

Ultrasonographic and Mammographic Evaluation of Breast Lesions – Comparative Research study

^a Dr. Padmavathi Mallela*,

^b Dr.Rajasree T K,

^a Dr. Sudhakar Babu Dasari.

^a Department of Anatomy, Osmania Medical College, Kothi, Hyderabad, Andhra Pradesh, INDIA.

^b Department of Anatomy, CMR Medical College, Jeedimetla, Hyderabad, Andhra Pradesh, INDIA.

ARTICLE INFO

Received 20 March 2014
Revised 21 March 2014
Accepted 24 March 2014
Available Online 26 March 2014

Keywords:

Mammogram,
Ultrasonogram,
Breast lesion,
Incidence,
Diagnostic accuracy.

ABSTRACT

The Study was done in 200 female patients with various breast lesions by using six parameters. In the study of incidence of breast lesions in relation with age it was found that the vulnerable age groups for the different lesions of breast were between 40-49, 50-59 years. Regarding the site of lesion the author found the upper outer quadrant was vulnerable for all types of lesions especially in left side. The accuracy of diagnostic procedure of mammography and ultrasonography, the mammogram showed only 86% accuracy with some false positive cases, whereas ultrasonography because of high percentage of accuracy, simplest technique comparatively cheaper and widely used over the mammogram.

Introduction:

¹In mammals the mammary glands form a secondary sexual feature of females and in rudimentary form in males. The breast develops from ectodermal mammary ridges. Till menarche its structure in male and female is similar and rudimentary. From menarche onwards till the menopause the organ is under constant influence of hormones and the structure varies accordingly.

Corresponding author: Dr. Padmavathi Mallela *

E-mail address: poreddy.mallela@gmail.com

Citation: Dr. Padmavathi Mallela * (Ultrasonographic and Mammographic Evaluation of Breast Lesions – Comparative Research study) BIOMIRROR: 30-36 / bm- 212222514

Copyright: ©: Dr. Padmavathi Mallela *. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

Any aberration in this process of development leads the organ to be susceptible to a spectrum of localized pathologies like infections hyperplastic and neoplastic changes. The evaluation of breast lesions in a systemic manner can be done by 'triple assessment'. The steps being symptoms, history taking, clinical examination, investigations which include imaging (ultrasonogram + mammogram) and biopsy etc.

The aims of evaluation of breast lesions are to confirm the diagnosis to see the extent of lesion and to plan for appropriate therapy. Carcinoma of the breast is the second most common cause of death among women. Early diagnosis of the breast lesion can prevent further complication in the patient both mentally and physically. Earlier the diagnosis

was mainly done by self examination of breast by the patient, then clinical evaluation of the lesion by the doctor followed by invasive procedure like biopsy etc. These are time consuming and traumatic and also have a hazard of localized spread and dissemination, not cost effective, needing hospitalization. Then later with the development of noninvasive imaging procedures like mammography, ultrasonography, MRI etc the accuracy of early diagnosis has improved. Mammography though good in result, not accessible to all the patients and also not cost effective. Ultrasonography in comparison with other imaging techniques are available and usable anywhere easily accessible to the patients and cost effective.

Materials & Methods:

The study was conducted with 200 patients in and around the Hyderabad who attended to MNJ institute of Oncology, IndoAmerican Cancer Institute, Elbit diagnostics Hyderabad.

Palpable abnormalities of the breast confirmed with histopathology includes in this study. All patients had routine clinical examination, mammography of both the breast and the high resolution ultrasonography of both the breast in MNJ, IndoAmerican cancer institute & Elbit diagnostics Hyderabad.

Mammography was performed using a dedicated mammography unit with a KVp of 26-30kv commonly used for breast of average size and density with focal spot of 0.3-0.35mm. Both craniocaudal and mediolateral views of both the breasts was performed after adequate compression, followed immediately by ultrasound examination of both the breasts and axilla using 7.5MHz linear array probe.

