"ASSOCIATION OF HISTOPATHOLOGICAL PARAMETERS AND AXILLARY LYMPHNODE METASTASIS IN PRIMARY BREAST CANCER"

BY

Dr. PRADEEP MITRA V, **MBBS**

DISSERTATION SUBMITTED TO

SRI DEVARAJ URS ACADEMY OF HIGHER EDUCATION & RESEARCH

TAMAKA, KOLAR, KARNATAKA

IN PARTIAL FULFILLMENT

OF THE REQUIREMENTS FOR THE DEGREE OF

DOCTOR OF MEDICINE

IN

PATHOLOGY

UNDER THE GUIDANCE OF

Dr. MANJULA K, *MD*

ADDITIONAL PROFESSOR

DEPARTMENT OF PATHOLOGY

DEPARTMENT OF PATHOLOGY

SRI DEVARAJ URS MEDICAL COLLEGE, KOLAR

MAY 2019

SRI DEVARAJ URS ACADEMY OF HIGHER EDUCATION & RESEARCH, TAMAKA, KOLAR, KARNATAKA.

DECLARATION BY THE CANDIDATE

I HEREBY DECLARE THAT THIS DISSERTATION ENTITLED

"ASSOCIATION OF HISTOPATHOLOGICAL PARAMETERS AND AXILLARY LYMPHNODE METASTASIS IN PRIMARY BREAST CANCER"

IN SRI DEVARAJ URS MEDICAL COLLEGE, KOLAR

IS A BONAFIDE AND GENUINE RESEARCH WORK CARRIED OUT BY ME UNDER THE DIRECT GUIDANCE OF

Dr. MANJULA K

ADDITIONAL PROFESSOR,

DEPARTMENT OF PATHOLOGY,

SRI DEVARAJ URS MEDICAL COLLEGE, KOLAR

DATE: SIGNATURE OF THE CANDIDATE

PLACE: KOLAR **Dr. PRADEEP MITRA V**

CERTIFICATE BY THE GUIDE

THIS IS TO CERTIFY THAT THE DISSERTATION ENTITLED

"ASSOCIATION OF HISTOPATHOLOGICAL PARAMETERS AND AXILLARY LYMPHNODE METASTASIS IN PRIMARY BREAST CANCER"

AT R.L.JALAPPA HOSPITALAND RESEARCH CENTRE, KOLAR

IS A BONAFIDE RESEARCH WORK DONE

BY

Dr. PRADEEP MITRA V

IN PARTIAL FULFILLMENT OF THE REQUIREMENT FOR THE DEGREE OF

M.D IN PATHOLOGY

DATE:

PLACE: KOLAR

SIGNATURE OF THE GUIDE

Dr. MANJULA K, MD
ADDTIONAL PROFESSOR
DEPARTMENT OF PATHOLOGY

CERTIFICATE BY THE CO-GUIDE

THIS IS TO CERTIFY THAT THE DISSERTATION ENTITLED

"ASSOCIATION OF HISTOPATHOLOGICAL PARAMETERS AND AXILLARY LYMPHNODE METASTASIS IN PRIMARY BREAST CANCER"

AT R.L.JALAPPA HOSPITALAND RESEARCH CENTRE, KOLAR

IS A BONAFIDE RESEARCH WORK DONE

BY

Dr. PRADEEP MITRA V

IN PARTIAL FULFILLMENT OF THE REQUIREMENT FOR THE DEGREE OF

M.D IN PATHOLOGY

DATE:

PLACE: KOLAR

SIGNATURE OF THE CO-GUIDE

Dr. BHASKARAN. A,
PROFESSOR
DEPARTMENT OF SURGERY

ENDORSEMENT BY THE HOD, PRINCIPAL/HEAD OF THE INSTITUTION

THIS IS TO CERTIFY THAT THE DISSERTATION ENTITLED

"ASSOCIATION OF HISTOPATHOLOGICAL PARAMETERS AND AXILLARY LYMPHNODE METASTASIS IN PRIMARY BREAST CANCER"

IS A BONAFIDE RESEARCH WORK DONE BY

Dr. PRADEEP MITRA V

UNDER THE GUIDANCE OF

DR. MANJULA K, ***MD***

ADDITIONAL PROFESSOR

DEPARTMENT OF PATHOLOGY

Dr. KALYANI. R	**Dr. M.L. HARENDRA KUMAR**
SEAL & SIGNATURE OF THE HOD	SEAL & SIGNATURE OF THE PRINCIPAL
DATE:	DATE:
PLACE: KOLAR	PLACE: KOLAR

COPYRIGHT

DECLARATION BY THE CANDIDATE

I HEREBY DECLARE THAT

SRI DEVARAJ URS ACADEMY OF HIGHER EDUCATION AND RESEARCH,

TAMAKA, KOLAR, KARNATAKA

SHALL HAVE THE RIGHTS TO PRESERVE, USE AND DISSEMINATE

THIS DISSERTATION,

IN PRINT OR ELECTRONIC FORMAT, FOR ACADEMIC / RESEARCH PURPOSE.

DATE: SIGNATURE OF THE CANDIDATE

PLACE: KOLAR **Dr. PRADEEP MITRA V**

SRI DEVARAJ URS MEDICAL COLLEGE, TAMAKA, KOLAR.

ETHICS COMMITTEE

CERTIFICATE

THIS IS TO CERTIFY THAT, THE ETHICS COMMITTEE OF

SRI DEVARAJ URS MEDICAL COLLEGE, TAMAKA, KOLAR

HAS UNANIMOUSLY APPROVED

Dr. PRADEEP MITRA V

POST GRADUATE STUDENT IN THE DEPARTMENT OF PATHOLOGY OF

SRI DEVARAJ URS MEDICAL COLLEGE

TO TAKE UP THE DISSERTATION WORK ENTITLED

"ASSOCIATION OF HISTOPATHOLOGICAL PARAMETERS AND AXILLARY LYMPHNODE METASTASIS IN PRIMARY BREAST CANCER"

TO BE SUBMITTED TO

SRI DEVARAJ URS ACADEMY OF

HIGHER EDUCATION AND RESEARCH, TAMAKA, KOLAR.

MEMBER SECRETARY **PRINCIPAL**

SDUAHER

Sri Devaraj Urs Academy of Higher Education and Research

Certificate of Plagiarism Check

Author Name	DR. Pradeep Mitra V
Course of Study	Synopsis / Thesis / Dissertation
Name of Supervisor	DR. MANJULA. K
Department	Pathology
Acceptable Maximum Limit	10%
Submitted By	librarian@sduu.ac.in
Paper Title	ASSOCIATION OF HISTOPATHOLOGICAL PARAMETERS AND AXILLARY LYMPHNODE METASTASIS IN PRIMARY BREAST CANCER
Similarity	9 %
Paper ID	181201060207
Submission Date	2018-12-01 06:02:07

* This report has been generated by DrillBit Anti-Plagiarism Software

Signature of Student	Signature of Supervisor
Head of the Department	
University Librarian 1/12/18	Post Graduate Director

Senior Librarian
Library and Information Centre
Sri Devaraj Urs Medical College
Tamaka, KOLAR-563 101

ACKNOWLEDGEMENT

I begin by expressing my immense gratitude to the almighty lord for his blessings.

My continued reverence and acknowledgement to my beloved teacher and guide ***Dr. MANJULA K,*** *Additional Professor, Department of Pathology, who handpicked this topic for me and graced study officially with her constant support and expert advice, her encouragement, wise constructive judgement the painstaking effort to weed out errors and her affection during course of study leaves me permanently indebted to her.. I dedicate the good part of the work to her.*

Thanks to ***Dr. Bhaskaran A****, Professor of General Surgery for consenting to be my co-guide and providing cases. His encouragement and guidance leaves me indebted to him.*

I would like to express my gratitude to ***Dr Kalyani R****, Professor and Head of the department for her constant guidance, support and encouragement.*

I take this opportunity to express my humble and sincere gratitude and indebtedness to my teachers ***Dr Harendra Kumar M.L****,* ***Dr CSBR Prasad*** *,* ***Dr. T.N. Suresh*** *and* ***Dr.Subhasish Das*** *Professors of Pathology for their expert advice, constant support, encouragement and timely help in every aspect. Iam gratefully indebted for their support.*

I would like to convey my heartfelt thanks to ***Dr. Hemalatha****.* ***A****, Additional Professor, for her constant guidance, advice and encouragement.*

I wish to express my sense of gratitude to ***Dr. Swaroop Raj B V****, Associate Professor, for his kind help and expert advice in preparing this dissertation.*

I express my sincere thanks to ***Dr.Shilpa M D, Dr. Supreetha M S, Dr Yashaswini R, Dr Geetha S****, Assistant Professors, for their constant guidance and encouragement in preparing this dissertation.*

My family, ***Mr. Venkatesh M A, Mrs. Geetha Venkatesh, Maj. Govindarajalu B T and Mrs. Deepa C V*** *who have and will always be my biggest source of strength and inspiration, for their unconditional love and support in every aspect of my life, I am forever indebted.*

I express my sincere thanks to my friends, ***Dr. Chandana Reddy, Dr.Manan shah and Dr.Hajra Mehdi****, for their support and love in every aspect of my life.*

My immense gratitude and special thanks to my juniors and friends, ***Dr. Varsha and Dr Preeti*** *their support and love.*

I enjoyed working with my seniors – ***Dr. Karthik, Dr. Nishit, Dr. Ankita*** *,* ***Dr.Shubhra, Dr. Argha, Dr. Swathi, Dr. Sulagna and Dr. Rajini*** *and my juniors –* ***Dr. Ankit****,* ***Dr.Gaurav, Dr. Priyanka*** *and* ***Dr. Sonia.*** *I thank them for their kind co-operation.*

I am thankful to ***Dr. Mahesh****, for his guidance in statistics.*

I am thankful to technical staffs and all non-teaching staffs for their invaluable help without whom this study would not have been possible.

Thank you everyone and…..Godbless.

Date: *Signature of the Candidate*

Place :Kolar ***DR.PRADEEP MITRA V***

LIST OF ABBREVATIONS

TDLU – Terminal Duct Lobular Unit

IDC - Infiltrating Duct Carcinoma

Tis – Insitu Carcinoma

DCIS – Ductal Carcinoma Insitu

LCIS – Lobular Carcinoma Insitu

NPI – Nottingham Prognostic Index

ENE – Extranodal Extension

ER – Estrogen Receptor

PR – Progesterone Receptor

Her 2 – Human Epidermal Growth Factor Receptor 2

ABSTRACT

BACKGROUND:

Mammary gland is an important organ of the body consisting of stromal and epithelial components. There has been a recent increasing trend in malignant and non-neoplastic lesion of breast in western as well as in Indian population. A large variety of risk factors have been implicated in the development of breast cancer and are hence considered multifactorial rather than a single entity. A wide range of potential prognostic features have been studied in breast cancer and are mainly divided into two groups i.e. Histopathological and Molecular. The histological features are cost effective and provides a reliable diagnostic and prognostic information in these tumors. Axillary Lymphnode status is one of the most important prognostic factor and greatly affects the morbidity and mortality of the patient.

AIMS AND OBJECTIVES:

- To study and document histopathological parameters of primary tumour in operated specimens of breast cancer.
- To study the association of histopathological parameters of primary breast cancer with axillary lymph node metastasis

MATERIALS AND METHODS:

All breast cancer specimens received in the Department of Pathology from R.L.Jalappa Hospital and Research Center attached to Sri Devaraj Urs Medical College, Tamaka, Kolar from December 2016 to September 2018.

Also cases of breast cancers were retrieved from archives of pathology from January 2013 to November 2016. The following histopathological parameters were carefully studied like Tumor size, Histological type, Grade, Presence of necrosis, Inflammatory cell infiltrate, Lymphatic invasion, Blood vessel invasion, Perineural invasion and other Stromal changes were studied in detail and association of these histopathological parameters with axillary lymph node metastasis were analysed.

RESULTS:

A total of 100 cases were studied and majority of the patients were over the age of 50 years. There was an equal distribution of cases on both right and left side with most common site being the retroareolar region. Maximum number of cases were in T2 stage(55%). Infiltrating ductal carcinoma (88%) was the most common type of tumor encountered in the study. Majority of the cases were Grade I tumors. Skin Invasion was seen in 14% and Lymphovascular Invasion was seen in 17% of cases respectively.

On further analysis, there was a statistically significant association between the size of the tumor, T stage, Grade of the tumor, necrosis and inflammatory infiltrate.

CONCLUSION:

Increased tumor size, T stage, higher grade, presence of necrosis and low inflammatory infiltrate are associated with increased chances of axillary lymphnode metastasis and can be considered as bad prognostic factors in the treatment of breast cancers.

Key words- Breast cancer, Lymphnode metastasis, Prognosis

TABLE OF CONTENTS

LIST OF TABLES

LIST OF CHARTS

LIST OF PICTURES

Introduction

INTRODUCTION

Mammary gland is an important organ of the body consisting of stromal and epithelial components. There has been an increasing trend in malignant and non-neoplastic lesion of breast in western as well as in Indian population.

About 2,30,000 newly detected cases were identified in United States during the year 2012 of which 99% were women and was associated with high disease specific mortality of about 17%[3].

The most common malignancy worldwide among females is breast carcinoma and the second most common malignancy in India, next to cervical cancer.

The estimated incidence of breast cancer is from 19.3 to 89.7 per 1 lakh population. In 2012 the newly detected breast cancer cases in India were 1,44,937 and 70,218 women succumbed to it. In India the disease specific mortality of breast cancer is roughly 50%[1].

The incidence of breast cancer in Kolar region is around 6.41% of all malignancies. The worldwide incidence of breast cancer comprises of 10.4% of all malignancies in female population[2].

On an average, in women, there is 12% lifetime risk in developing breast cancer. The recent advances in imaging like mammography are used as screening modalities and help in early diagnosis and treatment[2].

Breast cancer, a heterogeneous disease has varied morphological appearance, molecular features and behaviour of response to therapy. It is becoming increasingly important to assess the prognosis of breast cancer in each patient before treatment. A

wide range of potential prognostic features have been studied. They are mainly divided into two groups i.e. Histopathological and Molecular.

The histological features can be assessed during conventional gross examination and histopathological assessment of breast cancers.

These are relatively simple to assess and provide clinically useful prognostic information. Tumour size, grade, histopathological type and lymph node status are most important histopathological features. Grade remains very strong prognostic marker and provides data comparable to molecular signatures [4].

Lymph node staging is a important diagnostic factor and provides prognostic information and showed to be based on histological examination than clinical and radiological examination[5].

Patients with histologically identified regional lymph node metastasis have bad prognosis and also status of the regional lymph node metastasis is an important determining factor in recommending chemotherapy for patients with breast cancer. Patients with these tumors having positive lymph node shows higher mortality (four to eight times) than node negative cases. Not only the disease specific mortality increases in node positive patients but also the risk of distant recurrence[6].

The patient's response to chemotherapy, hormone receptor status and nodal status are found to be most important factors in predicting the recurrence of disease[2].

Though many studies are done in the field of breast cancer to determine the prognosis of different histopathological and molecular characteristics, there have been only a few studies done comparing all the histopathological parameters (tumour size,

shape, histopathological type, grade, pressure necrosis, inflammatory cell infiltrate, lymphatic tumor emboli, perineural invasion, extent of intraductal carcinoma, blood vessel invasion, stromal characteristics and other conventional factors like lesion invasive front) with axillary lymph node metastasis.

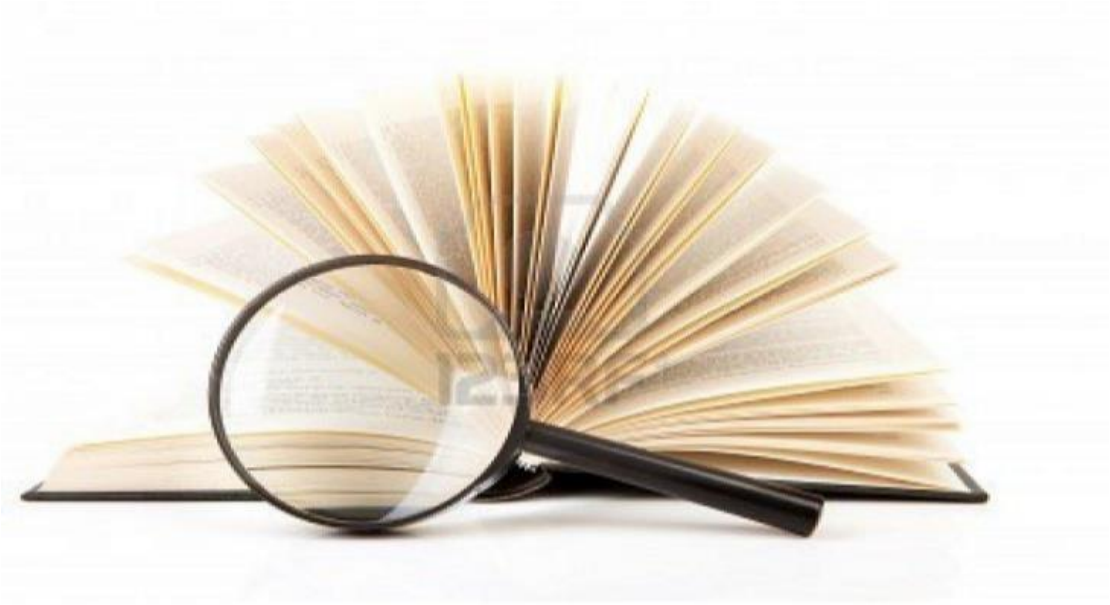
Hence this study has been taken up to study different histological parameters and associate these different histopathological parameters with metastasis in the axillary Lymph nodes in predicting the prognosis and guide the treatment.


Objectives

OBJECTIVES OF THE STUDY

- To study and document histopathological parameters of primary tumour in operated specimens of breast cancer.

- To study the association of histopathological parameters of primary breast cancer with axillary lymph node metastasis.



Literature Review

REVIEW OF LITERATURE

A. BREAST

EPIDEMIOLOGY AND INCIDENCE

Invasive Breast cancers are a heterogenous group of malignancies characterized by invasion into the surrounding tissues and tendency to metastasize. Most of these tumours are derived from the mammary parenchymal epithelium particularly the cells of the Terminal Duct Lobular Unit (TDLU). They are also described as heterogenous as they exhibit different morphological, immunohistochemical, prognostic and clinical characterstics[10].

Breast cancer is the most common malignancy in women worldwide and second most common malignancy in India, next to cervical cancer. It accounts for 22 % of all female malignancies and in developed countries reaches upto almost 26% which is two times more common than any malignancy of other sites.

The chance of a female developing breast cancer is 6% by the age of 75 years in developed countries whereas it is 2% in developing nations like Japan and India.

In the recent years, the increase in imaging screening modalities such as mammography, has bought more awareness among women and has made the detection of breast cancer more cost effective, non invasive, easier and earlier leading to a better prognosis[10].

ANATOMY OF BREAST

The breasts are the highly modified sweat glands and lie between 2nd and 6th rib on either sides and extend from edge of sternum to the mid axillary line. The glands are located in the subcutaneous plane above the pectoralis muscles. The ducts ultimately open into the nipple and nipple is surrounded by pigmented and round areola. A small part of breast extends to form axillary tail of spence.[3,7,9,71].

EMBRYOLOGY OF BREAST

The basic milk lines or the mammary ridges are the epidermal thickenings appearing during the 5th month of gestation. They extend from the mid axillary region to the upper region of thigh. The condensation of the mesenchymal tissue occurs around the epithelial stalk, the breast bud on the chest wall. The mesenchyme and the epithelium will form epithelial cords which then give rise to lobes of breast. Further breast development usually begins after puberty. [11]

HISTOLOGY

Each breast consists of compound tubule acinar gland which is formed by fusion of 15 to 25 independent lobes of varying sizes that connect to the surface by lactiferous sinuses. The main duct in each lobe of breast divides to form numerous terminal dusts which form a lobule consisting of plenty of acini. This unit is called as **Terminal duct lobular unit (TDLU).**

The nipple contains smooth muscles and its contraction causes erection of nipple due to its parallel arrangement. The areola surrounding the nipple is round, contains sebaceous glands and is pigmented[22].

LYMPHATIC DRAINAGE OF BREAST

The carcinomas of the breast commonly tend to invade and spread through the lymphatics to the regional Lymph nodes. Hence it is of great importance to the operating surgeon and the reporting pathologist.

The following are the important groups of Lymph node draining the breast tissue

1. Axillary group of Lymph nodes
2. Intramammary group of Lymph nodes
3. Other groups like Supraclavicular, Subdiaphragmatic, Posterior intercoastal and Cephalic group of Lymph nodes [21]

Histopathological factors and lymph node status play an important role in diagnosis of breast cancer and plan for treatment. It was identified that tumor size has a prognostic significance i.e. increased tumor size has decreased survival rate in node negative patients with breast cancer[12]. Many studies have showed that there is a good relationship between tumor size and axillary lymph node metastasis. The risk of developing metastasis in axillary Lymph nodes increases as tumor size progresses which suggests that larger tumor size is associated with increased chance of nodal metastasis, higher tumor stage and poorer prognosis[13].

Histologically, tubular, mucinous, tubule-lobular and cribriform breast tumors have best prognosis. These tumors have a 10- year survival rate in 80% of cases. Ductal, lobular, solid and mixed type tumors have a 10- year overall survival in only 50% of cases. [14]

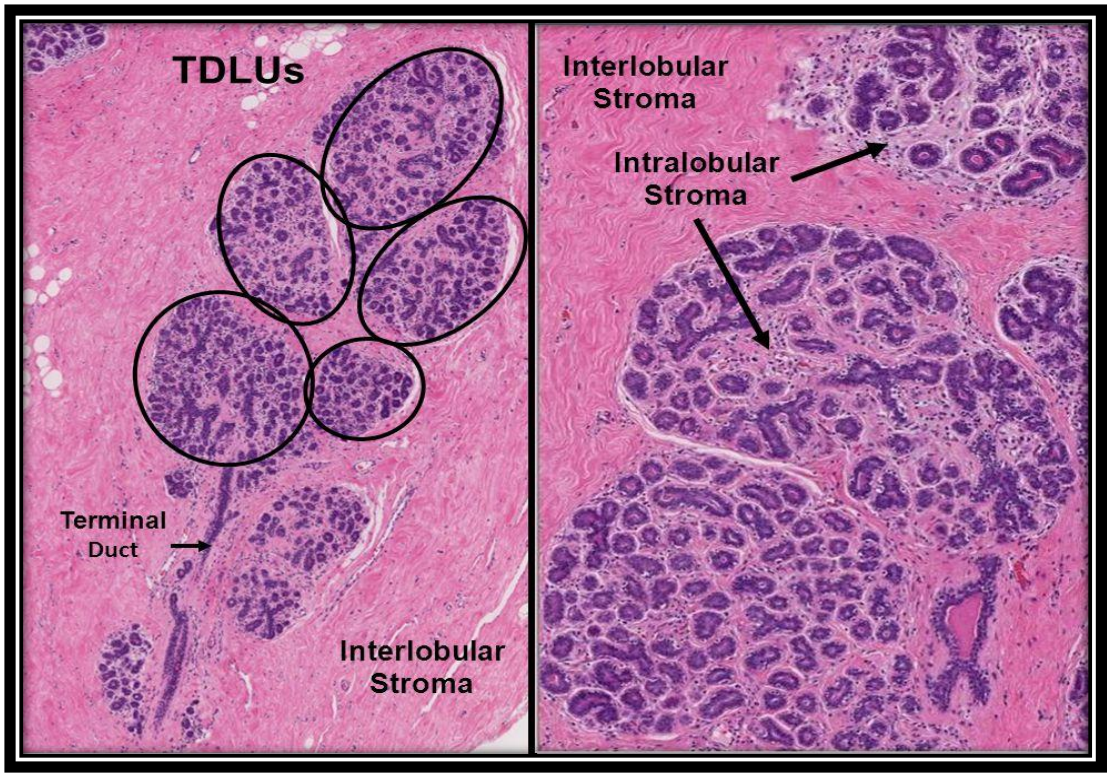


Figure 1 - Histology of Terminal duct lobular unit(TDLU)

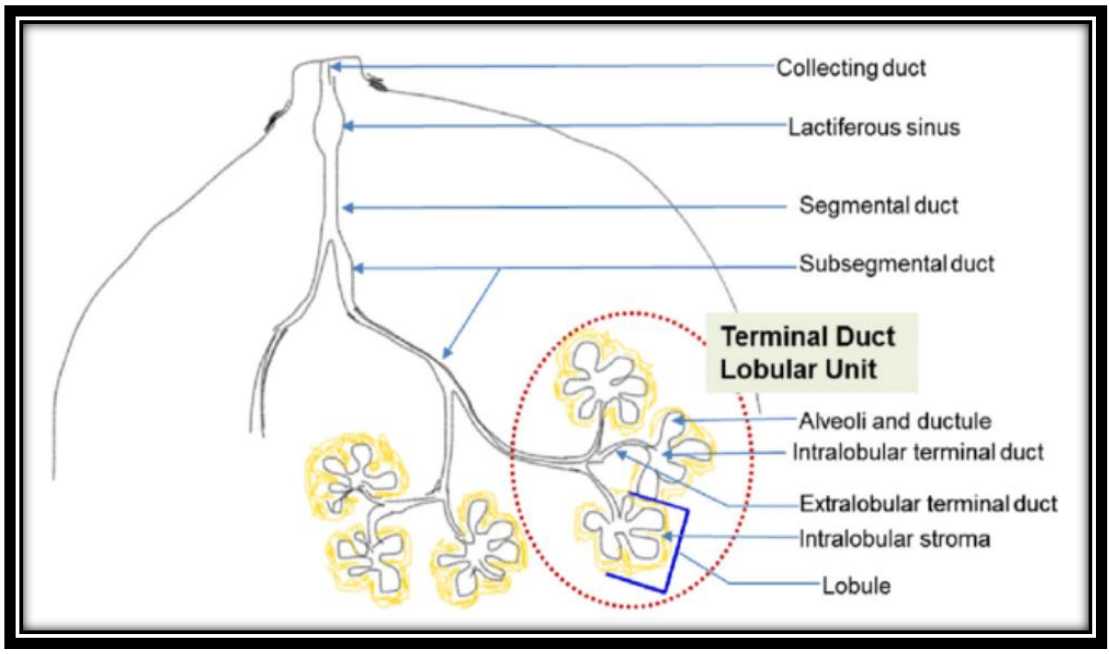


Figure 2- Schematic representation of TDLU

B. LYMPH NODE

EMBRYOLOGY AND HISTOLOGY OF LYMPH NODE

Lymph nodes are the core components of the lymphatic system usually arranged in small groups and in chains at crucial locations and drain the lymphatics of specific anatomical location[19].

The first step in the embryology of the Lymph node development begins as early as 5th week of intrauterine life as they are form lymphatic sacs from the outgrowths of endothelial cells. The lymphatic plexus which are invaded by mesenchymal cells are formed from the lymphatic sacs which then proliferate, aggregate together and a Lymph node is formed. [20]

The Lymph nodes are ovoid or kidney shaped structures which drain the lymphatic channels entering through the hilum of Lymph node. On histology, they have a well defined capsule with outer cortex, paracortical area and inner medulla. Cortex consists of primary and secondary follicles.

The primary follicle consists of inactive B lymphocytes with no germinal centre. The antigenic stimulation of these inactive B lymphocytes forms the germinal centre which is called as Secondary follicle.

The paracortex is the region between Medulla and cortex which contains predominantly mature B cells and T cells. It is the first site to be affected in metastatic and immunological reactions.

Medulla is the part nearest to the hilum and mainly consists of plasmablasts and mature B lymphocytes

BREAST CANCER

RISK FACTORS

A large variety of risk factors have been implicated in the development of breast cancer and are hence considered multifactorial rather than a single entity. The risk factors are:

1. Geographical factors- Breast cancers are more common in western population than India
2. Endogenous hormones- Early menarche and late menopause may cause increased risk of breast cancer
3. Family history- About 5-10% of breast cancers are inherited in autosomal dominant fashion
4. BRCA 1 and BRCA 2 are the tumor suppressor genes and the mutations of these genes predispose the patient to the increased risk of breast cancer.
5. Modifiable risk factors- Increased intake of fat, alcohol and smoking
6. Environmental factors- Ionising radiation
7. Benign breast disease- Ductal atypical hyperplasia are associated with increased risk
8. Exogenous hormones- Use of oral contraceptive pills have showed an increased relative risk in developing breast cancer.
9. Hormone replacement therapy – In postmenopausal women, the risk of breast cancer increases in patients receiving ART (Estrogen).

ETIOPATHOGENESIS

Numerous clinical and epidemiological studies are being done in the field of breast cancer but the exact pathogenesis still remains inconclusive. However, the recent studies have thrown some light on the etiopathogenesis and are considered multifactorial. They are as follows:

- Compared to the developing countries like India, developed countries have a six fold higher incidence of developing breast cancer.
- Patients with familial history of breast cancer, genetic mutations such as BRCA 1, BRCA 2, p53 and other rare mutations such as Ataxia telangiectasia gene and PTEN mutations have a higher chances of developing breast cancers.
- Females with estrogen excess such as prolonged reproductive life, nulliparity and hormone secreting ovarian tumors and plenty of miscellaneous factors such as early menarche, late menopause, tobacco smoking, abuse of alcohol and breast augmentation surgeries for cosmetic reasons are associated with increased risk of breast cancer. [23]

CLINICAL FEATURES

Most of the patients with breast cancer present with a vague lump in the breast, pain or discharge from the nipple. Apart from carcinomas, many other conditions can also present as breast lump such as cysts and fibroadenomas. Even nipple discharge can be associated with benign conditions like galactorrhea. Even, pain which is a common symptom can be associated with cyclical pain and non cyclical pain can be due to infections or trauma. Hence, it is very important to consider a detailed history and careful examination will aid to the nearest diagnosis [71].

MORPHOLOGICAL TYPES OF BREAST CANCER

INVASIVE DUCTAL CANCER NOS (IDC)– They are one of the most commonly encountered malignant tumor of breast and accounts to 40-75% of all breast malignancies[10]. They are more common above the age of 40 years and may be familial breast cancer associated with BRCA 1 mutations. The size varies from 1 cm to 10 cm and above and have irregular configuration and often gritty to cut.

On microscopy, the tumour cells may be arranged in cords, clusters and comprises of pleomorphic cells having infiltrative growth pattern[10].

LOBULAR CARCINOMA – This entity comprises 5-15% of all breast cancers with trend of increasing incidence in recent years. They are usually present with focal in situ lobular carcinomas and gross appearance is often irregular with poorly defined margins. The tumour cells are usually non-cohesive with cells arranged in Indian file pattern[10].

TUBULAR CARCINOMA – Usually comprises 2% of all breast cancers and are usually smaller in size (<2 cm). These tumors carry a better prognosis as they are less aggressive and due to the increased use of mammography. Most lesions tend to be in T1 stage, and 90% of tumour express ER positivity[10,11].

The most consistent microscopic feature is the open lumina lined by single layer of epithelial cells enveloping a clear lumen[10].

CRIBRIFORM CARCINOMA – It is the form of well differentiated infiltrating ductal carcinoma which has an excellent prognosis and shows cribriform pattern of growth and is often angulated with well-formed spaces giving a sieve like appearance. Tumour cells express apical snouts and show moderate degree of nuclear pleomorphism with occasional mitotic figures.

MEDULLARY CARCINOMA – Usually account for < 5% of all breast malignancies. Due to the presence of a high amount of lymphoplasmacytic infiltrate in these tumors, they may mimic lymphoepithelial malignancies occurring in other sites.

Few distinct histomorphological features are essential for diagnosis of medullary carcinoma. They are-

1. Symmetrical growth pattern (>75%)
2. Absence of glandular structure.
3. Diffuse lymphoplasmacytic infiltration.
4. Nuclear pleomorphism.
5. Complete circumscription.

MUCINOUS CARCINOMA – They are the slow growing tumours of breast consisting of tumour cells suspended or dispersed in pools of mucin. Their size may vary from 1 cm to 20 cm, usually circumscribed bosselated with glistening gelatinous appearance. Rarely cerebral infarction may occur due to mucin embolism and cause death. They carry a fairly good prognosis[10,11].

NEUROENDOCRINE TUMOURS – Represent 2-5% of malignant breast lesion usually present in 6^{th} or 7^{th} decade. They are a group of neoplasms exhibiting features of neuroendocrine tumour of lung and gastrointestinal tract. There may be areas of de-differentiation in infiltrating ductal carcinoma but should show immune reactivity to neuroendocrine markers in >50% of cell population.

INVASIVE PAPILLARY CARCINOMA – constitute 1-2% of breast cancers and carry a fairly good prognosis. They are more common in post-menopausal women and have characteristic multiple nodular densities of mammography. Light microscopy shows delicate papillary structures with cells having moderate amount of amphophilic cytoplasm and may also exhibit apical snouting[10].

APOCRINE CARCINOMA – As mammary glands are highly modified sweat glands apocrine carcinoma can also occurs in breast with morphological and immunohisto profile of apocrine cells in >90% of cell population [10,11].

SECRETORY CARCINOMA – This is usually a low grade carcinoma that can occur in juvenile and in adults. It is comparatively a rare tumour with tumour cells having intra and extracellular secretory material[10].

INFLAMMATORY CARCINOMA – Incidence varies widely (1-10%). They are characterised by dermal lymphovascular infiltration and has been categorised under T4d due to its poor prognosis[10].

