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Original Research Article

Clinico-Imaging and Pathological Spectrum & Management of Benign Breast Diseases

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Conflict of interest: Nil

Abstract

Background: The mammary glands or breasts are unique identification mark of mammals. The breasts are the most distinguishing feature of female anatomy and plays an integral role in reproduction system [1]. The well-developed breasts are sign of womanhood and represent status of hormonal balance. Benign breast diseases are frequently demonstrated in females and require consultation with clinicians [2,3]. Most of the breast lesions are benign in nature and need conservative management [4]. The spectrum of Benign Breast Diseases/ ranges from mild abnormality to Moderate disorder /disease [5,6,7]. BI-RADS system using mammography and ultrasound lexicon are useful scoring system to further differentiating between normal, Benign, suspicious Benign, low, intermediate and moderate suspicion of malignancy to high level of suspicion of malignancy of breast lesions.

Aims: (1) To know the clinical spectrum of Benign Diseases of Breast. (2) To establish the role of triple assessment in early diagnosis by (a) clinical examination, (b) imaging techniques and (c) pathology by FNAC of Benign breast disorder / diseases.

Objectives: (1) To early diagnosis of Benign lesions of breast. (2) To differentiate benign from malignant breast lesion by imaging techniques**.** (3) Confirmation of benign nature by fine needle aspiration cytology (FNAC)**.** (4) To put forward protocol for management of Benign breast lesions using BIRADS scoring system.

Material and Methods: This is retrospective study after IEC approval of 130 female patients, attended OPD and admitted in indoor wards for breast related abnormality /disease at tertiary care Centre (G. S. Medical college and Hospitals, Pilkhuwa, district Hapur), U.P., India. Duration of study – 1st January to 31st December 2021.

Results: Out of 130 female patients; 46(35%) were having nodularity of Breast ;32(25%) were having true non- cyclical mastalgia;28(22%) were having fibroadenoma;3(2%) were having phyllodes tumour;10(8%) were having macrocysts;5(4%) were having ductal ectasia and 3(2%) were having physiological nipple discharge and 3(2%) were having atypical duct hyperplasia. Out of 130 patient, 111(85%) patients were managed conservatively by

reassurance/drug therapy/aspiration. Only 19(15%) patients were required enucleation/ excision/simple mastectomy.

Conclusion: Mostly benign breast diseases were treated on conservative (85%) line of treatment while remaining (15%) benign lesions required surgical treatment. The most common benign breast disorders/diseases were ranging from nodularity /lump associated with or without mastalgia and tumor as fibroadenoma. The benign breast disorders/diseases were diagnosed by triple assessment method which provide high degree of accuracy with 98% of predictive value.

Keywords: Mastalgia, triple assessment, high resolution sonography (ultrasound), mammography, M.R.I. breasts, F.N.A.C.

Introduction

Breasts or mammary glands are a pair of structures present in the thoracic (chest) region of primates. Breasts are part of the female and male sexual anatomy which overlies in chest region. The breast are the accessory glands of the female reproductive system responsible for the lactation of a newly born child, among other functions. The visible parts of breast anatomy include the nipples and areolae. The breasts are made up of lobules, fibrous tissue, milk producing glandular structures, and a system of ducts that transport milk to the nipple.

The breast development is caused by hormones released by the ovaries at puberty. The size, shape, and weight of the breast changes in women in different stages of life like puberty, menstrual cycle, pregnancy, breast feeding and menopause. Most females experience breast changes at some time depending on age and hormone level. Some abnormal changes like lumpiness, pain, heaviness, nipple discharge occur in females' breasts at various phase of development and reproductive life & Menopausal phase.

The breast sign and symptoms may range from minor nodular lesion, with or without pain to a major problem like tumor (lump). The Benign lesions have characteristic

sonographic findings like smooth and well circumscribed margins, isoechoic to mildly hypoechoic with thin echogenic capsule, oval to ellipsoid shape with wider than tall. Most of the hyperechoic nodules are benign.

The increasing public awareness have led to consult a clinician for even mild symptoms of pain and small size of nodule or lump in breast for early detection of problem and to alleviate the fear of tumor/cancer. Hence this is very essential for radiologist to become familiar with the imaging findings of benign Breast diseases. The benign breast diseases (bbd) include a heterogeneous clinical and pathological conditions with wide range of abnormalities.

Usually solid hypoechoic mass/es with ill-defined/speculated margin, heterogenous texture, punctate calcifications, taller than wide, lesions especially in upper and outer quadrant of breast associated with axillary lymphadenopathy should be Investigated cautiously and biopsy of the mass is strongly advisable. Only 3 to 6 % of Breast lumps are detected as breast cancer.

Currently, malignant to benign breast tumor ratio of 1:10 are being seen in breast clinic (Barclay et al 1991). The benign breast diseases include fibroadenoma, fibrocystic changes, sclerosing lesions and papillary lesions [10,11]. Epithelial hyperplasia and papilloma are regarded as more complex conditions which may have an association with cyclical and involutional changes. The classification of benign breast disorder /diseases play an important role in management of benign breast diseases.

The scoring of benign breast lesions is done by Birads category by using high resolution sonography (ultrasound) & mammography lexicon which differentiate between benign and malignant lesions. MRI breasts were advised in patients having suspicious malignant breast lesions to rule out cancer. All cases of benign breast lesions were further confirmed by fine needle aspiration cytology (fnac) [12]. The management of lump/cyst/mastalgia & nipple discharge depends upon after confirmation of diagnosis by high resolution sonography(ultrasound) as initial investigation and mammography in selected cases and magnetic resonance imaging of breasts are also advised to rule out breast cancer [13]. Most of the benign lesions are managed medically on conservative line while most of the fibroadenoma Giant fibroadenoma & phyllodes tumor were managed surgically and cystic lesion may sometimes need aspiration. All symptomatic cases of duct ectasia underwent microdochectomy [14].