Ultrasound was performed in supine position with arms extended underneath the head.

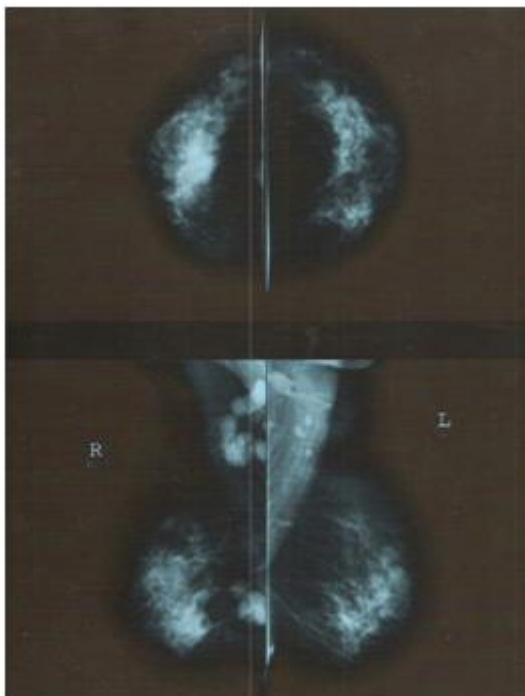
Observations & Discussion:

The research studied the diagnostic accuracy of both mammography and ultrasonography. The parameters taken are:

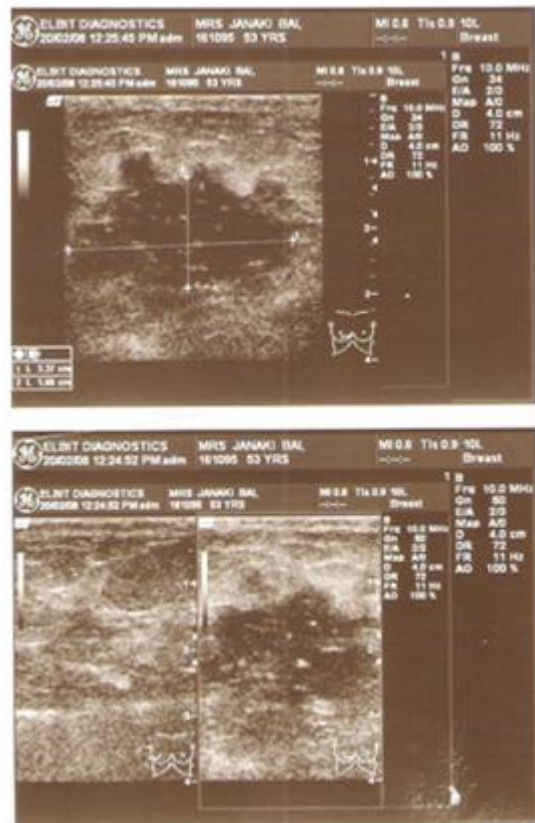
- Incidence of various breast lesions in the age group of 20-59years. Lesions include mastitis, cystic lesions, benign tumors (fibroadenomas) carcinomas, calcifications.

- Relative incidence of various breasts lesions in particular age group.
- Site of the lesions.
- Side of the lesions.
- Mammographic & ultrasonographic features of breast lesions.
- Diagnostic accuracy of mammogram & ultrasonogram.