WHO CLASSIFICATION OF TUMORS OF THE BREAST [9]

EPITHELIAL TUMOURS

Microinvasive carcinoma

Invasive breast carcinoma of no special type (NST)

Pleomorphic carcinoma

Carcinoma with osteoclast-like stromal giant cells

Carcinoma with choriocarcinomatous features

Carcinoma with melanotic features

Invasive lobular carcinoma

Classic lobular carcinoma

Solid lobular carcinoma

Alveolar lobular carcinoma

Pleomorphic lobular carcinoma

Tubulolobular carcinoma

Mixed lobular carcinoma

Tubular carcinoma

Cribriform carcinoma

Mucinous carcinoma

Carcinoma with medullary features

Medullary carcinoma

Atypical medullary carcinoma

Invasive carcinoma NST with medullary features

Carcinoma with apocrine differentiation

Carcinoma with signet-ring-cell differentiation

Invasive micropapillary carcinoma

Metaplastic carcinoma of no special type

Low-grade adenosquamous carcinoma

Fibromatosis-like metaplastic carcinoma

Squamous cell carcinoma

Spindle cell carcinoma

Metaplastic carcinoma with mesenchymal differentiation

Chondroid differentiation

Osseous differentiation

Other types of mesenchymal differentiation

Mixed metaplastic carcinoma

Myoepithelial carcinoma

Rare types

Carcinoma with neuroendocrine features

Neuroendocrine tumour, well-differentiated

Neuroendocrine carcinoma, poorly differentiated (small cell carcinoma)

Carcinoma with neuroendocrine differentiation

Secretory carcinoma

Invasive papillary carcinoma

Acinic cell carcinoma

Mucoepidermoid carcinoma

Polymorphous carcinoma

Oncocytic carcinoma

Lipid-rich carcinoma

Glycogen-rich clear cell carcinoma

Sebaceous carcinoma

Salivary gland/skin adnexal type tumours

Cylindroma

Clear cell hidradenoma

Epithelial–myoepithelial tumours

Pleomorphic adenoma

Adenomyoepithelioma

Adenomyoepithelioma with carcinoma

Adenoid cystic carcinoma

Precursor lesions

Ductal carcinoma in situ

Lobular neoplasia

Lobular carcinoma in situ

Classic lobular carcinoma in situ

Pleomorphic lobular carcinoma in situ

Atypical lobular hyperplasia

Intraductal proliferative lesions

Usual ductal hyperplasia

Columnar cell lesions including flat epithelial atypia

Atypical ductal hyperplasia

Papillary lesions

Intraductal papilloma

Intraductal papilloma with atypical hyperplasia

Intraductal papilloma with ductal carcinoma in situ

Intraductal papilloma with lobular carcinoma in situ

Intraductal papillary carcinoma

Encapsulated papillary carcinoma

Encapsulated papillary carcinoma with invasion

Solid papillary carcinoma In situ

Invasive

Benign epithelial proliferations

Sclerosing adenosis

Apocrine adenosis

Microglandular Adenosis

Radial scar/complex sclerosing lesion

Adenomas

Tubular adenoma

Lactating adenoma

Apocrine adenoma

Ductal adenoma

MESENCHYMAL TUMOURS

Nodular fasciitis

Myofibroblastoma

Desmoid-type fibromatosis

Inflammatory myofibroblastic tumour

Benign vascular lesions

- Haemangioma
- Angiomatosis
- Atypical vascular lesions

Pseudoangiomatous stromal hyperplasia

Granular cell tumour

Benign peripheral nerve-sheath tumours

- Neurofibroma
- Schwannoma

Lipoma

- Angiolipoma

Liposarcoma

Angiosarcoma

Rhabdomyosarcoma

Osteosarcoma

Leiomyoma

Leiomyosarcoma

FIBROEPITHELIAL TUMOURS

Fibroadenoma

Phyllodes tumour

- Benign
- Borderline
- Malignant

Periductal stromal tumour, low grade

Hamartoma

TUMOURS OF THE NIPPLE

Nipple adenoma

Syringomatous tumour

Paget disease of the nipple

MALIGNANT LYMPHOMA

Diffuse large B-cell lymphoma

Burkitt lymphoma

T-cell lymphoma

- Anaplastic large cell lymphoma
- ALK-negative

Extranodal marginal-zone B-cell lymphoma of MALT type

Follicular lymphoma

METASTATIC TUMOURS

TUMOURS OF THE MALE BREAST

Gynaecomastia

Carcinoma

- Invasive carcinoma
- In situ carcinoma

CLINICAL PATTERNS

Inflammatory carcinoma

Bilateral breast carcinoma

TNM CLASSIFICATION OF TUMOURS OF THE BREAST[9]

T – Primary tumour

TX - Primary tumour cannot be assessed

T0 - No evidence of primary tumour

Tis - Carcinoma in situ

Tis (DCIS) Ductal carcinoma in situ

Tis (LCIS) Lobular carcinoma in situ

Tis (Paget) Paget disease of the nipple not associated with invasive carcinoma and/or carcinoma in situ (DCIS and/or LCIS) in the underlying breast parenchyma

T1 - Tumour 2 cm or less in greatest dimension

T1mi - Microinvasion 0.1 cm or less in greatest dimension

T1a - More than 0.1 cm but not more than 0.5 cm in greatest dimension

T1b - More than 0.5 cm but not more than 1 cm in greatest dimension

T1c - More than 1 cm but not more than 2 cm in greatest dimension

T2 - Tumour more than 2 cm but not more than 5 cm in greatest dimension

T3 - Tumour more than 5 cm in greatest dimension

T4 - Tumour of any size with direct extension to chest wall and/or to skin (ulceration or skin nodules)

T4a - Extension to chest wall (does not include pectoralis muscle invasion only)

T4b - Ulceration, ipsilateral satellite skin nodules, or skin oedema (including peau d'orange)

T4c - Both 4a and 4b above

T4d - Inflammatory carcinoma

N – Regional lymph nodes

NX - Regional lymph nodes cannot be assessed (e.g. previously removed)

N0 - No regional lymph-node metastasis

N1 - Metastasis in movable ipsilateral level I, II axillary lymph node(s)

N2 - Metastasis in ipsilateral level I, II axillary lymph node(s) that are clinically fixed or matted; or in clinically detected* ipsilateral internal mammary lymph node(s) in the absence of clinically evident axillary lymph-node metastasis

N2a - Metastasis in axillary lymph node(s) fixed to one another (matted) or to other structures

N2b - Metastasis only in clinically detected internal mammary lymph node(s) and in the absence of clinically detected axillary lymph-node metastasis

N3 - Metastasis in ipsilateral infraclavicular (level III axillary) lymph node(s) with or without level I, II axillary lymph-node involvement; or in clinically detected* ipsilateral internal mammary lymph node(s) with clinically evident level I, II axillary

lymph-node metastasis; or metastasis in ipsilateral supraclavicular lymph node(s) with or without axillary or internal mammary lymph node involvement

N3a - Metastasis in infraclavicular lymph node(s)

N3b - Metastasis in internal mammary and axillary lymph nodes N3c Metastasis in supraclavicular lymph node(s)

M – Distant metastasis

M0 - No distant metastasis

M1 - Distant metastasis

Table 1- STAGING

Stage 0	Tis	N0	M0
Stage I	T1	N0	M0
Stage IIA	T0	N1	M0
	T1	N1	M0
	T2	N0	M0
Stage IIB	T2	N1	M0
	T3	N0	M0
Stage III A	T0	N2	M0
	T1	N2	M0
	T2	N2	M0
	T3	N1, N2	M0
Stage IIIB	T4	N0, N1, N2	MO
	Any T	N3	M0
Stage IV	Any T	Any N	M1

MOLECULAR CLASSIFICATION OF BREAST CANCER [72]

1. **LUMINAL A:** This expresses low molecular weight Cytokeratins, with ER / PR positive and Her 2/neu negative and has got good prognosis.

2. **LUMINAL B:** This category expresses low molecular weight cytokeratins. They are moderately positive for ER/PR and have variable expression of Her2/neu and carry a variable prognosis but worse than Luminal A.

3. **Her2/neu:** These tumors have a very high expression of Her2/neu but low expression of ER/PR and are associated with high grade tumors.

4. **BASAL LIKE:** Also known as triple negative breast cancers because of low expression of ER/PR and Her2/ neu and usually carry worse prognosis.

HISTOPATHOLOGICAL PARAMETERS IN BREAST CANCER

1. **TUMOR SIZE**: It is the measured largest diameter of the tumor.[7] Tumor size constitutes one of the important factor in determining the behaviour of tumor.[24] Many studies show that increase in tumor size is strongly associated with higher chances of axillary Lymph node metastasis and poorer survival rates. [7]

   Studies have shown that with each millimeter increase in the size of the tumor, the mortality increases considerably especially in the smaller tumors. [25]

2. **HISTOLOGICAL TYPE:** Infiltrating ductal carcinoma is the commonest breast carcinoma accounting to 22% of all malignancies in women. The prognosis of different histological types differs on the size, grade, stage, surgical procedure and the hormone receptor status as it drives the modality of treatment. Inflammatory carcinoma has the poorer survival rates among different histological types but with the introduction of systemic chemotherapy, the prognosis is better with survival rates of 25% to 50%.[7]

3. **TUMOR GRADE**: The tumor grade (Also known as the Nottingham modification of Bloom Richardson grade) is an important factor in the assessment of prognosis. It takes into account three important factors. i.e. tubule formation, nuclear size and mitotic count. It has been proved that patients with higher grade tumor are associated with increased chances of Lymph node metastasis and decreased survival. Grading also provides

valuable information in the prognostication of patients and also further guides in the management of patients with node negative disease. [26]

The newer molecular methods provide reliable information regarding the prognostic and predictive behaviour of the tumor but have its own limitations. Tumor grading is an important parameter as it is cost effective, simple and can be applied in a resource limited setting. [27]

4. **PRESENCE OF NECROSIS:** Tumor necrosis is an independent prognostic factor and was defined by Gilchrist as " Presence of confluent necrosis of any dimension in a section of invasive cancer that could be distinguished at intermediate magnification" [28]

   Central necrosis and fibrosis are more commonly observed in large tumors with higher T stage and negligible in early breast cancers. They significantly lack hormone receptors and are associated with higher grade. Some studies have shown that presence of necrosis is associated with poor outcomes irrespective of the grade of tumor. [29]

5. **INFLAMMATORY CELL INFILTRATE:** The presence of mononuclear inflammatory cell infiltrate in and around the tumor has been in long controversial entity.[7] However most of the recent studies have shown that this inflammatory response reflects the host defence mechanism against the tumor cells and are associated with better prognosis irrespective of their hormone receptor status, grade and other clinicopathological characterstics. [30] Inflammatory cells like macrophages are proved to be beneficial to the patient

in fighting against the cancer cells while the role of mast cells is still controversial.[31]

6. **LYMPHATIC INVASION:** It is one of the important prognostic marker in breast cancer. Many studies show that there is a significant association between tumor size, Lymph node metastasis, higher grade and increased Ki 67 expression which are considered to be bad prognostic markers. In addition, lymphatic invasion is associated with higher chance of Lymph node metastasis and higher stage of tumor. [32,33] Lymphatic invasion not only provides the information on prognostication but also guides the clinician in considering adjuvant treatment decision in chemotherapy contraindicated patients .[34]

7. **VASCULAR INVASION:** It is defined as "Penetration by the tumor cells into the lumen of an artery or vein". The presence of vascular invasion is associated with increased distant metastasis and poorer survival. [7] Many studies even with multivariate analysis show that vascular invasion is marker for Disease free survival and overall survival as they are associated with larger tumor size and higher grade. One study has shown that T1N0 disease with vascular invasion has got poorer prognosis compared to T1N1 diasease. [35, 36, 37] The patients who have systemic disease or metastatic disease will have vascular invasion. [38]

8. **PERINEURAL INVASION:** Perineural invasion in breast cancers are rarely encountered compared to the lymphovascular invasion and is the least to be studied. [39] It is seen in about 10 % of invasive breast tumors and is associated with lymphovasuclar invasion and higher grade of tumor. The low incidence may be attributed to the number of nerves with the notable size are less in the mammary gland. Though it is associated with other poor prognostic parameters, its role in prognosis as an individual parameter is still questionable. [7, 39]

9. **STROMAL CHARACTERISTICS:** Though there are strong associations between the stromal characteristics and the prognostication and variant of breast carcinomas, there is no sufficient evidence to guard them as an individual prognostic variable. Tumors with minimal stromal reaction usually have higher histological grade and higher nuclear grade whereas tumors with good stromal reaction like fibrosis or desmoplasia are stellate shaped, circumscribed, low grade and are likely to be hormone receptor positive.[7]

10. **EXTENT OF INTRADUCTAL CARCINOMA AND ATYPIA:** There is a higher chance of recurrence in patients who have undergone lumpectomy and are later diagnosed to have a component of Intraductal carcinoma (Comedo type). It is defined as "An intraductal carcinoma within and around an invasive tumor that comprises atleast 25% of neoplasm". Though there is an increased chance of recurrence after treatment, a total mastectomy with good margins will minimise the recurrence and improve the overall survival. [7]

Axillary lymph node status is one of the important prognostic indicators in the management of breast cancer and the detection of metastasis in axillary Lymph node is an important feature and is commonly associated with disease free and overall survival rate. Many predictive factors have been studied in breast cancers that are associated with increased risk of axillary Lymph node metastasis such as Tumor grade, histological type, stage and lymphovascular invasion[13].

A study done in southern India to find the significance of prognostic indicators in infiltrating ductal carcinoma of breast, 63.5% of breast cancers showed Lymph node positivity. Lymphovascular invasion, tumor size and tumor grade were associated with increased risk of Lymph node metastasis[15].

Axillary lymph node status is one of the important prognostic indicators in breast cancer and the detection of nodal metastasis is a key feature and strongly associated with disease free and overall survival. It also showed that the best predictive variable to axillary Lymph node involvement in breast cancer were tumor type, grade, stage and lymphovascular invasion.[16]

A study determining axillary lymph node metastasis in breast cancers, age and tumor size did not correlate with the lymph node positivity, but histopathological prognostic factors like type, histological grade and hormone receptor status showed results with high correlation i.e. these factors are associated with lymph node metastasis.[17]

A study evaluating and comparing the estrogen, progesterone receptor and histological features in breast cancer showed that size of the tumor, grade and Lymph node metastasis were inversely correlating with expression of ER/PR receptors whereas Lymph node metastasis was directly correlating with size and grade of tumor[18].


materials
and
methods

METHODOLOGY

STUDY DESIGN – Observational study

SOURCE OF DATA: All breast cancer specimens received in the Department of Pathology from R.L.Jalappa Hospital and Research Center attached to Sri Devaraj Urs Medical College, Tamaka, and Kolar from December 2016 to September 2018.

Also cases of breast cancers were retrieved from archives of pathology from January 2013 to November 2016

DURATION OF STUDY – Two Years.

METHOD OF COLLECTION:

All mastectomy specimens received in the Department of Pathology were analyzed and clinical data such as name, age, history of presenting illness (HOPI), personal history, family history, menstrual history, lactation history, clinical examination and surgical details were obtained.

These specimens were cut at 1cm interval and kept in 10% formalin for overnight fixation, and gross examination was done according to standard protocol.

Sufficient number of blocks were taken, ensure adequate sampling and routine paraffin embedding was carried out. Standard thin sections (4-6 microns) were taken and stained with routine H & E stain. [3]

The following histopathological parameters were carefully studied in detail:

1. Tumor size (According to American joint committee on cancer)

2. Histological type (WHO)
3. Grade
4. Presence of necrosis
5. Inflammatory cell infiltrate
6. Lymphatic invasion
7. Blood vessel invasion
8. Perineural invasion
9. Stromal characteristics
10. Other conventional morphological factors like amount and type of mucin production by tumor cells, presence of calcification was studied in detail. Association of these histopathological parameters with lymph node metastasis were analyzed.

HISTOLOGIC GRADING

MODIFIED BLOOM RICHARDSON SCORE

A three tiered system is used for grading of invasive breast carcinomas and it includes-

1. Tubule formation
2. Nuclear grade
3. Mitotic count

Each parameter is assessed on a scale from 1 to 3 and the sum of these scores gives the final histopathological grade.

Tubule formation

1. Score 1: > 75% of tumor cells has tubules
2. Score 2: 10%- 75% of tumor has tubules
3. Score 3: < 10% tubule formation

Nuclear size

1. Score 1: Tumor nuclei similar to normal duct cell nuclei(2-3 x RBC)
2. Score 2: Intermediate size nuclei
3. Score 3: Very large nuclei, usually vesicular with prominent nucleoli

Mitotic count (Per 10 hpf with 40x objective and field area of 0.195mm^2)

1. Score 1: 0-7 mitoses
2. Score 2: 8-14 mitoses
3. Score 3: 15 or more mitoses [7]

Table 2- Final grading of Scores[9]

Sum of the points	Final grade
3-5	I
6-7	II
8-9	III

NOTTINGHAM PROGNOSTIC INDEX

Nottingham Prognostic Index is an important prognostic marker in breast cancer following surgery. It takes into account:

1. The size of the tumor (In centimetres) (S)
2. Grade of the tumor (G)
3. Lymph node metastasis (N)

A score of 1 is assigned for tumors without Lymph node metastasis, Score of 2 for metastasis in one to three Lymph nodes and a score of 3 for more than three Lymph nodes. [65]

The formula is:

NPI = [0.2 x S] + N + G

Table 3 - Prognosis as per Nottingham Prognostic Index

NPI	Category	5 Year survival
>/=2.0 to </=2.4	1	93%
>2.4 to </=3.4	2	85%
>3.4 to </=5.4	3	70%
>5.4	4	50%

\

SCORING OF INFLAMMATORY CELL INFILTRATE

Inflammatory reaction was studied on H and E stains in the peritumoral area according to the study done by Klintrup et al [66] and scored on 4-point scale where:

- Score 0 - No inflammatory cell infiltrate
- Score 1 - Mild or patchy increase of inflammatory cells in the peritumoral area, but no destruction of invading cancer cells by the inflammatory cells.
- Score 2 - Prominent inflammatory reaction in the peritumoral area with some evidence of cancer cell destruction
- Score 3 - Florid 'cup-like' inflammatory infiltrate in the peritumoral area with frequent areas of tumor cell destruction.

GRADING OF NECROSIS

A semiquantitive assessment of grading od necrosis was done according to the study done by Richards CH et al [67] and was grade as

1. Absent/ None
2. Focal (<10% of tumour area)
3. Moderate (10–30%)
4. Extensive (> 30%)

SAMPLE SIZE

Sample size was estimated by using the proportion of Lymph node metastasis as 44.6% in breast cancer cases as detected by Histopathology scan from the study done by Chakraborthy A et al in [68] Netaji Subhash Chandra Bose Cancer Research Institute, Kolkata to determine the lymph node status in women using the formula

$$\text{Sample size} = \frac{Z_{1-\alpha/2}{}^2 p(1-p)}{d^2}$$

Here

$Z_{1-\alpha/2}$ = Is standard normal variate (at 5% type 1 error ($P<0.05$) it is 1.96 and at 1% type 1 error ($P<0.01$) it is 2.58). As in majority of studies P values are considered significant below 0.05 hence 1.96 is used in formula.

p = Expected proportion in population based on previous studies or pilot studies.

d = Absolute error or precision – Has to be decided by researcher.

p = 44.6 or 0.446

q = 53.4 or 0.543

d = 15% or 0.15

Using the above values at 95% Confidence level sample size of 43 subjects with breast cancer was included in the study.

Considering 10% non-response a sample size of 43 + 4.3 ≈ 48 subjects were included in the study. However due to availability of cases, a total of 100 cases were included in the study.

INCLUSION CRITERIA: All operated breast carcinoma specimens with axillary lymph node clearance.

EXCLUSION CRITERIA:

1. Carcinoma of breast in male patients.
2. Sarcomas of breast
3. Patients on or receiving radiotherapy or chemotherapy
4. Recurrent tumours.

Statistical analysis:

Data was entered into Microsoft excel data sheet and was analyzed using SPSS 22 version software. Categorical data was represented in the form of Frequencies and proportions. **Chi-square test** was used as test of significance for qualitative data. Continuous data was represented as mean and standard deviation. **Independent t test** was used as test of significance to identify the mean difference between two quantitative variables.

Graphical representation of data: MS Excel and MS word was used to obtain various types of graphs such as bar diagram, Pie diagram.

p value (Probability that the result is true) of <0.05 was considered as statistically significant after assuming all the rules of statistical tests.

Statistical software: MS Excel**,** SPSS version 22 **(**IBM SPSS Statistics, Somers NY, USA) was used to analyze data.


RESULTS

RESULTS

Table 4: Age distribution of subjects in the study group

		Count	%
Age	<50 years	47	47.0%
	>50 years	53	53.0%
	Total	100	100.0%

In the study,53% of cases were in the age group >50 years and 47% were in the age group <50 years.

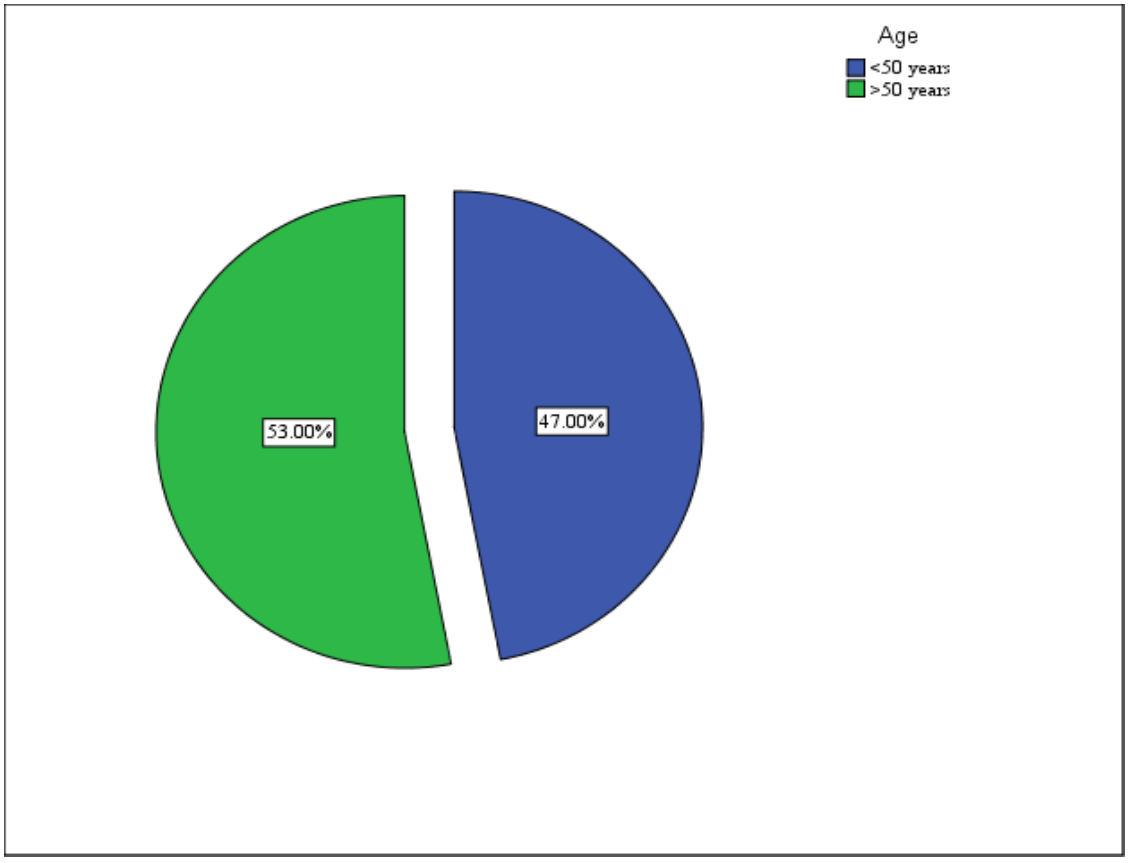


Chart 1: Pie diagram showing Age distribution of subjects

Table 5: Side/ laterality distribution of subjects inPresent study

		Count	%
Side	Right	50	50.0%
	Left	50	50.0%

In the study, there was equal distribution of cases on both right and left side.

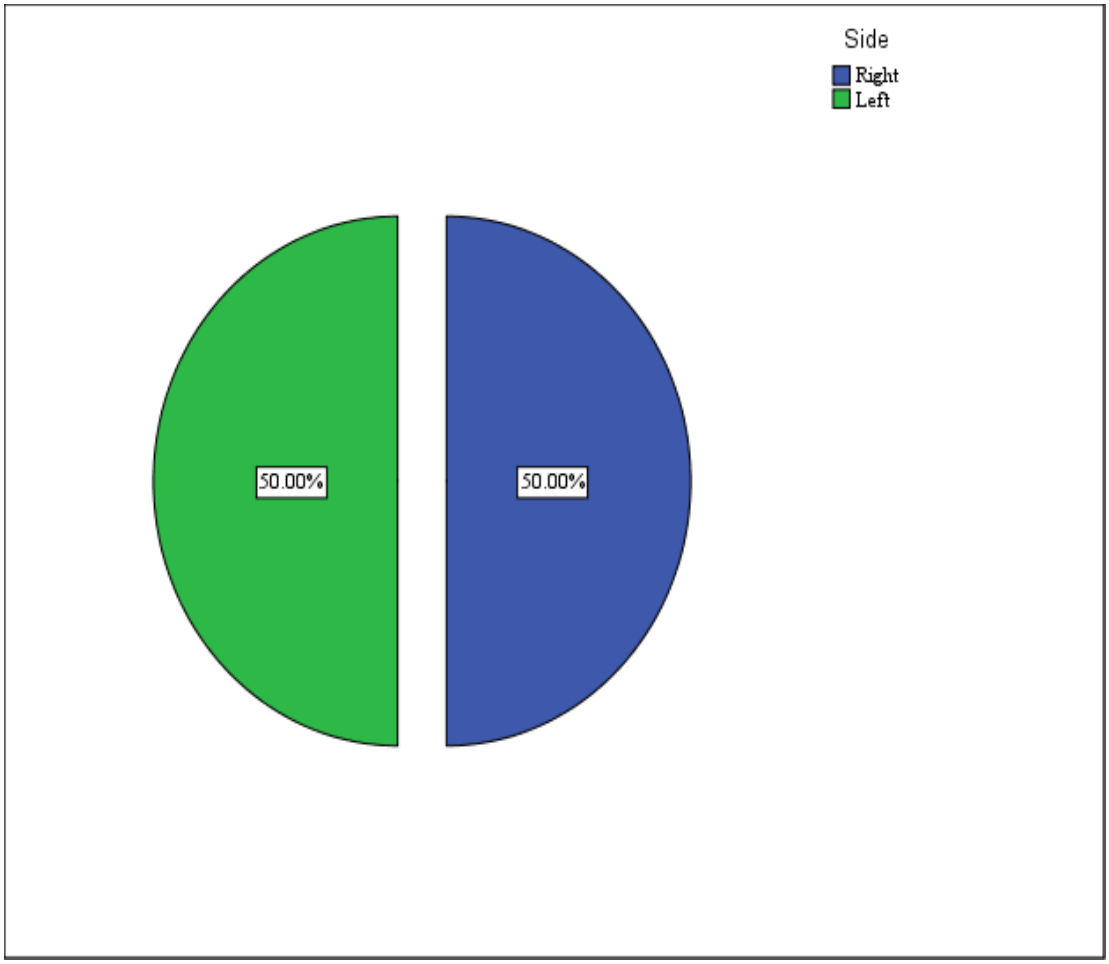


Chart 2: Pie diagram showing Side distribution among subjects

Table 6: Clinical presentation of subjects the study group

		Count	%
Complaints	Lump	90	90.0%
	Ulceration	4	4.0%
	Nipple discharge	4	4.0%
	Pagets disease	2	2.0%

In the study, 90% of cases presented with breast Lump, 4% presented with ulceration and nipple discharge each and 2% presented with Pagets diasease..

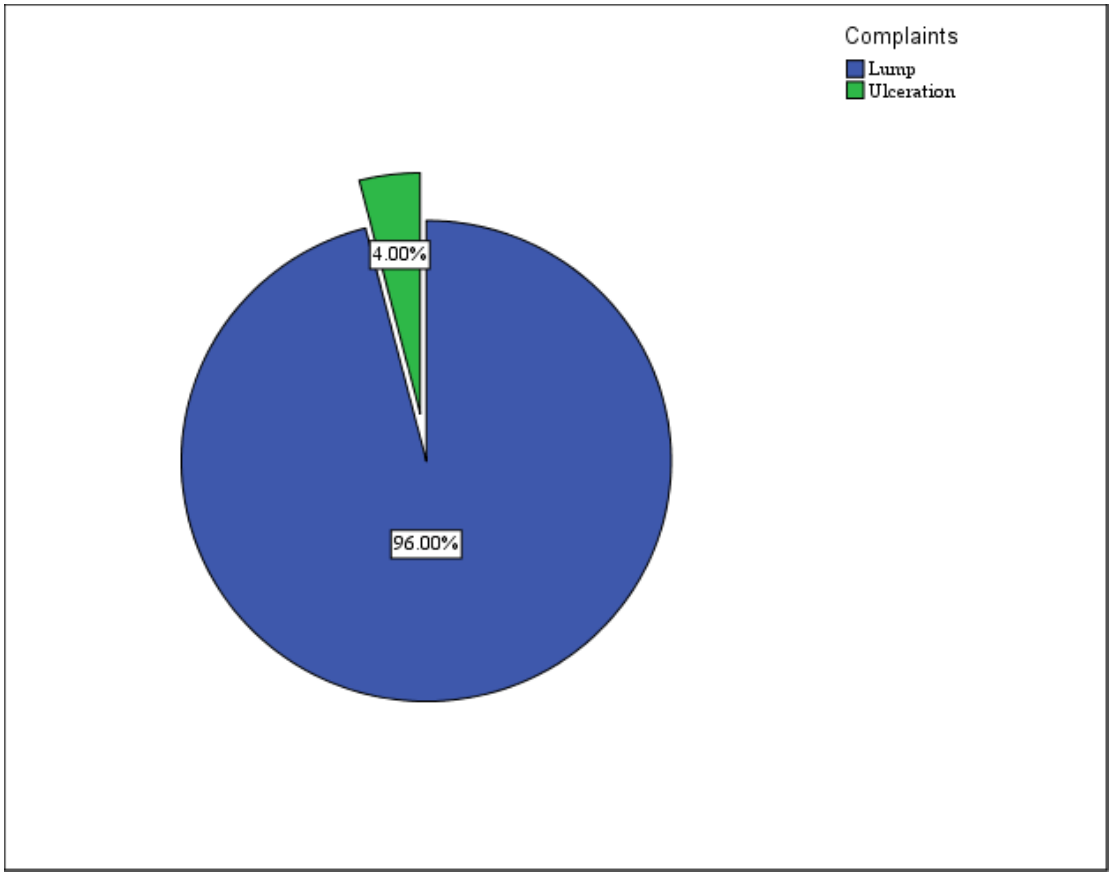


Chart 3: Pie diagram showing Complaints distribution among distribution

Table 7: Type of Surgery distribution in the study group

		Count	%
Surgery	Modified Radical Mastectomy	97	97.0%
	Mastectomy	3	3.0%

In the study, 97% of patients underwent modified radical mastectomy and 3% underwent mastectomy

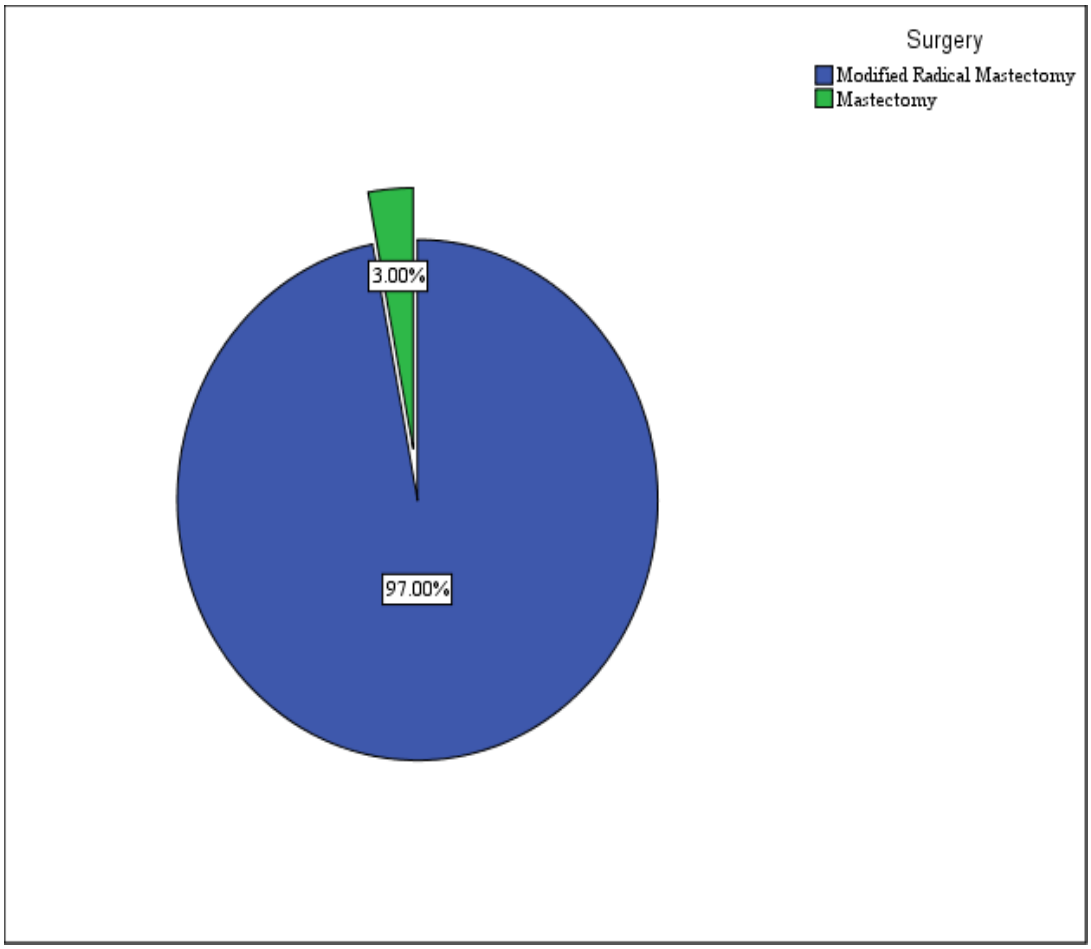


Chart 4: Pie diagram showing Type of Surgery distribution

Table 8: Distribution of Pre- Operative diagnosis in the study subjects

		Count	Percent (%)
Previous Diagnosis	Not Known	41	41.0%
	Ductal Carcinoma	52	52.0%
	Papillary Carcinoma	3	3.0%
	Medullary Carcinoma	1	1.0%
	Adenoid Cystic Carcinoma	1	1.0%
	Fibroadenoma	1	1.0%
	Phylloides	1	1.0%

In the study, previous diagnosis by FNAC/ biopsy/ Frozen section was not known in 41%, 52% of cases were diagnosed as Ductal Carcinoma, 3% had Papillary Carcinoma, 1% had Medullary Carcinoma, Adenoid Cystic Carcinoma, Fibroadenoma and Phylloides.

