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Research Article

A COMPARATIVE STUDY ON DIAGNOSTIC ACCURACY OF ULTRASOUND AND FILM-SCREEN MAMMOGRAPHY IN DIAGNOSING BREAST MASSES

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Abstract:

Aim: To determine diagnostic accuracy of film-screen mammography and ultrasound in differentiating benign from malignant breast masses taking histopathology as gold standard.

Study design: A cross-sectional study.

Place and Duration: In the Department of Radiology and pathology Jinnah Hospital Lahore for six months duration from September 2019 to February 2020.

Subjects and methods: 210 patients were selected by non-probability purposive sampling with a palpable lump on the breast. Mammography was performed using cranio-caudal (CC) and medial-lateral oblique (MLO) projection. Ultrasound examination was performed using a 7.5 MHz linear transducer. The final diagnosis was based on a comparison of ultrasound and mammography results with biopsy results.

Results: Mammography sensitivity and specificity was 77% and 94.9%, respectively. Positive and negative predictive values were 83.3% and 92.5%, respectively. The diagnostic accuracy ratio was 90.5%. The sensitivity and specificity of ultrasound were 77% and 96.2%, respectively. Positive and negative predictive values were 87% and 92.7%, respectively. The diagnostic accuracy ratio was 91.4%.

Conclusion: Timely diagnosis and treatment of breast cancer is necessary. With early diagnosis, the probability of getting rid of breast cancer is over 90%. The study suggested that both mammography and ultrasound were comparable in terms of sensitivity and specificity.

Keywords: mammography, ultrasound, breast cancer.

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INTRODUCTION:

Breast cancer is the most common non-skin cancer in white women. Worldwide, breast cancer is the second most common form of cancer after lung cancer (10.4% of all cancers) and is the fifth most common cause of death due to cancer. In Pakistan, multicenter studies have shown that breast cancer is the most common malignancy in the female population and accounts for 35.5% of all malignancies. Only in Pakistan is responsible for 40,000 deaths per year. Mammography has been the gold standard in detecting breast cancer for over 40 years, in particular because of its accuracy and ability to detect micro-calcifications. There is increasing evidence that screening mammography (MMG) contributes to reducing mortality from breast cancer due to early diagnosis, but there is no limit to the detection of small and lobular breast cancers, low resolution, no significant improvement in cancer detection despite intensive breast cancer and digital assisted mammography and diagnostics have inevitably led to the search for other methods to improve detection of breast cancer.

RESULTS:

The details of results are given in tables 1,2,3,5 and 4

MATERIALS AND METHODS:

The study was conducted at the Department of Radiology and pathology Jinnah Hospital Lahore for six months duration from September 2019 to February 2020. Patients referred to our department from surgical outdoor and indoor in this period fulfilling inclusion and exclusion criteria were enrolled in this study. Demographic history has been recorded with name, age and address. After giving informed consent, mammography and ultrasound examination of both breasts were performed. Ethical considerations, such as consideration of patient privacy, were considered and maintained. In a mammography / ultrasound clinical trial, 35-60 years old patients obtained from surgery (internal / external) with constant breast weight were included in the study. All those patients with negative finding on any procedure were excluded also Birads category 0 and 6, taking Hormone Replacement Therapy (HRT) and operated previously were excluded.

Table 1: Distribution of benign versus malignant disease (n=210)

Disease	n=	%age
Benign disease	158	75.2
Malignant disease	52	24.8

Table 2: Diagnosis of carcinoma breast with different modalities

Procedures	n=	%age
Biopsy	52	24.8
Mammography	48	22.8
USG	46	21.9

Table 3: Results of usg findings (biopsy as gold standard) (n=210)

Results of USG	Biopsy		Total
	+ve	-ve	
Positive	True (a) 40	False +ve (b) 6	a + b 46
Negative	False (c) 12	True -ve (d) 152	c + d 164
Total	a + c 52	b + d 158	n 210

Table 4: Results of mammography findings (Biopsy as Gold Standard) (n = 210)

Results of Mammography	Biopsy		Total
	Positive	Negative	
Positive	True +ve (a)40	False +ve (b)6	a + b 46
Negative	False -ve (c)12	True -ve (d) 152	c + d 164
Total	a + c 52	b + d 158	n 210

Table 5: Comparison of two modalities in diagnosing breast carcinoma (Biopsy as Gold Standard)

Modality	USG	Mammography
Sensitivity	77%	77%
Specificity	98.2%	94.0%
+ve Predictive value	87%	83.3%
-ve Predictive value	92.7%	92.5%
Accuracy Rate	91.9%	90.5%

DISCUSSION:

Radiology mainly includes MG (mammography) and ultrasound (ultrasound), followed by biopsy. By routine testing of healthy women with MG, the incidence of deaths from breast cancer can be reduced by 30%. This is due to breast changes such as distortion, neo-defective density, fibro-glandular architecture disorder, and micro-calcification. They are detected earlier than lesions that become clinically palpable or sometimes examine themselves. Mammograms often diagnose breast masses (symptomatic or asymptomatic). It is necessary to define precisely what constitutes the mass of the lesion to distinguish it from benign malignant lesions. Ultrasound plays an important role in distinguishing between cystic and rigid masses. It is useful for assessing tangible masses that cannot be seen in dense breasts, abscess masses that cannot be fully assessed by MG, and young patients susceptible to radiation damage⁶. MG and USG methods were used to reduce the negative / positive biopsy rate. Mammography, the basic method for detecting and diagnosing breast diseases, has a proven sensitivity of 85% to 95%. However, due to their low specificity, additional diagnostic procedures are often required. MG can help doctors determine if the injury is potentially malignant, and can also detect hidden diseases in the surrounding tissue. Recurrent or complex cysts may indicate malignancy; therefore these injuries require further assessment. Ultrasound is not considered a screening test, it is more sensitive than MG to detect lesions in women with dense breast tissue. It is useful in distinguishing benign and malignant solid masses and outperforms MG in diagnosing clinically benign masses (i.e. 87 percent accuracy for MG up to 97

percent). It has been found in the literature that MG is a recognized breast diagnostic method. It has high diagnostic performance, but MG is not 100% accurate in combination with ultrasound can provide significant improvement in accuracy rates. In this study, according to the sensitivity of ultrasound, the diagnosis of malignant breast disease is 77%, and the mammographic diagnosis is 77%. Both procedures are almost equally accurate. The difference between these procedures is not statistically significant ($p > 0.05$). After exclusion of malignant breast disease, the specificity of ultrasound and mammography is 96.2% and 94.0%, respectively. Both procedures, ultrasound and MG, did not show significant differences in comparison ($p > 0.05$).

CONCLUSION:

Rapid diagnosis and treatment of breast cancer is necessary. With early diagnosis, the probability of getting rid of breast cancer is over 90%. The study suggested that both mammography and ultrasound were comparable in sensitivity and specificity.

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