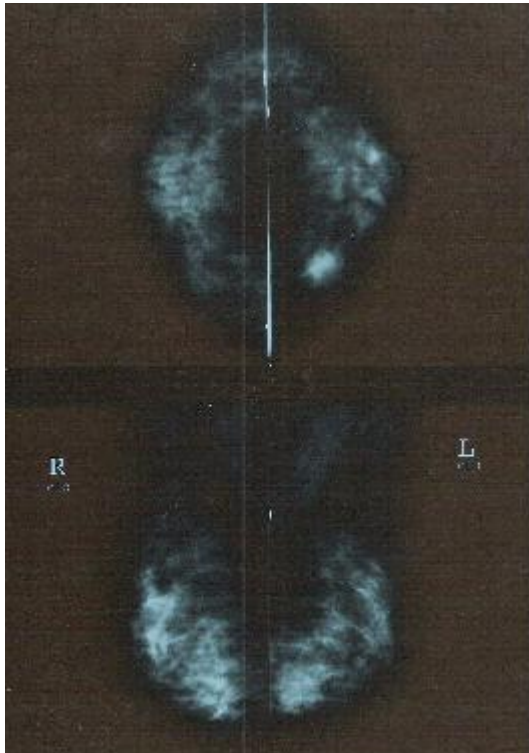
Mammogram of Case Report - III



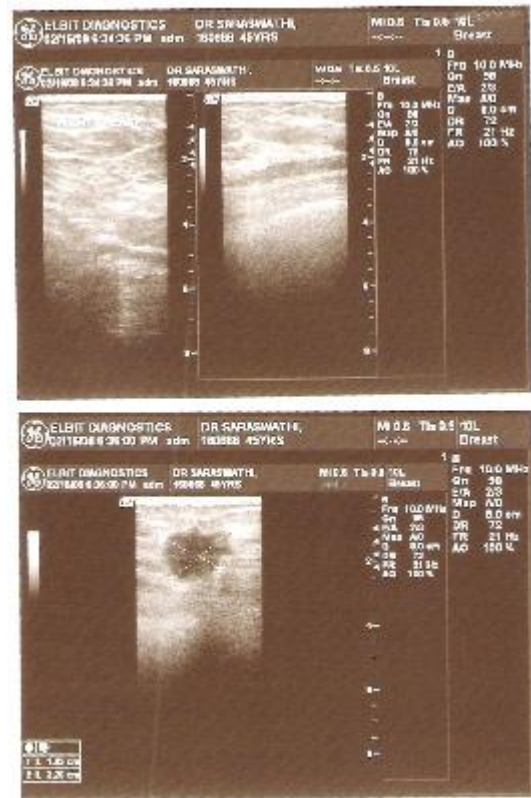
Ultrasonogram of Case Report - III



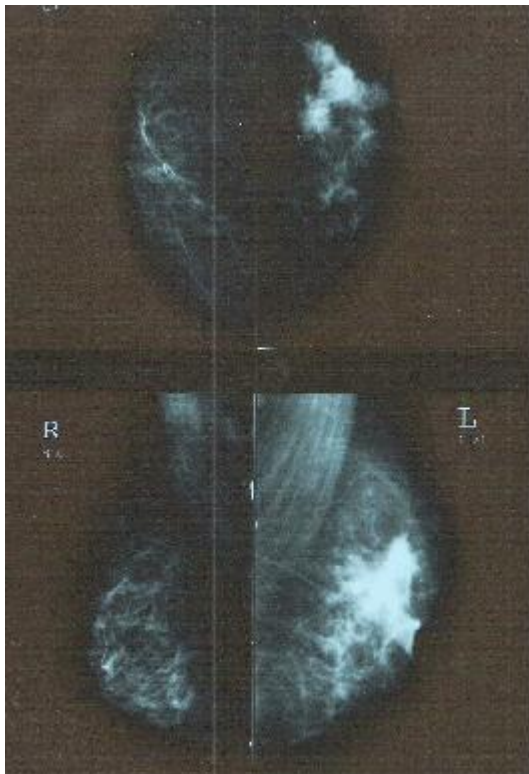
Mammogram of Case Report - II



Ultrasonogram of Case Report - II



Mammogram of Case Report - I



Ultrasonogram of Case Report - I



Incidence of Various Breast Lesions:

More number of patients that is 64/200 are seen between the age group of 40-49years. Next vulnerable group in 50-59years, minimum in 60-69years and rare in 20-29 years of age group. Present study coincides with the Mahesh²

K Shetty & differs with the Sachin Prasad³'s & Sandhya⁴'s studies where the cases were more below 30years of age. Results are given in the below table.

