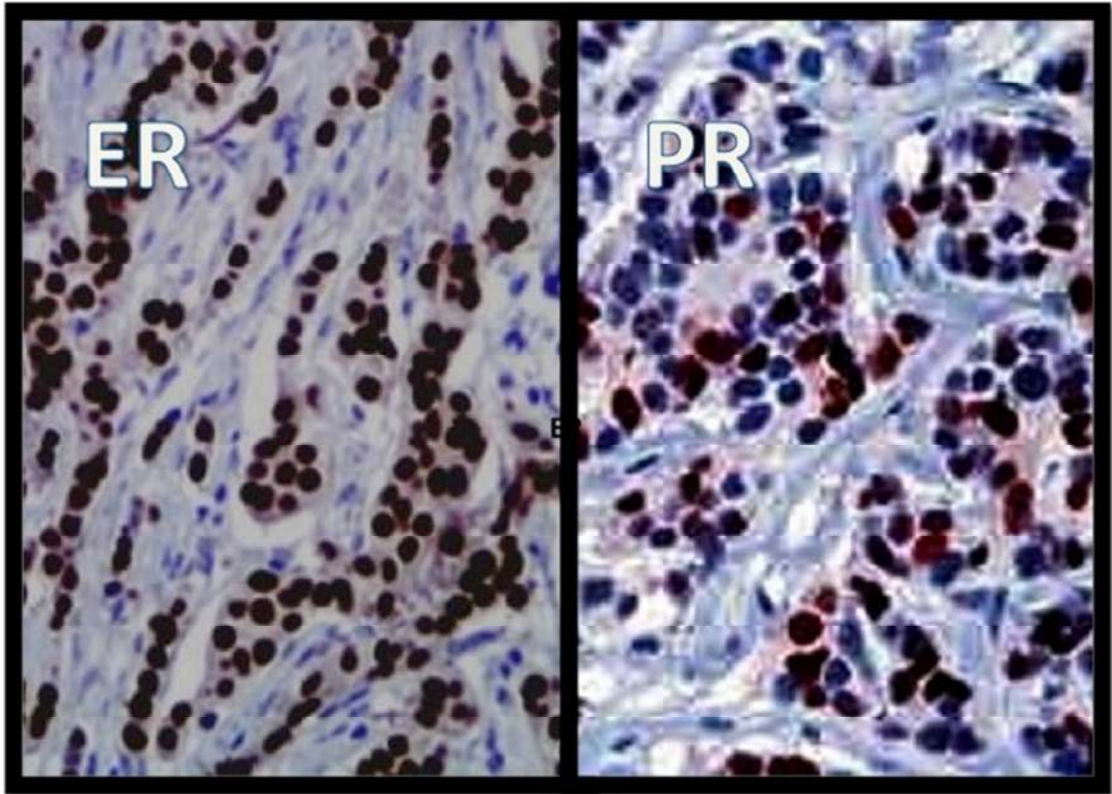
For borderline lesion - FISH is instituted.

The others that are used are

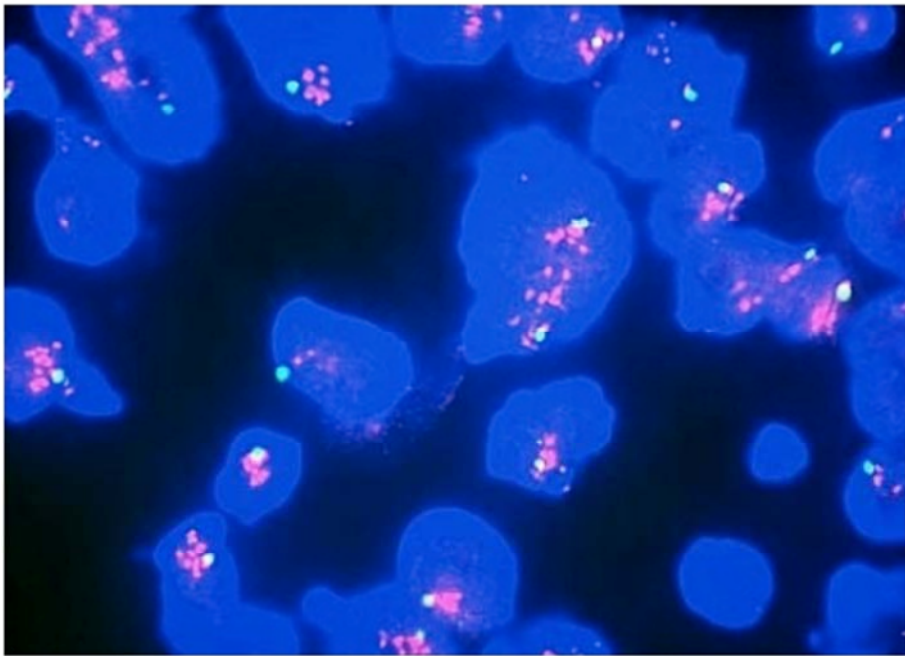
- Tumor markers – CA 15/3 , CEA
- Cathepsin
- S phase
- Ploidy
- Ki 67 – proliferative index
- Urinary aeticholanolone.
- Urinary hydroxyproline.
- Serum alkaline phosphatase.
- Gamma glutamyl transferase.