The clinical features of Benign Breast Diseases are:

1. Breast lump/lumpiness(nodularity): -Most common presenting complaint; can be unilateral or bilateral; single or multiple.
2. Breast Pain(mastalgia): -can be cyclical (most common) or non-cyclical
3. Breast Pain with nodularity.
4. Nipple discharge/distortion
5. Axillary Lymph adenopathy

How to Investigate: -Various non interventional and interventional methods are available for diagnosis

Investigations

Non- Interventional

High resolution sonography (Ultrasound): Ultrasound is particularly helpful in young women with dense breast in whom mammography is difficult toI. interpret and is differentiating cystic andII. solid masses. Masses that are smaller than 0.5-1 cm may not be visualized and masses in a fatty breast that is also difficult to visualize. The importance of ultrasound lies in the resolution of equivocal mammography. Ultrasound is an excellent method of guiding some interventional procedures. Ultrasonography features suggesting benign features include absence of malignant findings: ellipsoid shape, echogenic pseudo-capsule (Circumscribed Margins) hyper-echogenicity; homogenous interval echoes and enhanced echoes digital to the masses. Malignant lesions have an irregular shape, indistinct margin, spiculations, micro calcifications, height greater than width, hypo-echogenicity and shadowing.

Doppler flow study Doppler Studies- This technique is for routine use with duplex scanners, the lesion and surrounding tissues can be examined. Information about vascular anatomy is obtained, including the number of vessels and their arrangement and configuration as well as the anatomical relationships between vessels and the lesions. Blood flow in malignant lesions is enhanced. The signals can be used to detect increased flow and may further distinguish benign from malignant lesions. Thermography and Transillumination, are not effective and no longer in use

Table 1: classification of Benign Breast disease

	Normal	Disorder	Disease
Early reproductive Phase (15-25yr)	lobular development	fibroadenoma	giant fibroadenoma
	stromal development	adolescent hypertrophy	Gigantomachia
	nipple eversion	nipple inversion	subareolar abscess
			mammary duct fistula
reproductive Phase (26-45yr)	cyclical changes of menstruation	cyclical mastalgia	incapacitating mastalgia
		nodularity	
	epithelial hyperplasia of pregnancy	bloody nipple discharge	
Menopausal Phase (45-60years)	lobular involution	macrocystis	
		sclerosing lesions	
	duct involution		
	Dilatation	duct ectasia	periductal mastitis
	Sclerosis	nipple retraction	
	epithelial turnover	epithelial hyperplasia	epithelial hyperplasia with atypia

Mammography: The most commonly used breast imaging procedure is Mammography, defined as an X-ray examination of breast. The two major types of mammography are screening mammography and Diagnostic mammography. Screening mammography is used to detect unsuspected breast cancer in asymptomatic women. Diagnostic mammography is used to evaluate breasts of patients with symptoms, such as a lump or nipple discharge. Mammography is also used to guide interventional procedures including pre biopsy needle localization, needle aspiration, core needle biopsy and ductography. Mammography can be used detect masses and calcifications and also gives features which are important clues to their aetiology.

A mass is defined as space occupying lesion that is seen on at least two Mammographic projections. Calcification is the deposition of calcium salts in tissues. Fibroadenoma Appears as round, oval, or lobulated mass with a circumscribed margin. They may be solitary or multiple. In older women, they tend to develop characteristic coarse calcifications. Mammographic features alone cannot distinguish between cystosarcoma phyllodes tumour and fibroadenoma. Features suspicious of carcinoma with in fibroadenoma are a large mass, indistinct margin and clustered calcifications. Intraductal Papilloma is difficult to identify unless a tiny rosette of calcification with a barely perceptible rim of soft tissue can be seen.

Digital Mammography- This records the image electronically as a digitally format rather than directly on film. The image is kept in a computer and can be either displaced on a fluorescent monitor or transferred to hard copy. It has the advantage of image magnification on the display monitor to use computer aided diagnosis and teleradiograph.