Comparative Figures of Different Authors in Different Breast Lesions in Various Age Groups

| Age group | Sandhya ⁴ , et al study n=500 | Mahesh's ² study n=44 | Sachin Prasad ³ 's et al study n=62 | Present study n=200 |
|-----------|--|----------------------------------|--|---------------------|
| >20years | 99 | - | - | - |
| 20-29 | 192 | 28 | 20 | 24 |
| 30-39 | 137 | 106 | 19 | 40 |
| 40-49 | 72 | 166 | 16 | 64 |
| 50-59 | - | 82 | 4 | 63 |
| 60-69 | - | 21 | 3 | 9 |
| <70 | - | 8 | - | - |

Relative incidence of various breast lesions:

More cases of benign tumors were seen among 200 patients between the 40-49, 50-59yrs of age group i.e 23/69, 18/69. Malignant lesions were more in 50-59yrs i.e 21/45, mastitis in 30-39 (10/19) and calcifications 40-59yrs of age

group. Incidence of malignancies in different age groups, the author's study is coinciding with previous studies i.e Sandhya⁴ et al, Katsaro⁵ et al, Janardhan⁶ et al etc., it is predominantly seen in the mean age of 45yrs. Results are given in the below table.

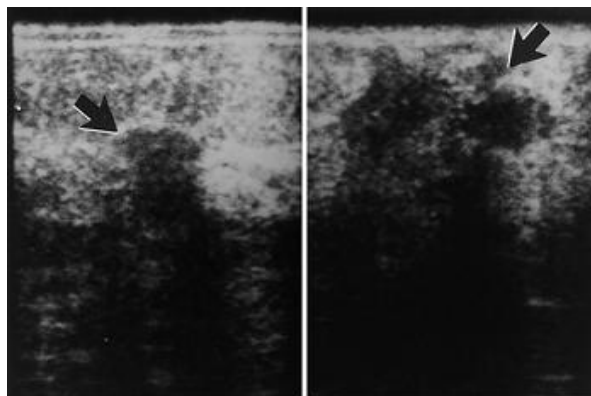
Comparative Figures of Different Authors in Various Breast Lesions

| Various Studies | Fibrocystic disease | Benign tumors | Carcinoma |
|------------------------------|---------------------|---------------|-----------|
| Sandhya ⁴ et al | - | 20-40yrs | >40yrs |
| Katsaro ⁵ et al | - | - | >50yrs |
| Janardhan ⁶ et al | - | - | 40yrs |
| Mona ⁷ , et al | 34yrs | 23yrs | - |
| Present study | 40-49yrs | 40-49yrs | 50-59yrs |

Mammogram of Inflammatory Carcinoma



Ultrasonogram of Inflammatory Carcinoma



Site of the lesion:

Upper outer quadrant of breast is occupied with maximum number of lesions in all studies that coinciding

with author's study. It reflects of greater amount of breast tissue in the upper outer quadrant when compared to the other quadrants. Results are given in the below table.

Comparative Figures of Different Authors of Site of the Lesion with Percentage

| Site | Raafta ⁸ , et al study | | Shozo ⁹ , et al study | | Sachin Prasad ³ , et al study | | Present study | |
|---------------|-----------------------------------|------|----------------------------------|-------|--|-------|---------------|------|
| UOQ | 26 | 32.5 | 30 | 37.97 | 28 | 45.16 | 109 | 54.5 |
| LOQ | 11 | 14 | 5 | 6.33 | 22 | 35.48 | 20 | 10 |
| UIQ | 12 | 15 | 24 | 30.38 | - | - | 26 | 13 |
| LIQ | 10 | 12.5 | 6 | 7.59 | 2 | 3.23 | 35 | 17.5 |
| RA | 21 | 26 | - | - | 10 | 16.13 | 10 | 5 |
| UO, UI | - | - | 4 | 5.06 | - | - | - | - |
| LO, LI | - | - | 4 | 5.06 | - | - | - | - |
| UO, LO | - | - | 5 | 6.33 | - | - | - | - |
| UI, LI | - | - | 1 | 1.27 | - | - | - | - |

