

**ORIGINAL ARTICLE****Assessment of accuracy of mammography and ultrasound in women with breast symptoms: A comparative study**

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**ABSTRACT**

**Background:** Breast cancer is among the most common causes of cancer deaths today, coming fifth after lung, stomach, liver and colon cancers. Mammography, although invaluable in a screening role, is not 'specific' enough for making a definitive preoperative diagnosis. Hence; the present study was undertaken for assessing the accuracy of mammography and ultrasound in women with breast symptoms. **Materials & methods:** A total of 150 women with breast symptoms were examined during the study period. Detection of breast lesions was done for detection of breast lesions, followed by mammography and ultrasound. Complete demographic details of all the patients were obtained. Conventional film-screen mammography was performed in all the patients. Ultrasound examinations were performed using a high-resolution unit. Histopathologic examination of all the patients was carried out by histopathologic method. All the results were recorded in Microsoft excel sheet and were analysed by SPSS software.

**Results:** Overall sensitivity of mammography was found to be 53.2 percent whereas overall sensitivity of ultrasound was found to be 73.2 percent. Overall specificity of mammography was found to be 75.1 percent whereas overall sensitivity of ultrasound was found to be 87.4 percent. Significant results were obtained while comparing the sensitivity and specificity of mammography and ultrasound in detecting breast lesions. **Conclusion:** Accuracy of breast USG is higher in comparison to mammography in symptomatic women of less than 45 years of age. At the same time, sensitivity of mammography progressively improves among elderly women.

**Key words:** Breast, Mammography, Ultrasound.

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**INTRODUCTION**

Breast cancer is among the most common causes of cancer deaths today, coming fifth after lung, stomach, liver and colon cancers. It is the most common cause of cancer death in women. In 2005 alone, 519 000 deaths were recorded due to breast cancer. This means that one in every 100 deaths worldwide and almost one in every 15 cancer deaths were due to breast cancer. Refinement of high-frequency technology, particularly with 7.5–13 MHz probes, has brought out a totally new facet in ultrasonography (USG) breast imaging.<sup>1-3</sup>

The accurate diagnosis of breast lesions without resort to formal biopsy is highly desirable both for patients who can be quickly reassured or counselled and the clinician who can reduce unnecessary surgery. Mammography, although invaluable in a screening role, is not 'specific' enough for making a definitive preoperative diagnosis. In suspected cases of carcinoma this usually requires histological proof by either a Tru-cut or an excision biopsy. More recently the less traumatic technique of aspiration cytology, long accepted abroad, has been gaining in popularity. Several centres will now make a firm diagnosis of malignancy on a positive cytology alone (3) or as part of a triple assessment.<sup>4,5</sup>

Hence; the present study was undertaken for assessing the accuracy of mammography and ultrasound in women with breast symptoms.

**MATERIALS & METHODS**

The present study was commenced in the department of radio-diagnosis with the aim of comparing the accuracy of mammography and ultrasound in women with breast symptoms. Ethical approval was obtained from institutional ethical committee and written consent was obtained after explaining in detail the entire research protocol. A total of 150 women with breast symptoms were examined during the study period. Detection of breast lesions was done for detection of breast lesions, followed by mammography and ultrasound. Complete demographic details of all the patients were obtained. Conventional film-screen mammography was performed in all the patients. Ultrasound examinations were performed using a high-resolution unit. Histopathologic examination of all the patients was carried out by histopathologic method. All the results were recorded in Microsoft excel sheet and were analysed by SPSS software. Chi- square test was used for assessment of level of significance.

**RESULTS**

In the present study, a total of 150 patients with suspected breast lesions were analysed. Majority of the patients belonged to the age group of 40 to 60 years. Among these 150 patients, 81 had benign lesions while the remaining 69 patients had malignant lesions. Overall sensitivity of mammography was found to be 53.2 percent whereas overall sensitivity of ultrasound was found to be 73.2 percent.