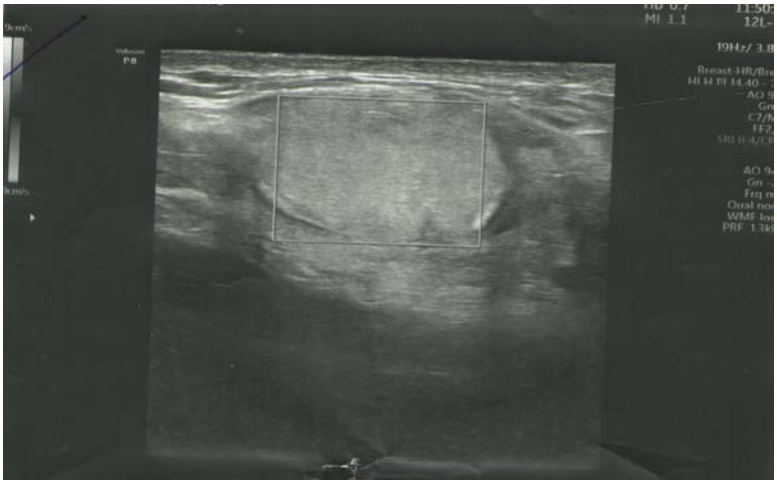


Figure 1: Fibroadenoma breast

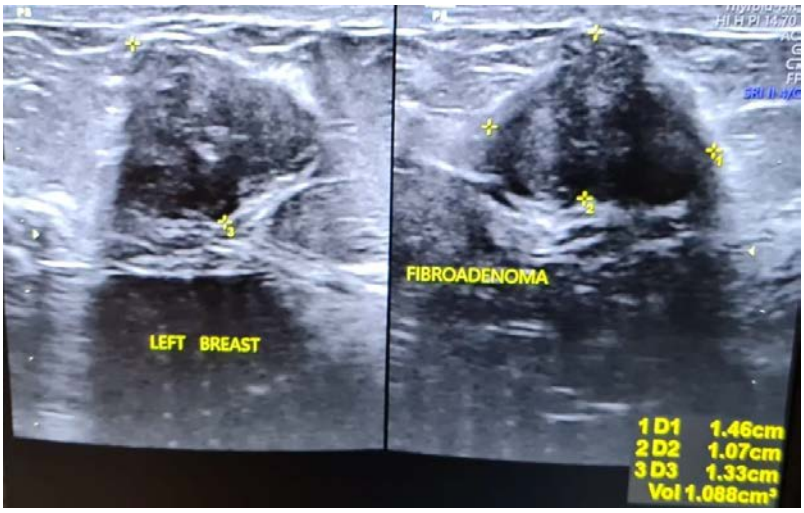


Figure 2: Fibroadenoma breast

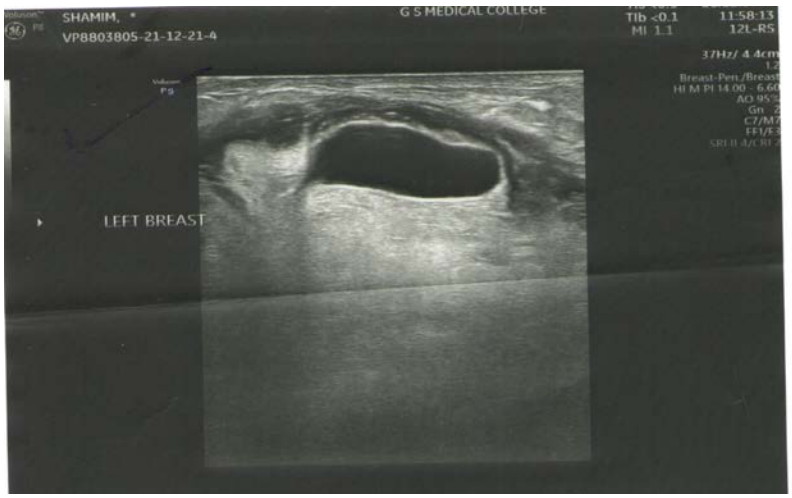


Figure 3: Macrocyst in breast

Figure 4: Galactocele in breast

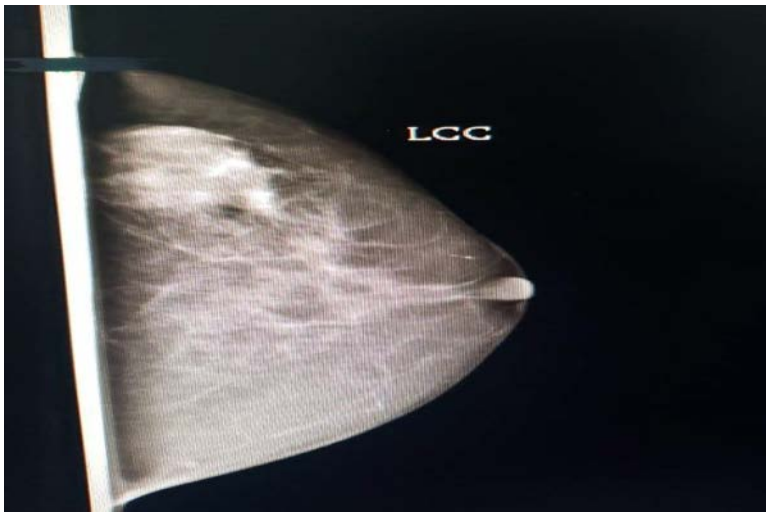


Figure 5: Mammography imaging

Figure 6

Figure 7

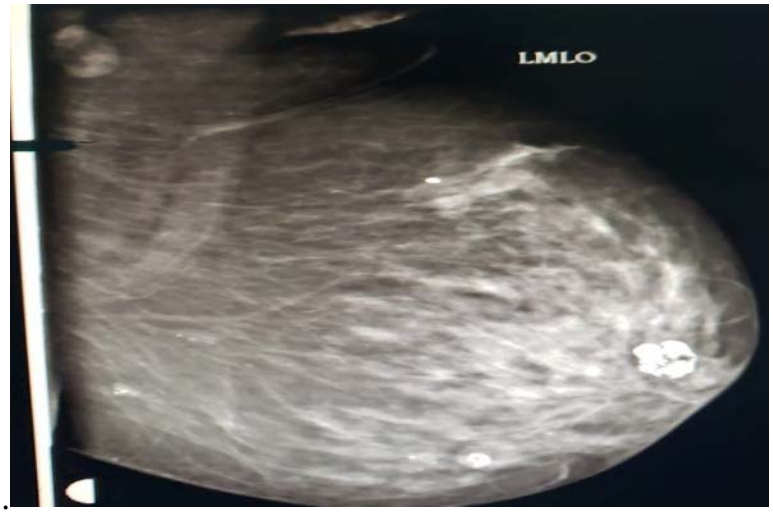


Figure 8

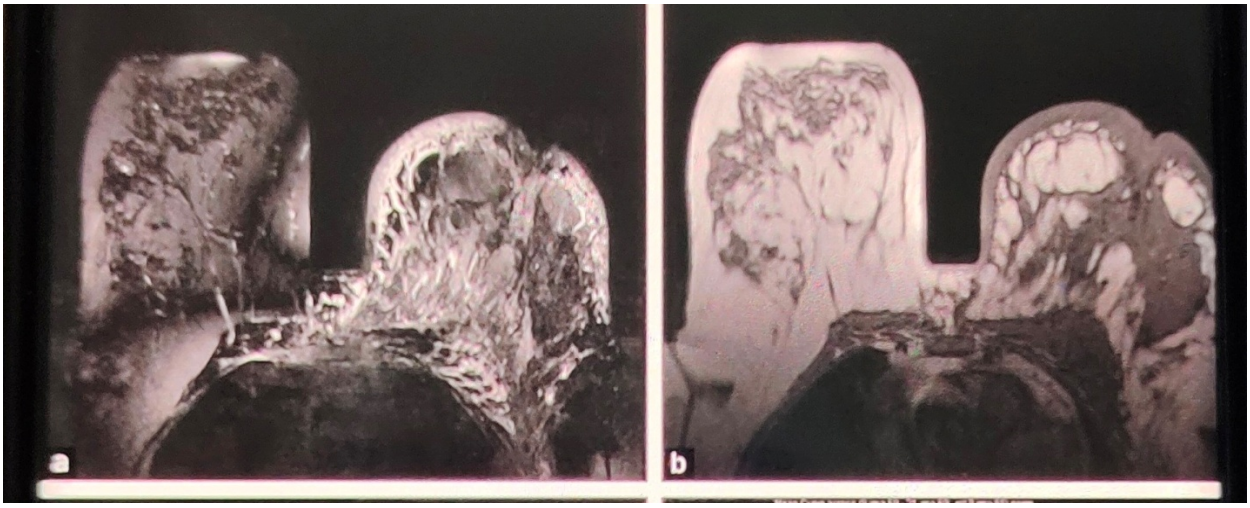


Figure 9: MRI breast imaging

This is most advanced technique of imaging for detection of breast cancer with >90% accuracy and plays an important role in diagnosis and management of breast carcinoma. MRI breast imaging characterize the lesions between benign and malignant

nature and helpful in staging of cancer. MRI breast is also useful in follow up of disease in post- operative and post chemotherapy cases. This technique is superior to mammography when assessing patients with dense breast parenchyma to detect additional occult cancer lesions in ipsilateral and contralateral breast.