Side of the lesion:

Maximum incidence of breast lesions were confined to left side i.e 96/200 (48%), in right side 87 cases were reported (43.5%). Minimum incidence in bilateral 17/200 (8.5%) coinciding with previous studies. Results are given in the below table

| Study | Right | Left | Bilateral |
|---------------------------|-------|------|-----------|
| Mona ⁷ , Nazer | 39.5% | 45% | 7% |
| Present Study | 43.5% | 48% | 8.5% |

Mammographic & Ultrasonographic appearance of Breast lesions:

In present study 200 female patients with various breast lesions the author has evaluated the ultrasonography and mammographic appearance of various confirmed breast lesions. In total 200 patients ultrasound could detect 191 cases successfully (95.5%). Mammogram could detect 172 cases (86%). The Author's study is co-relating with previous studies. Ultrasound is an excellent imaging method to evaluate the various breast lesions when compared to mammography. Results are given in the below table

| Different Studies | Ultrasonogram | Mammogram |
|------------------------------------|---------------|-----------|
| Noriyuki ¹⁰ , et al | 100% | 64.7% |
| Nasu ¹¹ , et al | 88.76% | 84.27% |
| Sachin Prasad ³ , et al | 70% | 77% |
| Hiecken ¹² , et al | 75% | 65% |
| Cox BA Kelly ¹³ , et al | 100% | 77.07% |
| Present Study | 95.5% | 86% |

Diagnostic accuracy of Ultrasonography and Mammography:

In detection of mastitis cases, the accuracy of ultrasonogram vs mammogram (100% vs 74%). In cystic lesions, the accuracy of ultrasonogram vs mammogram (100% vs 78.5%) and in benign tumors (96% vs 88%). In carcinomas (100% vs 93%). Finally in calcifications both

ultrasound and mammogram 100%. The Author's study is similar with that of previous studies. The diagnostic accuracy of ultrasound was superior when compared to diagnostic accuracy of mammogram.

Conclusion:

The Author tried to evaluate the accuracy of diagnostic procedure of mammography & ultrasonography. The Mammogram showed only 86% accuracy with some false positive cases, whereas ultrasound because of its high percentage of accuracy, the simplest technique involved, comparatively cheaper and most widely used over the mammogram. This procedure is sufficient to diagnose the different types of lesions, mainly carcinomas in the early stages even in rural areas.

References:

- 1) Gray's Anatomy – Normal Anatomy 38th edition, page no 418-424.
- 2) Mahesh K. Shetty, Prospective evaluation of the value of combined MG & USG assessment in patients with palpable abnormalities of the breast J ultrasound Med 22:263-268, 2003.
- 3) Sachin Prasad N, A comparison of mammography and ultrasonography in the evaluation of breast masses. Biomed papmed Fac unic palacky Olomouc czech repub.2007, 151(2):315-322.
- 4) Sandhya P Iyer ,Epidemiology of Benign Breast diseases in females of child bearing age group:http://bhj.org/journal/2000-4201.Jan 00/original-141.htm
- 5) Katsaros, comparison of mammography, ultrasonography & nuclear scintigraphy in the detection of malignant breast lesions. Journal of the American Chiropractic association Dec2002.
- 6) Janardhan V Bhatt, Pathophysiology of breast lesions: vision beyond the clinical eye. 2002.
- 7) Mona A, Outline of Breast diseases in Qatif Central Hospital: Kuwait Medical Journal 2004, 36(3): 182-185
- 8) Raafta, Sensitivity of Scintimammography for diagnosis of breast carcinoma in different breast sites 99Mtc -- sestemibi scintimammography: Effect of lesion site size and Cancer inst. Vol.12, NO.3 sept: 183-189 2000.
- 9) Shozo Ohsuni, Breast biopsy for mammographically detected non palpable lesions using a vaccum assisted biopsy device and