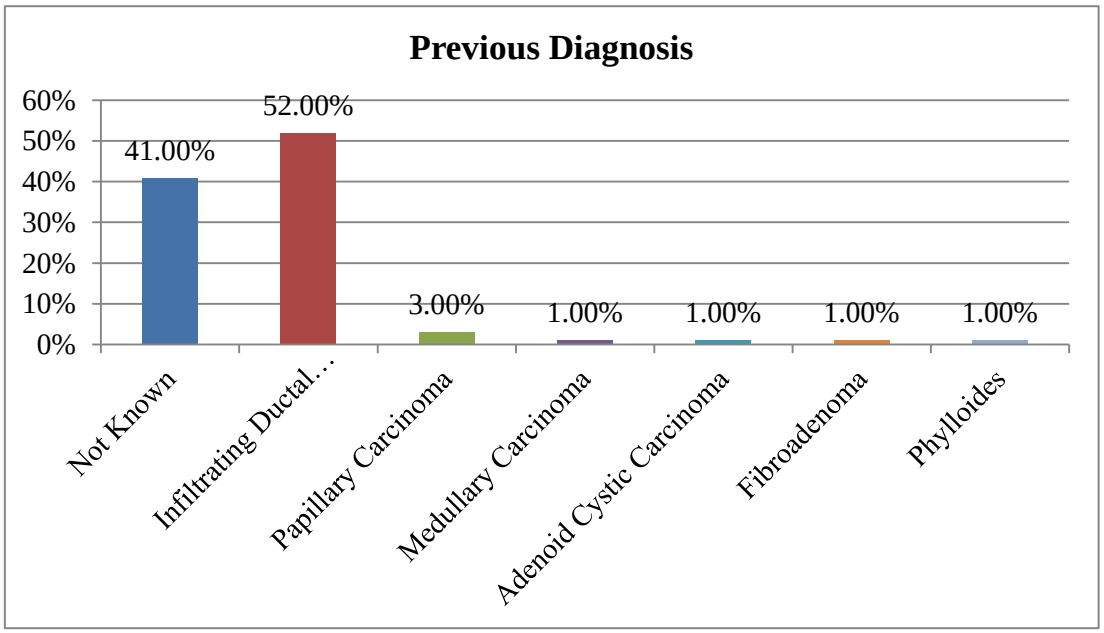


Chart 5: Bar diagram showing Pre- Operative diagnosis distribution.

Table 9: Pre-operative diagnostic Procedure distribution in the study group

		Count	%
Previous Procedure	Not Known	41	41.0%
	FNAC	53	53.0%
	Biopsy	5	5.0%
	Frozen Section	1	1.0%

In the study, 53% of cases underwent FNAC, 5% underwent biopsy and 1% underwent frozen section.

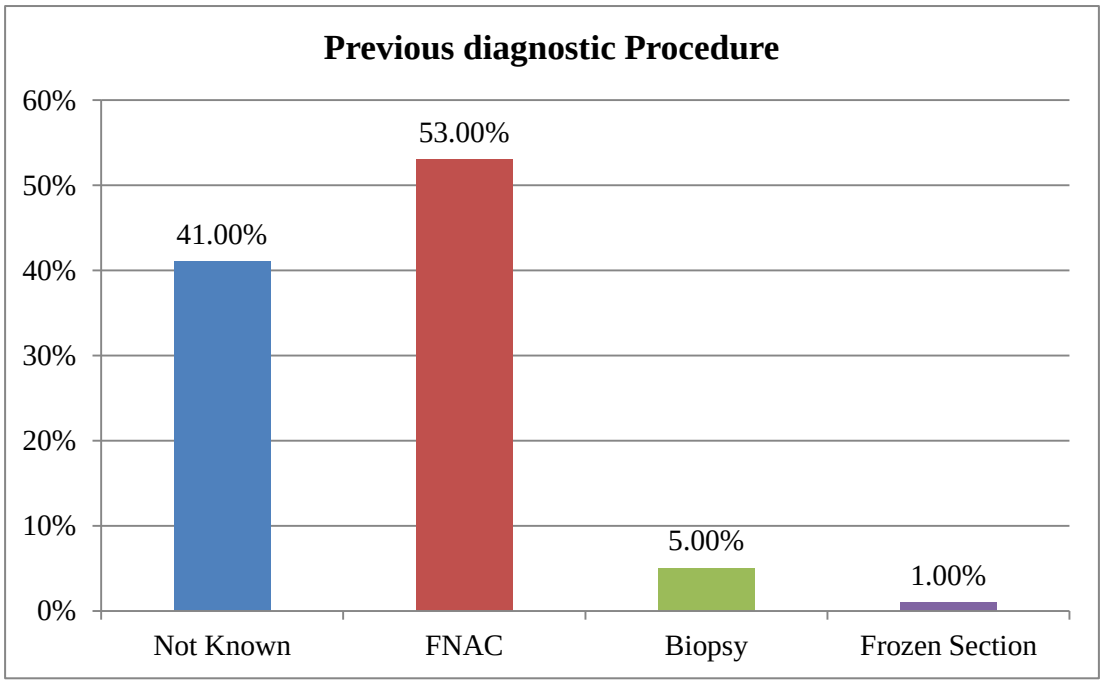


Chart 6: Bar diagram showing Pre-operative diagnostic Procedure distribution

Table 10: Tumor site distribution in the study group

The tumor site was distributed into 4 groups I.e Retroareolar , Medial, lateral and both medial and lateral quadrants for statistical analysis. Medial quadrant included inner upper and inner lower quadrants Lateral quadrant included Outer upper and Outer lower quadrants

		Count	%
Site	Retroareolar	58	58.0%
	Medial	16	16.0%
	Lateral	23	23.0%
	Both Medial and Lateral	3	3.0%

In the study, most common site was Retroareolar in 58%, medial in 16%, lateral in 23% and involving both medial and lateral quadrants in 3%.

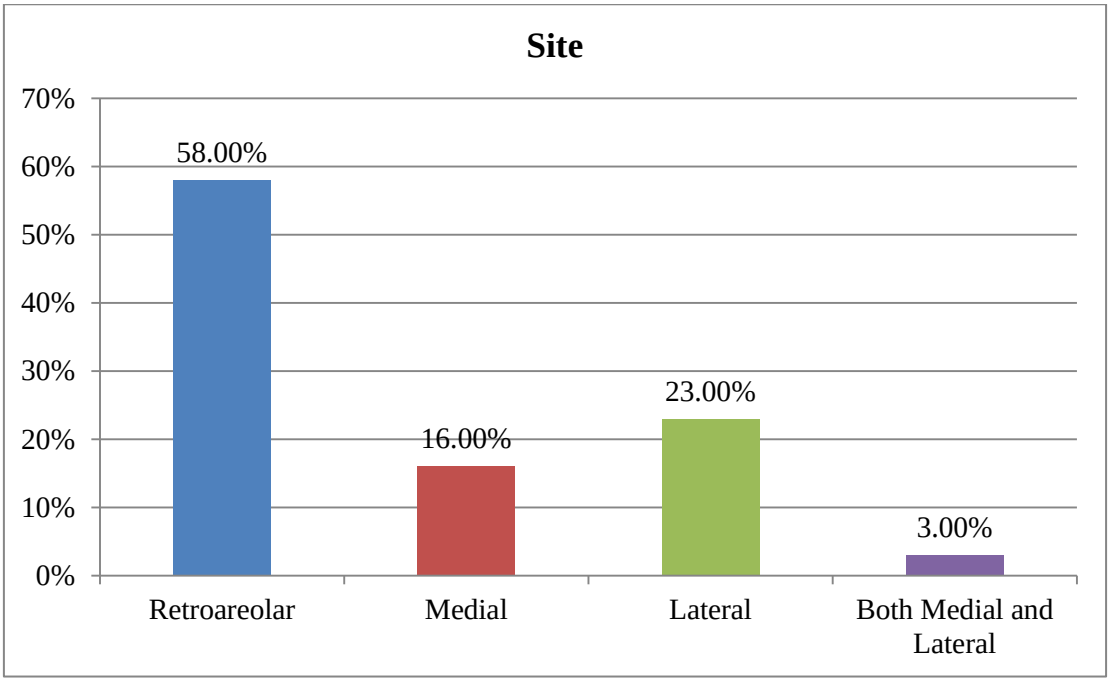


Chart 7: Bar diagram showing tumor site distribution

Table 11: Tumor Size distribution in the study group

		Count	%
Tumor Size	<2 cms	14	14.0%
	2 cms - 5 cms	55	55.0%
	>5 cms	31	31.0%

In the study, 14% of patients had Tumor size <2cms, 55% had b/w 2 to 5cms and 31% >5cms.

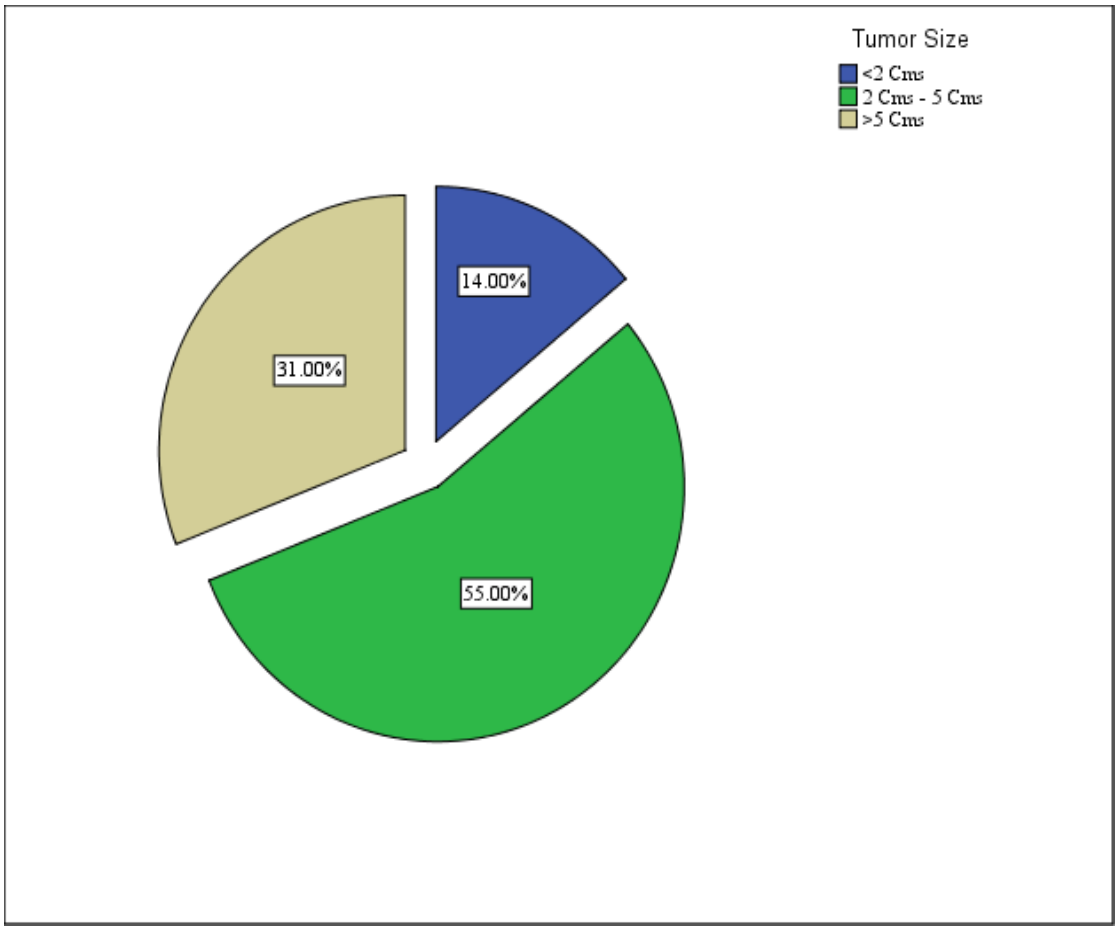


Chart 8: Pie diagram showing Tumor Size distribution

Table 12: T Staging distribution in study subjects

		Count	%
T Category	T1	11	11.0%
	T2	48	48.0%
	T3	22	22.0%
	T4	19	19.0%

In the study 11% were in T1 stage, 48% were in T2 stage, 22% were in T3 Stage and 19% were in T4 Stage.

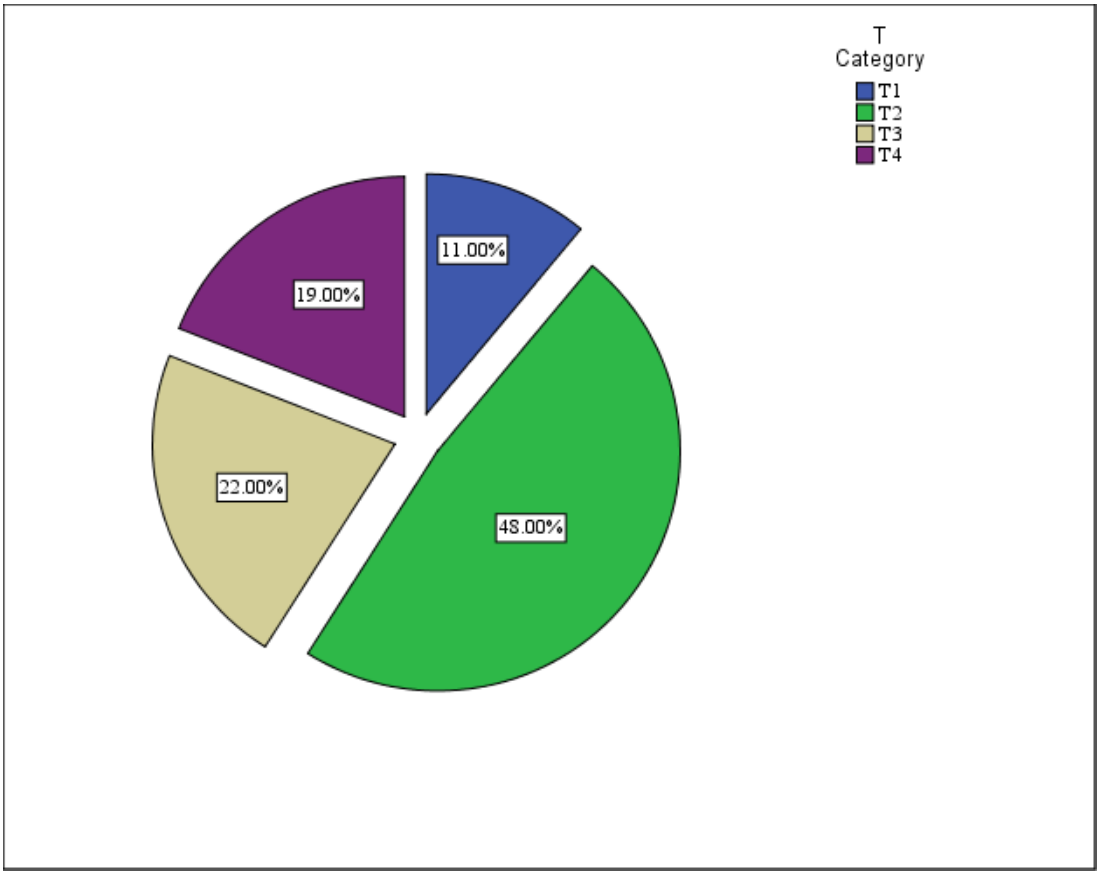


Chart 9: Pie diagram showing T Staging distribution among subjects

Table 13: Histopathology Diagnosis distribution in study subjects

		Count	%
Histopathology Diagnosis	Infiltrating Ductal Carcinoma	88	88.0%
	Infiltrating Ductal Carcinoma + Lobular Carcinoma	2	2.0%
	Papillary Carcinoma	2	2.0%
	Infiltrating Ductal Carcinoma + Medullary Carcinoma	1	1.0%
	Medullary Carcinoma	3	3.0%
	Adenoid Cystic Carcinoma	1	1.0%
	Infiltrating Ductal Carcinoma + Mucinous Carcinoma	2	2.0%
	Lobular Carcinoma	1	1.0%

In the study, 88% of patients had Infiltrating Ductal Carcinoma, 2% had Infiltrating Ductal Carcinoma + Lobular Carcinoma, 2% had Papillary Carcinoma, 1% had Infiltrating Ductal Carcinoma + Medullary Carcinoma, 3% had Medullary Carcinoma, 1% had Adenoid Cystic Carcinoma, 2% had Infiltrating Ductal Carcinoma + Mucinous Carcinoma and 1% had Lobular Carcinoma.

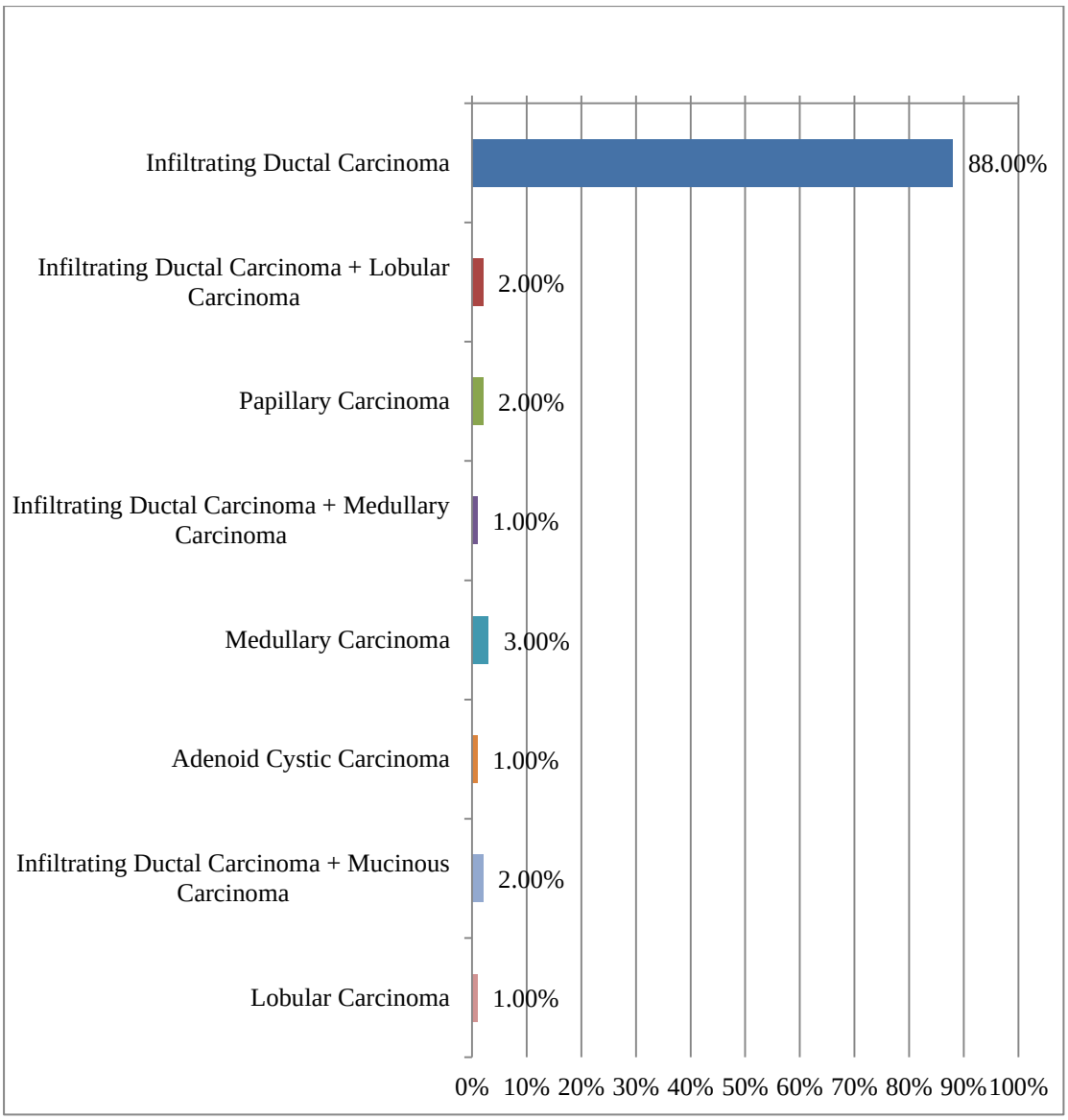


Chart 10: Bar diagram showing Histopathology Diagnosis distribution

Table 14: Tumor Grade distribution in the study subjects

		Count	%
Grade	Grade 1	46	46.0%
	Grade 2	39	39.0%
	Grade 3	15	15.0%

In the study, 46% of cases were Grade 1, 39% had Grade 2 and 15% had Grade 3.

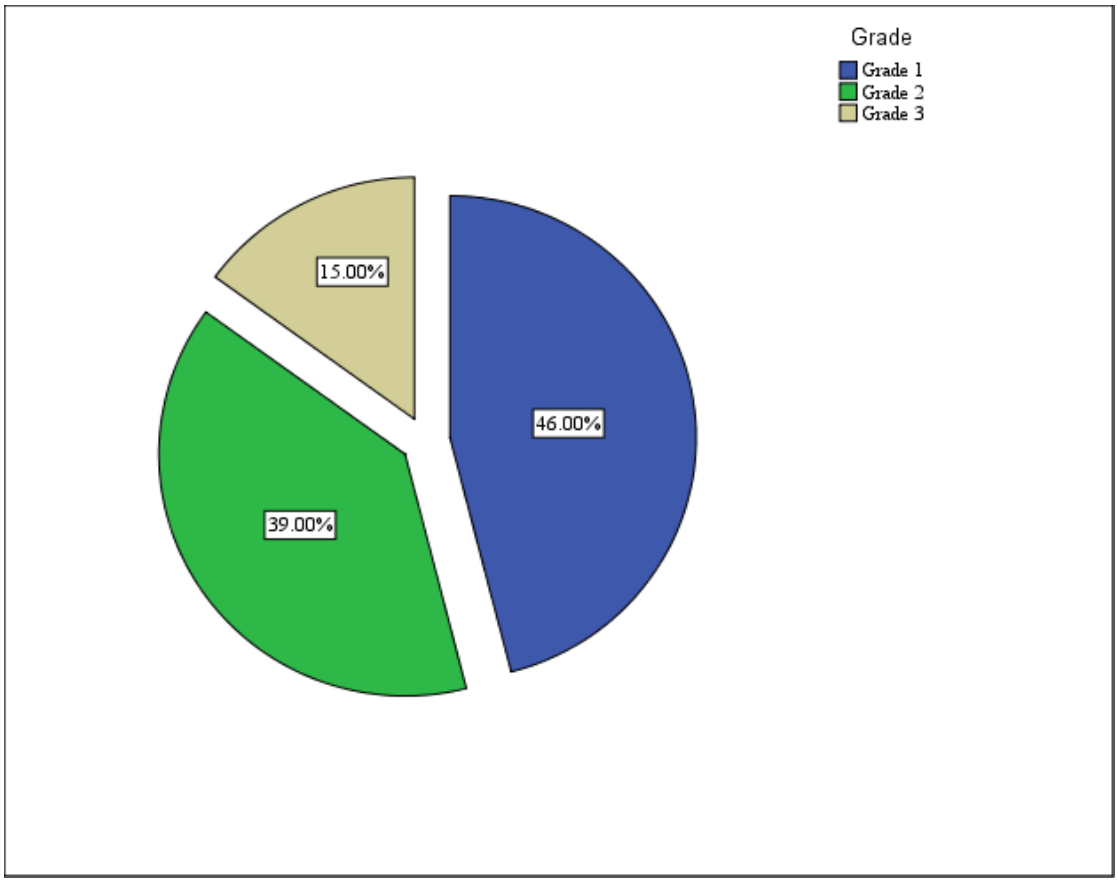


Chart 11: Pie diagram showing Grade distribution in the study group

Table 15: Skin, Dermal and Lymphovascular Invasion in the study group

	Present		Absent	
	Count	%	Count	%
Skin/Nipple/Muscle Invasion	14	14.0%	86	86.0%
Dermal Lymphovascular Invasion	9	9.0%	91	91.0%
Lymphovascular Invasion	17	17.0%	83	83.0%

In the study,14% of cases had Skin/Nipple/Muscle Invasion, 9% had Dermal Lymphovascular Invasion and 17% had Lymphovascular Invasion.

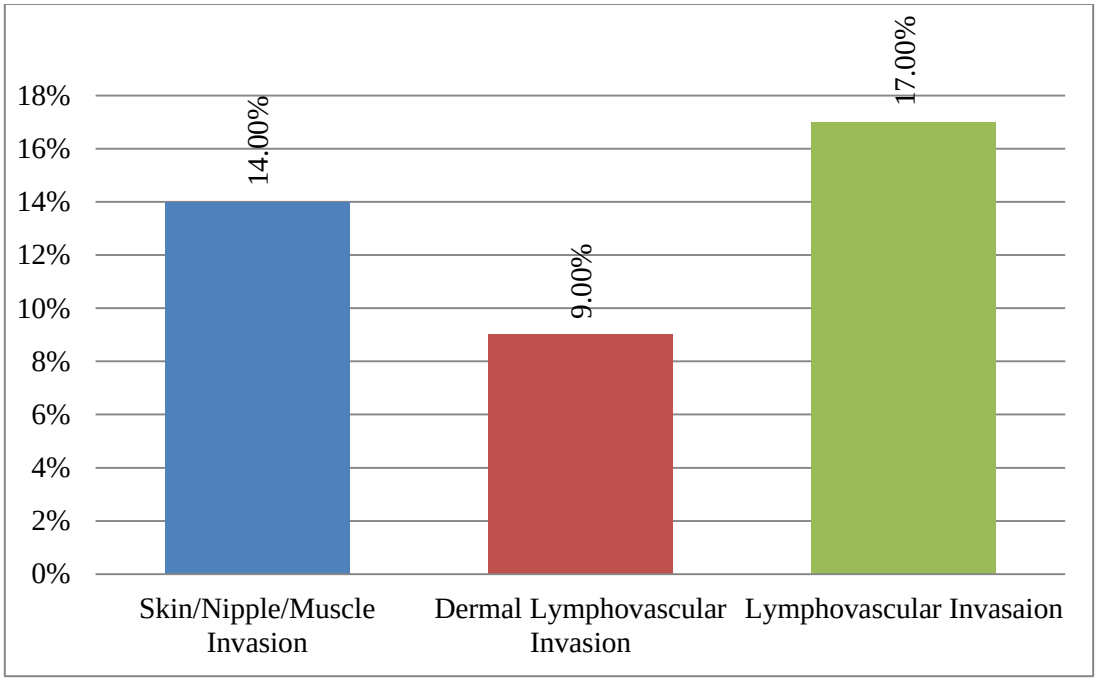


Chart 12: Bar diagram showing Skin, Dermal and Lymphovascular Invasion in the study group

Table 16: Grades of Necrosis among the study subjects

		Count	Row N %
Necrosis	Not Identified	17	17.0%
	Focal	28	28.0%
	Moderate	17	17.0%
	Extensive	38	38.0%

In the study, 28% of cases had Focal, 17% had moderate and 38% had extensive necrosis.

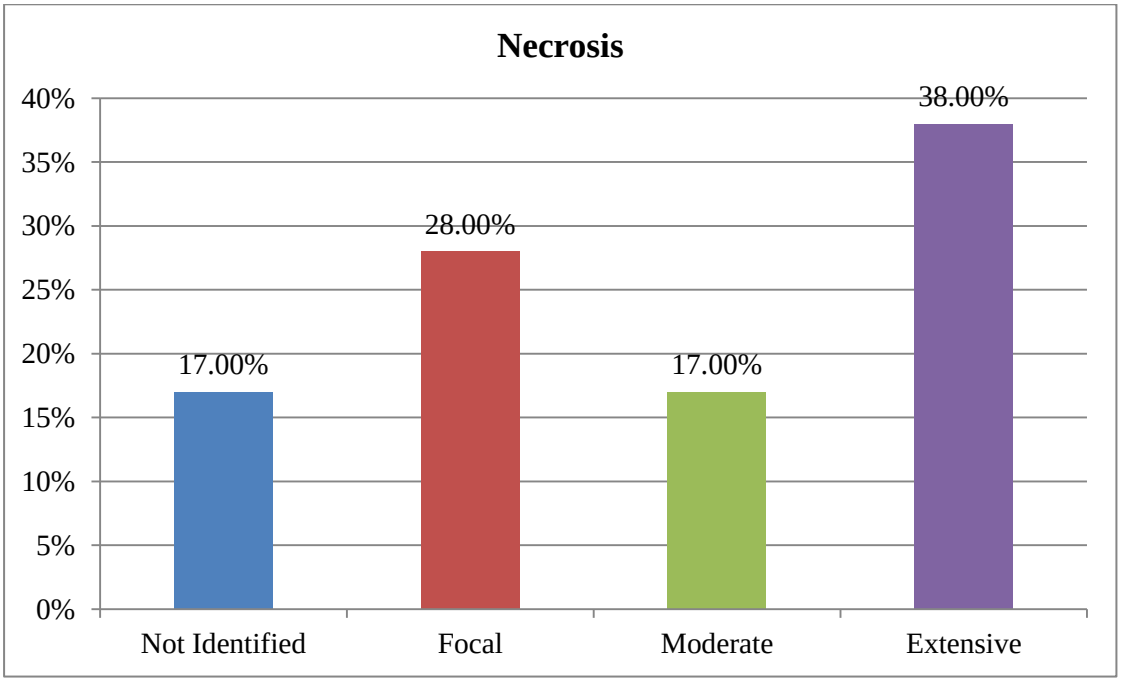


Chart 13: Bar diagram showing Necrosis distribution among subjects

Table 17: Margin status among study subjects

		Count	Row N %
Margin	Negative	87	87.0%
	Positive	13	13.0%

In the study, 13% of cases had positive margins and 87% were negative.

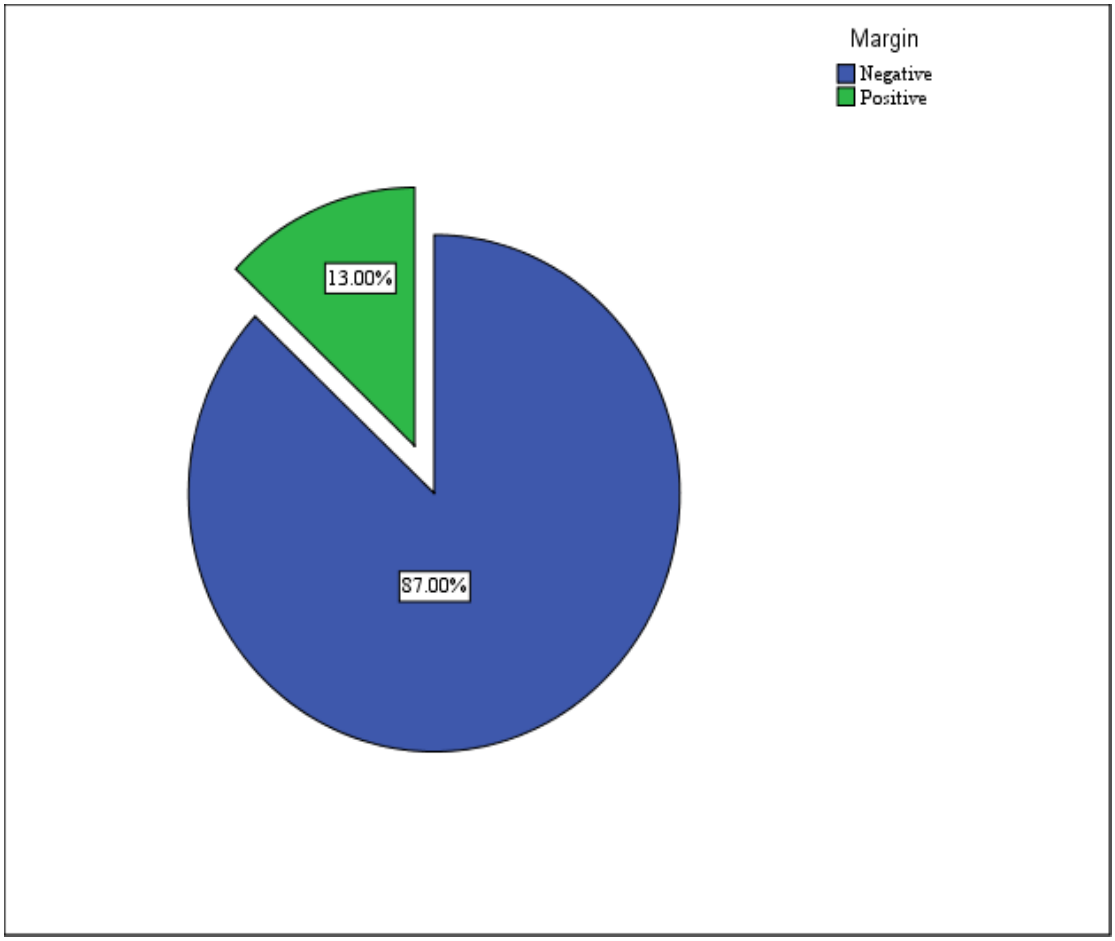


Chart 14: Pie diagram showing Margin distribution among subjects

Table 18: Lymph node Stage distribution among study subjects

		Count	%
Lymph node Stage	N0	47	47.0%
	N1	30	30.0%
	N2	14	14.0%
	N3	9	9.0%

In the study, 47% of patients were in N0 stage, 30% were in N1 stage, 14% were in N2 stage and 9% were in N3 stage.