2. Interventional methods:

FNAC (Fine Needle Aspiration Cytology)- It's an outpatient procedure. It involves the use of fine needle (22 or 23 gauge) with a syringe to aspirate cells from a suspicious area, smearing them on a glass slide, fix and stain for cytological examination. However, specific histological diagnosis may be impossible because of the inability to maintain architectural patterns with aspirations.

Core-Needle Biopsy- The core needle biopsy is similar to FNAC but, the caliber of the needle used is bigger, it removes a small cylinder of tissue. There are two special devices used for taking core biopsy, they are Mammotome and advanced breast biopsy instrument (ABBI).

Image-Guided Needle Biopsy- This acts as an alternative to surgical biopsy for mammographically detected abnormalities. Needle biopsy of occult lesions can be guided by stereotactic mammography or ultrasonography.

Surgical Biopsy and Excisional Biopsy- In few cases, when FNAC or core needle biopsy is inconclusive, surgical biopsy may be needed to remove a bit of tissue or whole tissue for examination under microscope. When lump is small, excision biopsy is attempted because it serves as a therapeutic as well as diagnostic procedure.

4. Diagnosis by non- interventional & interventional method.
5. Breast imaging.

Material and Methods:

A retrospective study conducted at the department of general surgery and Radiodiagnosis, G.S Medical college & hospitals; PILKHUWA HAPUR U.P from JANAUARY 2021to OCTOBER 2021 which include 130 female patients; Data was collection from the medical record department of the institution.

Inclusion Criteria:

1. Females of any age suffering from lump /nodule of breast.
2. Female patients attending OPD and admitted in indoor wards of surgery for benign breast disorder.
3. Females coming from OPD of medicine, Obstetrics & gynaecology and referred to Radiodiagnosis department for ultrasound, mammography and Ultrasound guided FNAC/Biopsy.

Exclusion Criteria:

1. Females having irregular menstrual cycles.
2. Females taking hormones like-Oral contraceptive pills, hormonal replacement therapy.
3. Females habitual of smoking, drinking alcohol or having addiction for any drug.
4. Female patient having co-morbid conditions or suffering from any other disease.
5. Female patients having breast malignancies.

Clinico-pathological profile [15].

1. History taking.
2. Physical examination.
3. Clinical breast examination. Cyclical or non-cyclical mastalgia [16].

    a. Patient age<30 years- Ultrasonography.

b. Patient age>30 years- Ultrasonography and mammography.

6. Breast pathology.
   a. FNAC in all cases with palpable lump/s in breast. Histopathology after surgery, if operated.
7. Treatment was done by reassurance, conservative drug therapy and/or surgery.
8. Follow up was done within the period of study.

Table 2: Interpretation of FNAC

C1	Inadequate	Acellualr or sparsely cellular or poorly preserved smear.
C2	Benign	Adequately cellular with unequivocal benign epithelial cells.
C3	Probably benign	Adequetely cellular with mainly benign cells present but some mild atypia present.
C4	Suspicius/probably malignant	Some features of malignancy in a low cellularity sample or highly cellular with some atypical cells present.
C5	Malignant	Frankly malignant cells present Cells showing lack of cohesion with large nuclear to cytoplasmic ratios and nuclear variability Severe nuclear pleomorphism

Result:

In this study 130 female patients having Benign Breast Diseases were examined.46(35%) were having nodularity of Breast ,32(25%) was having true non-cyclical mastalgia,28(22%) were having fibroadenomas,3(2%) were having phyllodes tumour,10(8%) were having macrocysts,5(4%) were having duct ectasia,3(2%) were having physiological nipple discharge and 3(2%) were having atypical duct hyperplasia.

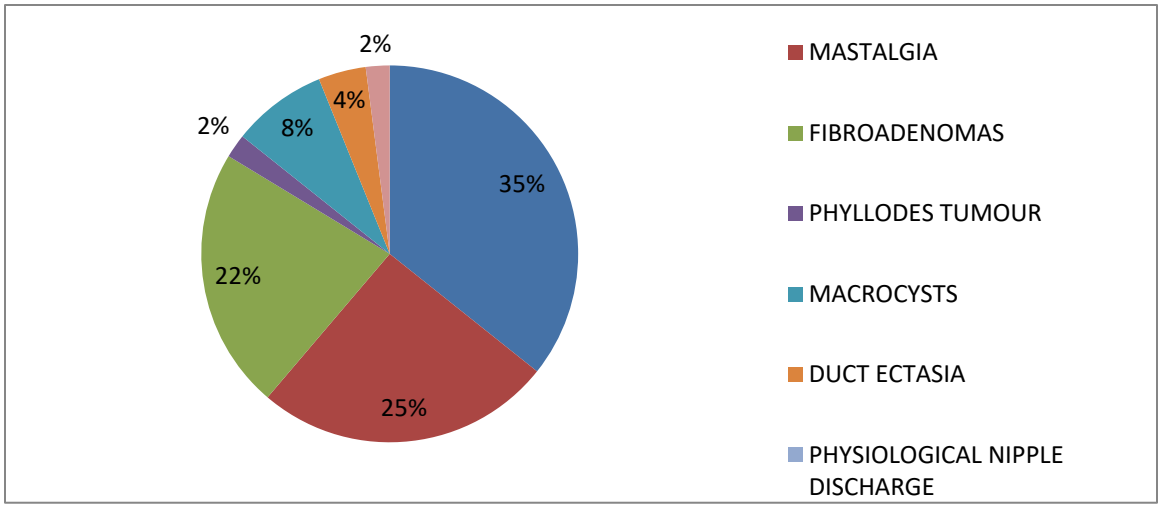


Figure 10: Showing Spectrum of Benign Breast Diseases in 130 female patients

31 patients presented with discrete lump, out of which 28(90%) were having fibroadenoma and 3(10%) were having phyllodes tumour.