In the present study, overall specificity of mammography was found to be 75.1 percent whereas overall sensitivity of ultrasound was found to be 87.4 percent. Significant results were obtained while comparing the sensitivity and specificity of mammography and ultrasound in detecting breast lesions.

**Table 1:** Demographic data

Parameter		Lesions	
		Benign	Malignant
Age group (years)	Less than 40	15	12
	40 to 50	24	19
	51 to 60	26	28
	61 and above	16	10
Total		81	69

**Table 2:** Comparison of sensitivity

Age group	Number of subjects	Sensitivity of Mammography (%)	Sensitivity of Ultrasound (%)
Less than 40	27	16.8	64.8
40 to 50	43	42.2	70.4
51 to 60	54	62.7	73.1
61 and above	16	72.1	79.4
Total	150	53.2	73.2
p- value		0.002 (Significant)	

**Table 3:** Comparison of specificity

Age group	Number of subjects	Sensitivity of Mammography (%)	Sensitivity of Ultrasound (%)
Less than 40	27	36.1	80.1
40 to 50	43	59.4	83.4
51 to 60	54	67.8	85.4
61 and above	16	83.2	89.8
Total	150	75.1	87.4
p- value		0.004 (Significant)	

**DISCUSSION**

Harmonic imaging and real-time compounding has been shown to improve image resolution and lesion characterization. More recently, USG elastography seems to be quite promising. Initial results indicate that it can improve the specificity and positive predictive value of USG in the characterization of breast masses. The reason why any lesion is visible on mammography or USG is the relative difference in the density and acoustic impedance of the lesion, respectively, as compared to the surrounding breast tissue. This is exemplified in women with dense breast tissue, where USG is useful in detecting small breast cancers that are not detected on mammography.<sup>6-9</sup>

In the present study, a total of 150 patients with suspected breast lesions were analysed. Majority of the patients belonged to the age group of 40 to 60 years. Among these 150 patients, 81 had benign lesions while the remaining 69 patients had malignant lesions. Overall sensitivity of mammography was found to be 53.2 percent whereas overall sensitivity of ultrasound was found to be 73.2 percent. Smallwood JA et al compared the accuracy of breast ultrasound using all-purpose static beta-scanning equipment with mammography. Ultrasound was found to be both more sensitive (93%:82%) and specific (95%:89%) in a large retrospective series of 1000 patients undergoing investigation for symptomatic breast disease. In a smaller prospective and consecutive series of 142 patients undergoing surgery where histological proof was obtained ultrasound was also found to be more sensitive (91%:81%) and specific (81%:69%). In both studies, the greater accuracy of ultrasound was attributed to its ability to diagnose lesions hidden in X-ray dense breasts and where mammography had revealed featureless asymmetrical densities of uncertain nature. In these instances ultrasound may have a significant role to play as an adjunct to mammography in the preoperative assessment of breast lesions.<sup>9</sup>

In the present study, overall specificity of mammography was found to be 75.1 percent whereas overall sensitivity of ultrasound was found to be 87.4 percent. Significant results were obtained while comparing the sensitivity and specificity of mammography and ultrasound in detecting breast lesions. Pain JA et al studied two hundred women presenting with primary breast carcinoma for assessing the most accurate single or combination of methods to assess breast tumour size. Correlations of the maximum clinical, mammographic and ultrasound tumour diameter were made with maximum histological diameter. Tumour size could be assessed clinically in all 200 patients, and overestimated the size of small tumours and underestimated large tumours (P less than 0.001). Mammographic measurement, which was possible in 145 (72.5%), underestimated the size of large tumours (P less than 0.01). Only 100 women underwent ultrasound examination (size assessed in 86%) and this modality tended to underestimate the size of all tumours (P less than 0.05). All methods of measurement showed similar correlations with histological size. They concluded that clinical measurement of breast cancer size is as accurate as that from mammography or ultrasound. Accuracy can be improved by the use of a simple formula of both clinical and mammographic measurements.<sup>10</sup>