1- Her2 neu – IHC:





2- ER / PR status.



3 – Her2 neu - FISH

TNM STAGING:

T : PRIMARY TUMOUR	
Tis – DCIS / Paget ‘s	
T1 – size < 2cm	
T2 – size 2 – 5 cm	
T3 - > 5 cm	
T4a – extension into the chest wall	
T4b – edema / ulceration / satellite nodules.	
T4c – both T4a & T4b	
T4d – inflammatory carcinoma	
N : lymph nodes	
N1- metastasis to ipsilateral level I , II	
N2a – fixed or matted level I , level II	
N2b – metastasis to internal mammary nodes with absent axillary nodes.	
N3a – metastasis to ipsilateral infraclavicular nodes	
N3b – metastasis to ipsilateral axillary & internal mammary nodes.	
N3c – metastasis to ipsilateral supraclavicular nodes.	
M – metastasis	
M0 – no metastasis	M1 – distant
metastasis	

STAGING:

STAGE 0	TIS	N0	M0
Stage IA	T1 ^a	N0	M0
Stage IB	T0	N1mi	M0
	T1 ^a	N1mi	M0
Stage IIA	T0	N1 ^b	M0
	T1 ^a	N1 ^b	M0
	T2	N0	M0
Stage IIB	T2	N1	M0
	T3	N0	M0
Stage IIIA	T0	N2	M0
	T1 ^a	N2	M0
	T2	N2	M0
	T3	N1	M0
	T3	N2	M0
Stage IIIB	T4	N0	M0
	T4	N1	M0
	T4	N2	M0
Stage IIIC	Any T	N3	M0
Stage IV	Any T	Any N	M1

TREATMENT:

SURGERY	CHEMOTHERAPY HORMONAL	RADIATION
<ul style="list-style-type: none">• BREAST CONSERVING• MASTECTOMY	<ul style="list-style-type: none">• AC followed by TAXANES.• tamoxifen• transtuzumab	<ul style="list-style-type: none">• APBI• conventional

➤ SURGERY:

1. BREAST CONSERVING SURGERY:

Indications:

1. Tumor < 4cm
2. Unicentric
3. Adequate tumor to breast ratio
4. Patient available for follow up
5. Patient willing for radiation.

Contra indications:

1. Extensive in situ component.
2. Pregnancy
3. Collagen vascular disease.
4. Inadequate breast to tumor ratio.
5. Tumor > 4 cm.
6. Multicentric.
7. Not willing for follow up.

The treatment part consists of wide local excision with 1 cm clearance followed by radiotherapy. Here the boost to the tumor bed is 1000 cGy.

Don't in BCS :

No flap to be raised.

No drain

Do not obliterate cavity.

Pectoral fascia not fascia not opened.

QUART THERAPY:

It was introduced by Veronesi from Italy. It includes lumpectomy with a clearance of 2-3 cm with separate incision for axillary dissection and radiotherapy to the tumor bed.

SENTINEL LYMPH NODE BIOPSY:

In case of T1/2 lesion - *sentinel lymph node biopsy* is done.

It is the first draining node of the breast. It was opted first by *Dr. Giuliano* and hence the node is named in respect to his contribution as *Giuliano node*.

Contra indications of SLNB are:

1. Allergic to dye
2. Clinically palpable nodes.

The dyes used are

- Technetium labelled albumin
- Isosulphan blue
- Technetium labelled Sulphur colloid.

The timing of the injection is intra operative or on the morning of the surgery and on the night before the day of surgery. The latter two is employed for isotope study.

In case of radioisotope the *gamma camera* is used for assessment of radioactivity.

Injection methods:

It is either *peritumour* or *around the areolar* so that it drains by Sappey's plexus.

For axilla:

The axillary approach is made via the separate incision between the pectoralis major and latissimus dorsi muscle. It is either horizontal or along the pectoralis minor muscle.

For internal mammary node:

It is done either as same incision in case if mastectomy is performed or through a separate horizontal incision inn the parasternal space if breast conserving surgery is performed. Here the gamma probe is of more use for localization of internal mammary nodes.

Around 2-3 nodes are removed and send in paraffin blocks or saline gauze and is studied.

The metastasis is labelled as

Micro < 2 mm

Macro > 2 mm

Isolated tumor nest – few scattered tumor cells.

MASTECTOMY:

The indications of prophylactic mastectomy include

- BRCA gene mutations
- LCIS

The technique employed for this are nipple sparing mastectomy where the nipple is retained and the breast volume is immediately replaced by either implant or flaps.

NAME	STRUCTURES REMOVED
Simple	Only the breast is removed
Extended simple	Breast along with level I node is removed
Modified radical	Breast with level I and level II axillary nodes are removed.
Halstedt radical mastectomy	Breast, pectoralis major , pectoralis minor , serratus anterior , subclavius , level I to III nodes are removed
Extended radical mastectomy	Radical mastectomy + internal mammary nodes removal
Super extended mastectomy	Extended mastectomy + supraclavicular node removal
Toilet mastectomy	It is done in case of ulcerative lesion of the breast

The structures removed in Halsted radical mastectomy are

- Breast
- Level I to III nodes
- Pectoralis major and minor
- Subclavius
- Serratus anterior
- Few fibres of external oblique and rectus abdominis

The structures preserved are:

RADICAL	MODIFIED RADICAL
<p>Axillary vein</p> <p>Nerve to serratus</p> <p>Cephalic vein</p>	<p>Axillary vein</p> <p>Nerve to serratus</p> <p>Nerve to latissimus dorsi</p> <p>Medial and lateral pectoral nerve</p> <p>Cephalic vein</p>

The various modifications of modified radical mastectomy include,

Patey's modification: here the pectoralis minor is cut at its origin

Scanlon modification: here the pectoralis minor is divided.