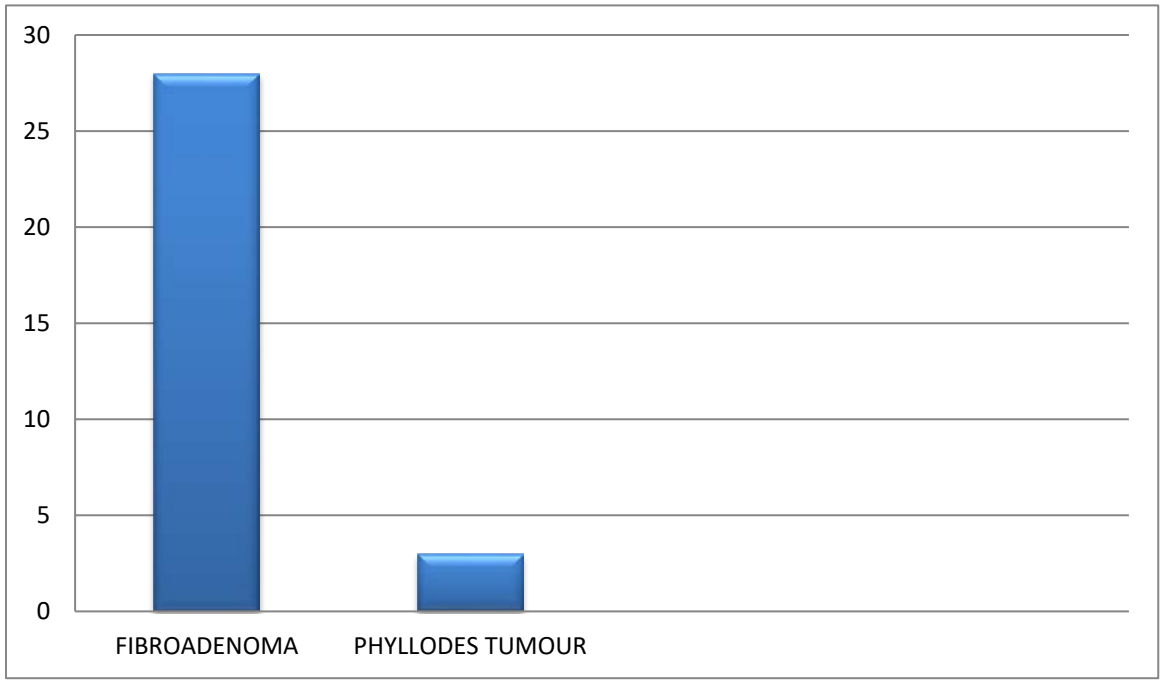


Figure 11: Showing Spectrum of 31 Patients presented with Breast Lump

Nipple discharge: Total 8 patient presented with nipple discharge

3 were having physiological discharge

5 patient of duct ectasia were having grumous discharge

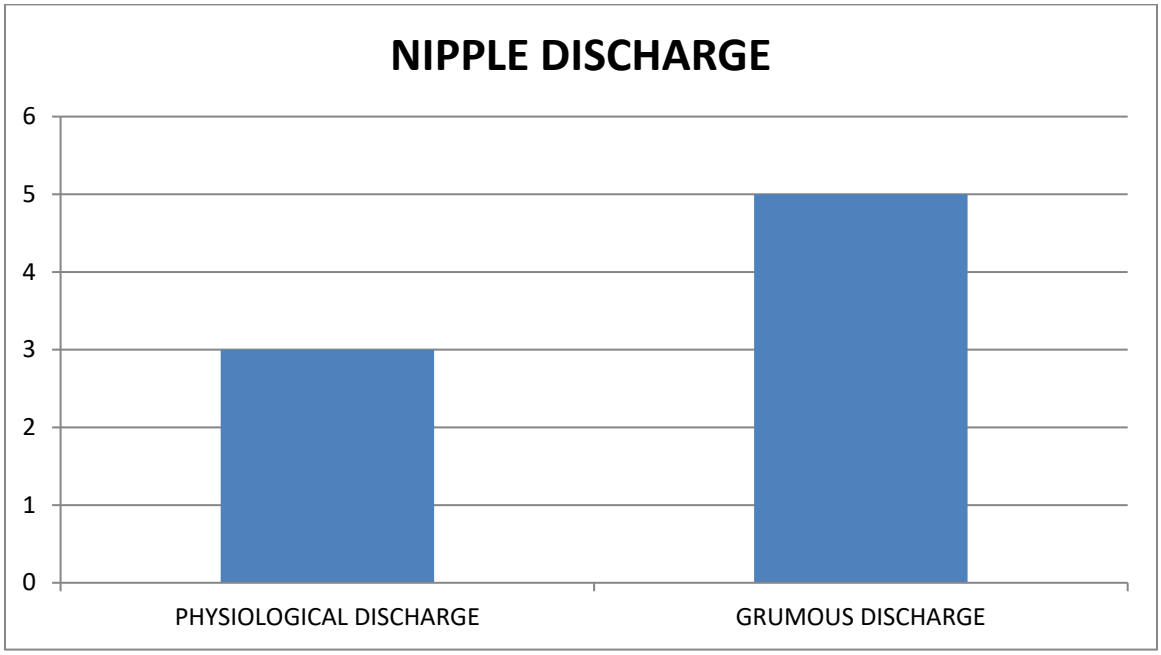


Figure 12: Spectrum of Nipple Discharge in this study

Type of treatment required: Out of 130 patients; 111 (85 %) patients were managed Conservatively and only 19 (15 %) patients were required

enucleation / excision / simple mastectomy.