Devulli-Disha E et al determined which is more accurate imaging test mammography or ultrasound for diagnosis of breast cancer based on the women’s age and breast density. They examined 546 patients with breast symptoms, by clinical breast examination, mammography and ultrasound. A total of 546 breast lesions were examined by histopathology analyses. In the 259 women who had both tests, ultrasound had a higher sensitivity than mammography in women younger than 45 years, whereas mammography had a higher sensitivity than ultrasound in women older than 60 years. The sensitivity

according to age was 52,1% for mammography and 72,6% for ultrasound. The specificity according to age was 88, 5% for ultrasound and 73, 9% for mammography. Comparing the sensitivity of mammography and ultrasound according to the breast density indicates that mammographic sensitivity was 82,2% among women with predominantly fatty breast, but 23.7% in women with heterogeneous dense breasts, with the increase of fibro glandular density the level of sensitivity with mammography decreases, while ultrasonographic sensitivity was 71,1% among women with predominantly fatty breast and 57,0% for heterogeneous dense breasts. Their data indicated that sensitivity and specificity of ultrasound was statistically significantly greater than mammography in patients with breast symptoms for the detection of breast cancer and benign lesions particularly in dense breast and in young women.<sup>11</sup>

### CONCLUSION

From the above results, the authors concluded that accuracy of breast USG is higher in comparison to mammography in symptomatic women of less than 45 years of age. At the same time, sensitivity of mammography progressively improves among elderly women. However; further studies are recommended.

### REFERENCES

1. World Health Organization (February 2006) Fact sheet No 297: Cancer.
2. Catarazzi S, Guispetti GM, Rissato G, Roselli Del Turo M. Studio Multicentrico per la valutazione della efficacia diagnostics dellammografia e della ecografia nelle neoplasie mammarie non palpabili. *Radiol Med.* 1992;84:193.
3. Valea FL, Katz VL. Breast diseases: diagnosis and treatment of benign and malignant disease. In: Katz VL, Lentz GM, Lobo RA, Gershenson DM, editors. *Comprehensive Gynecology.* 5th ed. Philadelphia, Pa: Mosby Elsevier; 2007. p. 15.
4. Stavros AT. Benign Solid Nodules: Specific pathologic diagnosis. In: Stavros AT, editor. *Breast Ultrasound.* Vol. 13. Lippincot Williams & Wilkins; 2004. pp. 528–96.
5. Stavros AT, Thickman D, Rapp CL, Dennis MA, Parker SH, Sisney GA. Solid breast nodules: use of sonography to distinguish benign and malignant lesions. *Radiology.* 1995;196:123–34.
6. Maniero MB, Goldkamp A, Lazarus E, Livingston L, Koelikker SL, Schepps B, Mayo-Smith WW. Characterization of Breast Masses with Sonography. *J Ultrasound Med.* 2005;24:161–7.
7. Meritt CRB. Technology Update. *Radiol Clin North Am.* 2001;39:385–97.
8. Shapiro RS, Wagreich J, Parsons RB, et al. Tissue Harmonic Imaging Sonography, evaluation of image quality compared with conventional sonography. *AJR.* 1998;171:1203–6.
9. Smallwood JA, Guyer P, Dewbury K, et al. The accuracy of ultrasound in the diagnosis of breast disease. *Ann R Coll Surg Engl.* 1986;68(1):19–22.
10. Pain JA1, Ebbs SR, Hern RP, Lowe S, Bradbeer JW. Assessment of breast cancer size: a comparison of methods. *Eur J Surg Oncol.* 1992 Feb;18(1):44-8.
11. Devolli-Disha E, Manxhuka-Kërliu S, Ymeri H, Kutllovci A. Comparative accuracy of mammography and ultrasound in women with breast symptoms according to age and breast density. *Bosn J Basic Med Sci.* 2009;9(2):131–136.