Auchincloss modification: here the pectoralis minor is retracted.

The various incision used commonly are :

- Stewart
- Modified Stewart
- Classical Orr
- Modified Orr

The other incision that are of less importance are Kocher, Greenough and Grey.

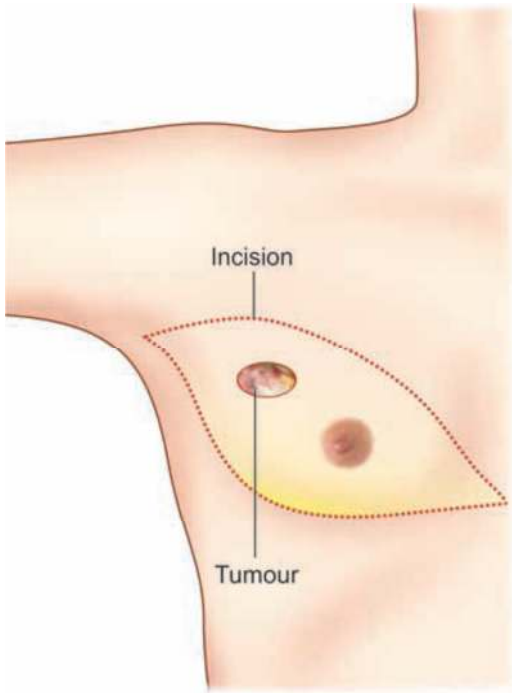
The boundaries of axillary dissection are

Superolaterally – axillary vein

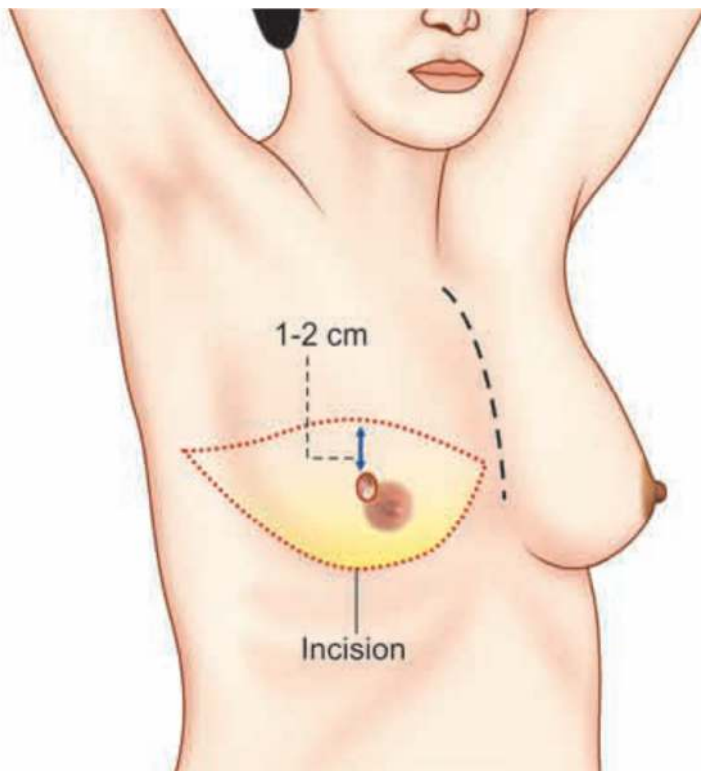
Laterally – anterior border of latissimus dorsi

Medially – pectoralis minor

Inferiorly - angular vein.



a) Orr incision



b) Stewart incision

II) CHEMOTHERAPY:

The methods of chemotherapy are

1. Adjuvant after surgery
2. Neo adjuvant before surgery
3. Palliative - in case of stage IV.

The indications of chemotherapy includes

- Size of >0.5 cm in case of pre menopausal and >1 cm in case of post menopausal.
- Node positive
- Poor prognostic factors like vascular and lymphatic invasion, poorly differentiated, high nuclear grade.

The various regimens are

- CMF – cyclophosphamide + methotrexate + 5 fluorouracil.
- CAF – cyclophosphamide + Adriamycin + 5 fluorouracil.
- AC + Taxanes – Adriamycin + cyclophosphamide + paclitaxel.

The latter is the most commonly used one.

The response to neo adjuvant chemotherapy is labeled as

1. Complete response – complete resolution of tumor
2. Partial response - $>50\%$ reduction in size
3. non responder - $< 50\%$ reduction in size or 25% increase in size
4. Progressive - $>25\%$ increase in size.

❖ HORMONAL THERAPY:

The various therapy used are

1. anti estrogens. – tamoxifen, raloxifene
2. aromatase inhibitors
3. targeted therapy like bevacizumab , sunitinib.
4. progestogens – medroxyprogesterone.
5. Inj. Testosterone.
6. LHRH agonist

TAMOXIFEN:

It is a type of selective estrogen receptor modulator (SERM).