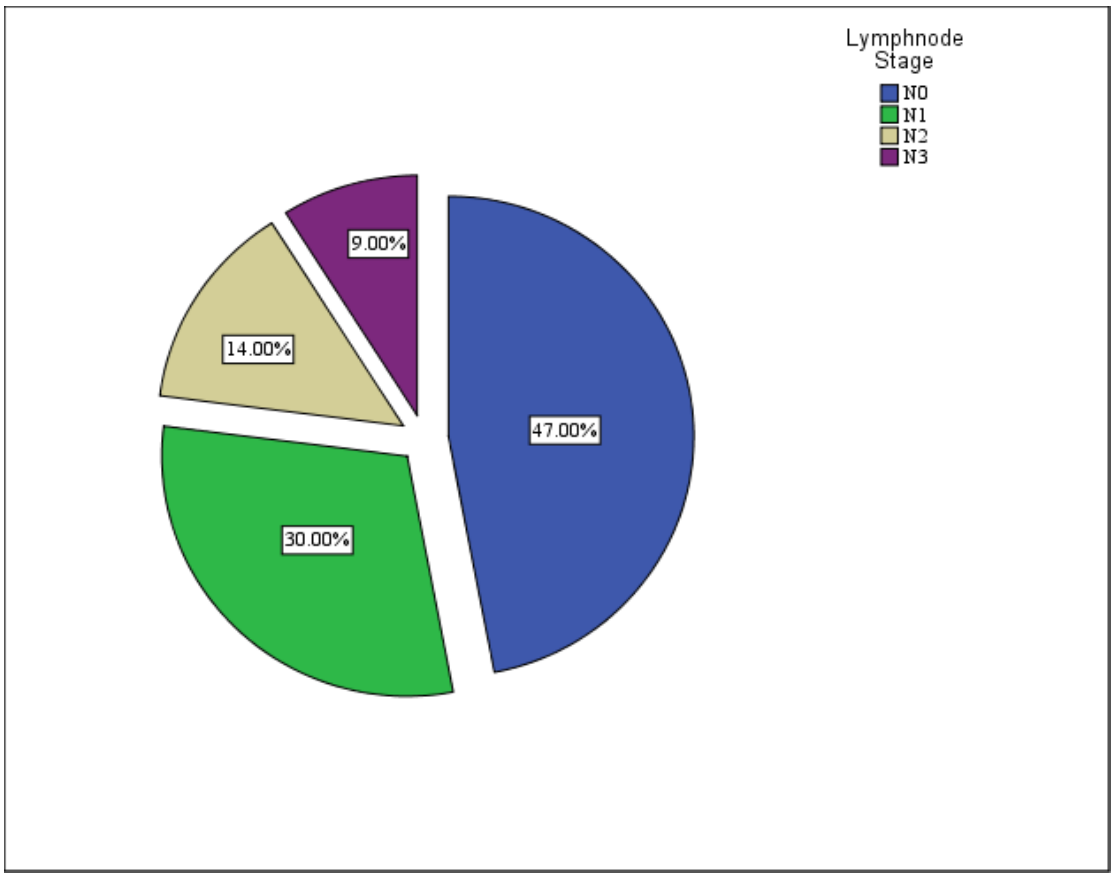


Chart 15: Pie diagram showing Lymph node Stage distribution among subjects

Table 19:Grades of Inflammatory cell Infiltrate among study subjects

		Count	%
Inflammatory Infiltrate	No Inflammatory Cell Infiltrate	6	6.0%
	Mild/ Patchy Increase	37	37.0%
	Prominent Inflammatory Reaction	28	28.0%
	Florid “Cup Like” Inflammatory Infiltrate	29	29.0%

In the study, 6% had No Inflammatory Cell Infiltrate, 37% had Mild/ Patchy Increase, 28% had Prominent Inflammatory Reaction and 29% had Florid “Cup Like” Inflammatory Infiltrate.

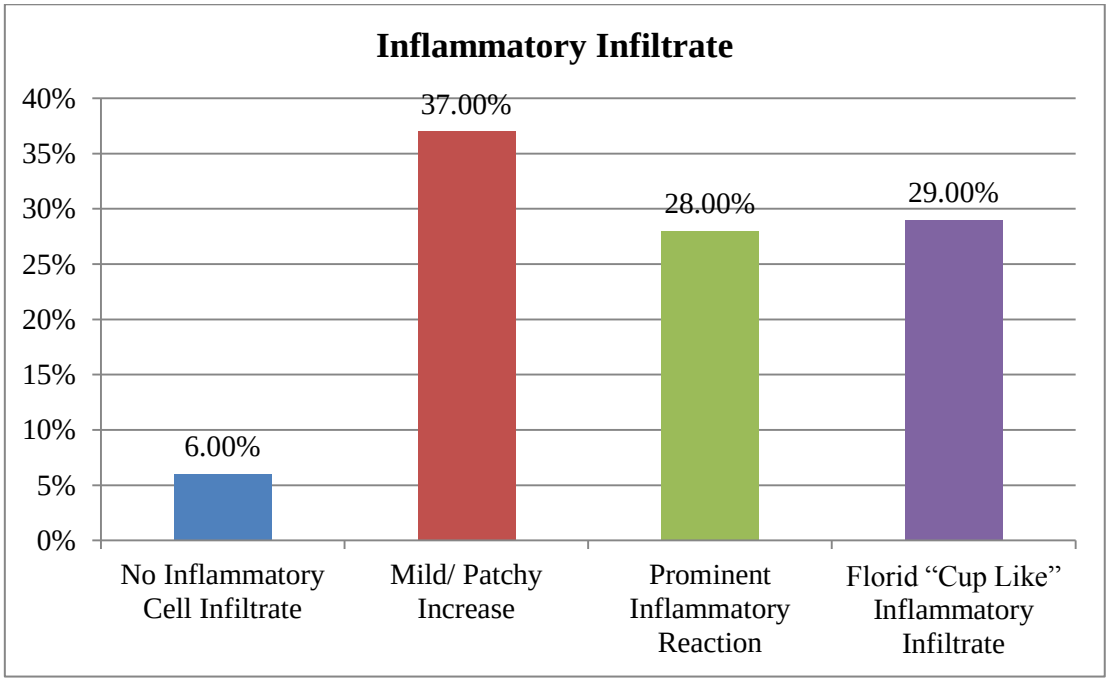


Chart 16: Bar diagram showing Inflammatory Infiltrate distribution among subjects

Table 20: Status of Perineural Invasion distribution among subjects

		Count	%
Perineural Invasion	Absent	97	97.0%
	Present	3	3.0%

In the study, 3% of cases had Perineural Invasion.

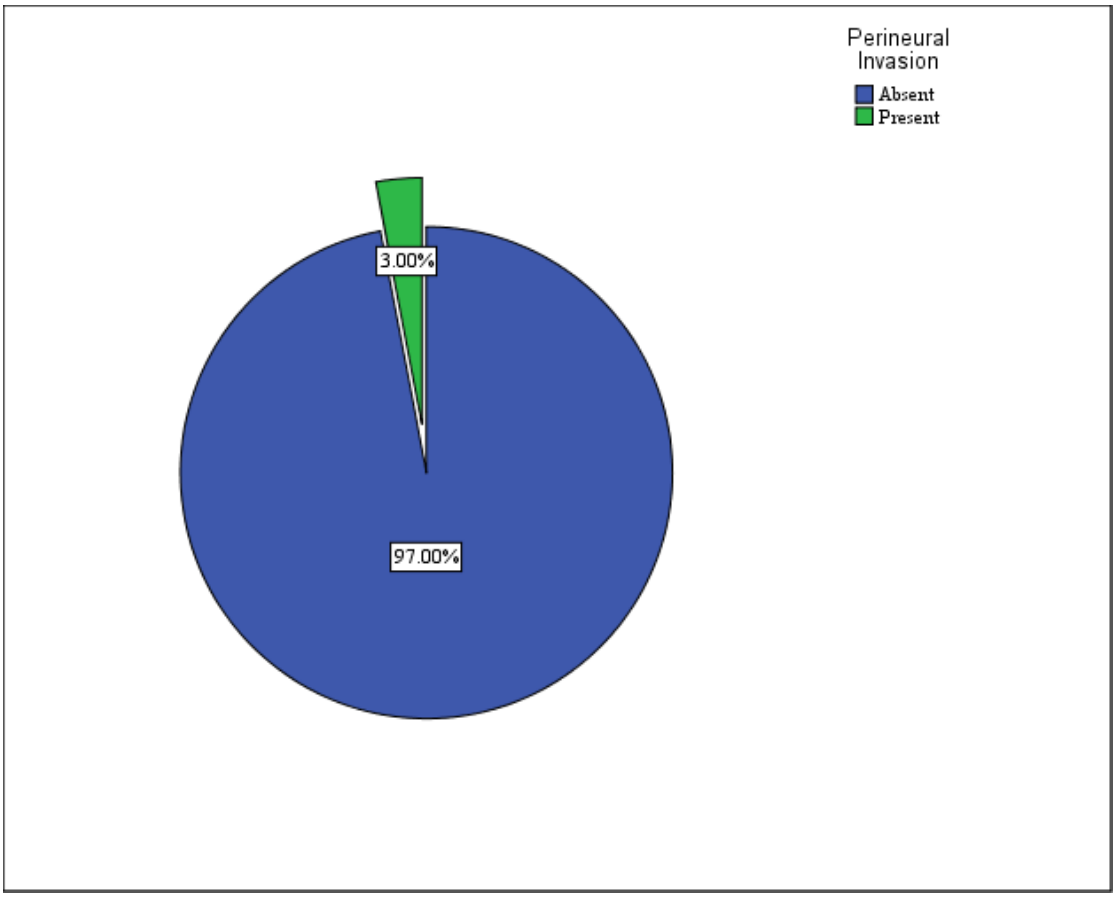


Chart 17: Pie diagram showing Perineural Invasion distribution among subjects

Table 21: Different Stromal morphology among study subjects

		Count	%
Stroma	Normal	59	59.0%
	Desmoplasia	18	18.0%
	Myxoid Change	2	2.0%
	Hyalinization	4	4.0%
	Mucinous	3	3.0%
	Mixed	7	7.0%
	Fibrocystic	4	4.0%
	Calcification	3	3.0%

In the study, 59% of cases had normal stroma, 18% had Desmoplasia , 2% had Myxoid Change, 4% had Hyalinization, 3% had Mucinous change , 7% had Mixed, 4% had Fibrocystic and 3% had areas of Calcification.

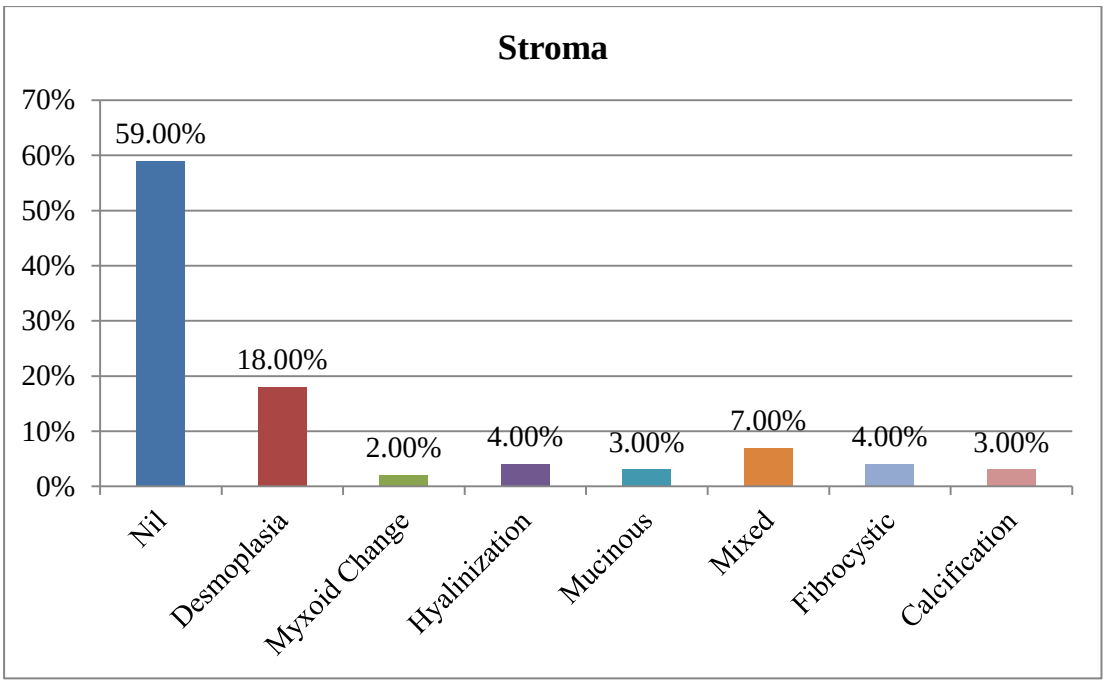


Chart 18: Bar diagram showing Stroma distribution among subjects

Table 22: NPI score among study subjects

		Count	%
NPI	2-2.4	10	10.0%
	2.4-3.4	26	26.0%
	3.4- 5.4	42	42.0%
	>5.4	22	22.0%

In the study, 10% had NPI score between 2 to 2.4, 26% had NPI between 2.4 to 3.4, 42% had NPI between 3.4 to 5.4 and 22% of cases had NPI >5.4.

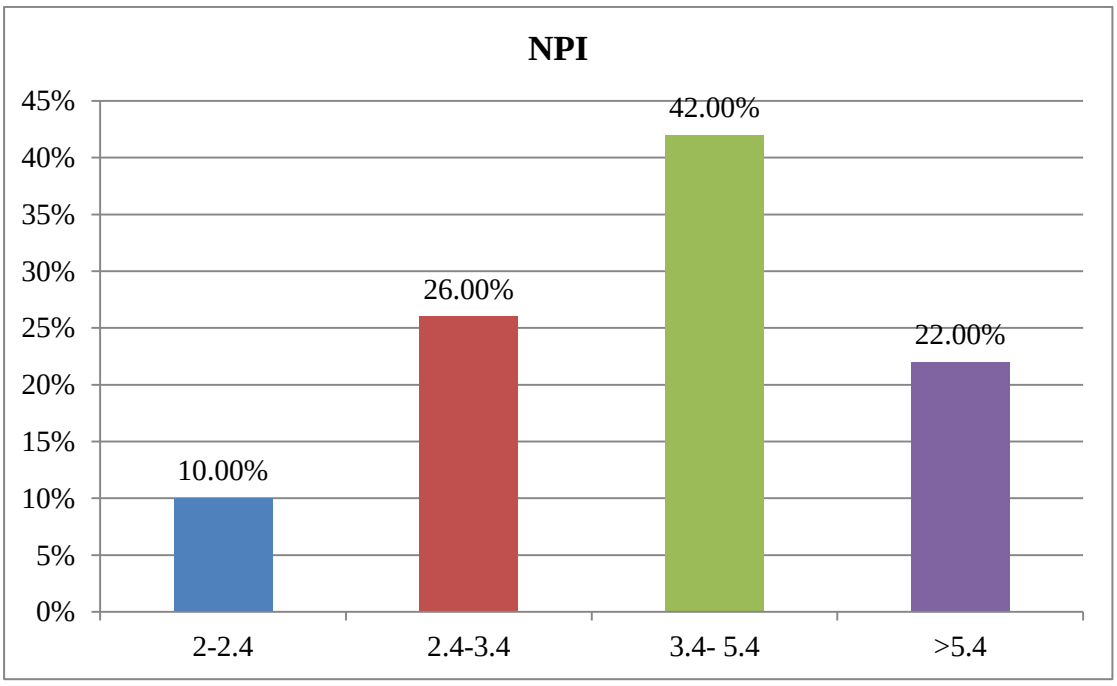


Chart 19: Bar diagram showing NPI distribution among subjects

Table 23: Stage of Tumor in various cases in the study subjects

		Count	%
Stage	I	4	4.0%
	IA	2	2.0%
	IIA	30	30.0%
	IIB	26	26.0%
	IIIA	11	11.0%
	IIIB	8	8.0%
	IIIC	9	9.0%
	IV	10	10.0%

In the study, 4% of cases were in Stage I, 2% were in Stage IA, 30% were in Stage IIA, 26% were in Stage IIB, 11% were in Stage IIIA, 8% were in Stage IIIB, 9% were in Stage IIIC and 10% were in Stage IV.

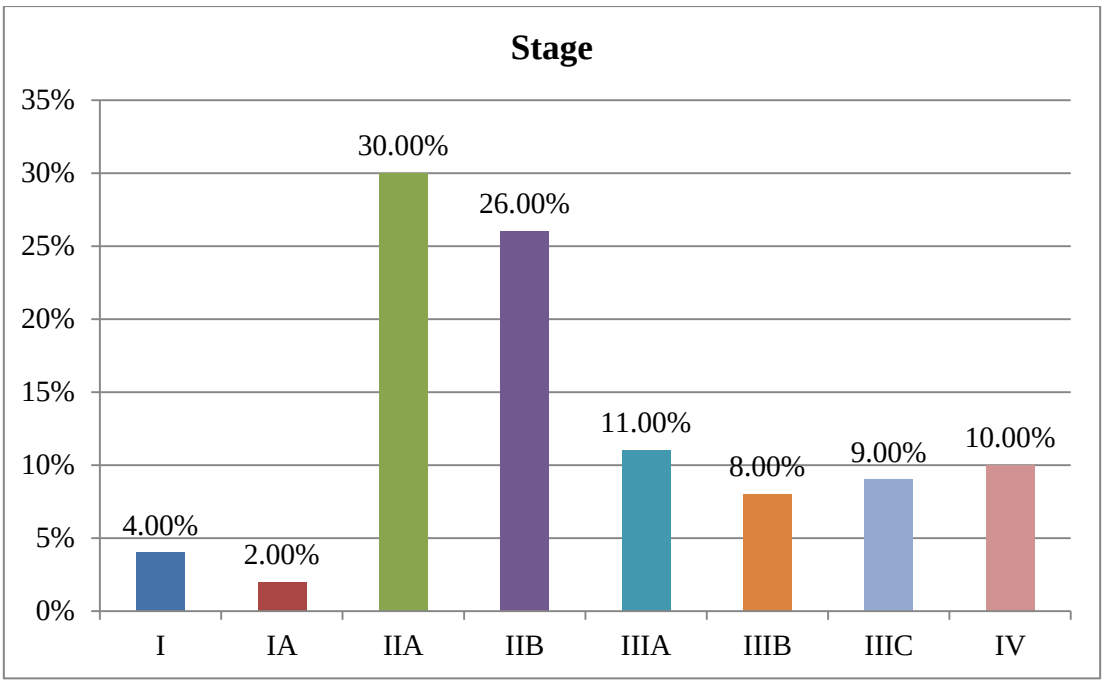


Chart 20: Bar diagram showing distribution of stage of Tumor in the study group

ASSOCIATION OF DIFFERENT CLINICO-PATHOLOGICAL PARAMETERS WITH AXILLARY LYMPH NODE METASTASIS

Table 24: Association between Age and Lymph node Stage in the study group

			Lymph node Stage				Total
			N0	N1	N2	N3	
Age	<50 years	Count	21	13	7	6	47
		%	44.7%	27.7%	14.9%	12.8%	100.0%
	>50 years	Count	26	17	7	3	53
		%	49.1%	32.1%	13.2%	5.7%	100.0%
Total		Count	47	30	14	9	100
		%	47.0%	30.0%	14.0%	9.0%	100.0%

$\chi 2 = 1.711$, df =3, p = 0.634

In this study, there was no significant association between age and Lymph node stage.

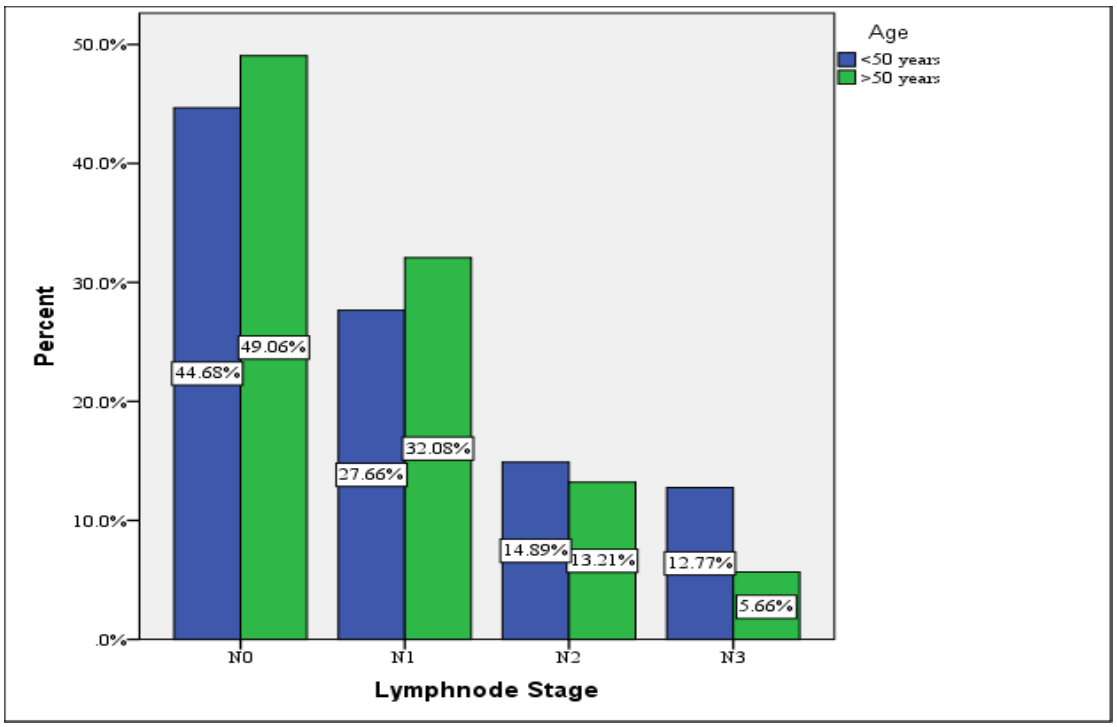


Chart 21: Bar diagram showing Association between Age and Lymph node Stage

Table 25: Association between Site and Lymph node Stage

			Lymph node Stage				Total
			N0	N1	N2	N3	
Site	Retroareolar	Count	27	13	10	8	58
		% within Site	46.6%	22.4%	17.2%	13.8%	100.0%
	Medial	Count	8	5	2	1	16
		% within Site	50.0%	31.2%	12.5%	6.2%	100.0%
	Lateral	Count	11	10	2	0	23
		% within Site	47.8%	43.5%	8.7%	0.0%	100.0%
	Both Medial and Lateral	Count	1	2	0	0	3
		% within Site	33.3%	66.7%	0.0%	0.0%	100.0%
Total		Count	47	30	14	9	100
		% within Site	47.0%	30.0%	14.0%	9.0%	100.0%

$\chi 2 = 9.312$, df =9, p = 0.409

In the study, there was no significant association between Site and Lymph node stage.

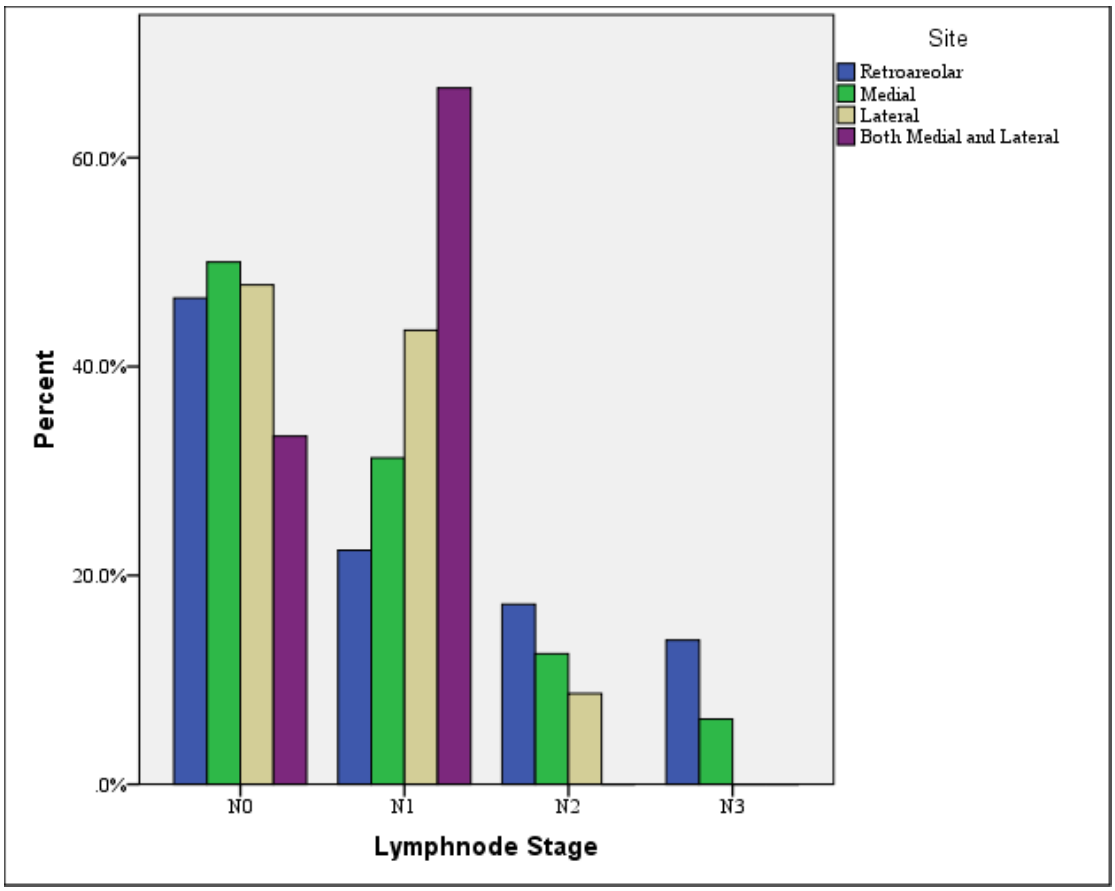


Chart 22: Bar diagram showing Association between site of tumor and Lymph node Stage

Table 26: Association between Tumor Size and Lymph node Stage in the study group

			Lymph node Stage				Total
			N0	N1	N2	N3	
Tumor Size	<2cms	Count	8	5	1	0	14
		%	57.1%	35.7%	7.1%	0.0%	100.0%
	2cms – 5cms	Count	28	21	5	1	55
		%	50.9%	38.2%	9.1%	1.8%	100.0%
	>5cms	Count	11	4	8	8	31
		%	35.5%	12.9%	25.8%	25.8%	100.0%
Total		Count	47	30	14	9	100
		%	47.0%	30.0%	14.0%	9.0%	100.0%

$\chi 2 = 24.4$, df =6, p <0.001*

In the study there was significant association between Tumor size and Lymph node stage i.e. among those with <2cm size, 57.1% were in N0, 35.7% were in N1 and 7.1% were in N2 Stage.

Those with size 2cms to 5cms, 50.9% were in N0, 38.2% were in N1, 9.1% were in N2 and 1.8% was in N3.

Those with >5cms, 35.5% were in N0, 12.9% were in N1, 25.8% were in N2 and 25.8% were in N3.

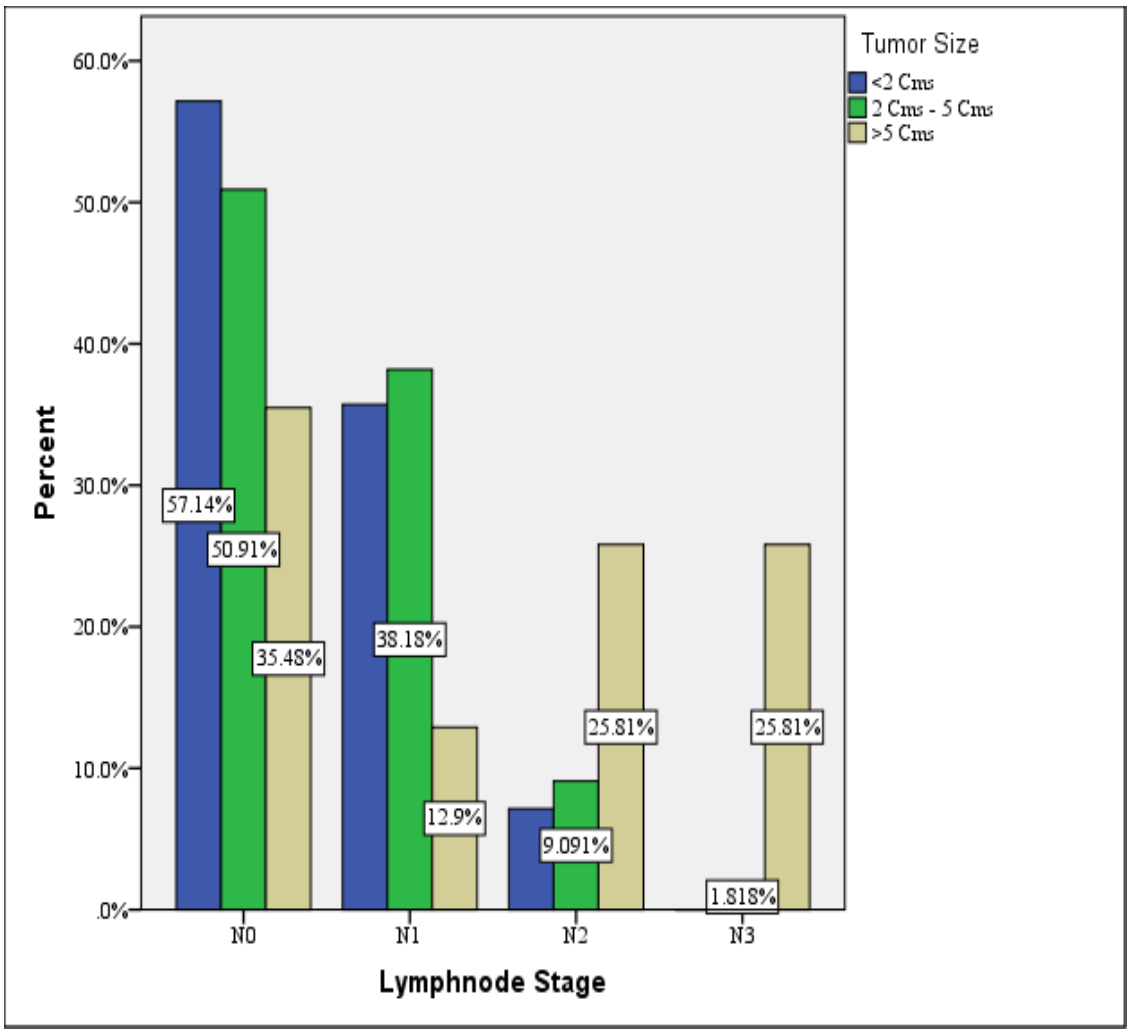


Chart 23: Bar diagram showing Association between Tumor Size and Lymph node Stage

Table 27: Association between Pathological T Stage and Lymph node Stage in the study group

			Lymph node Stage				Total
			N0	N1	N2	N3	
T stage	T1	Count	5	5	1	0	11
		%	45.5%	45.5%	9.1%	0.0%	100.0%
	T2	Count	24	18	5	1	48
		%	50.0%	37.5%	10.4%	2.1%	100.0%
	T3	Count	9	1	5	7	22
		%	40.9%	4.5%	22.7%	31.8%	100.0%
	T4	Count	9	6	3	1	19
		%	47.4%	31.6%	15.8%	5.3%	100.0%
Total		Count	47	30	14	9	100
		%	47.0%	30.0%	14.0%	9.0%	100.0%

$\chi 2 = 25.24$, df =9, p = 0.003*

In the study there was significant association between T stage and Lymph node stage.

Those in T1 stage, 45.5% were in N0, 45.5% were in N1 and 9.1% were in N2 stage. Those in T2 Stage, 50% were in N0, 37.5% were in N1, 10.4% were in N2 and 2.1% were in N3 stage. Those in T3 stage, 40.9% were in N0, 4.5% were in N1, 22.7% were in N2 and 31.8% were in N3 stage and those in T4 stage, 47.4% were in N0, 31.6% were in N1, 15.8% were in N2 and 5.3% were in N3 stage.