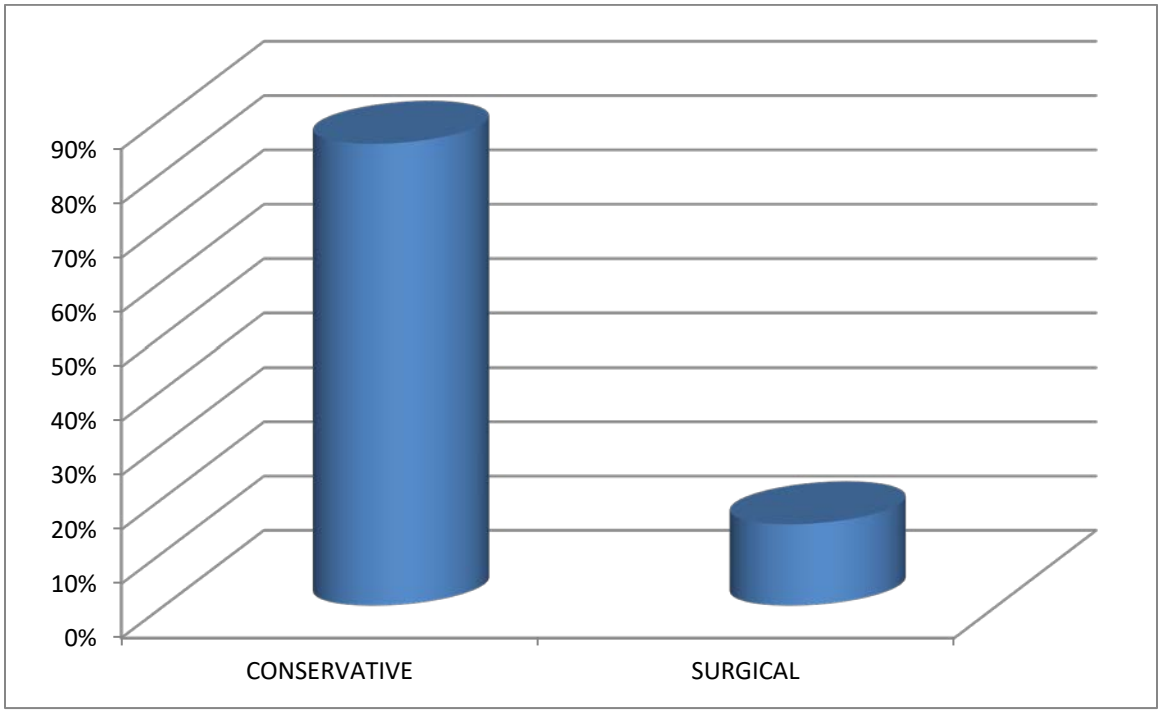


Figure 13: Treatment given to the Patients

Macrocysts: out of 10 patients with macrocysts, 7 macrocysts disappeared after single aspiration: but in 3 patients macrocysts required 2 aspirations at

the interval of 6 weeks due to recurrence.

Discussion:

In this present study incidence of nodularity of true non- cyclical mastalgia was 60 % while Fibroadenoma was 22 %. In this present study out of 78 patients with mastalgia, incidence of cyclical was 59 % & of true non-cyclical was 41 %

- In this present study 36 % fibroadenoma patient were required enucleation.
- In this present study ratio of fibroadenoma to phyllodes tumour was 28:3. Two patients of phyllodes tumour were treated by wide local excision and one patient required simple mastectomy due to recurrence after wide local excision.
- In this present study incidence of macrocysts was 8% & all were managed conservatively by aspiration and compression.
- In this present study incidence of nipple discharge was 6 % of out of 8 patient microdochectomy was done in 2 cases of major duct excision in 1 case.
- In this present study 3 patients were found to have atypical duct hyperplasia and during follow up none of them proved to be malignant.
- Management of various etiology