It is antagonist at breast and agonist to all other areas.

Its half life is 7 days.

It takes 4 weeks to take action.

The dose is 10mg bid for 5 years.

The side effects include increased sweating, hot flushes, endometrial carcinoma, deep vein thrombosis, cerebrovascular accident, transient ischemic attacks.

LETROZOLE:

It is non steroidal competitive inhibitor of aromatase enzyme.

It is responsible for conversion of peripheral fat into estrogen.

It is useful in post menopausal age group.

The others include exemestane , anastrozole.

The most important side effect is osteoporosis.

Hence it is usually combined with bisphosphonates.

TRANSTUZUMAB:

It is a monoclonal antibodies against the Her2 neu receptor.

It is a cardio toxic drug hence should not be combined with Adriamycin as both are cardio toxic.

It is used as 2mg/day for 1 year as maintenance.

LAPATINIB – a second generation which is acts against both epidermal growth factor and also Her2 neu. It also crosses blood brain barrier hence useful in metastatic disease.

III) RADIOTHERAPY:

Dose – 5000 – 6000 cGy

Indications

T3/ T4 lesions.

Positive margins

After breast conserving surgery

>1 positive axillary node

Inadequate node dissection

The site covered include breast , axilla , internal mammary area, supra and infra clavicular area.

Accelerated Partial Breast Irradiation:

It is used in conjunction in breast conserving surgery.

The advantage of this is there is decreased incidence of pneumonitis , lung fibrosis, lung cancer and decreased dose to normal tissue.

The principle is to treat the lumpectomy bed along with 2-3 cm of normal breast tissue.

The dose used is 34 Gy x 5 days.

The technique used are multicatheter brachytherapy, balloon catheter , IORT.

For the internal mammary node:

The use of normal two dimensional conformation of radiation provided increased risk to lung and heart injury. Hence it has been implied to use tangential beam irradiation and also using three dimensional CT conformation to ensure safety to the lung and heart.

PROGNOSTIC FACTORS:

TUMOUR FACTORS	HOST FACTORS
Nodal status	Age
High grade	Menopausal status
Vascular and lymphatic invasion	Family history
DNA status (ploidy , S phase)	Previous history of breast cancer
Tumour size	Nutrition
Hormone receptor status	Immunosuppression
Pathological stage	Prior chemotherapy
	Prior radiation

For guiding / individualizing treatment plans:

The gene assays used are

- Oncotype Dx
- MammaPrint
- PAM 50

PROGNOSTIC INDICATORS:

- Van Nuy's prognostic index - DCIS
- Nottingham prognostic index.

Van Nuy's prognostic index for DCIS			
Score	1	2	3
Size in mm	<15 mm	15–40 mm	>40 mm
Clearance in mm	>10 mm	1–10 mm	<1 mm
Grade and necrosis	not high grade	not high grade	high grade
	No necrosis	Necrosis present	Necrosis present
Total score is 9			
Score 3–4 conservative breast surgery (wide local excision)			
Score 5–7 conservative surgery + Radiotherapy			
Score 8–9 total mastectomy			

Nottingham Prognostic Index (NPI): (0.2 × Tumour size in cm) + Lymph node stage + Tumour grade
 NPI score—<3.4 Good prognosis with 80% survival (15 years)
 NPI score—3.4–5.4 Moderate prognosis with 40% survival
 NPI score—>5.4 Poor prognosis with 15% survival

CLINICAL STUDY

Aim and objective

Material and methodology

Observation and results

Discussion

Conclusion

AIM :

The aim of this study is to assess the incidence of internal mammary nodes in response to various quadrants and various stages of carcinoma breast in contrast enhanced computed tomography scan.

MATERIALS AND METHODOLOGY:

TOPIC:

**A STUDY TO ASSESS THE INCIDENCE OF INTERNAL
MAMMARY NODES IN RESPONSE TO VARIOUS QUADRANTS
AND VARIOUS STAGES BY CT SCAN IN CARCINOMA
BREAST**

SOURCE OF DATA:

Patient admitted at GMKMCH in General Surgery department.

INCLUSION CRITERIA:

All patients with clinical and investigatory support for the diagnosis and willingness for evaluation of carcinoma breast

Nodes are considered positive >5 mm.

EXCLUSION CRITERIA:

1. Patient not willing for participation.
2. Patients on neo adjuvant chemotherapy
3. Recurrent disease.

STUDY DESIGN:

Prospective Clinical study.

STUDY PERIOD:

2 years.

PLACE OF STUDY:

GMKMCH SALEM.

SAMPLE SIZE:

30 cases of carcinoma breast.

ETHICAL COMMITTEE CLEARANCE

Obtained from Institutional Ethical Committee.

STUDY METHODOLOGY:

All the patient that come under the inclusion criteria were selected and the patient were excluded according to the exclusion criteria.

The patient's details such as

Age

Sex

Duration of symptoms

Detailed clinical examination

Radiological investigations.

are registered and entered in the master chart.

The internal mammary nodes of size > 5 mm in size were considered positive and were taken into the study.