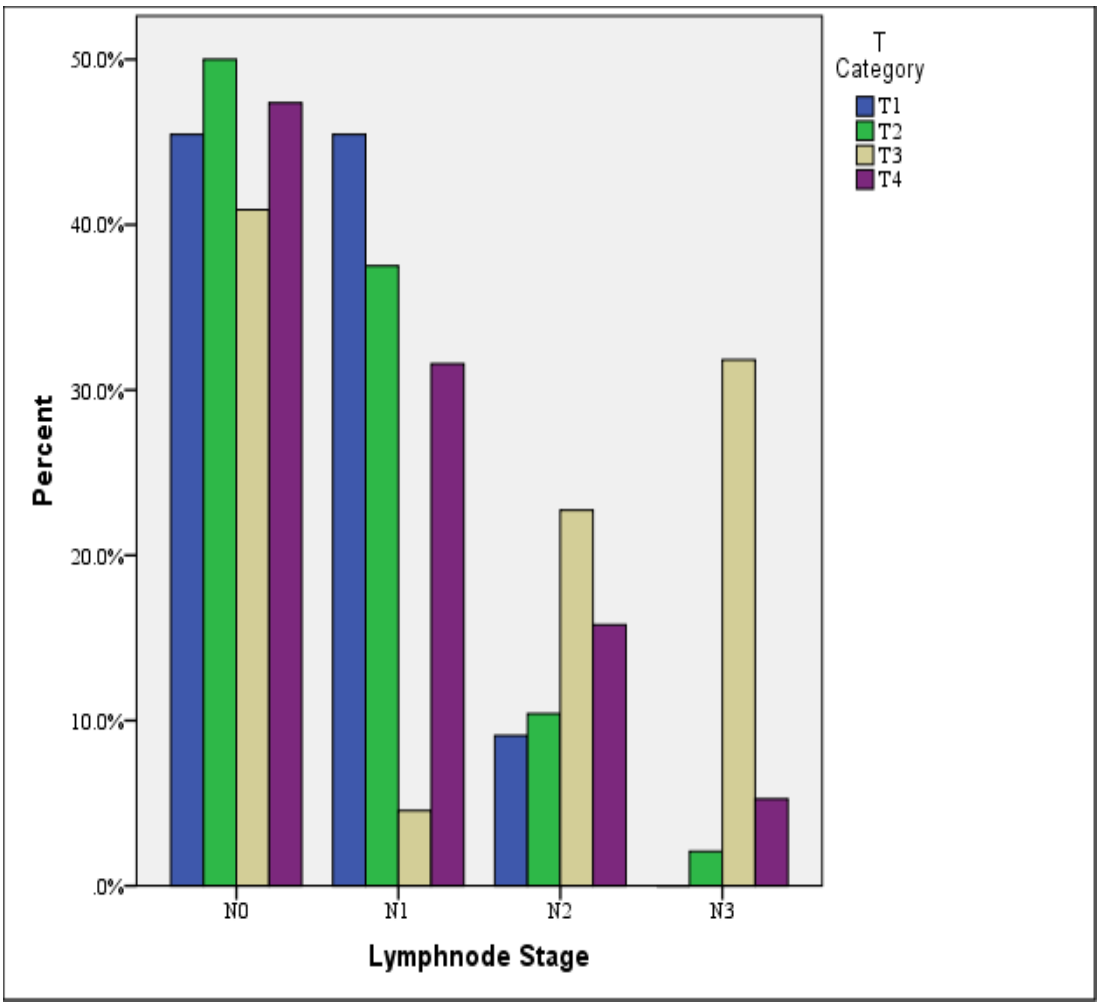


Chart 24: Bar diagram showing Association between pathological T Stage and Lymph node Stage

Table 28 : Association between Histopathology Diagnosis and Lymph node Stage in the study group

			Lymph node Stage				Total
			N0	N1	N2	N3	
Histopathology Diagnosis	Infiltrating Ductal Carcinoma	Count	40	28	13	7	88
		%	45.5%	31.8%	14.8%	8.0%	100.0%
	Infiltrating Ductal Carcinoma + Lobular Carcinoma	Count	1	0	0	1	2
		%	50.0%	0.0%	0.0%	50.0%	100.0%
	Papillary Carcinoma	Count	1	1	0	0	2
		%	50.0%	50.0%	0.0%	0.0%	100.0%
	Infiltrating Ductal Carcinoma + Medullary Carcinoma	Count	1	0	0	0	1
		%	100.0%	0.0%	0.0%	0.0%	100.0%
	Medullary Carcinoma	Count	3	0	0	0	3
		%	100.0%	0.0%	0.0%	0.0%	100.0%
	Adenoid Cystic Carcinoma	Count	1	0	0	0	1
		%	100.0%	0.0%	0.0%	0.0%	100.0%
	Infiltrating Ductal Carcinoma + Mucinous Carcinoma	Count	0	0	1	1	2
		%	0.0%	0.0%	50.0%	50.0%	100.0%
	Lobular Carcinoma	Count	0	1	0	0	1
		%	0.0%	100.0%	0.0%	0.0%	100.0%
Total		Count	47	30	14	9	100
		%	47.0%	30.0%	14.0%	9.0%	100.0%

$\chi 2 = 20.735$, df =21, p = 0.475

In the study there was no significant association between Histopathology Diagnosis and Lymph node Stage.

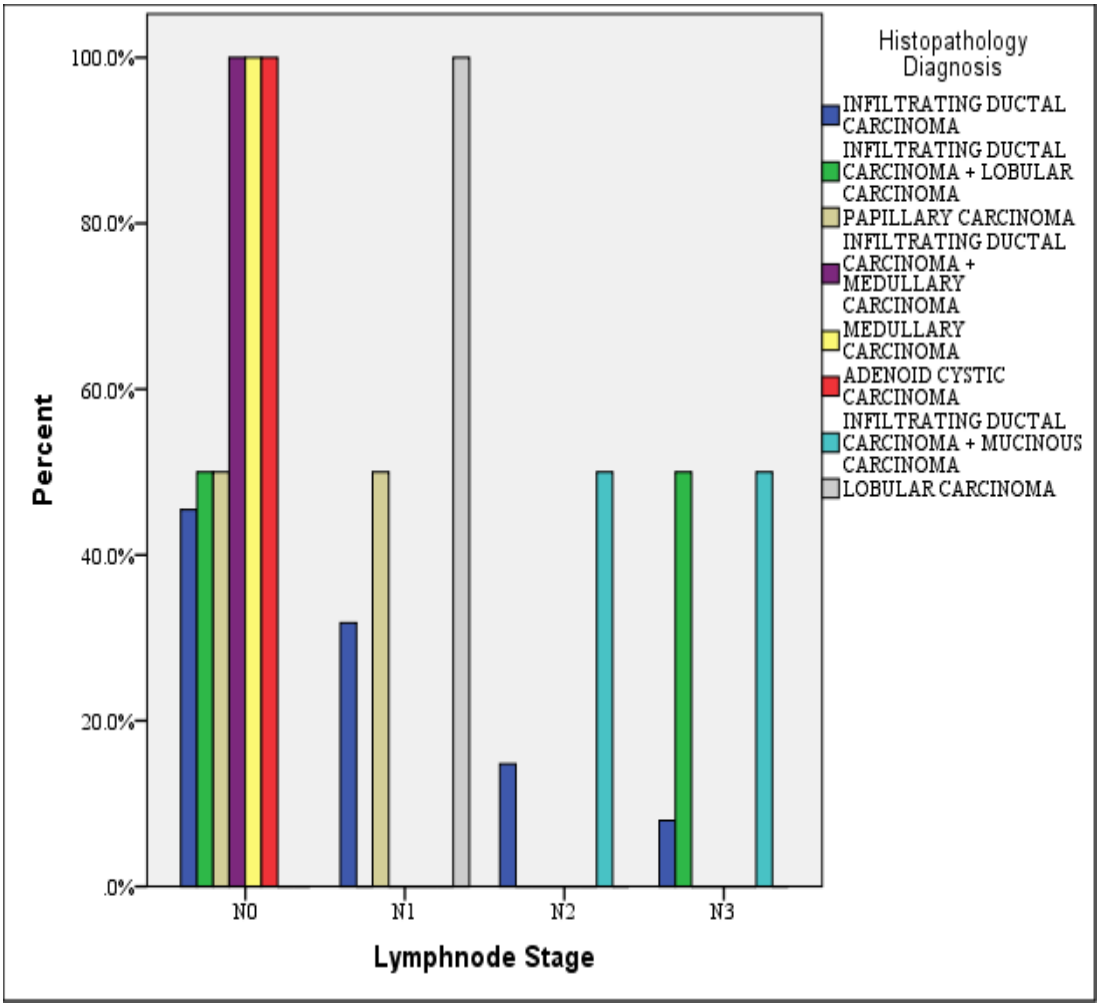


Chart 25: Bar diagram showing Association between Histopathology Diagnosis and Lymph node Stage

Table 29 : Association between Grade and Lymph node Stage in study group

			Lymph node Stage				Total
			N0	N1	N2	N3	
Grade	Grade 1	Count	30	13	1	2	46
		%	65.2%	28.3%	2.2%	4.3%	100.0%
	Grade 2	Count	11	14	9	5	39
		%	28.2%	35.9%	23.1%	12.8%	100.0%
	Grade 3	Count	6	3	4	2	15
		%	40.0%	20.0%	26.7%	13.3%	100.0%
Total		Count	47	30	14	9	100
		%	47.0%	30.0%	14.0%	9.0%	100.0%

$\chi 2 = 17.995$, df =6, p = 0.006*

In the study, there was significant association between Grade and Lymph node stage i.e. among those who were in Grade 1, 65.2% were in N0, 28.3% were in N1, 2.2% were in N2 and 4.3% were in N3.

Among those who were in Grade 2, 28.2% were in N0, 35.9% were in N1, 23.1% were in N2 and 12.8% were in N3 stage. Among those who were in Grade 3, 40% were in N0, 20% were in N1, 26.7% were in N2 and 13.3% were in N3 stage.

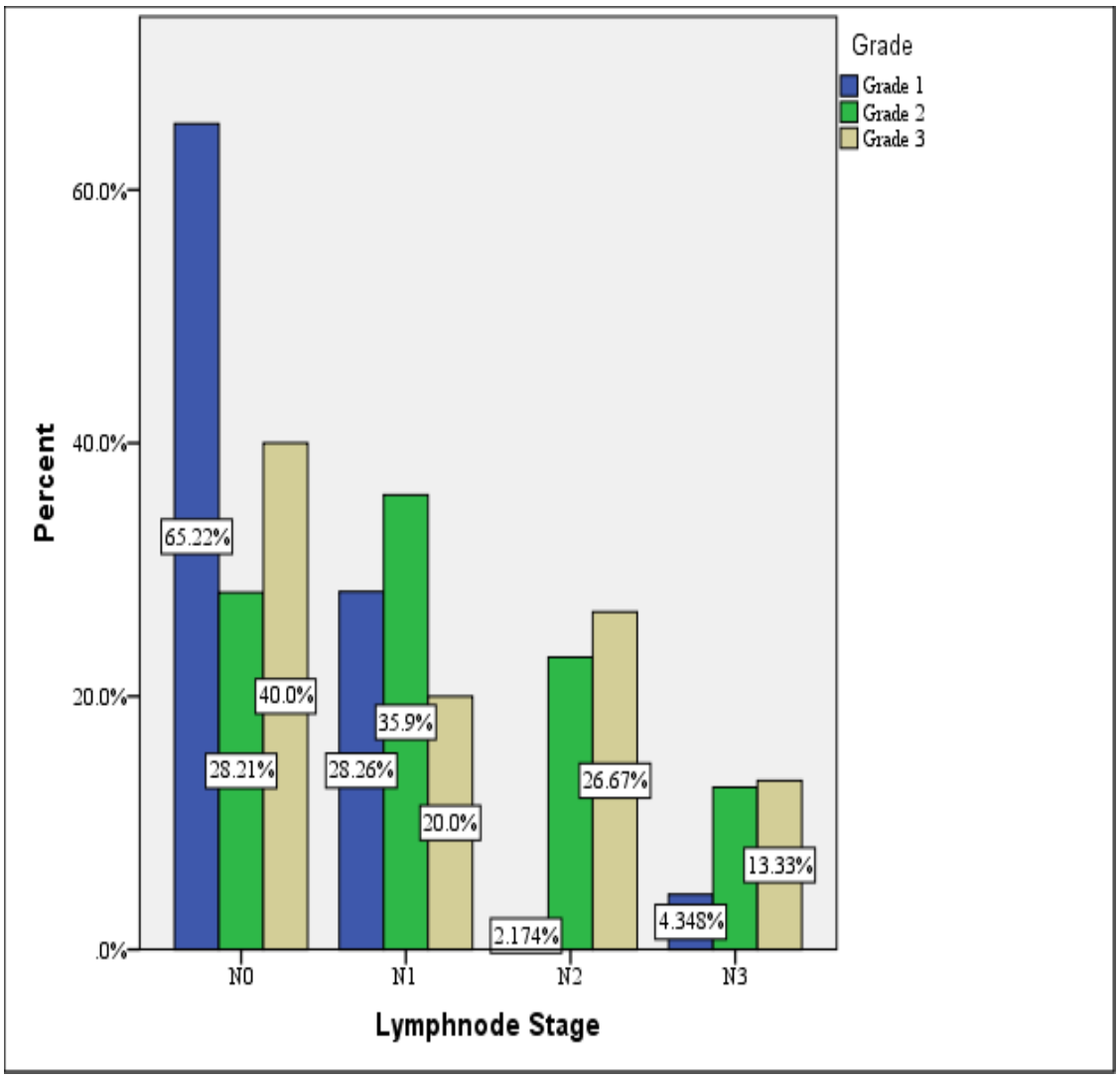


Chart 26 : Bar diagram showing Association between tumor grade and Lymph node Stage

Table 30 : Association between Skin/Nipple/Muscle Invasion and Lymph node Stage in the study group

			Lymph node Stage				Total
			N0	N1	N2	N3	
Skin/Nipple/Muscle Invasion	Absent	Count	42	24	11	9	86
		%	48.8%	27.9%	12.8%	10.5%	100.0%
	Present	Count	5	6	3	0	14
		%	35.7%	42.9%	21.4%	0.0%	100.0%
Total		Count	47	30	14	9	100
		%	47.0%	30.0%	14.0%	9.0%	100.0%

χ 2 =3.445, df =3, p = 0.328

In the study, there was no significant association between Skin/Nipple/Muscle Invasion and Lymph node stage.

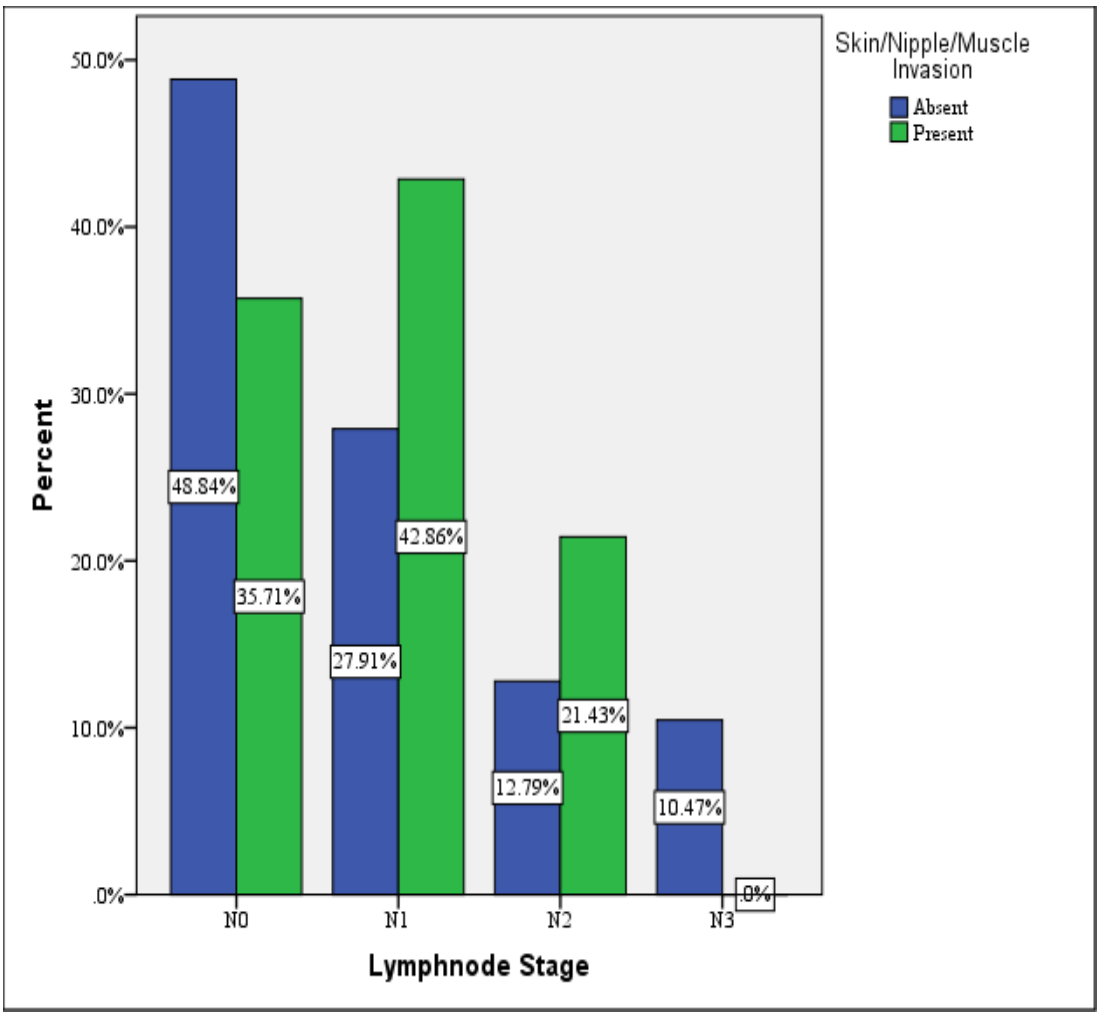


Chart 27: Bar diagram showing Association between Skin/Nipple/Muscle Invasion and Lymph node Stage

Table 31 : Association between Dermal Lymphovascular Invasion and Lymph node Stage in the study group

			Lymph node Stage				Total
			N0	N1	N2	N3	
Dermal Lymphovascular Invasion	Absent	Count	42	27	14	8	91
		%	46.2%	29.7%	15.4%	8.8%	100.0%
	Present	Count	5	3	0	1	9
		%	55.6%	33.3%	0.0%	11.1%	100.0%
Total		Count	47	30	14	9	100
		%	47.0%	30.0%	14.0%	9.0%	100.0%

$\chi 2 = 1.624$, df =3, p = 0.654

In the study, there was no significant association between Dermal Lymphovascular Invasion and Lymph node stage.

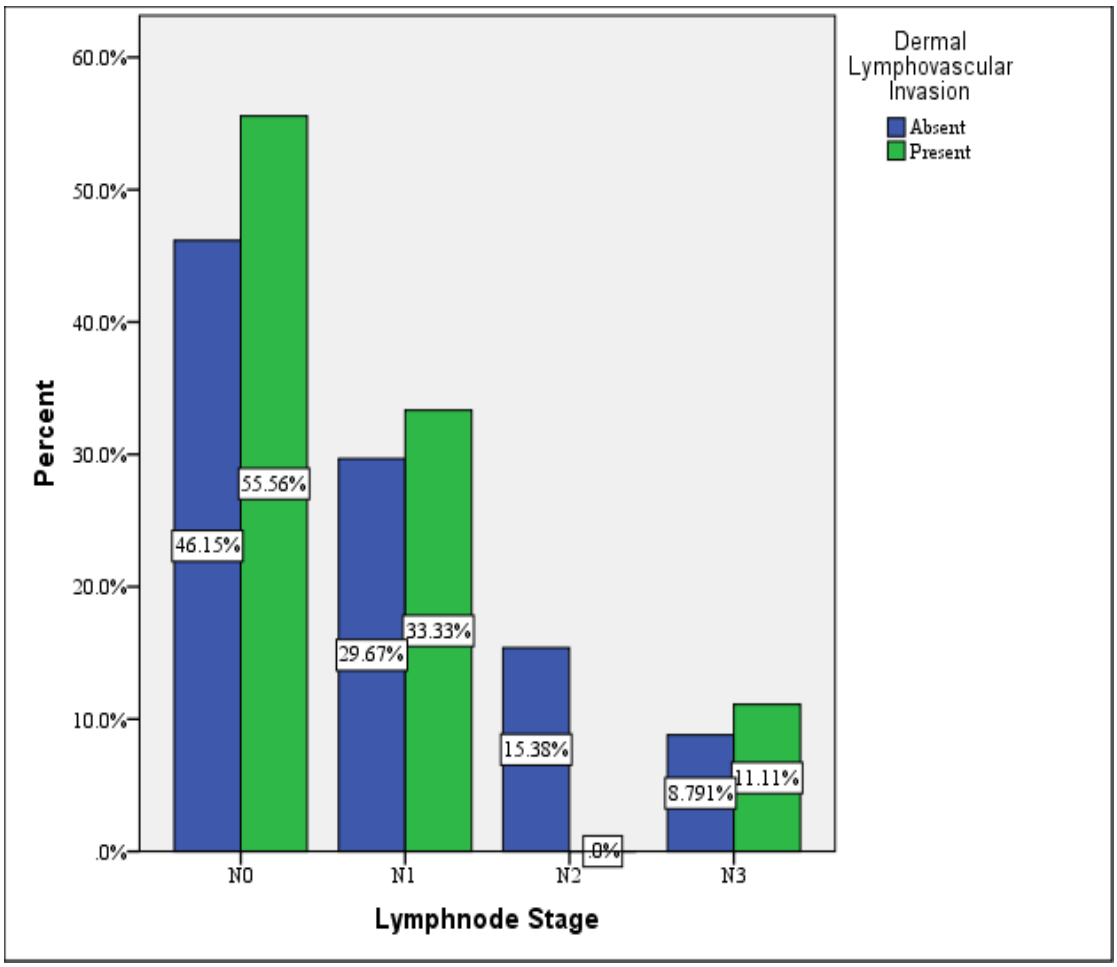


Chart 28 : Bar diagram showing Association between Dermal Lymphovascular Invasion and Lymph node Stage

Table 32 : Association between Lymphovascular Invasion and Lymph node Stage in the study group

			Lymph node Stage				Total
			N0	N1	N2	N3	
Lymphovascular Invasion	Absent	Count	41	26	10	6	83
		%	49.4%	31.3%	12.0%	7.2%	100.0%
	Present	Count	6	4	4	3	17
		%	35.3%	23.5%	23.5%	17.6%	100.0%
Total		Count	47	30	14	9	100
		%	47.0%	30.0%	14.0%	9.0%	100.0%

$\chi 2 = 3.913$, df =3, p = 0.271

In the study, there was no significant association between Lymphovascular Invasion and Lymph node stage.

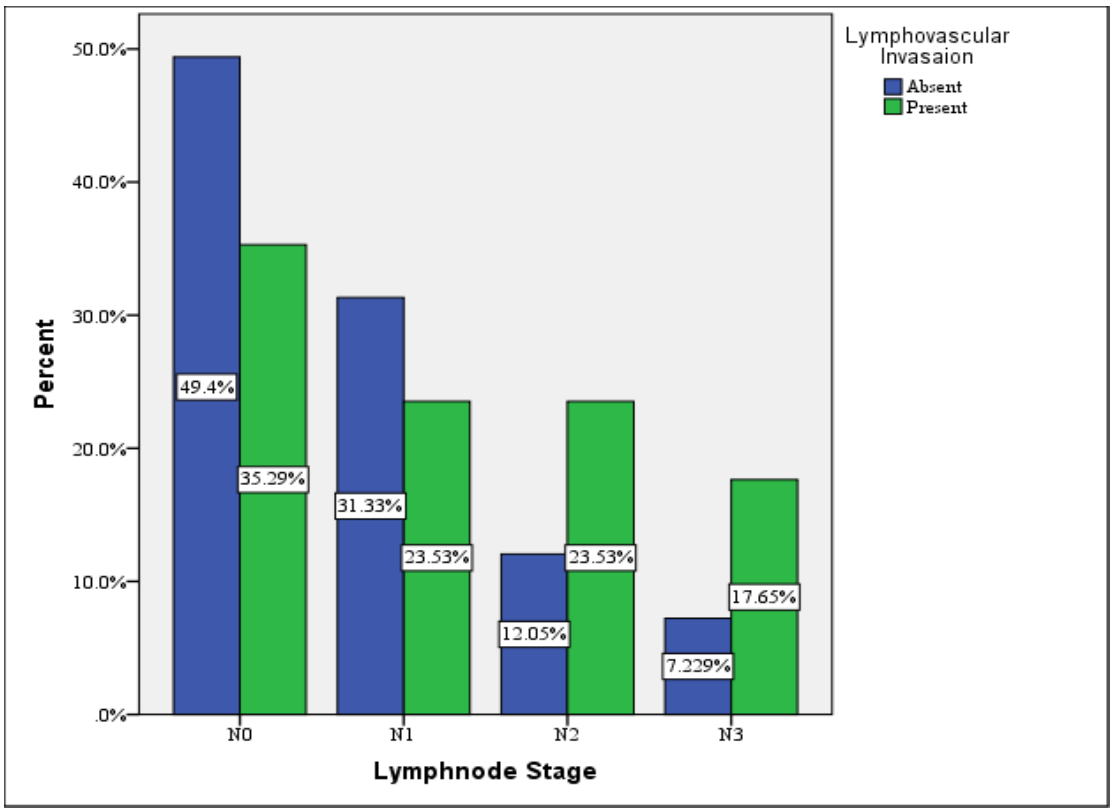


Chart 29 : Bar diagram showing Association between Lymphovascular Invasion and Lymph node Stage

Table 33:Association between Necrosis and Lymph node Stage in the study group

			Lymph node Stage				Total
			N0	N1	N2	N3	
Necrosis	Not Identified	Count	15	2	0	0	17
		%	88.2%	11.8%	0.0%	0.0%	100.0%
	Focal	Count	20	5	3	0	28
		%	71.4%	17.9%	10.7%	0.0%	100.0%
	Moderate	Count	9	5	2	1	17
		%	52.9%	29.4%	11.8%	5.9%	100.0%
	Extensive	Count	3	18	9	8	38
		%	7.9%	47.4%	23.7%	21.1%	100.0%
Total		Count	47	30	14	9	100
		%	47.0%	30.0%	14.0%	9.0%	100.0%

$\chi 2 = 44.85$, df =9, $p < 0.001$*

In the study,there was significant association between Necrosis and Lymph node stage. Among those who had Focal Necrosis, 71.4% were in N0, 17.9% were in N1, 10.7% were in N2 and 0% was in N3 stage. Those with moderate necrosis, 52.9% were in N0, 29.4% were in N1, 11.8% were in N2 and 5.9% were in N3 stage and those with extensive necrosis, 7.9% were in N0, 47.4% were in N1 stage, 23.7% were in N2 stage and 21.1% were in N3 stage.

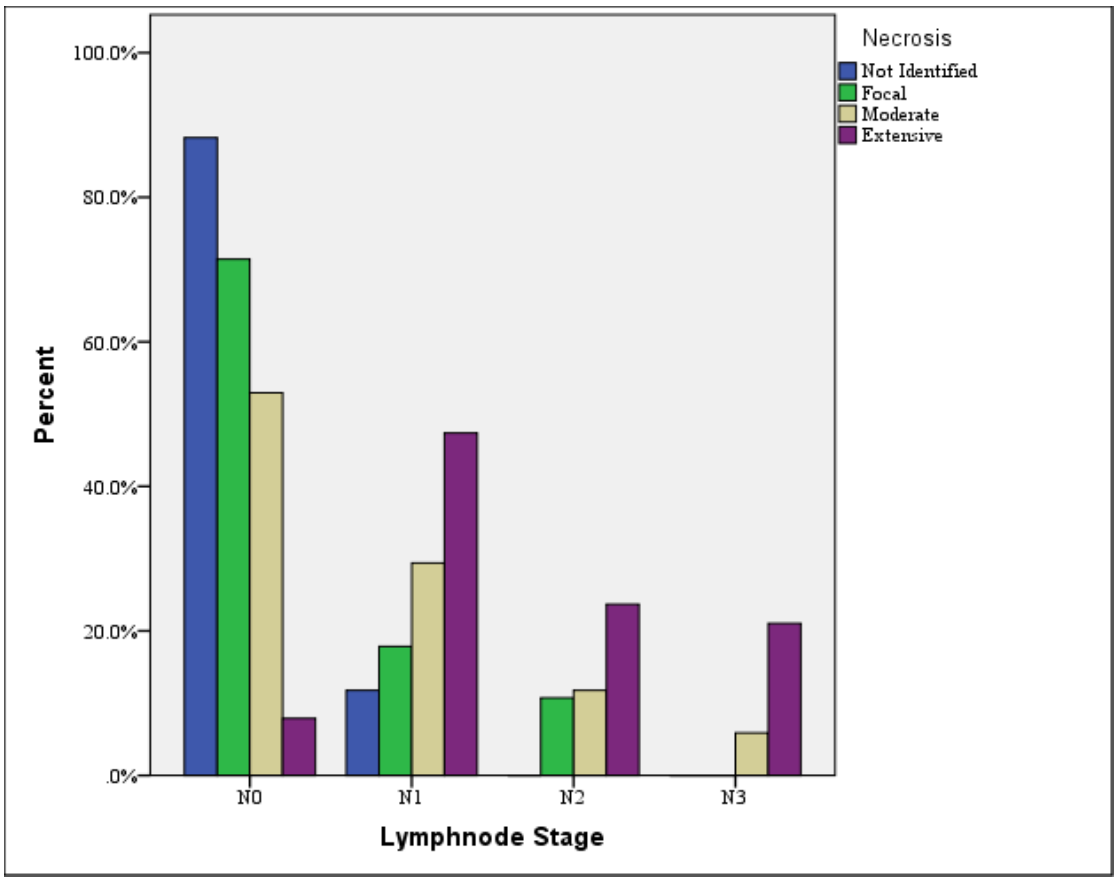


Chart 30 : Bar diagram showing Association between Necrosis and Lymph node Stage

Table 34 : Association between Inflammatory infiltrate and Lymph node Stage in the study subjects

			Lymph node Stage				Total
			N0	N1	N2	N3	
Inflammatory Infiltrate	No Inflammatory Cell Infiltrate	Count	1	2	2	1	6
		%	16.7%	33.3%	33.3%	16.7%	100.0%
	Mild/ Patchy Increase	Count	8	12	9	8	37
		%	21.6%	32.4%	24.3%	21.6%	100.0%
	Prominent Inflammatory Reaction	Count	12	14	2	0	28
		%	42.9%	50.0%	7.1%	0.0%	100.0%
	Florid “Cup Like” Inflammatory Infiltrate	Count	26	2	1	0	29
		%	89.7%	6.9%	3.4%	0.0%	100.0%
Total		Count	47	30	14	9	100
		%	47.0%	30.0%	14.0%	9.0%	100.0%

$\chi 2 = 46.299$, df =9, $p < 0.001$*

In the study, there was significant association between inflammatory infiltrate and Lymph node stage i.e. among those with No Inflammatory Cell Infiltrate, 16.7% were in N0, 33.3% were in N1, 33.3% were in N2 and 16.7% were in N3 stage. Those with Mild/ Patchy Increase 21.6% were in N0, 32.4% were in N1, 24.3% were in N2 and 21.6% were in N3 stage.

Those with Prominent Inflammatory Reaction, 42.9% were in N0, 50% were in N1, 7.1% were in N2 stage and those with Florid “Cup Like” Inflammatory Infiltrate 89.7% were in N0 stage, 6.9% were in N1 stage, 3.4% were in N2 stage.