- an upright type stereotactic mammography: Japanese Journal of clinical oncology 2001.
- 10) Noriyuki Tohnosu, a comparison between USG and MG, computed tomography and digital subtraction angiography for the detection of breast cancers. *Surgery today* :0941-1291:1436-2813, volume 23, No.81 August 1993, pages 704-710.
 - 11) Nasu S, a study of breast cancer undetectable by USG and MG: health evaluation and promotion; *YO267A:1347-0086. Vol.30:No:4 page.436-438(2003)*
 - 12) Hiecken TJ, correlating USG, MG and pathology in the assessment of breast cancer size. *AM J surg* 2001;182:351-4
 - 13) COX BA Kelly, Ultrasound characteristics of breast carcinoma. *AM Surg* 1995 Oct;64(10):934-8.
 - 14) Alper Akcam, chondromatous tumor, A histologic variant of mammary, Hamartoma, presenting as calcifications in Mammography and ultrasonography *Ericyes universities tip Fakultesi, Genel cerrahi anabilim Dal, kayseri, Turkiye; 2001.*
 - 15) Arikian S, Hydatid disease, in the breast: a case report, *Acta Chir Belg*, 2004, 104, 473 – 475.
 - 16) Bhaskar Reddy L, Diseases of Breast, classification of breast lesions, Pg No. 33 - 43.
 - 17) Bilgen IG, Fat necrosis of the breast: clinical, mammographic and ultrasonographic features. *Eur J radial.* 2001 Aug; 39(2):92-9.
 - 18) Chae Yeon Lyou, Mammographic and sonographic findings of primary breast lymphoma. *D 2007 Elsevier Inc.*
 - 19) David Sutton - Imaging modalities seventh edition volume 2 page no. 1451 – 1456.
 - 20) Dershaw DD, inflammatory breast carcinoma: Mammographic findings. *Radiology* 1994 Mar:19093):
 - 21) Elling D, Preliminary experience with combined Ultrasonographic and Roentgen – Mammographic diagnosis of cystic mammary tumors. *zentralbl Gynakol* 1982;104:134-9.
 - 22) Fani Sperber, preoperative clinical, Mammographic and sonographic assessment of Neoadjuvant chemotherapy response in breast cancer. *IMAJ* 2006;8:342-346.
 - 23) Flobbe K, The role of ultrasonography as an adjunct to mammography in the detection of breast cancer, a systemic review. *Eur J cancer* 2002;38:1044-50.
 - 24) Gatta G, clinical, Mammographic and Ultrasonographic features of blunt breast Trauma. *Eur J Radiol* 2006 Sep;59(3):327-30.
 - 25) Gulfor H, ultrasound demonstration of Mammographically detected microcalcifications. *Acta Radiol.* 2000 May; 41(3):217-21.
 - 26) Gunhan-Bilgen I, sclerosing Adenosis:Mammographic and Ultrasonographic findings with clinical and histopathological correlation. *Eur J Radiol.* 2002 Dec;44(3):232-8.
 - 27) Hata T, Magnetic resonance imaging for preoperative evaluation of breast cancer; a comparative study with Mammography and Ultrasonography; *J Am Coll Surg* 2004; 198:190-7.
 - 28) Jae-Hwan Park, A surgically confirmed case of breast sparganosis showing characteristic mammography and ultrasonography. *Korean Journal of parasitology* vol.44, No.2:151-156 June 2006.
 - 29) Kaiser JS, Palpable breast thickening: Role of MG and USG in cancer detection. *Radiology.*2002 Jun; 223(3):839-44
 - 30) Kim. Computed Tomography of the breast : Abnormal findings with Mammographic and Ultrasonographic correlation of computer assisted Tomography. 2003-27(5):761-770.