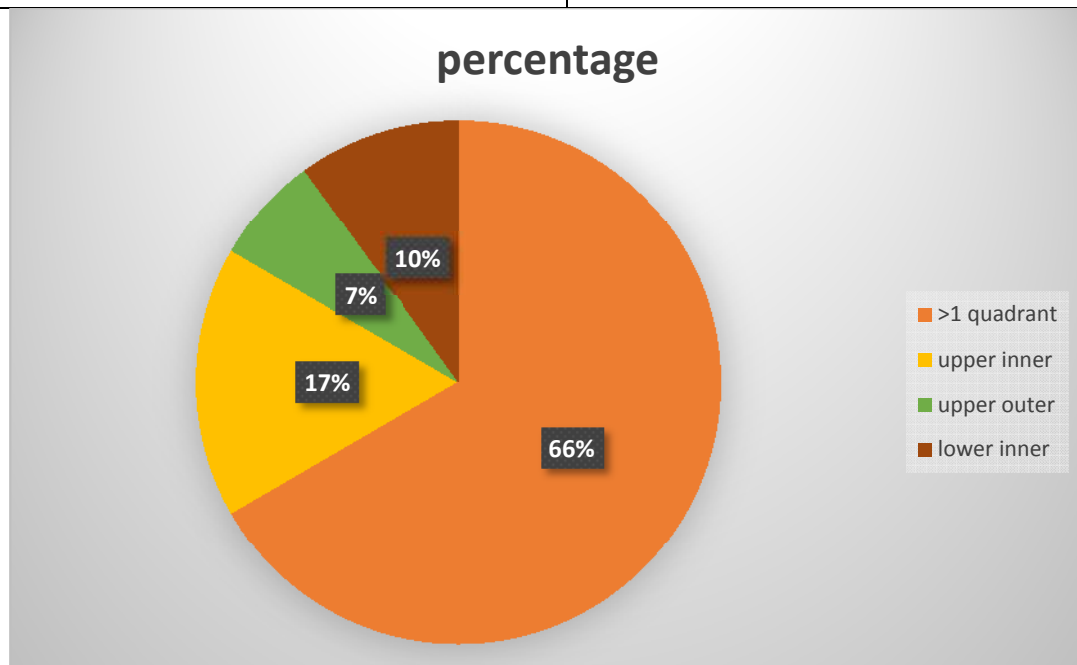
OBSERVATION & RESULTS:

The following observations were made and were listed

Of the 30 patients that were observed,

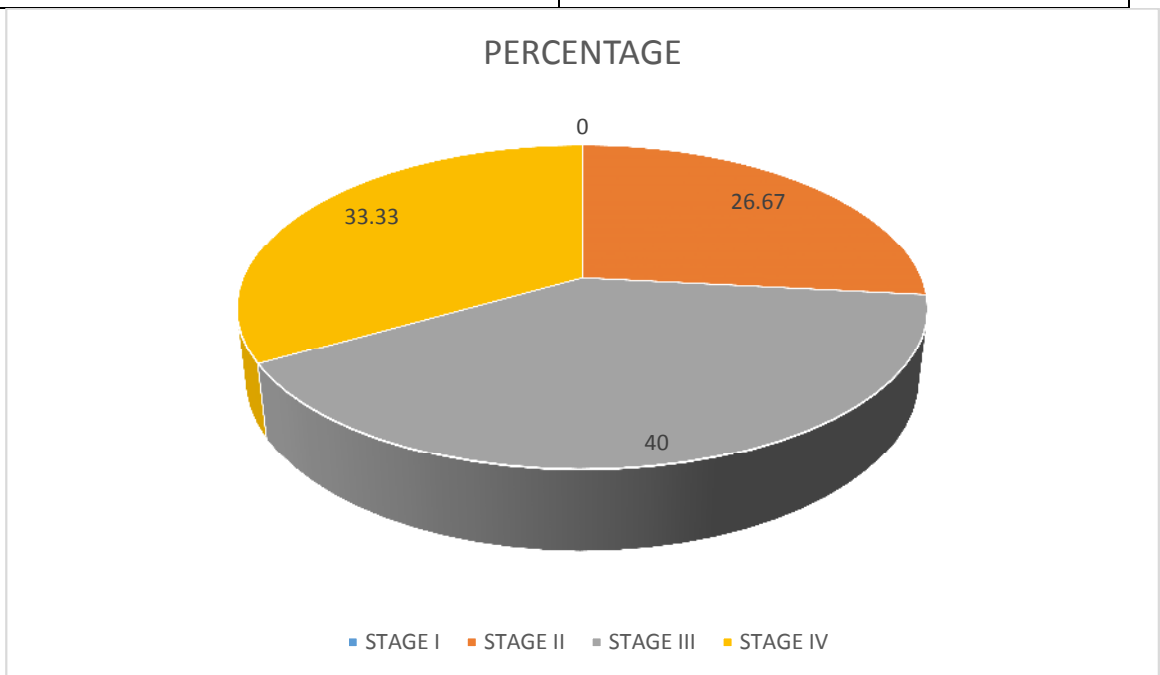
- a) The percentage of internal mammary node positive in response to various quadrants of carcinoma breast.