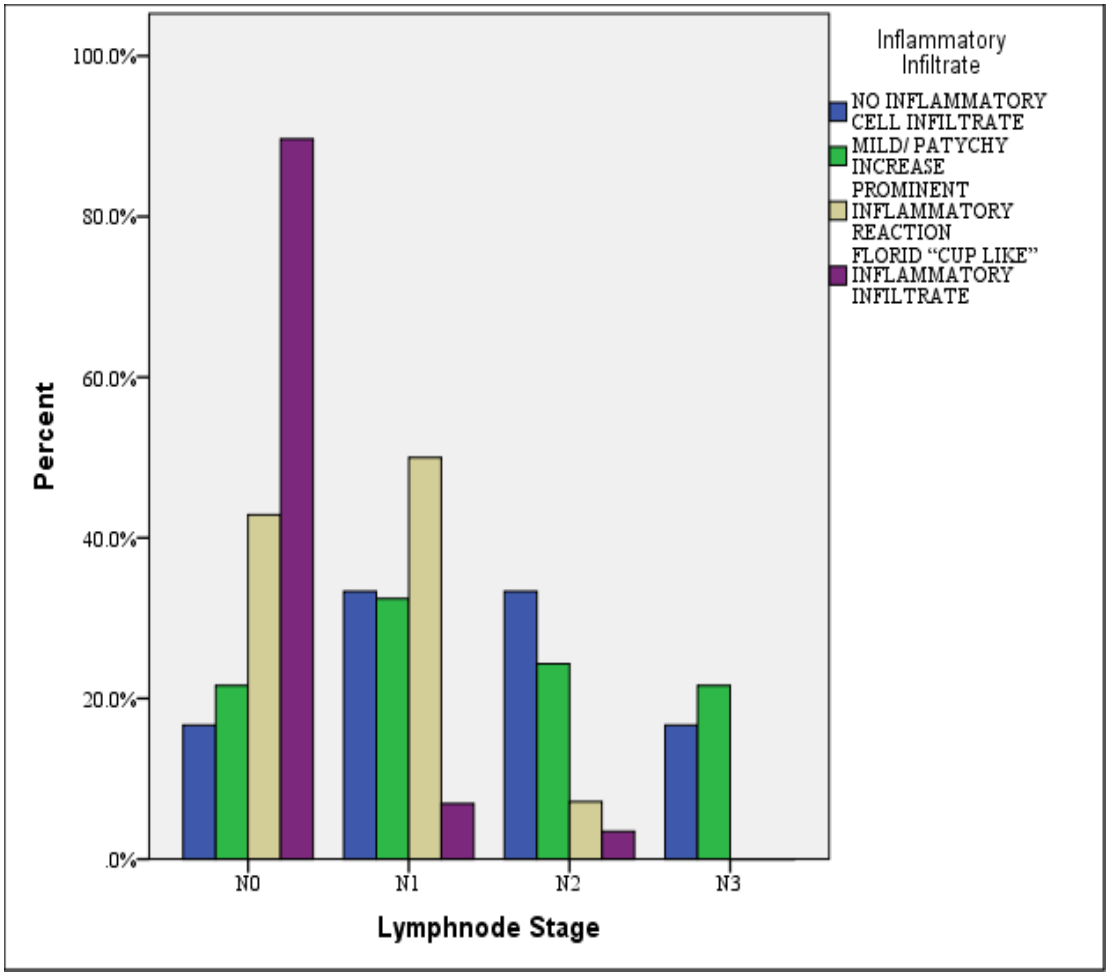


Chart 31 : Bar diagram showing Association between Inflammtory infiltrate and Lymph node Stage

Table 35 : Association between Perineural Invasion and Lymph node Stage in the study group

			Lymph node Stage				Total
			N0	N1	N2	N3	
Perineural Invasion	Absent	Count	47	28	13	9	97
		%	48.5%	28.9%	13.4%	9.3%	100.0%
	Present	Count	0	2	1	0	3
		%	0.0%	66.7%	33.3%	0.0%	100.0%
Total		Count	47	30	14	9	100
		%	47.0%	30.0%	14.0%	9.0%	100.0%

$\chi 2 = 3.944$, df =3, p = 0.268

In the study, there was no significant association between perineural invasion and Lymph node stage.

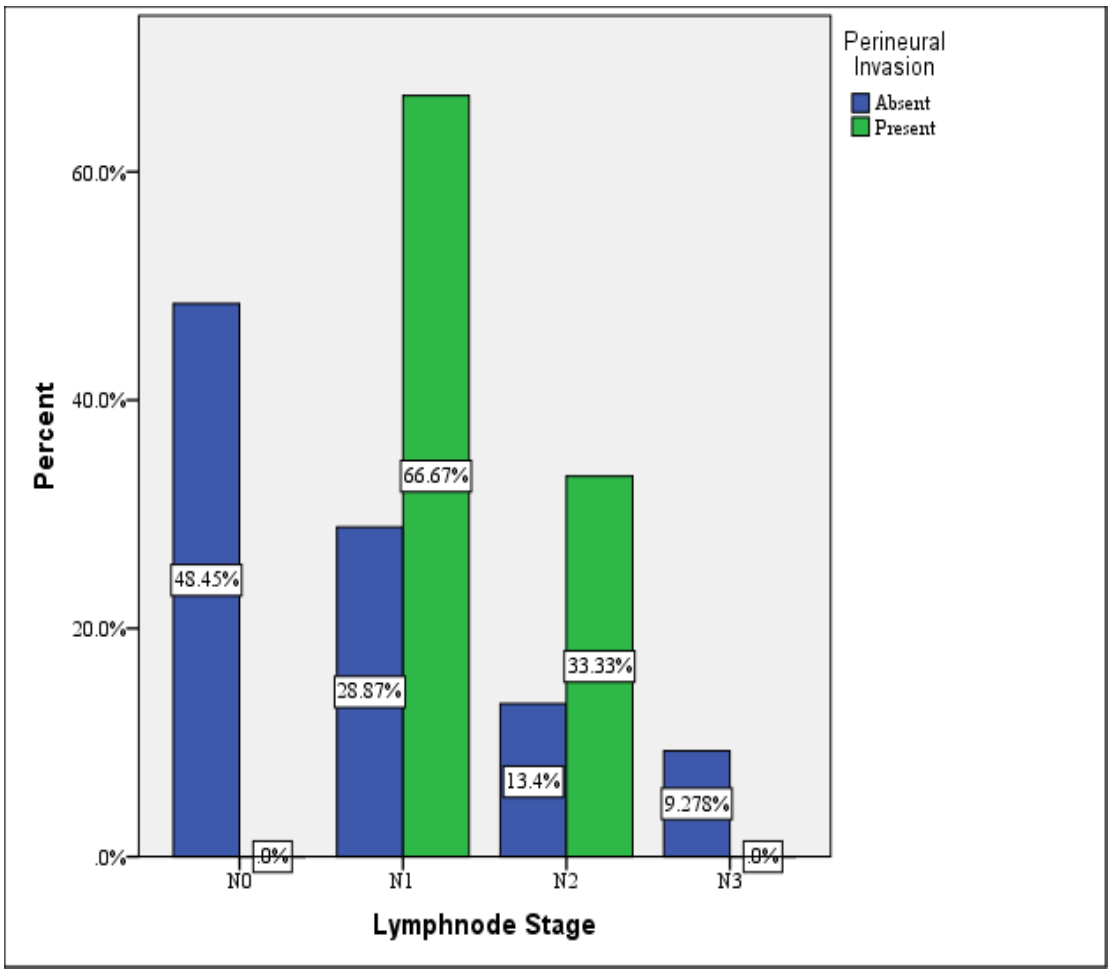


Chart 32 : Bar diagram showing Association between perineural Invasion and Lymph node Stage

Table 36 : Association between Stroma and Lymph node Stage

			Lymph node Stage				Total
			N0	N1	N2	N3	
Stroma	Nil	Count	27	16	10	6	59
		%	45.8%	27.1%	16.9%	10.2%	100.0%
	Desmoplasia	Count	9	7	2	0	18
		%	50.0%	38.9%	11.1%	0.0%	100.0%
	Myxoid Change	Count	2	0	0	0	2
		%	100.0%	0.0%	0.0%	0.0%	100.0%
	Hyalinization	Count	4	0	0	0	4
		%	100.0%	0.0%	0.0%	0.0%	100.0%
	Mucinous	Count	0	1	1	1	3
		%	0.0%	33.3%	33.3%	33.3%	100.0%
	Mixed	Count	1	4	0	2	7
		%	14.3%	57.1%	0.0%	28.6%	100.0%
	Fibrocystic	Count	3	1	0	0	4
		%	75.0%	25.0%	0.0%	0.0%	100.0%
	Calcification	Count	1	1	1	0	3
		%	33.3%	33.3%	33.3%	0.0%	100.0%
Total		Count	47	30	14	9	100
		%	47.0%	30.0%	14.0%	9.0%	100.0%

χ 2 =23.93, df =21, p = 0.296

In the study, there was no significant association between Stroma and Lymph node stage.

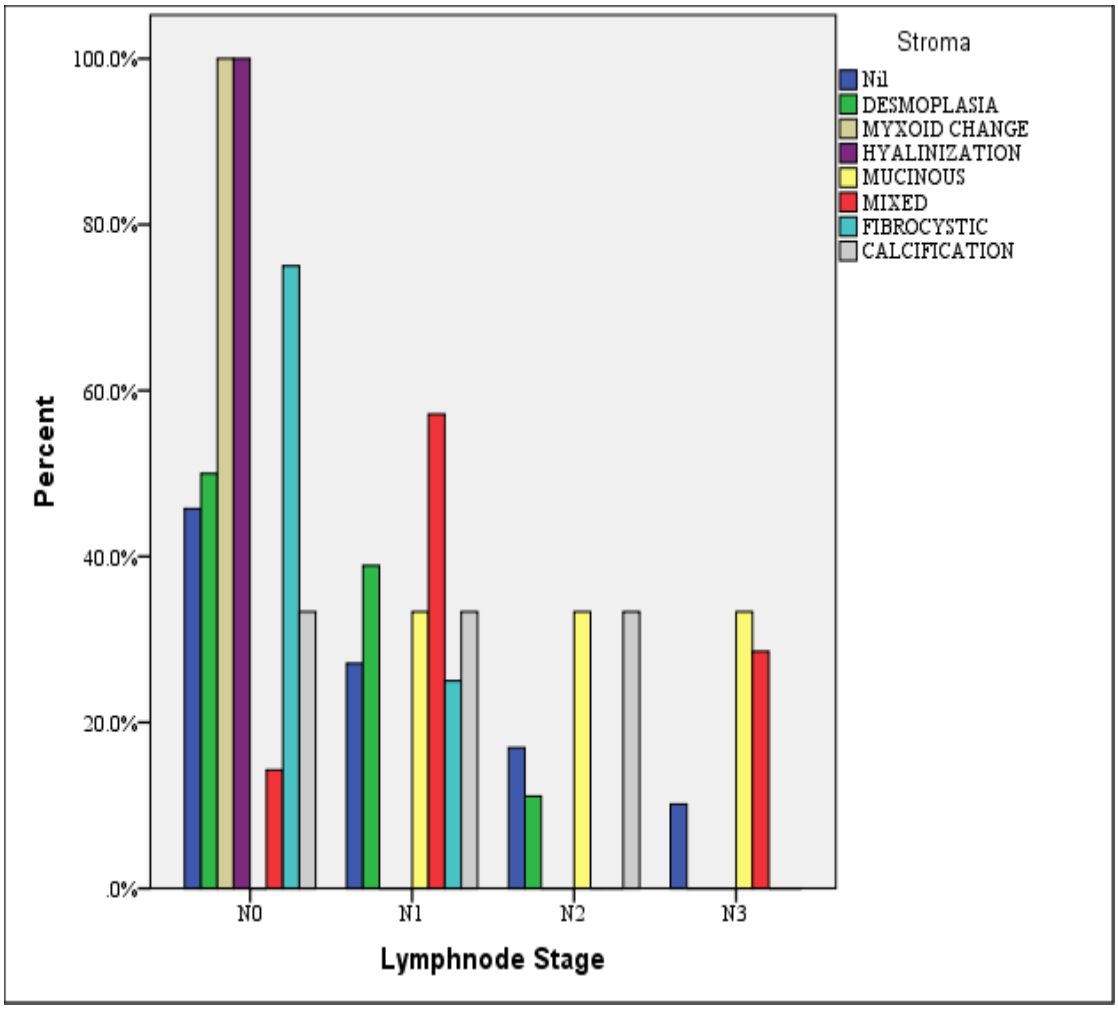


Chart 33 : Bar diagram showing Association between Stroma and Lymph node Stage

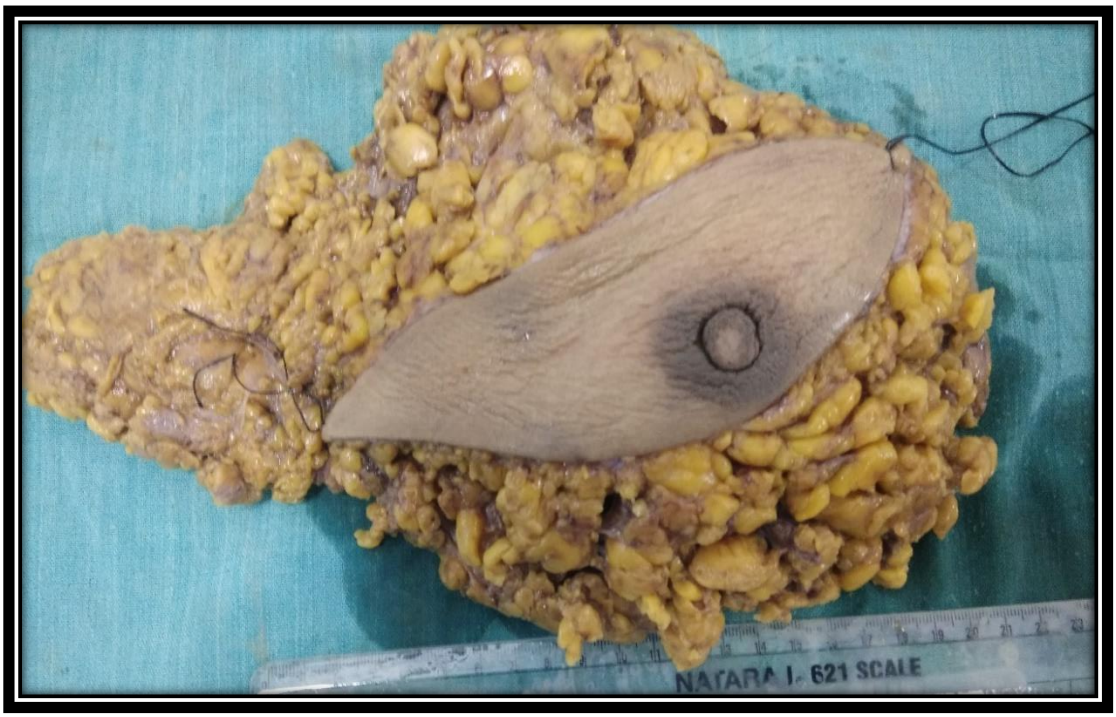


Figure 3 – Gross image of Modified radical mastectomy specimen of Infiltrating ductal carcinoma of breast

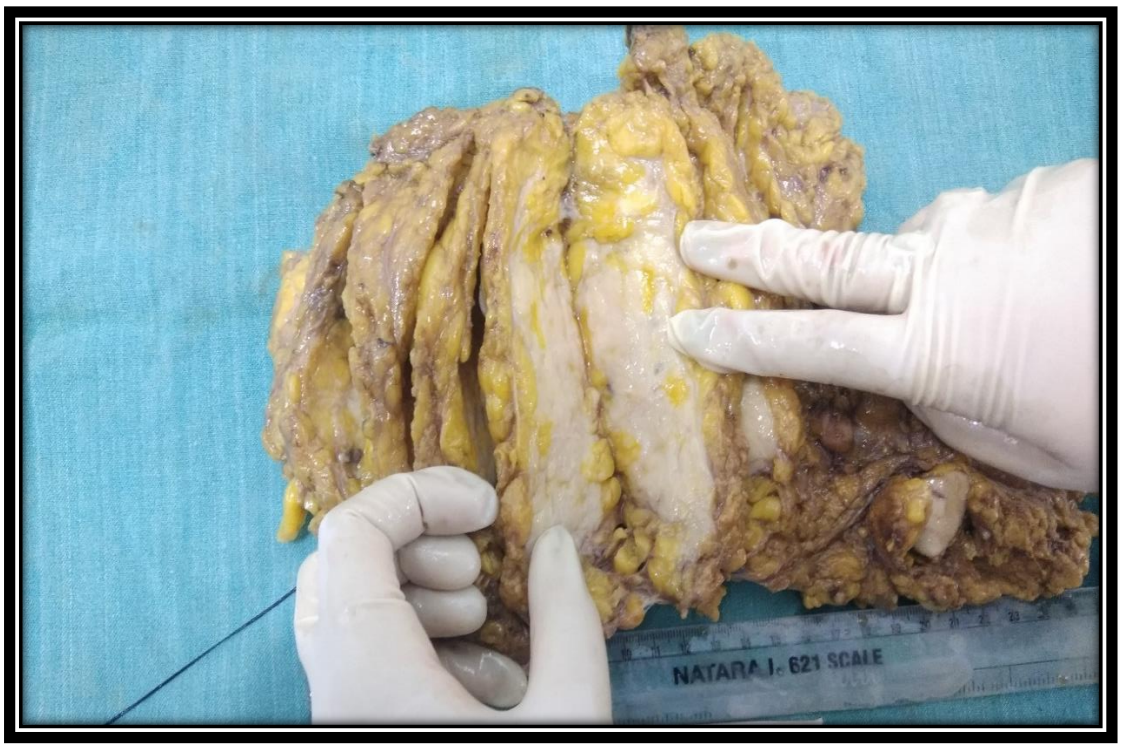


Figure 4 – Cut section of the breast showing grey white tumor area

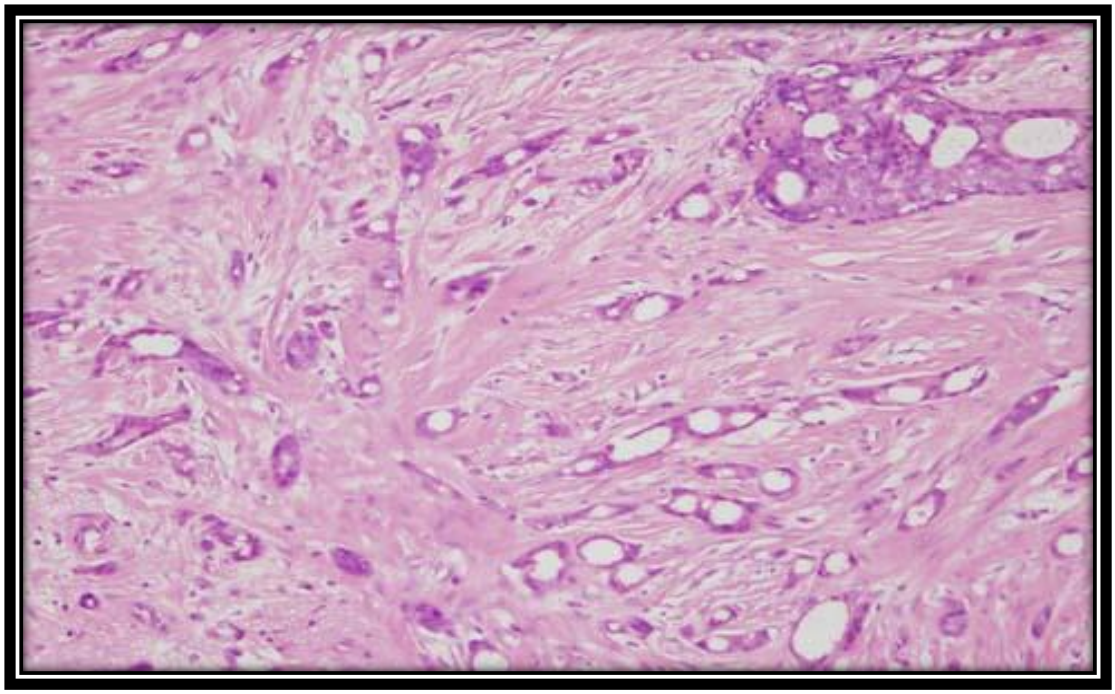


Figure 5 – Showing tubule formation in Infiltrating Duct carcinoma(x40X)

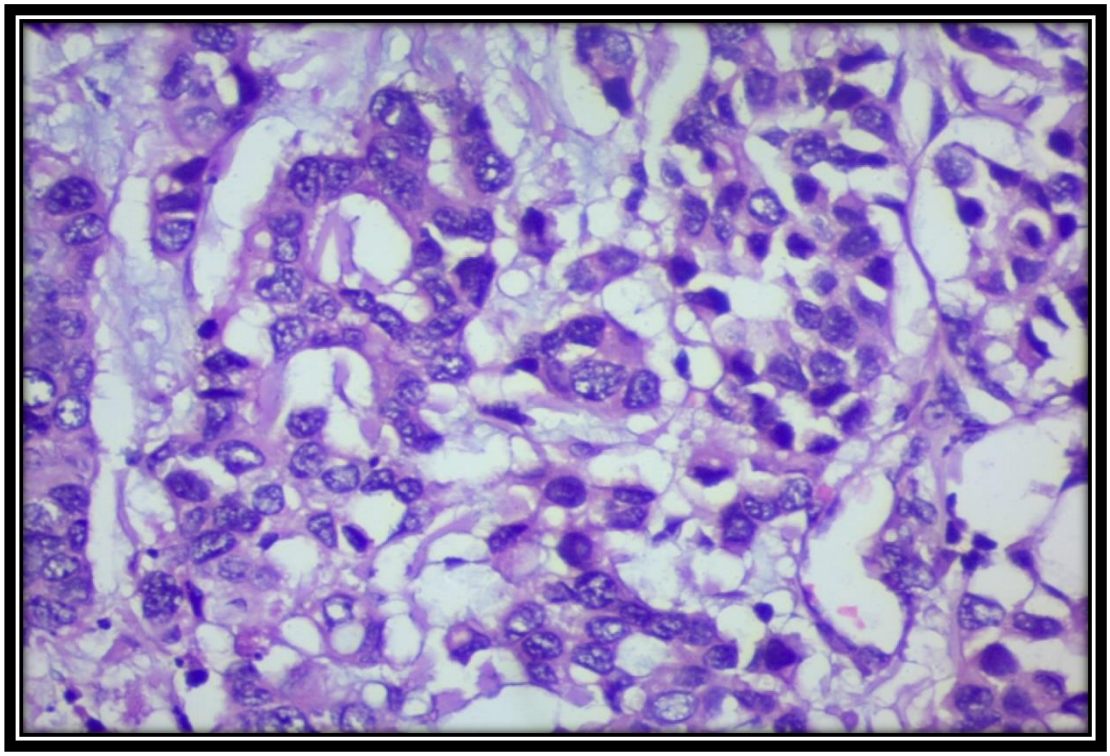


Figure 6- Nuclear pleomorphism in Infiltrating duct carcinoma(x40X)

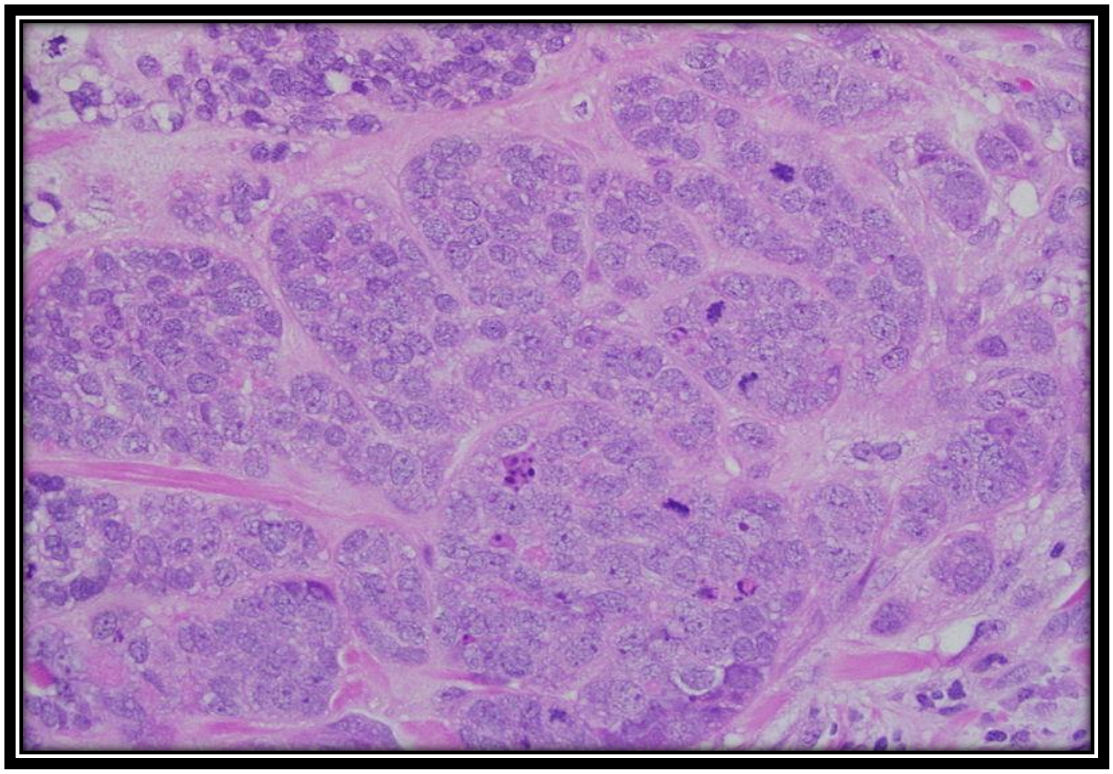


Figure 7 – Mitotic figures in Invasive duct Carcinoma(x40X)

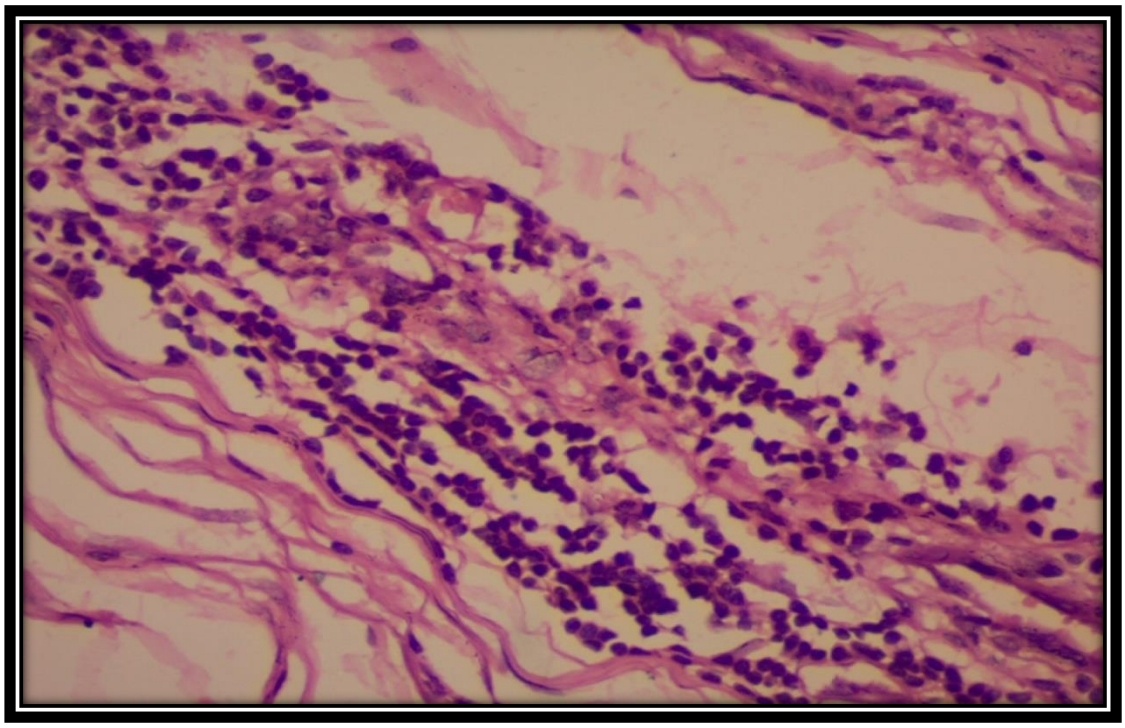


Figure 8 – Mild or patchy increase in inflammatory infiltrate(Grade 1) (x40X)

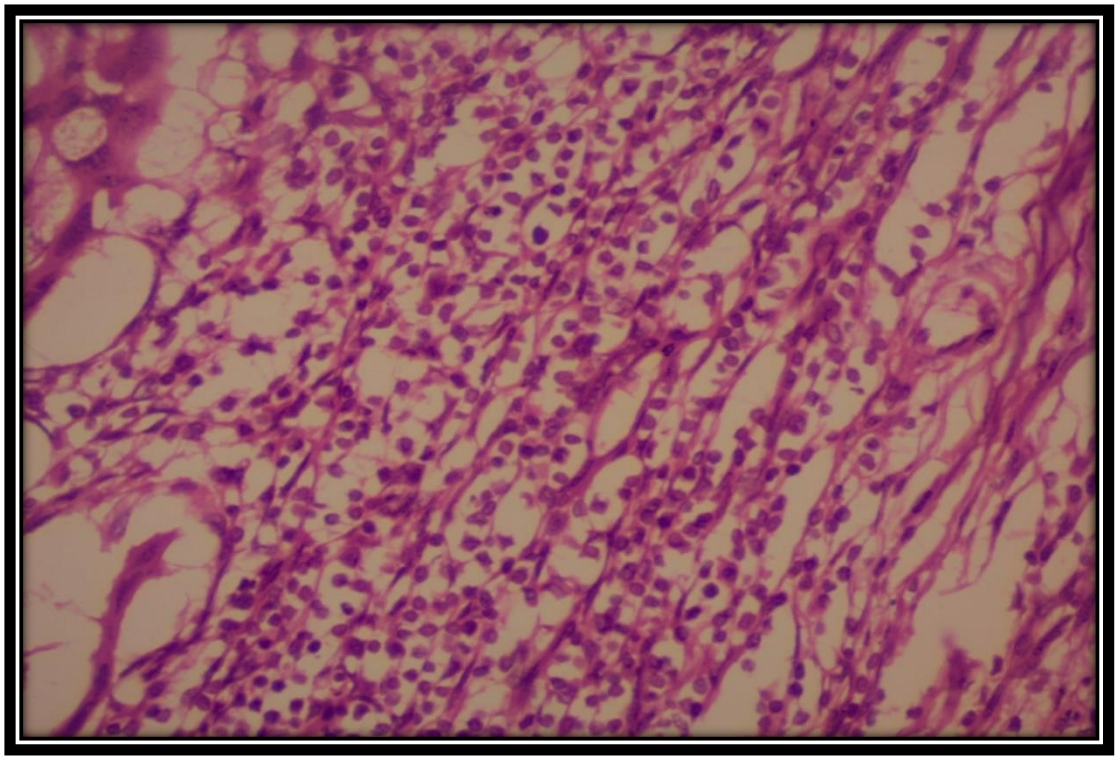


Figure 9 – Prominent inflammatory reaction with some evidence of cancer cell destruction (Grade- 2) (x40X)

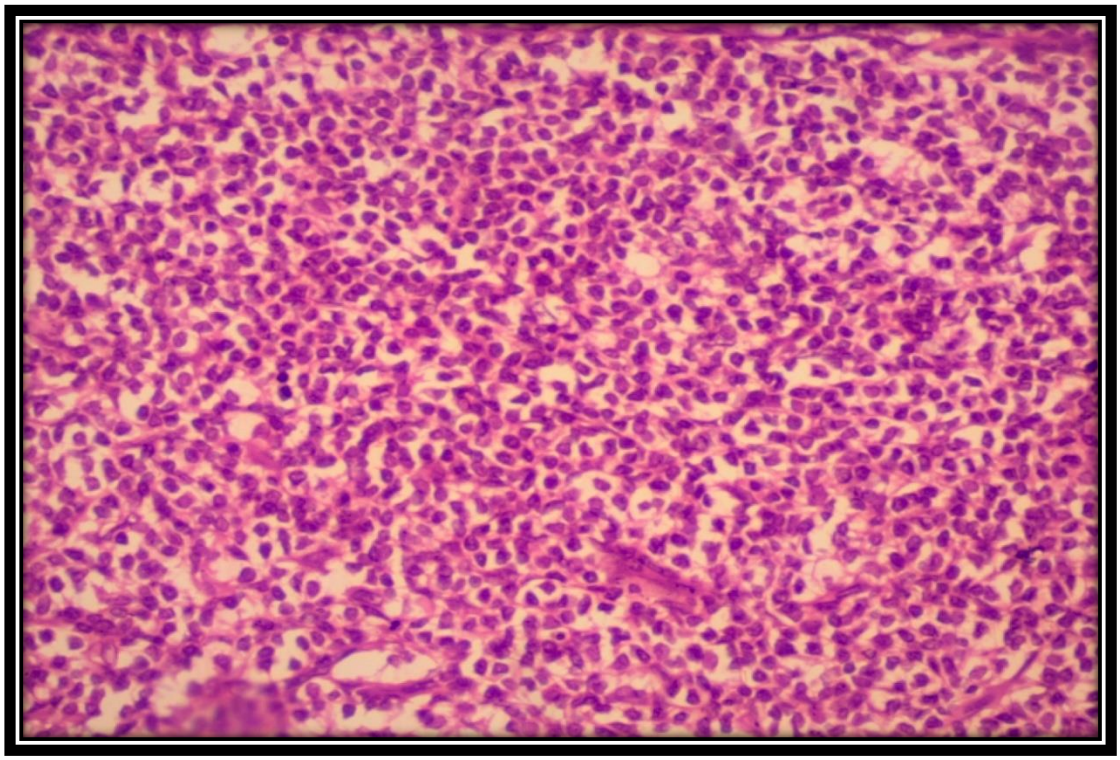


Figure 10 - Florid 'cup-like' inflammatory infiltrate (Grade 3) (x40X)