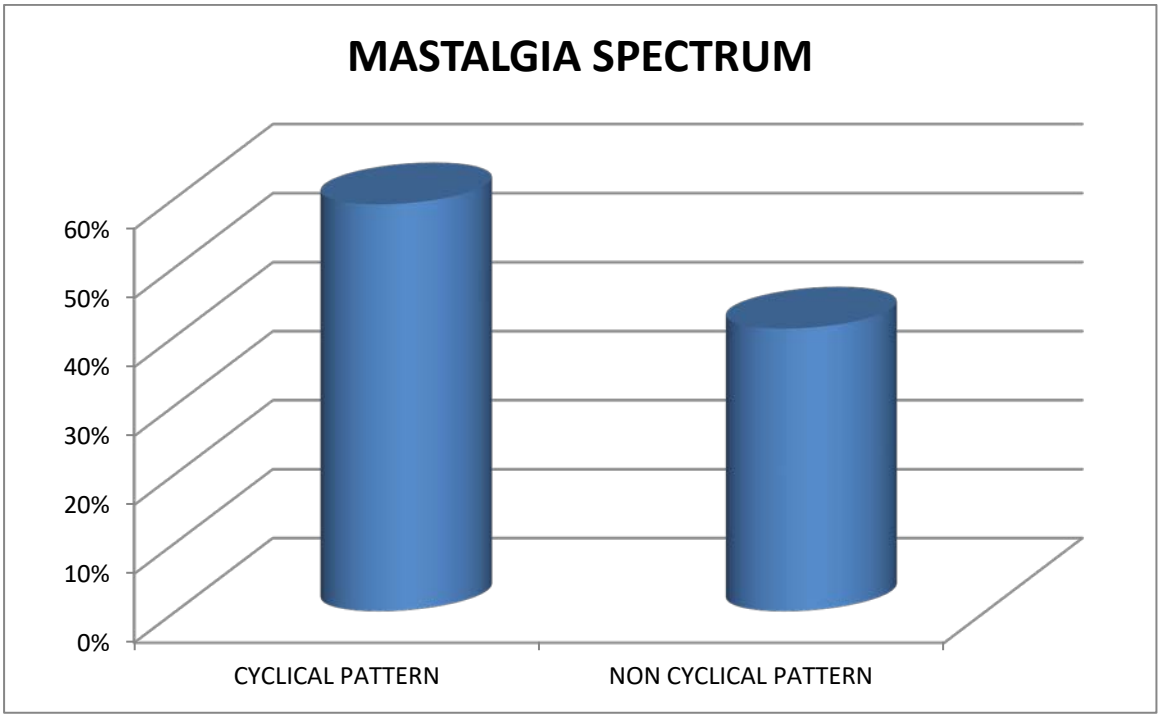
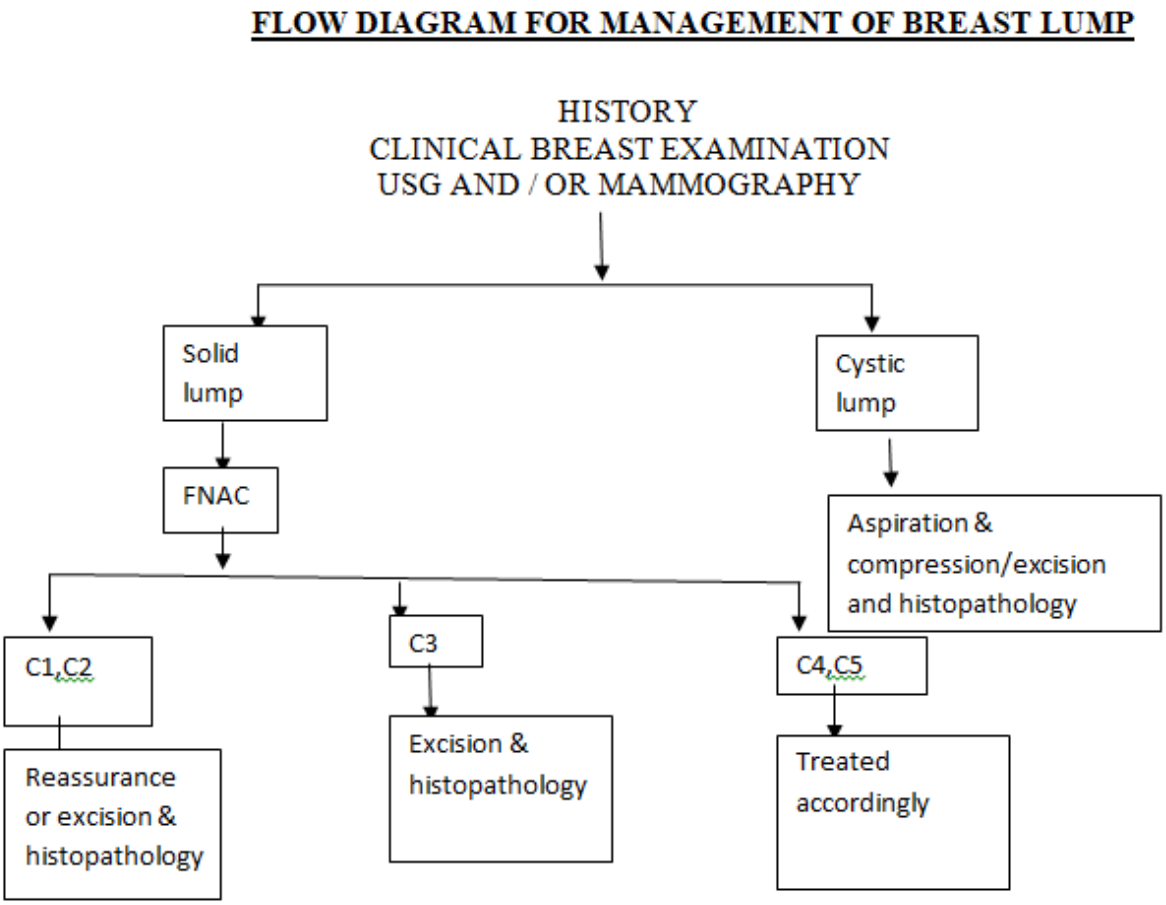
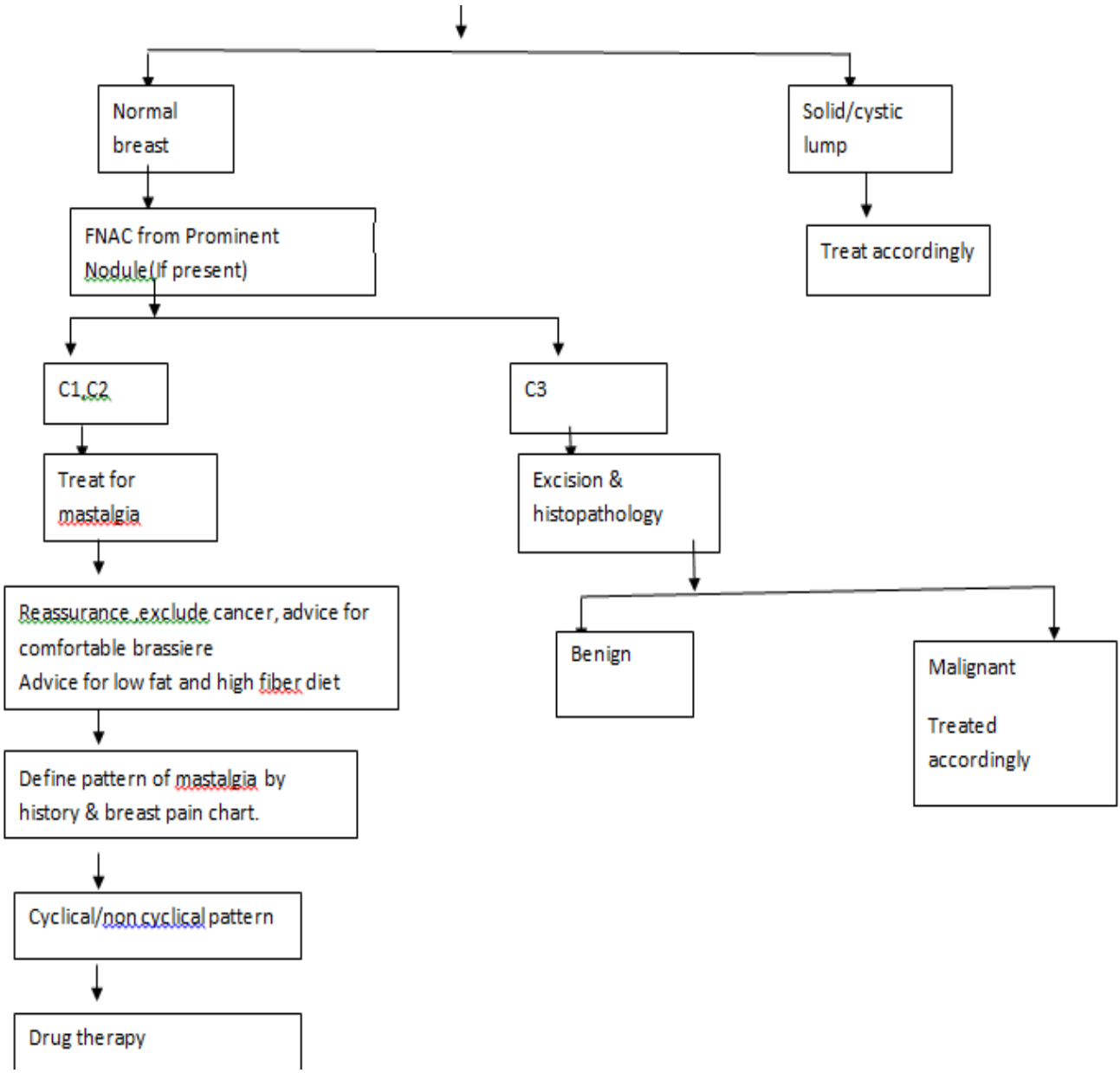