Involving more than one quadrant	66.67 %
Upper medial / inner	16.67%
Upper lateral / outer	6.67%
Lower medial / inner	10%
Lower lateral / outer	-



b) incidence of internal mammary nodes in response to various stages:

Stage I	-
Stage II	26.67%
Stage III	40%
Stage IV	33.33%



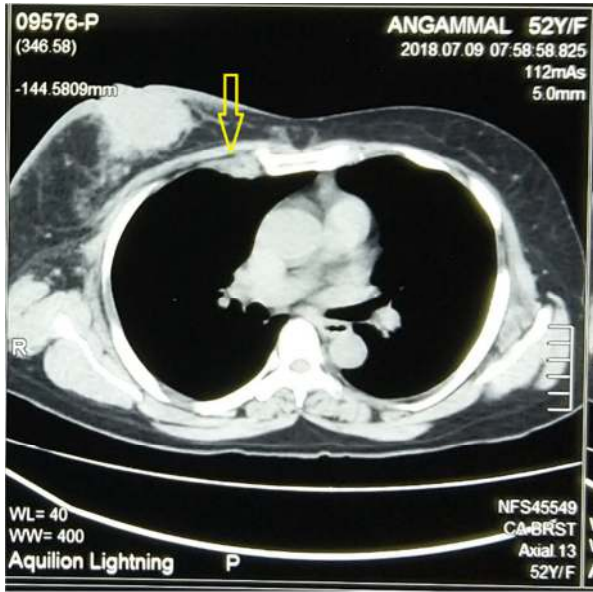
QUADRANTS:

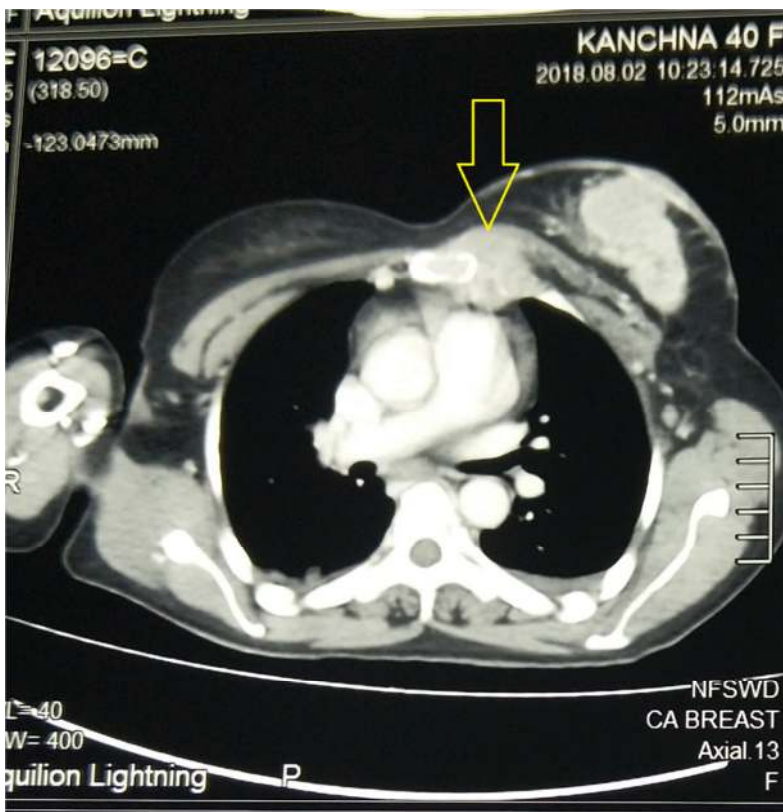
In comparison of the whole, the node positivity was obtained in about 70% of cases in tumor involving more than one quadrant (T3 /T4) lesions and hence cannot be categorized into any specific quadrants.