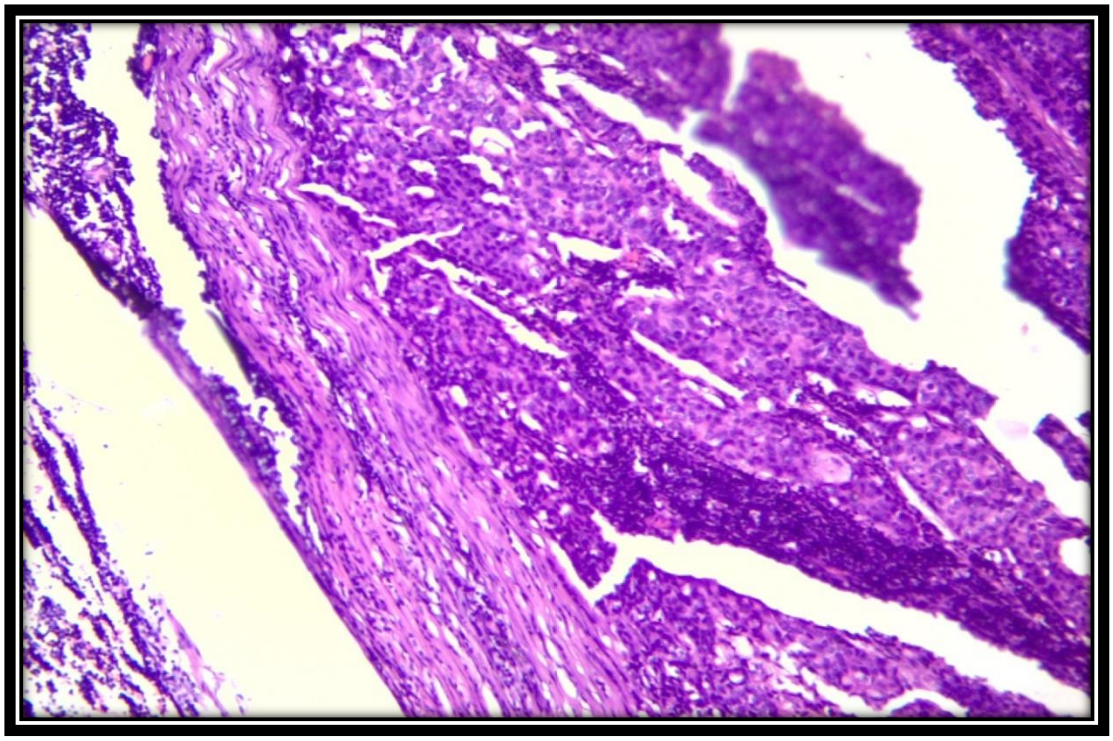


Figure 11– Metastatic Lymph node from Infiltrating duct carcinoma (x40X)

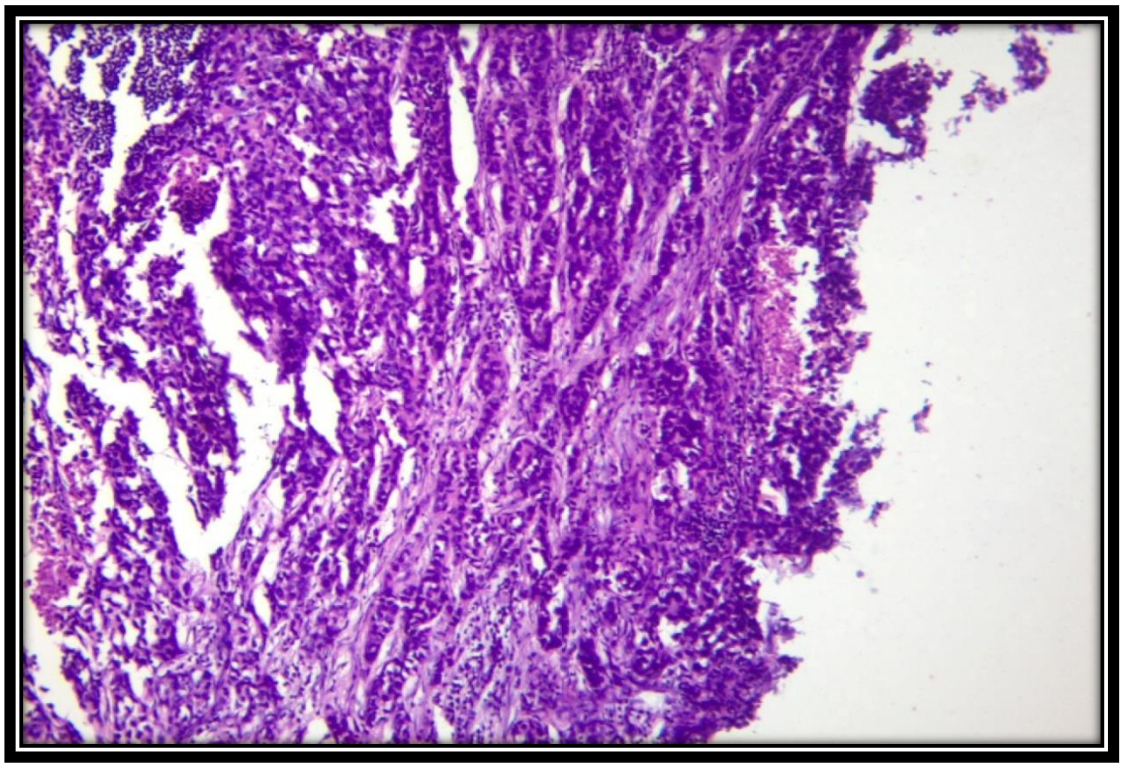


Figure 12 – Extranodal spread of tumor cells invading through the Lymph node capsule(x40X)

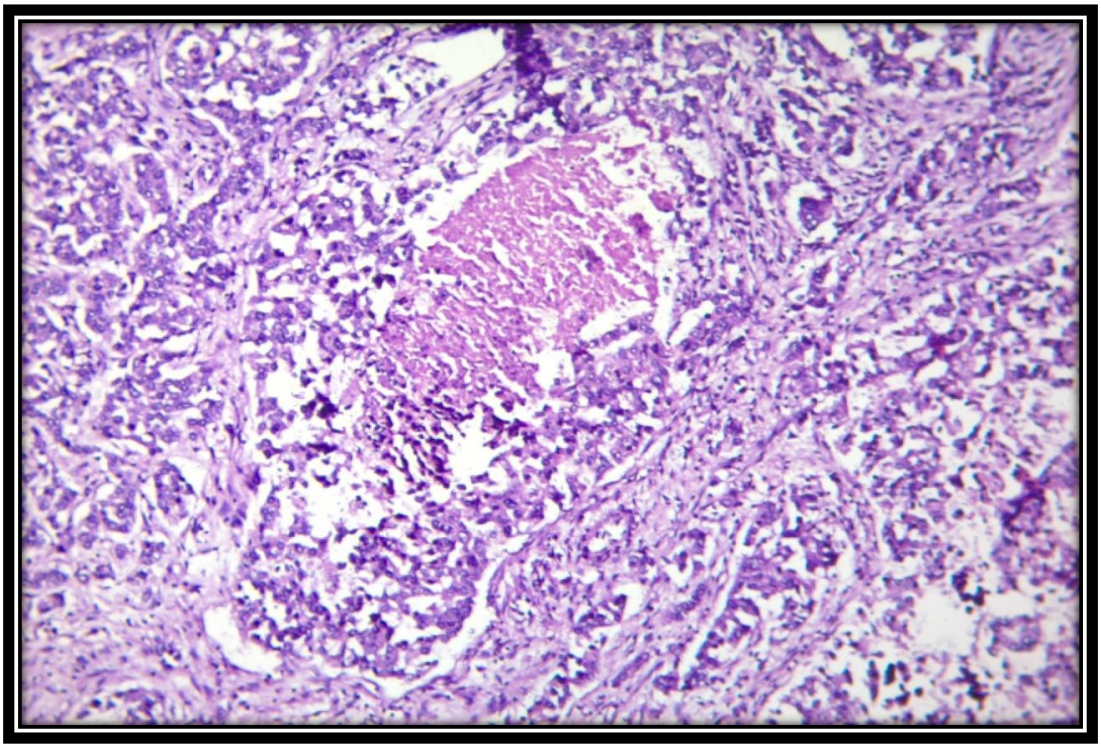


Figure 13–Microphotograph showing Comedonecrosis (x40X)

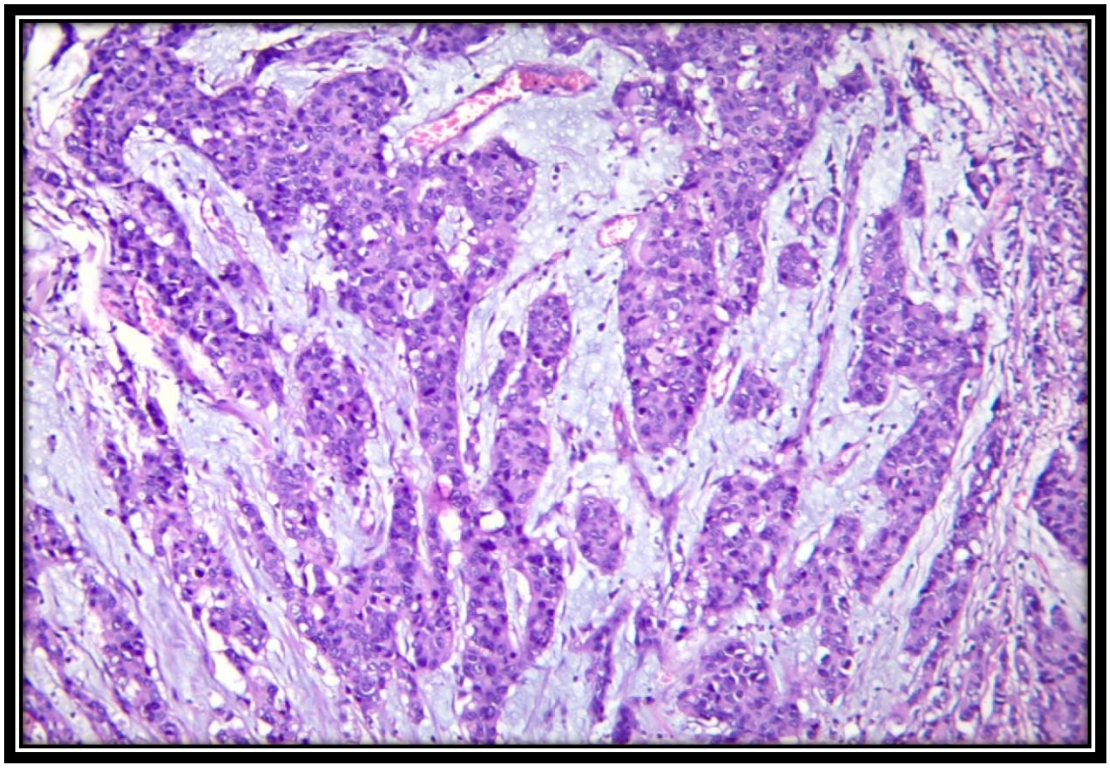


Figure 14 – Microphotograph showing areas of myxoid change in Invasive duct carcinoma(x40X)


DISCUSSION

DISCUSSION

Breast cancer is a leading cause of cancer death among women worldwide. Numerous studies have shown that these malignancies are multifactorial and life style, genetic and environmental factors play a major role in development of breast carcinomas.

Table 37 - Comparison of Age with Other studies

	El Saghir NS et al [44] (2002)	Najjar H et al [45] (2010)	Present study (2018)
Less than 50 years (< 50)	49.1%	65.5%	47%
More than 50 years (>50)	50.9%	34.5%	53%
Mean age	49.8 ± 13.9	49.4±16	51.68±15

In the present study, the age group ranged from 25 years to 92 years with mean age of 51.68 years, which is almost similar to the studies done by EL Saghir et. al.[44] with 49.1% cases less than 50 years and mean age of 49.8 years. Similar observation was made by Najjar et. al.[45] with mean age of 49.4 years which is comparable to the present study.

In this study, there was no statistical significant association between age of patient and Lymph node metastasis

Table 38 - Comparision of laterality of malignancy with other studies

	Sughrue T et al [46] (2014)	Present study (2018)
Left breast	54%	50%
Right breast	46%	50%
Laterality ratio	1.08	1.0

In the present study, both the right and left breasts were involved in equal proportions i.e. 50% each which is similar to study done by Sughrue et al [46] and the laterality ratio was also in concordance with the study.

In this study, there was no association between laterality and Lymph node metastasis.

Table 39- Comparison of site of tumor with other studies

	Bright et al [47] (2013)	Sughrue T et al [46] (2014)	Present study (2018)
Retroareolar	24.9%	8%	58.0%
Medial	14.9%	14%	16.0%
Lateral	39.8%	38%	23.0%
Both Medial and Lateral	20.4%	40%	3.0%

In contrast to the observations made by Bright et. al.[47] and Sughrue T et. al.[46], the present study showed tumor in retroareolar region in 58% followed by lateral quadrants and medial quadrants. This may be attributed to different geographical location as there are studies showing that breast cancer laterality and quadrant involvement depends on the country of origin. [48, 46]

In this study, there was no statistically significant association between site of tumor and axillary Lymph node metastasis.

Table 40- Comparison of tumor size with other studies

	Kwon GY et al [49] (2005)	Ogawa Y et al [50] (1995)	Present study (2018)
< 2 cms	24.5%	42%	14.0%
2-5 cms	55.5%	47.7%	55.0%
>5 cms	20%	10.3%	31.0%

In the present study, majority of the cases were between 2 to 5cms followed by tumor size of more than 5cms. Similar observations were made by Ogawa Y et. al.[50] and Kwon GY et. al.[49] with highest number of cases between tumor size of 2 to 5cms.

There was a statistically significant association between the size of the tumor and chance of axillary Lymph node metastasis i.e. among those with <2cm size, 57.1% were in N0, 35.7% were in N1 and 7.1% were in N2 Stage.

Those with size 2cms to 5cms, 50.9% were in N0, 38.2% were in N1, 9.1% were in N2 and 1.8% was in N3.

Those with >5cms, 35.5% were in N0, 12.9% were in N1, 25.8% were in N2 and 25.8% were in N3.

Table 41- Comparison of T stage with other studies

T stage	Pistelli M et al [69] (2013)	Wang M et al [70] (2017)	Present study (2018)
T1	53.6%	18.1%	11%
T2	30.8%	43.4%	48%
T3	12.7%	14.5%	22%
T4	2.6%	23.9%	19%

In the present study, the maximum number of cases were in T2 stage (48%) which was similar to the study done by Wang M et al [70]. T2 was followed by T3 stage (22%), T4 stage(19%) and T1 stage (11%) respectively.

Pistelli M et al [69] in his study on early stage breast cancers observed that maximum number of cases were in T1 stage (53.6%) followed by T2 stage (30.8%) which was contrary to the observations made in the present study. The reason could be that the stage IV tumors were excluded in the study by Pistelli M et al [69] and the study was done only on early breast cancer patients.

There was a statistically significant association between the T stage and axillary Lymph node metastasis ($p = 0.003$).

Table 42 - Comparison of tumor type with Other studies

	Erdogan N et al[51] (2009)	Medri et al [52] (2000)	Rani D et al [53] (2014)	Present study (2018)
IDC	89%	82.2%	82%	88.0%
Medullary carcinoma	-	-	-	3%
Lobular	12.9%	8.2%	5.4%	1%
Others	-	9.6%	12.72%	11%

In the present study, the most common histopathological type was the infiltrating ductal carcinoma similar to the other studies done by Erdogan et. al.[51], Medri et. al.[52] and Rani D et. al.[53] The second most common tumour encountered was the Medullary carcinoma of breast followed by Lobular carcinoma and other malignancies.

In this study, there was no statistically significant association between histopathological type and axillary Lymph node metastasis.

Table 43- Comparison of histopathological grade with Other studies

Grade	Hemalatha et al[54] (2013)	Qureshi HS et al[55] (2006)	Parker et al[56] (2001)	Present study (2018)
I	44%	22.1%	18.6%	46.0%
II	40%	41.7%	41.5%	39.0%
III	8%	36.2%	39.7%	15.0%

In the present study, Nottingham modification of Bloom Richardson scoring system was used to grade the tumors. It takes into account the tubule formation, nuclear size and the mitotic counts. Majority of the cases in the present study were in grade I (46%) followed by grade II (39%). Similar observations was made in the study done by Hemalatha et. al.[54]. The percentage grading of these tumors were in concordance with Qureshi HS et. al. [55] and Parker et. al.[56].

In this study, there was statistically significant association between grade of the tumor and axillary Lymph node metastasis i.e. among those who were in Grade 1, 65.2% were in N0, 28.3% were in N1, 2.2% were in N2 and 4.3% were in N3. Among those who were in Grade 2, 28.2% were in N0, 35.9% were in N1, 23.1% were in N2 and 12.8% were in N3 stage. Among those who were in Grade 3, 40% were in N0, 20% were in N1, 26.7% were in N2 and 13.3% were in N3 stage.

Table 44- Comparison of lymphovascular invasion with other studies

	Rakha AE et al [57] (2011)	Mohammad ZMA et al [58] (2013)	Hadi NI et al [59] (2016)	Present study (2018)
Lymphovascular invasion present	30%	39%	35.3%	17%
Lymphovascular invasion absent	70%	61%	64.7%	83%

In the present study, lymphovascular invasion was present in 17% of the cases which is less than the observations made by Rakha AE et. al. [57], Mohammad ZMA et. al.[58] and Hadi NI et. al. [59]

In the study, there was no statistically significant correlation between Lymphovascular invasion and axillary Lymph node metastasis

Table 45- Comparison of skin/ nipple invasion with other studies

Skin / Nipple involvement	Hadi NI et al [59] (2016)	Present study (2018)
Present	24.7%	14%
Absent	75.3%	86%

In the present study, Skin / Nipple invasion was seen in 15% of cases which is closely similar to the study done by Hadi NI et. al.[59]

Skin invasion/ nipple invasion is seen in advanced stage disease and directly falls in the category T4 of TNM classification. Studies have shown that tumors with Skin/ nipple invasion are associated with poorer prognosis.

Table 46- Comparison of Perineural invasion with other studies

Perineural invasion	Hadi NI et al [59] (2016)	Karak SG et al [60] (2010)	Present study (2018)
Present	8.7%	1.14%	3%
Absent	91.3%	98.86%	97%

In the present study, perineural invasion was seen 3 % of the cases which is in concordance to the study done by Hadi NI et. al.[59] and Karak SG et. al.[60].

In the study, there was no statistically significant correlation between perineural invasion and axillary Lymph node metastasis.

Table 47- Comparison of tumor necrosis with other studies

	Krishnamurthy J et al[61] (2016)	Carlomango C et al [62] (1995)	Present study (2018)
Tumor Necrosis present	58.8%	20.3%	83%
Tumor necrosis absent	41.2%	76.7%	17%

In the present study, necrosis was seen in 83% of cases in comparable to the study done by Krishnamurthy et. al.[61] whereas Carlomango et. al. [62] observed necrosis in only 20.3% of cases.

In this study, necrosis was graded as Not identified, Focal, Moderate and Extensive according to the study done by Richard CH et al [67]

Among those who had Focal Necrosis, 71.4% were in N0, 17.9% were in N1, 10.7% were in N2 and 0% was in N3 stage. Those with moderate necrosis, 52.9% were in N0, 29.4% were in N1, 11.8% were in N2 and 5.9% were in N3 stage and those with extensive necrosis, 7.9% were in N0, 47.4% were in N1 stage, 23.7% were in N2 stage and 21.1% were in N3 stage.

In the study there was significant association between Necrosis and axillary Lymph node metastasis showing that larger areas of necrosis are associated with higher chance of axillary Lymph node metastasis.

Table 48- Comparison of inflammatory cell infiltrate with other studies

Inflammatory cell infiltrate	Matkowski R et al[63] (2009)	Present study (2018)
Absent	4.54%	6%
Mild/ Patchy Increase	44.32%	37%
Prominent Inflammatory Reaction	36.6%	28%
Florid "Cup Like" Inflammatory Infiltrate	14.78%	29%

The observations made in the present study were similar to the study done by Matkowski R et. al. [63]. The inflammatory infiltrate predominantly consisted of lymphocytes and few plasma cells. The highest number of cases showed Mild/ patchy increase followed by Florid "Cup Like" Inflammatory Infiltrate and Prominent Inflammatory Reaction which was very closely similar to the observations made by Matkowski et. al.[63].

There was statistically significant correlation between the inflammatory infiltrate and axillary Lymph node metastasis i.e. as the inflammatory infiltrate increases, the chance of axillary Lymph node metastasis decreases.

STROMAL CHANGES

The characteristics of tumor vary with changes in the stromal component. Many of the stromal characters like collagenisation or desmoplasia is seen in Scirrhous carcinoma whereas medullary carcinomas show no collagenisation. Increased collagenisation in tumors is considered as a defence mechanism by the host against the malignant cells. Hence collagenisation is a marker of good prognosis and also responsive to hormonal therapies. Other stromal changes like myxoid change/ hyaline change, calcifications are observed in long standing tumors but their prognostic and therapeutic utility is still questionable. [7]

In the present study, there was no statistically significant correlation between the different stromal changes observed and axillary Lymph node metastasis.

EXTRACAPSULAR EXTENSION

Extracapsular extension (ENE) also known as Extranodal extension is the extension of the tumor cells into the surrounding structures with the destruction of capsule. It is considered as one of the poor prognostic factors in breast cancer and is associated with high recurrence rates. The chances of recurrence also increases with the number of foci of extranodal extension.[64]

In the present study, extracapsular extension of tumor cells was seen in 9 cases.

NOTTINGHAM PROGNOSTIC INDEX

In the present study, 10 cases were in category 1, 26 cases were in category 2, 42 cases were in category 3 and 22 cases were in category 4 which is associated with poorer prognosis

In this study, there was a statistical significance between NPI index and Axillary Lymph node metastasis, but this association is questionable as NPI is a dependent prognostic factor of Lymph node metastasis.

TUMOR STAGING

Tumor stage is an important prognostic factor in breast cancer.[7] Higher stage of the tumor is associated with higher number of Lymph node metastasis as it is a dependent variable.

In the present study, 6 cases were in stage I, 56 cases were in stage II, 28 cases were in stage III and 10 cases were in stage IV.

In this study, there was a statistical significance between Tumor Stage and Axillary Lymph node metastasis, but is questionable as Stage is not an independent prognostic variable in assessing axillary Lymph node metastasis.


Summary &
Conclusion

CONCLUSION

The study was taken up to study and document histopathological parameters of primary tumour in operated specimens of breast cancer and also to study the association of histopathological parameters of primary breast cancer with axillary lymph node metastasis

In the present study, there was a statistically significant correlation between Tumor size, T stage , Grade of the tumor, Necrosis and inflammatory infiltrate with axillary Lymph node metastasis. I.e increased tumor size, T stage, higher grade, presence of necrosis and low inflammatory infiltrate are associated with increased chances of axillary Lymph node metastasis and can be considered as bad prognostic factors in the treatment of breast cancers.

These histopathological factors can be used to assess the prognosis in patients with breast cancer in a resource limited setting.

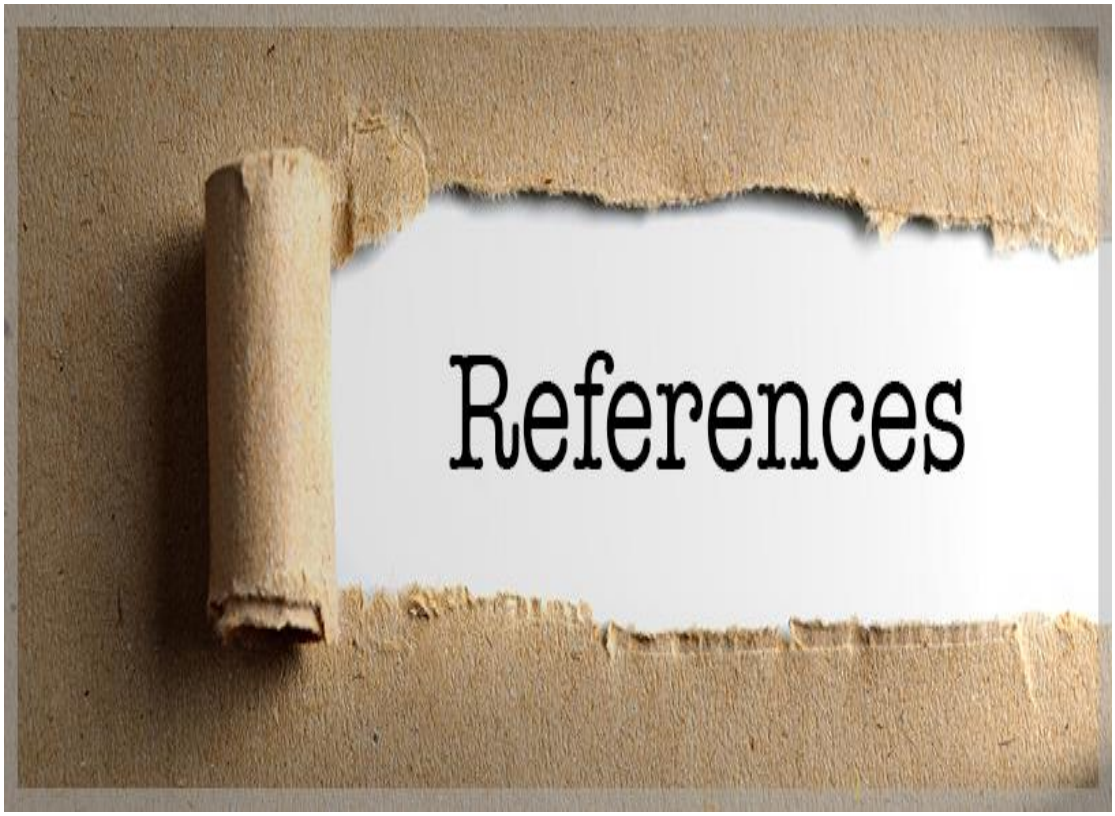
SUMMARY

- The present study was conducted in the Department of Pathology, Sri Devaraj Urs Medical College, Tamaka, Kolar from December 2016 to September 2018.
- Also retrospective cases were collected from January 2013 to November 2016.
- A total of 100 cases were studied and majority of the patients were over the age of 50 years.
- There was an equal distribution of cases on right and left breast
- Most of the cases were retroareolar (58%) followed by lateral quadrants (23%)
- Majority of cases (55%) had tumor size between 2-5 cms
- Infiltrating ductal carcinoma (88%) was the most common type followed by Medullary carcinoma (3%)
- Majority of the cases were Grade I tumors (46%)
- Skin/Nipple/Muscle Invasion was seen in 14% of cases.
- Lymphovascular Invasion was seen in 17% of cases.
- In the study, there was no statistically significant correlation between laterality, site of tumor, histopathological type, Skin/ muscle invasion, lymphovascular invasion, perineural invasion and different stromal characteristics.
- Out of 100 cases, axillary Lymph node metastasis was seen 53 cases.
- Among the tumors with size <2cm, 57.1% were in N0, 35.7% were in N1 and 7.1% were in N2 Stage. Those with size 2cms to 5cms, 50.9% were in N0, 38.2% were in N1, 9.1% were in N2 and 1.8% was in N3. Those with >5cms, 35.5% were in N0, 12.9% were in N1, 25.8% were in N2 and 25.8% were in

N3. There was a statistically significant association between the size of the tumor and chance of axillary Lymph node metastasis (p <0.001)

- Tumors with Grade 1, 65.2% were in N0, 28.3% were in N1, 2.2% were in N2 and 4.3% were in N3. Among those who were in Grade 2, 28.2% were in N0, 35.9% were in N1, 23.1% were in N2 and 12.8% were in N3 stage. Among those who were in Grade 3, 40% were in N0, 20% were in N1, 26.7% were in N2 and 13.3% were in N3 stage. There was significant association between Grade and Lymph node metastasis (p = 0.006)
- Among those who had Focal Necrosis, 71.4% were in N0, 17.9% were in N1, 10.7% were in N2 and 0% was in N3 stage. Those with moderate necrosis, 52.9% were in N0, 29.4% were in N1, 11.8% were in N2 and 5.9% were in N3 stage and those with extensive necrosis, 7.9% were in N0, 47.4% were in N1 stage, 23.7% were in N2 stage and 21.1% were in N3 stage. There was significant association between Necrosis and Lymph node metastasis (p <0.001)
- Among the cases with No Inflammatory Cell Infiltrate, 16.7% were in N0, 33.3% were in N1, 33.3% were in N2 and 16.7% were in N3 stage. Those with Mild/ Patchy Increase 21.6% were in N0, 32.4% were in N1, 24.3% were in N2 and 21.6% were in N3 stage. Those with Prominent Inflammatory Reaction, 42.9% were in N0, 50% were in N1, 7.1% were in N2 stage and those with Florid “Cup Like” Inflammatory Infiltrate 89.7% were in N0 stage, 6.9% were in N1 stage, 3.4% were in N2 stage. There was significant association between inflammatory infiltrate and Lymph node (p <0.001)

- Though there is some controversy regarding the prognostic significance of necrosis and Inflammatory infiltrate, the present study showed a significant correlation between necrosis and inflammatory infiltrate. As the inflammatory infiltrate decreases and necrosis increases, there is a higher chance of axillary Lymph node metastasis. This shows that Necrosis and Inflammatory infiltrate can serve as a prognostic factor in breast carcinomas.


References

BIBILIOGRAPHY

1. Kalyani R, Das S, Singh Bindra MS, Kumar HML. Cancer profile in Kolar: A ten years study. Indian J Cancer 2010; 47: 160-5.

2. Stankov A, Bargollo RJE, Silvio NS, Ramirez MT,Ninova KS, Gracia AM. Prognostic Factors and Recurrence in Breast Cancer: Experience at the National Cancer Institute of Mexico. Int Schol Res Net 2012; 10: 1-7.

3. Carter D, Schnitt SJ, Millis RR. The Breast. In: Mills SE, Greenson JK, Hornick JL, Longacre TA, Reuter VE editors. Sternberg's Diagnostic Surgery Pathology. 6th ed. Philadelphia: Wolters Kluwer; 2015.p.317-384.

4. Sinha S, Nath J, Mukherjee A, Chatterjee T. Predictive and Prognostic Factors in Breast Cancer and their Association with ERPR HER2/neu expression. L Carcinog Mutagen 2016; 7: 1-4.

5. Ellis IO, Lee AHS, Pinder SE, Rakha AE. Tumors of the breast. In: Fletcher CDM. Diagnostic Histopathology Of Tumors. 4th ed. Philadelphia: Elsevier; 2013.p.57-1145.

6. Fisher B, Bauer M, Wickerham DL, Redmond CK, Fisher ER, Cruz AB. Relation of number of positive axillary nodes to the prognosis of patients with primary breast cancer. AN NSABP update. Cancer 1983; 52: 1551-7.

7. Hoda SA, Brogi E, Koerner FC, Rosen PP. Rosen's Breast Pathology. 3rd ed. Philadelphia: Wolters Kluwer; 2013.p.235-513.

8. Lakhani SR, Ellis IO, Schnitt SJ, Tan PH, Vijver MJ editors. WHO Classification of Tumors of the Breast and female genital organs. 4th ed. France: IARC; 2012.

9. Rosai J, Ackerman's. Breast. In: Rosai, Ackerman, editors. Surgical Pathology, Vol 2 (10th edition). New Delhi: Mosby;2011.p.1659-1770.

10. Lakhani SR, Ellis IO, Schnitt SJ, Tan PH, Vijver MJ editors. WHO Classification of Tumors of the Breast and female genital organs. 3rd ed. France: IARC; 2002.

11. Krishna G. BD Chaurasia's Human anatomy Regional and applied Dissection and Clinical. 5th ed. India: CBC publishers and distributors;2015.

12. Mirza AN, Mirza NQ, Vlastos G, Singletary SE. prognostic factors in node-negative breast cancer: A review of studies with sample size more than 200 and follow-up more than 5 years. Ann Surg 2002; 235: 10-26.

13. Chakraborty A, Bose CK, Basak J, Sen AN, Mishra R, Mukhopadhyay A. Determinants of lymph node status in women with breast cancer: A hospital based study from Eastern India. Indian J Med res 2016; 143: 45-51.

14. Stankov A, Bargallo-Rocha JE, Silvio NS, Ramirez MT, Stankova-Ninova K, Meneses-Garcia A. Prognostic factors and recurrence in breast cancer: Experience at National Cancer Institute of Mexico. ISRN Oncol 2012;8:1-7.

15. Krishnamurthy J, Kumar SP. Significance of prognostic indicators in infiltrating duct carcinoma breast: Scenario in developing country. Indian J Cancer 2016; 53: 34-8.

16. Sinha S, Nath J, Mukherjee A, Chatterjee T. Predictive and Prognostic Factors in Breast Cancer and their Association with ERPR HER2/neu expression. L Carcinog Mutagen 2016; 7: 1-4.

17. Ashturkar AV, Pathak GS, Deshmukh SD, Pandave HT. Factors predicting the axillary lymph node metastasis in breast cancer: Is axillary node clearance indicated in every breast cancer patient? Indian J Surg 2100; 73: 331-5.

18. Rai T, Patle Y, Rai GS. Estrogen, progesterone receptors and breast cancer- an evaluative and correlative study. Int J Pathol 2017; 1: 37-41.

19. Ioachim HL, Medeiros LJ. Metastatic tumors in lymph nodes. Ioachim's Lymph node Pathology. 4th ed. Philadelphia: Wolters Kluwer;2009.p.590-614.

20. Pernick, N. Normal: embryology. Pathology Outlines.com. http://www.pathologyoutlines.com/topic/Lymph nodesembryology.html. November 17th 2018.

21. Krishna G. BD Chaurasia's Human anatomy Regional and applied Dissection and Clinical. 5th ed. India: CBC publishers and distributors;2015.

22. Young B, Woodfard P, O'Dowd G. Female reproductive system. Wheater's functional Histology. A text and colour atlas. 6th ed. USA: Churchill Livingston Elservier; 2014.p.351-383.

23. Harsh Mohan.The Breast. Textbook of Pathology. 6th ed. Delhi: Jaypee publishers;2010.p.754-767.

24. Zheng Y, Wang L, Hu X, Shao Z. Effect of tumor size on breast cancer specific survival stratified by joint hormone receptor status in a SEER population based study. Oncotarget 2015; 6: 22985-95.