Figure 14: Mastalgia Spectrum in the study

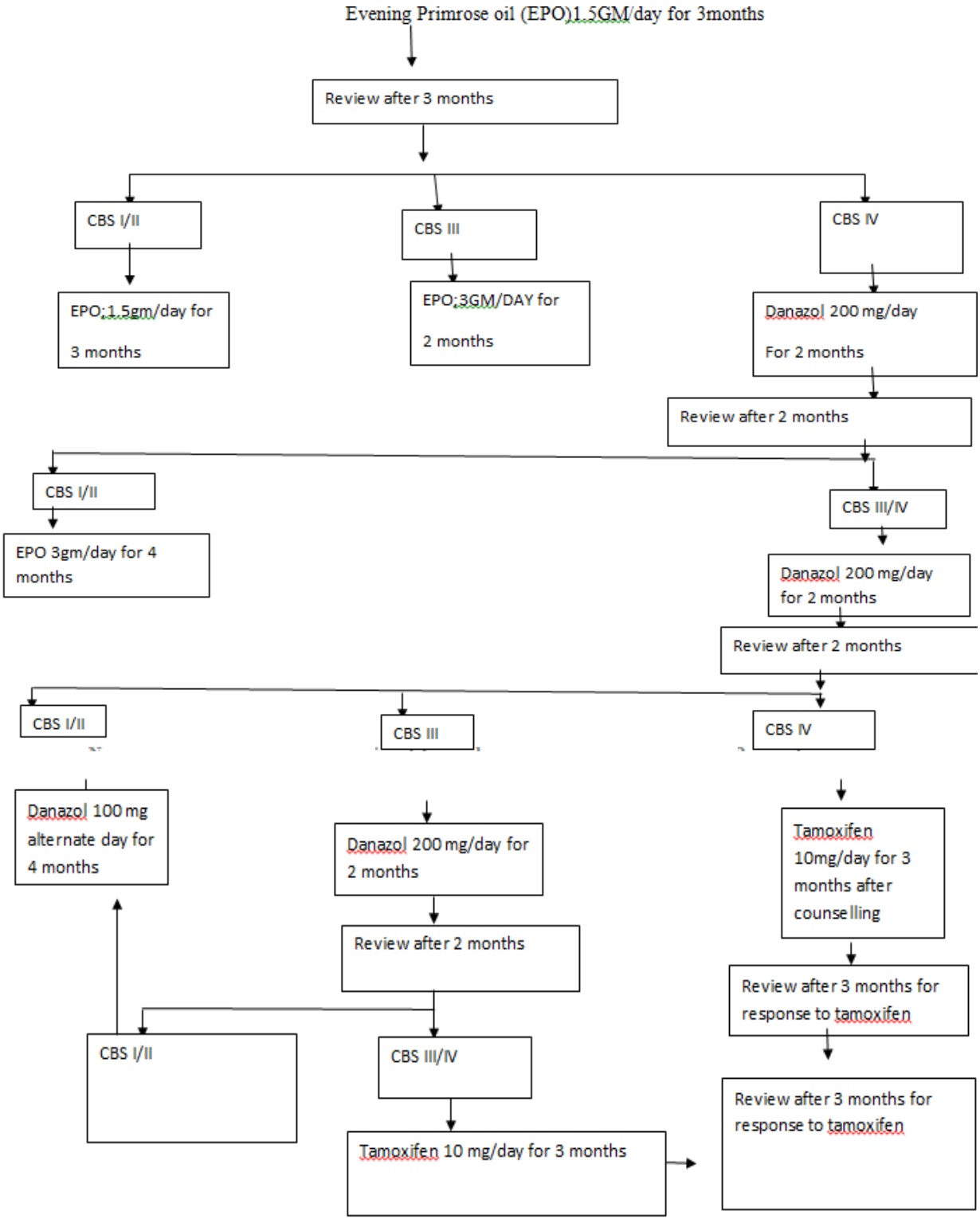


Flow diagram for management of mastalgia with/without nodularity.

History,
Clinical breast examination,
It is important to review patient during first half of menstrual cycle,
Ultrasound (age of patient<30 years),
Ultrasound and Mammography (age of patient ≥ 30 years)



Flow diagram for drug therapy for mastalgia



Conclusion

The above classification provides the better understanding in diagnosing the benign breast diseases with adequate correlation of clinical signs and symptoms with histologic changes and allow better risk stratification and adaptation of management protocol. Triple assessment provides quick diagnosis and alleviate unnecessary anxiety from the patients about the breast carcinoma.

Most of the cases of Benign Breast Diseases can be managed conservatively. Triple assessment provides high degree of diagnostic accuracy, with 98% predictive value for the diagnosis of benign breast disorder.

Conflict of interest- We do not have any conflicts of interest to declare. Informed written consent of each patient is taken prior to examination. Ethical approval already taken approved from I.E.C. Cohort overlap- no such study is reported earlier.

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