 - 31) Lee SN, metaplastic carcinoma in an ectopic breast: from southern medical journal 1998.
 - 32) Lister D. The accuracy of breast ultrasound in evaluation of clinically benign discrete, symptomatic breast lumps. *Clin radiol* 1992 Jul: 53490-2.
 - 33) Mashankar-A, breast Filariasis-mammographic and ultrasonographic findings. *Ind j radiol imag* 2005.
 - 34) Meyer JE, Medullary carcinoma of the breast: mammographic and ultrasonographic appearance: from the journal of allergy and clinical immunology. 1989
 - 35) Nadra EL, Adenosis tumor of the breast: cytological and radiological features of a case confirmed by histology. *Diagn. Cytopathol.* 2008; 36:496-498. (c) 2008 wiley-liss, Inc.
 - 36) Nestor de Barros, cutaneous myiasis of the breast: mammographic and ultrasonographic features. Report of five cases. *Radiology rsnajlns. Org/content/full/218/2/517/DCI*
 - 37) Nobuyuki uchida, schwannoma-breast: abnormal findings with mammographic and sonographic correlation 2004.
 - 38) Ozdemir A, T1-201 scintigraphy, mammography and ultrasonography in the evaluation of palpable and non palpable breast lesions: a correlative study. *Eur J Radiol* 1997; 24:145-54.
 - 39) Pande AR, predictive value of ultrasonography in the diagnosis of palpable breast lump. *Kathmandu university medical Journal* (2003) vol.1, No.2, 78-4.
 - 40) Perre CI, Ultrasonographic Study of the palpable breast tumor: *Ned Tijdschr Geneesk.* 1993 Nov 13; 137 (46): 2374-7.
 - 41) Rosner D, what ultrasonography can tell in breast masses that mammography and physical examination cannot: *J Surg Oncol* 1985;28:308-13.
 - 42) Sabine Malur, comparison of written reports of mammography, sonography and magnetic resonance mammography for preoperative evaluation of breast lesion, with special emphasis on magnetic resonance mammography. *Breast cancer Res* 2001, 3:55-60, doi:10/1186/bcr 271.
 - 43) Sakr AA, mammographic and sonographic features of tuberculous mastitis. *Eur J Radiol* 2004 Jul; 51(1):54-60
 - 44) Shine J.H, Micro invasive ductal carcinoma arising with in a fibro adenoma: A case report; from southern medical journal 1987.
 - 45) Skaane P, Ultrasound as an adjunct to mammography in evaluation of breast tumors. *Acta radiol suppl* 1999; 420:1-47
 - 46) Todd Beyer M.D, Normal Mammography and Ultrasonography in the setting of palpable breast cancer. (2001).
 - 47) Urbanowicz Z, The value of combined examination i.e.. Ultrasonography, Mammography and fine needle biopsy in the diagnosis of breast diseases. *Ginekol pol* 1992;63:28-31.
 - 48) Van Oord JC, The value of ultrasound Mammography in palpable breast masses. *Rofo* 1991;155:63-6.
 - 49) Yang WT, Role of ultrasonography in evaluation of palpable breast masses. *J Ultrasound Med* 1990 Sep;15:637-44.
 - 50) Yilmaz E, differentiates of phylloides tumors versus fibroadenomas; Mammographic and ultrasonographic features; dept. of radiology and pathology, Dokuz Eylul University Hospital, Izmir, Turkey.

- 51) Yoshihara K, The clinical epidemiological investigation of diagnostic modalities in breast cancer detection - a comparison of ultrasonography and mammography. Fukuoka Igaku Zasshi 1999, 90:39-45.