25. Verschraegen C, Vinh-Hung V, Cserni G, Gordon R, Royce ME, Vlastos G, Tai P, Storme G. Modeling the effect of tumor size in early breast cancer. Ann Surg 2005; 241: 309-18.

26. Ahmad Z, Khurshid A, Qureshi A, Idress R, Asghar N, Kayani N. Breast carcinoma grading, estimation of tumor size, axillary lymph node status, staging and Nottingham Prognostic Index scoring on mastectomy specimens. Indian J Pathol Microbiol 2009; 52: 477-81.

27. Rakha EA, Reis-Filho JS, Baehner F, Dabbs DJ, Decker T, Eusebi V et. al. Breast cancer prognostic classification in the molecular era: the role of histological grade. Breast cancer Res 2010; 12: 1-12.

28. Gilchrist KW, Gray R, Fowble B, Tormey DC, Taylor SG. Tumor necrosis is a prognostic predictor for early recurrence and death in lymph node-positive breast cancer: a 10 year follow-up study of 728 Eastern cooperative Oncology Group patients. J Clin Oncol 1993; 11: 1929-35.

29. Maiorano E, Regan MM, Viale G, Mastropasqua MG, Colleoni M, Castiglione –Gertsch M et. al. Prognostic and predictive impact of central necrosis and fibrosis in early breast cancer. Results from two international breast cancer study group randomized trials of chemoendocrine adjuvant therapy. Breast Cancer Res Treat 2010; 121: 211-8.

30. Mohammed ZMA, Going JJ, Edwards J, Elsberger J, Doughty JC, McMillan DC. The relationship between components of tumour inflammatory cell infiltrate and clinicopathological factors and survival in patients with primary operable invasive ductal breast cancer. Br J Cancer 2012; 107: 864-73.

31. Mohammed ZMA, Going JJ, Edwards J, Elsberger J, McMillan DC. The role of the tumour inflammatory cell infiltrate in predicting recurrence and survival in patients with primary operable breast cancer. Cancer Treatment Reviews 2012; 38: 943-55.

32. He K, Sun J, Liu Z, Zhuo P, Ma Q, Liu Z, Yu Z. Prognostic significance of lymphatic vessel invasion diagnosed by D2-40 in Chinese invasive breast cancers. Medicine 2017; 96: 1-9.

33. Guleria P, Srinivas V, Basannar D, Dutta V. Comparison of lymphangiogenesis, lymphatic invasion and axillary lymph node metastasis in breast carcinoma. Indian J Pathol Microbiol 2018; 61: 176-80.

34. Song YJ, Shin SH, Cho JS, Park MH, Yoon JH, Jegal YJ. The role of lymphovascular invasion as a prognostic factor in patients with lymph node-positive operable invasive breast cancer. J Breast Cancer 2011; 14: 198-203.

35. Westenend PJ, Meurs CJC, Damhuis RAM. Tumour size and vascular invasion predict distant metastasis in stage I breast cancer. Grade distinguishes early and late metastasis. J Clin Pathol 2005; 58: 196-201.

36. Rosen PP, Groshen S, Saigo PE, Kinne DW, Hellman S. Pathological prognostic factors in stage I (T1N0M0) and stage II (T1N1M0) breast carcinoma: a study of 644 patients with median follow-up of 18 years. J Clin Oncol 1989; 7: 1239-51.

37. Lee AHS, Pinder SE, Macmillan RD, Mitchell M, Ellis IO, Elston CW, Blamey RW. Prognostic value of lymphovascular invasion in women with Lymph node negative invasive breast carcinoma. Eur J Cancer 2006; 42: 357-62.

38. Fujii T, Yajima R, Hirakata T, Miyamoto T, Fujisawa T, Tsutsumi S. Impact of the prognostic value of vascular invasion, but not lymphatic invasion, of the primary tumor in patients with breast cancer. Anticancer Res 2014; 34: 1255-60.

39. Karak SG, Quatrano N, Buckley J, Ricci A Jr. Prevalence and significance of perineural invasion in invasive breast carcinoma. Conn Med 2010; 74: 17-21.

40. Gaddis, ML, Gaddis, GM. Introduction to biostatistics: Part 4, Statistical inference techniques in hypothesis testing. Ann Emerg Med. 1990;19:820–825

41. Patra P. Sample size in clinical research, the number we need. Int J Med Sci Public Health. 2012;1:5–9.

42. Sundar Rao PSS, Richard J. Introduction to Biostatistics and research methods. 5th ed. New Delhi: Prentice hall of India Private Limited; 2012. 86-160.

43. Elenbaas, RM, Elenbaas, JK, Cuddy, PG. Evaluating the medical literature, part II: Statistical analysis. *Ann Emerg Med*. 1983;12:610–620.

44. El Saghir NS, Shamseddine AL, Gaera F, Bikhazi K, Rahal B, Salem ZM et.al. Age distribution of breast cancer in Lebanon: increased percentages and age adjusted incidence rates of younger-aged groups at presentation. J Med Liban 2002; 50: 3-9.

45. Najjar H, Easson A. Age at diagnosis of breast cancer in Arab nations. Int J Surg 2010; 8: 448-52.

46. Sughrue T, Brody JP. Breast tumor laterality in the United States depends upon the country of birth, but not race. PLos One 2014; 9: e103313. doi:10.1371/journal.pone.0103313.

47. Bright CJ, Rea DW, Francis A. Comparison of quadrant specific breast cancer incidence trends in the United States and England between 1975 and 2013. Cancer Epidemiology 2016; 44: 186-94.

48. Rummel S, Human MT, Costantino N, Shriver CD, Ellsworth RE. Tumor location with in the breast: Does tumor site have prognostic ability. Ecancermedicalscience 2015;9:1-10.

49. Kwon Gy, Lee SD, Park ES. Mast cell and macrophage counts and microvessel density in invasive breast carcinoma: Comparison analysis with clinicopathological parameters. Cancer Res Treat 2005;37:103-8

50. Ogawa Y, Chung YS, Nataka B, Taksuka S, Maeda K, Sawada T et al. Microvessel quantitation in invasive breast cancer by staining for factor VII antigen. British Journal of cancer 1995;71:1297-1301.

51. Erdogan N, Dengizmen A, Akyildizigdem A, Sahan E, Tetikkurt US. Angiogenesis in breast cancers without lymph node metastasis. Turk J Pathol 2010; 26: 136-9.

52. Medri L, Nanni O, Volpi A, Scarpi E, Dubini A, Riccobon A et. al. Tumor microvessel density and prognosis in node-negative breast cancer. Int J Cancer 2000; 89: 74-80.

53. Rani DMN, Kumar H, Raj SBV. Significance of microvessel density in invasive breast carcinoma. Ann Pathol Lab Med 2018; 5: 184-7.

54. Hemalatha A, Suresh TN, Kumar MLH. Expression of vimentin in breast carcinoma its correlation with Ki67 and other histopathological parameters. Indian J Cancer 2013; 50: 189-94.

55. Qureshi HS, Linden MD, Divine G, Raju UB. E-Cadherin status in breast cancer correlates with histologic type but does not correlate with established prognostic parameters. Am J Clin Pathol 2006; 125: 377-85.

56. Parker C, Rampaul RS, Pinder SE, Bell JA, Wencyk PM, Blamey RW et. al. E-cadherin as a prognostic indicator in primary breast cancer. Br J Cancer 2001; 85: 1958-63.

57. Rakha EA, Martin S, Lee AH, Morgan D, Pharoah PD, Hodi Z et. al. The prognostic significance of lymphovascular invasion in invasive breast carcinoma. Cancer 2012; 118: 3670-80.

58. Mohammed ZMA, McMillan DC, Edwards J, Mallon E, Doughty JC, Orange C, Going JJ. The relationship between lymphovascular invasion and angiogenesis, hormone receptors, cell proliferation and survival in patients with primary operable invasive ductal breast cancer. BMC Clin Pathol 2013; 13: 1-9.

59. Hadi Ni, Jamal Q. Comparison of clinicopathological characteristics of lymph node positive and lymph node negative breast cancer. Pak J Med Sci 2016; 32: 863-8.

60. Karak SG, Quatrano N, Buckley J, Ricci A Jr. Prevalence and significance of perineural invasion in invasive breast carcinoma. Conn Med 2010; 74: 17-21.

61. Krishnamurthy J, Kumar SP. Significance of prognostic indicators in infiltrating duct carcinoma breast: Scenario in developing country. Indian J Cancer 2016; 53: 34-8.

62. Carlomagno C, Perrone F, Lauria R, De Laurentiis M, Gallo C, Morabito A et. al. Prognostic significance of necrosis, elastosis, fibrosis and inflammatory cell reaction in operable breast cancer. Oncology 1995; 52: 272-7.

63. Matkowski R, Gisterek I, Halon A, Lacko A, Szewczyk K, Staszek U et. al. The prognostic role of tumor-infiltrating CD4 and CD8 T lymphocytes in breast cancer. Anticancer Res 2009; 29: 2445-52.

64. Aziz S, Wik E, Knutsvik G, Klingen TA, Chen Y, Davidsen B et.al. Extra-nodal extension is a significant prognostic factor in lymph node positive breast cancer. PLos One 2017; 12: e0171853. doi:10.1371/jurnal.pone.0171853.

65. Galae MH, Blamey RW, Elston CE, Ellis IO. The Nottingham Prognostic Index in primary Breast cancer. Breast cancer research and treatment 1992;22:207-19.

66. Klintrup K, Makinen JM, Kauppila S, Vare PO, Melkko J, Tuominen H et. al. Inflammation and prognosis in colorectal cancer. Eur J Cancer 2005; 41: 2645-54.

67. Richards CH, Flegg KM, Roxburgh CSD, Going JJ, Mohammed Z, Horgan PG, McMillan DC. The relationships between cellular components of the pertumoural inflammatory response, clinicopathological characteristics and survival in patients with primary operable colorectal cancer. Br J Cancer 2012; 106: 2010-5.

68. Chakraborthy A, Bose CK, BasakJ,Sen AN, Mishra R, Mukhyopadhya A. Determinants of Lymph node status in women with breast cancer: A hospital based study from eastern India. Indian J Med Res 2016;143:45-46.

69. Pistelli M, Pagliacci A, Battelli N, Santinelli A, Biscotti T, Ballatore Z et. al. Prognostic factors in early stage triple negative breast cancer: Lessons and limits from clinical practice. Anticancer Res 2013; 33: 2737-42.

70. Wang M, Chen H, Wu K, Ding A, Zhnag M, Zhnag P. Evaluation of the prognostic stage in the 8th edition of the American Joint Committee on cancer in locally advanced breast cancer: An analysis based on SEER a9 database. The Breast 2018; 37: 56-63.

71. Lester SC. The breast.In: Kumar V,Abbas AK, Fausto N, Aster J editors. Robbins & Cotran Pathologic basis of Disease. 8th ed. New Delhi: Elsevier; 2010.p.1065-95.

72. Eliyatki N, Yalcin E, Zenge B, Aktas S, Vardar E. Molecular Classification of Breast Carcinoma: From Traditional, Old-Fashioned Way to A New Age, and A New Way. J Breast Health 2015; 11: 59-66.

ANNEXURES

PROFORMA

Name:

Case No:

Age:

IP No:

Biopsy Number:

Presenting complaints:

Past History:

Personal history:

Family history:

Menstrual history:

Neoadjuvant therapy received: Yes/ No

Clinical diagnosis with TNM staging:

Type of surgery:

Side: Right/ Left

Radiological findings:

Size:

Site:

Diagnosis:

Previous pathological findings: FNAC/Biopsy/Trucut if any,

GROSS FEATURES

Nature of Specimen:

Tumour site:

Tumour size:

Tumor shape:

Specimen size:

Complete gross description:

MICROSCOPY

Invasive tumour type:

Histological grade:

Disease extent:

Microscopic extension of tumour:

Skin changes

Nipple

Skeletal muscle

Micro calcification: Present / Absent

Lymphovascular invasion: Present / Absent

Dermal lymphovascular invasion: Present / Absent

Perineural invasion: Present / Absent

Necrosis:

Grade 1- Absent/ None

Grade 2 - Focal (<10% of tumour area)

Grade 3- Moderate (10–30%)

Gerade 4- Extensive (> 30%)

Margins:

Distance from closest margin: ___ mm

Any positive margins-

Lymph node:

Axillary nodes present: No □ Yes □

Total present: .....

Total positive: .....

Extracapsular spread: Present □ Not identified □

Additional pathological findings:

Inflammatory cell infiltrate

- Score 0 - No inflammatory cell infiltrate
- Score 1 - Mild or patchy increase
- Score 2 - Prominent inflammatory reaction
- Score 3 - Florid ‘cup-like’ inflammatory infiltrate

Stromal characterstics-

Extent of intraductal carcinoma-

Nottingham Prognostic Index-

KEYS TO MASTER CHART

SIDE	1- RIGHT 2- LEFT
AGE	1- < 50 YEARS 2- ≥50 YEARS
SITE	1- RETROAREOLAR 2- MEDIAL 3- LATERAL 4- MEDIAL AND LATERAL BOTH
PRESENTINGCOMPLAINTS	1- LUMP 2- ULCERATION 3- NIPPLE DISCHARGE 4- PAGET'S DISEASE
TYPE OF SURGERY	1- MODIFIED RADICAL MASTECTOMY 2- MASTECTOMY
PREVIOUS PROCEDURE	0- NOT KNOWN 1- FNAC 2- BIOPSY 3- FROZEN SECTION
PREVIOUS DIAGNOSIS	0- NOT KNOWN 1- INFILTRATING DUCTAL CARCINOMA 2- PAPILLARY CARCINOMA 3- MEDULLARY CARCINOMA 4- ADENOID CYSTIC CARCINOMA 5- FIBROADENOMA 6- PHYLLOIDES
TUMOR SIZE	1- ≤2 CMS 2- 2 CMS - ≤5 CMS 3- >5 CMS
T CATEGORY	1- T1 2- T2 3- T3 4- T4
HISTOPATHOLOGICAL DIAGNSOSIS	1- INFILTRATING DUCTAL CARCINOMA 2- INFILTRATING DUCTAL CARCINOMA + LOBULAR CARCINOMA 3- PAPILLARY CARCINOMA 4- INFILTRATING DUCTAL CARCINOMA + MEDULLARY CARCINOMA 5- MEDULLARY CARCINOMA 6- ADENOID CYSTIC CARCINOMA

	7- INFILTRATING DUCTAL CARCINOMA + MUCINOUS CARCINOMA 8- LOBULAR CARCINOMA
HISTOLOGICAL GRADE	1- GRADE 1 2- GRADE 2 3- GRADE 3
SKIN/ NIPPLE/ SKELETAL MUSCLE INVASION	0- ABSENT 1- PRESENT
LYMPHOVASCULAR INVASION	0- ABSENT 1- PRESENT
DERMAL LYMPHOVASCULAR INVASION	0- ABSENT 1- PRESENT
NECROSIS	0- NOT IDENTIFIED 1- FOCAL 2- MODERATE 3- EXTENSIVE
TUMOR MARGIN	0- NEGATIVE 1- POSITIVE
LYMPH NODES RETRIEVED	NUMBER OF LYMPH NODES RETRIEVED
LYMPH NODES POSITIVE	0- N0 1- N1 2- N2 3- N3
EXTRACAPSULAR EXTENSION	0- ABSENT 1- PRESENT
INFLAMMATORY INFILTRATE	0- NO INFLAMMATORY CELL INFILTRATE 1- MILD/ PATYCHY INCREASE 2- PROMINENT INFLAMMATORY REACTION 3- FLORID “CUP LIKE” INFLAMMATORY INFILTRATE
PERINEURAL INVASION	0- ABSENT 1- PRESENT

STROMAL CHARACTERISTICS	1- DESMOPLASIA 2- MYXOID CHANGE 3- HYALINIZATION 4- MUCINOUS 5- MIXED 6- FIBROCYSTIC 7- CALCIFICATION
NOTTINGHAM PROGNOSTIC INDEX	1- 2-2.4 2- 2.4-3.4 3- 3.4- 5.4 4- >5.4

SL.NO	H. NO	YEAR	B. NO	NAME	AGE	SIDE	COMPLAINTS	SURGERY	PREVIOUS DIAGNOSIS	PROCEDURE	SITE	TUMOR SIZE	T Category	HISTOPATH DIAGNOSIS	GRADE	SKIN/ NIPLE/ SKELETAL MUSCLE INVASION	DERMAL	LYMPHO VASCULAR INVASION	NECROSIS	MARGIN STATUS	LN RETRIVED	LYMPHNODES POSITIVE	EXTRACAPSULAR EXT	INFLAMM INFILTRATE	PERINEURAL INVASION	STROMA	NPI	STAGE
1	380287	2017	43	Ramakka	2	1	1	1	1	1	1	3	3	1	1	0	0	0	1	0	2	0	0	3	0	2	2	IIB
2	35502	2017	24	FAREEDA	1	1	1	1	0	0	2	3	3	1	3	0	0	0	2	0	7	0	0	2	0	0	3	IIB
3	407106	2017	585	VANAJA	1	1	1	1	2	1	1	1	1	1	1	0	0	0	1	0	7	0	0	2	0	2	2	I
4	408977	2017	559	GAYATHRI	1	2	1	1	0	0	3	2	2	1	1	0	0	0	0	0	3	0	0	3	0	3	3	IIA
5	410488	2017	663	JAYALAKSHMI	2	2	1	1	1	1	1	1	4	1	2	1	1	1	2	0	11	0	0	3	0	0	3	IIIB
6	416599	2017	806	RESHMA TAJ	1	2	1	1	1	1	2	2	2	2	2	0	0	1	3	0	26	3	1	1	0	5	3	IIIC
7	414508	2017	848	NAGARATHNAMMA	2	1	1	2	3	1	4	2	2	3	1	0	0	0	1	0	10	1	0	2	0	5	3	IIB
8	422649	2017	856	LAXMAMMA	2	2	1	2	2	3	1	2	2	3	2	0	0	0	1	0	0	0	0	3	0	3	3	IIA
9	431787	2017	1141	GAYATHRAMMA	1	2	1	1	0	0	3	3	3	1	1	0	0	0	2	0	15	1	0	1	0	5	3	IIIC
10	465862	2017	1831	FIRDOSE KOUSAR	1	2	1	1	1	1	1	3	4	4	3	0	1	1	1	0	0	0	0	3	0	3	2	IIIB
11	461944	2017	1878	HASEENA BANU	1	1	1	2	1	1	1	3	3	1	2	0	0	0	2	0	12	2	0	1	0	0	4	IIIA
12	461171	2017	1717	SUSHEELA NAGENDRA	2	2	1	1	0	0	3	2	2	1	1	0	0	0	0	0	9	1	0	2	0	5	3	IA
13	428215	2017	1516	PRAMELAMMA	2	2	1	1	1	1	2	2	4	5	2	0	1	1	2	0	21	0	0	1	0	0	2	IIIB
14	1007672	2014	844	APARNA	2	1	1	1	0	0	2	2	2	1	3	0	0	1	3	0	5	1	0	2	0	1	4	IIB
15	995047	2014	944	VENKATAMMA	1	2	1	1	1	2	3	2	2	1	1	0	0	0	1	0	0	0	0	1	0	1	3	IIA
16	1015402	2014	989	ASMAT	2	1	1	1	0	0	3	2	2	1	3	0	0	0	1	0	2	0	0	1	0	0	2	IIA
17	9676	2014	1374	RAMAMMA	2	2	1	1	1	2	1	2	4	1	1	1	0	0	2	0	3	1	0	2	1	0	2	IV
18	999331	2014	1381	ALUVELAMMA	1	2	1	1	1	1	2	3	4	1	3	1	0	0	1	0	16	2	0	3	0	1	4	IV
19	14843	2014	1419	RATHNAMMA	2	1	1	1	1	1	1	2	2	1	2	0	0	0	3	0	13	1	0	2	0	1	3	IIB
20	1018698	2014	1905	VASANHAMMA	1	1	1	1	4	1	1	2	2	6	1	0	0	0	3	0	11	0	0	0	0	0	2	IIA
21	62056	2014	2477	NAGAMMA	2	2	1	1	1	1	1	1	1	1	1	0	0	1	3	0	6	1	0	3	0	0	3	IIA
22	64224	2014	2592	BYAMMA	2	1	1	1	0	0	1	2	2	1	1	0	0	0	0	0	9	0	0	1	0	0	2	IIA
23	66409	2014	2662	PUSHPA	1	1	1	1	5	1	1	2	2	1	1	0	0	0	1	0	0	0	0	2	0	0	2	IIA
24	72556	2014	2763	THIMMAKKA	2	1	1	1	1	1	3	3	4	1	2	1	0	0	2	0	4	2	0	1	0	0	4	IV
25	62641	2014	2873	lakshminarasamma	1	1	1	1	1	1	1	3	4	1	2	1	0	1	1	1	4	1	0	2	0	0	4	IV
26	90989	2015	110	SUSHEELAMMA	2	2	1	1	1	1	2	2	2	1	3	0	0	0	1	1	9	1	0	3	0	0	3	IIB
27	90989	2015	223	SUSHEELAMA	2	2	1	1	1	2	4	1	1	1	1	0	0	0	0	0	0	0	0	1	0	0	1	I
28	120768	2015	601	ANJUM	1	2	1	1	6	1	1	3	4	1	2	1	1	0	3	0	1	1	0	2	0	4	3	IIIB
29	124421	2015	773	USHA	2	1	1	1	0	0	1	2	2	1	2	0	0	0	2	0	30	0	0	1	0	1	3	IIA
30	109750	2015	851	NARASAMMA	2	1	1	1	1	1	1	3	4	7	1	0	1	0	2	0	16	3	1	1	0	4	4	IIIC
31	1020959	2015	976	NARAYANAMMA	2	2	1	1	0	0	1	2	2	1	1	0	0	0	0	1	0	0	0	2	0	0	2	IIA
32	109869	2015	1219	RAMADEVI	1	1	1	1	0	0	3	2	2	1	2	0	0	0	3	0	2	0	0	3	0	1	2	IIA
33	123371	2015	1239	SHANTHA	1	2	1	1	0	0	3	2	4	1	1	1	0	0	1	0	2	0	0	3	0	0	2	IV
34	148469	2015	1403	VENKATARATHNAMMA	1	1	1	1	1	1	3	1	1	1	2	0	0	0	3	1	23	1	0	2	0	0	4	IIA
35	175651	2015	2071	SUMITHRA	1	2	1	1	1	1	4	2	2	1	1	0	0	0	3	0	3	1	0	1	0	1	3	IIB
36	176259	2015	2420	CHOWDAMMA	2	2	2	1	1	1	2	1	4	1	2	0	1	0	1	0	0	0	0	3	0	0	2	IIIB
37	243453	2015	2851	SHAKEERA	1	1	1	1	1	1	3	1	4	1	1	0	1	0	2	1	10	0	0	3	0	0	2	IIIB
38	223773	2015	3212	GOWRAMMA	2	2	1	1	1	2	3	2	4	1	2	1	0	0	1	0	15	0	0	2	0	1	3	IV
39	222506	2015	3238	LAKSHMAMMA	1	2	1	1	1	1	3	2	4	1	2	1	1	0	3	0	7	1	0	1	0	1	3	IIIB
40	868865	2013	84	SAROJAMMA	2	2	1	1	1	1	1	2	2	1	3	0	0	0	0	0	3	0	0	1	0	6	3	IIA
41	872784	2013	41	GADAVARI BAI	2	2	1	1	1	1	1	3	3	1	2	0	0	0	3	0	37	3	0	1	0	0	4	IIIC

42	877207	2013	156	JABEEN TAJ	1	1	1	1	1	1	2	1	1	1	1	0	0	0	1	0	0	0	0	3	0	0	2	I
43	877207	2013	255	J TAJ	1	1	1	1	0	0	1	2	2	8	1	0	0	0	3	0	4	1	0	2	0	5	2	IIB
44	879988	2013	269	MANGAMMA	2	2	1	1	0	0	1	2	2	1	3	0	0	0	3	0	9	2	0	1	0	0	4	IIIA
45	892839	2013	569	LAXMAMMA	2	2	1	1	1	1	1	3	3	1	1	0	0	0	1	0	5	0	0	3	0	7	1	IIB
46	894827	2013	584	MUNILAKSHMI	2	1	1	1	1	1	3	2	2	1	1	0	0	0	2	0	1	0	0	2	0	0	3	IIA
47	889235	2013	594	KRISHNAMMA	2	1	1	1	1	1	3	1	1	1	1	0	0	0	2	0	0	0	0	2	0	0	2	I
48	911874	2013	997	SARASAMMA	1	1	1	1	0	0	1	2	2	1	2	0	0	0	3	0	3	1	0	2	0	0	3	IIB
49	918817	2013	1172	NARAYANAMMA	1	1	1	1	0	0	3	3	3	1	1	0	0	0	3	0	15	2	0	1	0	0	4	IIIA
50	921434	2013	1203	DILSHAN	1	1	1	1	0	0	1	2	2	1	2	0	0	0	3	0	6	1	0	1	0	0	4	IIB
51	928945	2013	1431	NARAYANAMMA	2	2	2	1	1	1	2	2	4	1	1	1	0	1	2	0	1	0	0	3	0	0	2	IV
52	934684	2013	1539	THIMMAKKA	1	2	1	1	0	0	1	3	3	1	2	0	0	0	3	0	11	2	0	0	0	0	3	IIIA
53	898579	2013	1696	BHAGYAMMA	1	2	1	1	0	0	1	3	3	1	1	0	0	0	1	0	0	0	0	3	0	0	3	IIB
54	921133	2013	2063	SHAHANAZ	2	1	1	1	0	0	1	1	1	1	2	0	0	0	3	0	3	1	0	0	0	0	3	IIA
55	954790	2013	2123	MUNIVENKATAMMA	1	1	1	1	0	0	1	3	3	1	2	0	0	0	3	0	17	3	0	0	0	0	4	IIIC
56	254221	2016	471	NAZEEM TAJ	1	1	1	1	0	0	2	2	2	1	1	0	0	0	1	0	9	0	0	3	0	5	3	IIA
57	310945	2016	2573	PARVENN TAJ	1	2	1	1	1	1	1	2	2	1	2	0	0	0	3	0	6	2	0	2	1	0	4	IIIA
58	295125	2016	2574	GANGAMMA	1	1	1	1	1	1	2	2	2	1	3	0	0	0	2	0	5	1	0	1	0	0	4	IIB
59	371216	2016	3184	SHANTAMMA	2	2	1	1	1	1	2	2	2	1	3	0	0	0	3	0	13	2	0	0	0	0	4	IIIA
60	236685	2016	30	CHOWDAMMA	2	2	2	1	1	1	3	3	4	1	2	1	1	0	2	0	8	1	0	2	0	0	3	IIIB
61	238421	2016	64	SARASWATHAMMA	1	2	1	1	1	1	1	3	3	1	1	0	0	0	1	1	0	0	0	3	0	0	3	IIB
62	287475	2016	1471	SHANTAMMA	1	2	2	1	0	0	1	3	4	1	3	1	0	0	3	0	9	2	0	1	0	1	3	IV
63	302185	2016	1721	SARASAMMA	2	2	1	1	0	0	1	3	3	1	3	0	0	0	3	0	11	3	0	1	0	5	3	IIIA
64	293825	2016	1731	MALATHI	1	1	1	1	1	1	1	3	3	1	3	0	0	0	3	0	12	3	0	1	0	0	3	IIIC
65	274504	2016	1011	SUMITHRAMMA	2	1	1	1	1	1	1	2	2	2	2	0	0	0	1	0	0	0	0	3	0	0	2	IIA
66	521986	2018	89	CHIKKAMUNIYAMMA	2	1	1	1	1	1	1	3	3	5	2	0	0	0	1	0	11	0	0	2	0	0	3	IIB
67	506481	2018	146	ZAREEN TAJ	2	2	1	1	0	0	2	2	4	1	1	1	0	0	1	1	7	1	0	1	1	1	1	IV
68	529217	2018	191	BHAGYAMMA	2	1	1	1	1	1	3	2	2	1	2	0	0	0	0	1	7	0	0	3	0	1	2	IIA
69	537450	2018	274	GOHAR TAJ	2	2	1	1	1	1	1	2	2	1	1	0	0	0	3	0	10	1	0	1	0	0	3	IIA
70	421835	2018	510	RUBY STELLA	1	2	1	1	1	1	2	2	2	1	3	0	0	0	3	0	2	0	0	2	0	0	3	IIA
71	552929	2018	548	NARAYANAMMA	1	2	1	1	0	0	3	2	2	1	3	0	0	0	0	0	1	0	0	3	0	6	3	IIA
72	562743	2018	732	AMARAVATHI	1	1	1	1	2	1	1	3	3	1	1	0	0	0	0	0	0	0	0	3	0	0	3	IIB
73	563067	2018	897	LAXMIDEVAMMA	1	2	1	1	0	0	1	3	3	5	1	0	0	0	0	0	2	0	0	3	0	0	2	IIB
74	570525	2018	952	PARVATHAMMA	2	1	1	1	1	1	2	2	2	1	2	0	0	0	0	0	10	1	0	2	0	0	3	IIB
75	581449	2018	1236	THIRUVASUGI	2	2	1	1	1	1	3	2	2	1	1	0	0	0	3	0	5	1	0	1	0	0	3	IIB
76	560942	2018	1250	SAKAMMA	2	2	1	1	0	0	2	2	2	1	1	0	0	1	0	1	13	0	0	3	0	1	2	IIA
77	562848	2018	1279	ZUBEDA	2	1	1	1	0	0	1	1	1	1	1	0	0	0	3	1	15	1	0	1	0	7	2	IIA
78	582456	2018	1293	TABASUM	2	2	1	1	1	1	1	1	1	1	2	0	0	1	3	0	13	2	0	1	0	0	3	IIIA
79	58	2018	1309	CHANNABASAVAMMA	2	1	1	1	1	1	1	3	3	7	2	0	0	1	3	0	8	2	0	1	0	4	3	IIIA
80	584126	2018	1371	LAXMAMMA	1	1	1	1	0	0	3	2	2	1	2	0	0	1	3	0	9	1	0	0	0	0	3	IIB
81	608018	2018	1918	VENKATALAKSHMAMMA	2	2	1	1	1	1	1	2	2	1	1	0	0	0	1	0	10	0	0	2	0	1	1	IIA
82	588292	2018	1536	IRFANA	2	1	1	1	0	0	1	3	3	1	1	0	0	0	0	0	1	0	0	3	0	0	3	IIB
83	569103	2018	1051	ANASUYAMMA	1	1	1	1	1	1	1	3	3	1	2	0	0	1	3	0	10	3	1	1	0	0	4	IIIC
84	576151	2018	1145	PILLAMMA	2	1	1	1	0	0	1	3	4	1	2	1	0	0	1	0	1	0	0	1	0	1	2	IV
85	575396	2018	1200	FAMIDA	2	2	1	1	0	0	3	2	2	1	2	0	0	0	3	1	12	1	0	1	0	1	3	IIB
86	769146	2012	147	NAGAMMA	1	1	1	1	0	0	3	1	1	1	2	0	0	0	1	0	8	1	0	1	0	0	3	IIA
87	770946	2012	208	DSHAHEEDA	1	1	1	1	0	0	1	2	2	1	1	0	0	0	0	0	8	0	0	3	0	0	1	IIA
88	771600	2012	436	PRAMEELA	1	2	1	1	0	0	1	3	3	1	2	0	0	1	3	0	10	3	1	1	0	0	4	IIIC
89	784673	2012	472	LAKSHMAMMA	2	1	1	1	0	0	1	2	2	1	2	0	0	1	1	0	7	2	1	1	0	0	4	IIIA

90	795926	2012	843	MAGESHWARI	1	2	1	1	1	2	1	1	1	1	1	0	0	0	0	0	4	0	0	3	0	0	1	IA
91	816016	2012	1297	BIBIJAN	1	1	1	1	1	1	1	2	2	1	1	0	0	0	0	0	6	0	0	3	0	3	1	IIA
92	815357	2012	1363	ZAIBUNNISA	2	2	1	1	0	0	1	2	2	1	2	0	0	1	3	0	6	2	1	2	0	0	4	IIB
93	830889	2012	1644	BAIRAMMA	2	2	1	1	0	0	1	2	2	1	1	0	0	0	1	0	4	0	0	3	0	0	1	IIA
94	601433	2018	1917	LALITHA	2	2	1	1	1	1	1	2	2	1	1	0	0	0	2	0	12	1	0	2	0	0	2	IIB
95	612034	2018	1972	RATHANAMMA	1	1	1	1	1	1	1	3	3	1	1	0	0	0	3	0	16	3	0	1	0	0	4	IIIC
96	857146	2012	2205	RADHAMMA	1	1	1	1	0	0	1	3	3	1	2	0	0	0	1	0	12	2	0	1	0	7	4	IIIA
97	618289	2018	2086	PUSHPA	1	1	1	1	1	1	3	2	2	1	1	0	0	0	3	0	23	1	0	2	0	6	2	IIB
98	609669	2018	2028	SHRADDAMMA	2	2	1	1	0	0	1	2	2	1	1	0	0	1	2	1	20	0	0	2	0	6	1	IIA
99	616799	2018	2101	ANASUYAMMA	2	1	1	1	0	0	1	2	2	1	1	0	0	0	0	0	4	0	0	2	0	1	1	IIA
100	611791	2018	1987	CHINNAMMA	2	1	1	1	1	1	1	2	2	1	2	0	0	0	3	1	10	1	0	1	0	1	4	IIB