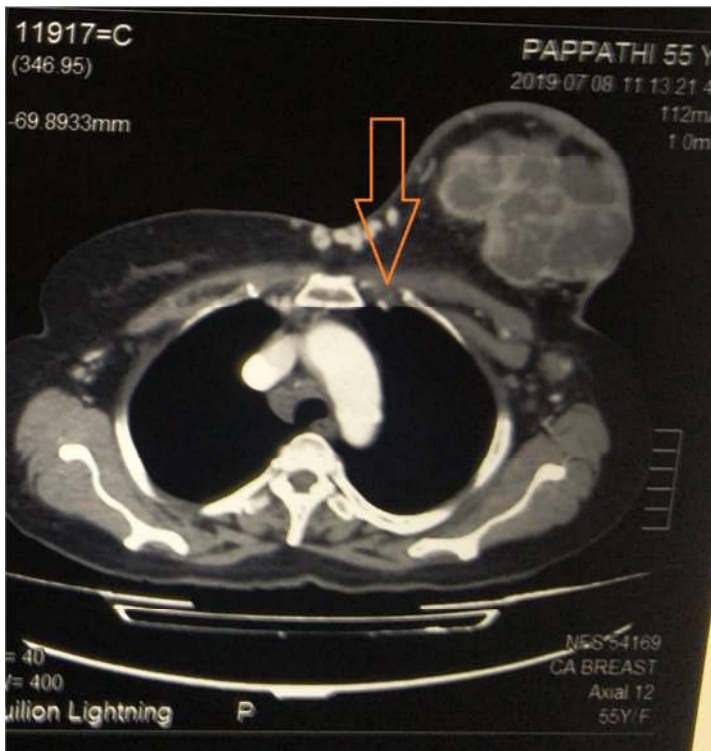
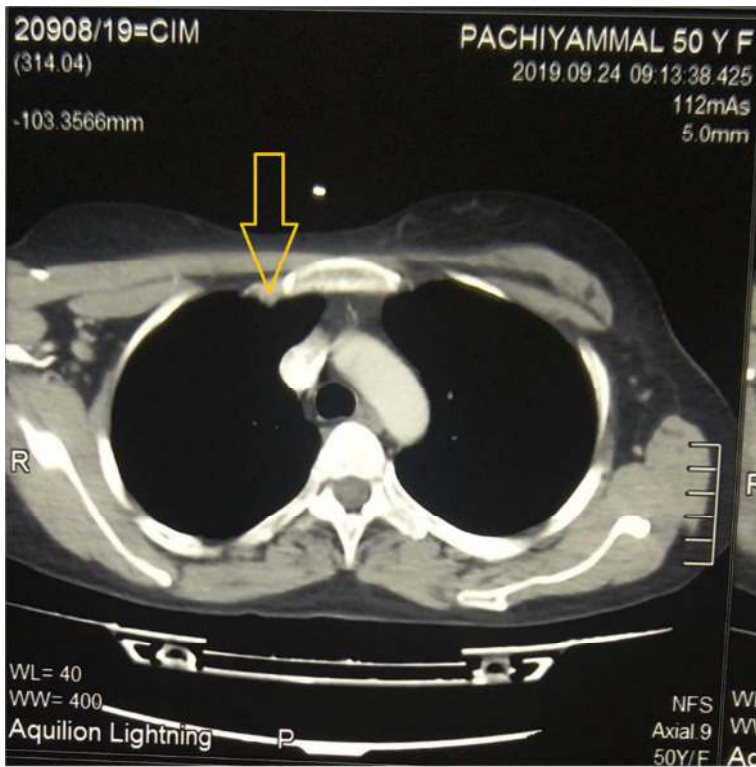
Of these isolated quadrants for which node were positive, the upper medial /inner quadrant has highest incidence of 17% in terms of percentage comparison to others.

STAGE:

In terms of stage: The incidence was high in response to stage III lesion (40%) overall followed by stage IV lesion.











DISCUSSION:

The presence of internal mammary nodes as metastatic lesion in correspondence with carcinoma breast is often overlooked due to the most common spread being the axillary nodes. But the diagnosis of internal mammary nodes positivity may directly shift the patient's stage of the disease to higher stages (stage III) and also changes the treatment protocol from the surgery to neo adjuvant chemotherapy.

PET/CT and MRI is the investigation modality in the easy identification of internal mammary nodal metastasis. This study is employed to see the effect of contrast enhanced computed tomography scan in the diagnosis of nodal metastasis.

Keeping all this into account this study was undertaken with a sample size of 30 patients with node positivity in the patients admitted for carcinoma breast in GMKMCH. After obtaining proper consent and evaluation the node positivity was in response to various and various stages of carcinoma breast. The following results were obtained. In response to quadrant of the disease the node positivity was noted more in the upper medial / inner quadrant followed by lower medial quadrant. In terms of various stages the carcinoma was noted more common in stage III followed by stage IV.

CONCLUSION:

From our study it is concluded that the incidence of internal mammary nodal metastasis is more common in the upper inner quadrant and also was observed more commonly in stage III disease. The presence of internal mammary nodal metastasis is associated with increased chance of distant metastasis, making it as one of the predictors of prognosis. Hence in carcinoma breast the imaging of internal mammary nodes must be taken into account as it provides details about the prognosis and site of recurrence.

ABBREVIATION

SLNB – sentinel lymph node biopsy.

CT – computed tomography.

MRI – magnetic resonance imaging.

PET CT – positron emission tomography.

IMN – internal mammary nodes

RT – radiotherapy

BCS - breast conserving surgery.

mg – milligram.

GMKMCH – government mohan kumaramangalam medical college and hospital.

IHC – immunohistochemistry

FISH – fluorescence insitu hybridization.

BRCA – breast cancer associated gene.

DCIS – ductal carcinoma insitu

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PATIENT CONSENT FORM

STUDY TITLE:

A STUDY TO ASSESS THE INCIDENCE OF INTERNAL MAMMARY NODES IN RESPONSE TO VARIOUS QUADRANTS AND VARIOUS STAGES BY CT SCAN IN CARCINOMA BREAST

Department of General surgery, GMKMCH

PARTICIPANT NAME :

AGE :

SEX:

I.P. NO :

I confirm that I have understood the purpose of surgical/invasive procedure for the above study. I have the opportunity to ask the question and all my questions and doubts have been answered to my satisfaction.

I have been explained about the possible complications that may occur during and after medical/ surgical procedure. I understand that my participation in the study is voluntary and that I am free to withdraw at any time without giving any reason.

I understand that investigator, regulatory authorities and the ethics committee will not need my permission to look at my health records both in respect to the current study and any further research that may be conducted in relation to it, even if I withdraw from the study. I understand that my identity will not be revealed in any information released to third parties or published, unless as required under the law. I agree not to restrict the use of any data or results that arise from the study.

I hereby consent to participate in this study for various surgical/invasive procedures and their outcomes.

Time :

Date :

Place:

Signature / Thumb Impression Of Patient

Signature of the investigator:

Name:

Name:

**A STUDY TO ASSESS THE INCIDENCE OF INTERNAL
MAMMARY NODES IN RESPONSE TO VARIOUS QUADRANTS
AND VARIOUS STAGES BY CT SCAN IN CARCINOMA
BREAST**

PROFORMA

A.

Name:

Address:

Age/sex:

RELIGION:

O.P No:

LP No:

D.O.A:

B. CHIEF COMPLAINTS:

Duration of symptoms:

C.PAST HISTORY:

1. DM
2. TB
3. EPILEPSY
4. MALARIA
5. PREVIOUS SURGERY
6. JAUNDICE
7. CIRRHOSIS

D.PERSONAL HISTORY:

SMOKER

ALCOHOLIC

E.MENSTRUAL HISTORY:

F.OBSTETRIC HISTORY:

G.FAMILY HISTORY:

F.INITIAL ASSESSMENT OF PATIENT

1.Vitals:

PR :

BP :

RR :

Temperature :

2.GENERAL EXAMINATION:

Pallor

Tongue

Skin

Icterus

Cyanosis

Lymphadenopathy:

3.SYSTEMIC EXAMINATION:

CVS

RS

CNS

Abdomen:

PER RECTAL EXAMINATION

4.LOCAL EXAMINATION:

CLINICAL DIAGNOSIS

5. INVESTIGATIONS

A. HB%

B. GROUPING & TYPING

C. BT/CT

D. PCV

E. HBSAG

HIV

F. ECG

G. URINE:

Macro

Micro

Albumin

Sugar

H. BLOOD:

RBS

BLOOD UREA

SER.CREATININE

I. CHEST X RAY PA VIEW

J. SKELETAL SURVEY:

K. ABDOMEN & PELVIS USG :

L. CECT CHEST:

M. TRUCUT BIOPSY:

N. MAMMOGRAPHY:

O. CECT ABDOMEN:

P: MRI SPINE:

FINAL DIAGNOSIS:

MASTER CHART

NAME	AGE	QUADRANT	STAGE							
MRS.PARVATHY	65	> 1 QUADRANT	STAGE III							
MRS.PAPPATHI	50	> 1 QUADRANT INNER	STAGE IV							
MRS.KALIYAMMAL	75	MEDIAL	STAGE II A							
MRS.PACHAIYAMMAL	50	UPPER OUTER > 1	STAGE II B	STAGE III 4	STAGE III	STAGE II	0	STAGE IV	10	
MRS.CHANDRAMANI	60	QUADRANT > 1	STAGE III A	A 7	STAGE III	STAGE II A	4	STAGE IV A	0	
MRS.KANCHANA	45	QUADRANT > 1	STAGE IV	STAGE IIIA 1	STAGE II B	4	STAGE IV B	0		
MRS.CHINNAPONNU	40	QUADRANT > 1	STAGE III	12		8		10		
MRS.SHANTHI	50	QUADRANT > 1	STAGE III	30		30		30		
MRS.ANGAMMAL	62	QUADRANT > 1 INNER	STAGE III A	40%		27%		33%		
MRS.MUNIYAMMAL	55	MEDIAL > 1	STAGE IV							
MRS.KUPPAMMAL	80	QUADRANT > 1	STAGE III A							
MRS.JHANSI	61	QUADRANT INNER	STAGE IV							
MRS.PARVATHY	79	MEDIAL > 1	STAGE II B		STAGE I	0.00%				
MRS.CHINNAMMAL	74	QUADRANT LOWER	STAGE III	8	STAGE II	26.67%		20	> 1 QUADRANT	66.67%
MRS.SUMATHI	59	MEDIAL > 1	STAGE II A	12	III	40.00%		5	INNER MEDIAL	16.67%
MRS.ANDAL	73	QUADRANT > 1	STAGE III A	10	IV	33.33%		3	LOWER MEDIAL	10.00%
MRS.PARAMESHWARI	48	QUADRANT > 1	STAGE IV	30				2	UPPER OUTER	6.67%

MRS.ANITHA	41	INNER MEDIAL	STAGE II B	30	> 1 QUADRANT	66.67%
MRS.PECHIAMMAL	51	> 1 QUADRANT	STAGE III A		UPPER MEDIAL / INNER	16.67%
MRS.PRIYA	39	UPPER OUTER LOWER	STAGE II A		LOWER MEDIAL	10.00%
MRS.AMBIGAI	49	MEDIAL	STAGE II B		UPPER OUTER	6.67%
MRS.SOUNDAMMAL	68	> 1 QUADRANT	STAGE III A			
MRS.USHARANI	42	> 1 QUADRANT	STAGE IV			
MRS. KOTHAI	58	INNER MEDIAL	STAGE IV			
MRS.SHANTHI	59	> 1 QUADRANT	STAGE IIIA			
MRS.BEEVI	47	> 1 QUADRANT	STAGE IV			
MRS.KALAISELVI	54	> 1 QUADRANT	STAGE IV			
MRS.KUPPAMAL	63	LOWER MEDIAL	STAGE II A			
MRS.DEVI	52	> 1 QUADRANT	STAGE III A			
MRS.KAMATCHI	55	> 1 QUADRANT	STAGE IV			