A Prospective Study of Use of Modified Triple Test (MTT) in Diagnosing Breast Mass

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Abstract

Breast cancer is one of the most common cause of cancer related mortality and morbidity worldwide. A palpable breast mass in young women is a common cause of anxiety. It is indeed a frightful experience for the patient to directly undergo an invasive procedure like biopsy of breast mass. Hence the need for such diagnostic tool which is noninvasive or minimally invasive, quick, reliable, and also cost effective. Hence this study was undertaken to study the use of modified triple test (MTT) in the diagnosis of palpable breast mass. Methodology- The study was a prospective study done in the department of General Surgery in a tertiary care teaching hospital in Central India from January 2020 to December 2020. A total of 150 patients who presented with palpable breast mass were included. All the patients were investigated at first by sonomammography then FNAC. Either core biopsy or excisional biopsy of breast mass was done in all the cases. Findings were recorded and data analysis was done. Breast mass histopathology (HPE) report was considered to be gold standard and all the results were compared with HPE of the same breast mass. Observation and results: Out of total 150 patients studied, 148 were females and 2 were males. The sensitivity, specificity and accuracy of MTT is comparable with histopathology of the same breast mass. Conclusion: MTT is alone a reliable investigation for diagnosing palpable breast mass and biopsy of breast mass should be reserved only for doubtful cases.

Keywords: *breast mass, fine needle aspiration cytology, breast biopsy.*

Introduction

Breast carcinoma is the most common cancer and also the primary cause of mortality due to cancer in female around the World. There is huge difference in breast cancer survival rates worldwide, with an estimated 5-year survival of 80% in developed countries to below 40% for developing countries[1]. Developing countries have resource and infrastructure constraints that challenge the objective of improving breast cancer outcomes by timely recognition, diagnosis and management [2]. A palpable breast mass accidently found in young women is a common cause of anxiety though majority of these lesion are benign. Breast carcinoma is one of the most common causes of morbidity and mortality among women worldwide. [3] Tissue biopsy and histopathology are important diagnostic tools as approximately 15% of such lesions can be mammographically occult. [4] it is difficult to distinguish benign breast mass from a malignant one by clinical examination only. Missing a palpable breast carcinoma may invite medical and potential legal consequences. The biopsy taken for palpable breast mass however revealed that only 10 – 30% of the masses are malignant which indicate that approximately 70% - 90% are benign lesions[5,6] It is indeed a frightful experience for the patient to undergo an invasive procedure like biopsy of breast mass hence, there is a need of such a diagnostic tool which is non-invasive or minimally invasive, quick, reliable and cost

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effective. Modified Triple Test (MTT) consists of clinical examination, sonomammography of breast and fine needle aspiration cytology (FNAC) and is considered as an important tool of investigation for diagnosing breast mass. [7] Recently, use of ultrasonic equipment has led to one of the best tools in breast imaging which can identify 27% of breast mass especially in women younger than 50 years of age that can be occult on mammography.[8,9] To standardize the characteristic of breast lesion, ACR has developed a BIRAD lexicon for breast sonomammography[10-12]. BIRAD lexicon is quite helpful in differentiating between benign and malignant breast lesions[13,14]. Our study thus aims to compare the result of modified triple test, i.e., clinical examination, sonomammography of breast and FNAC of breast mass with that of histopathology in making diagnosis of the same breast mass in the same population.

Methodology

The study was a prospective study done in tertiary care teaching hospital in central India from January 2020 to December 2020 in the department of surgery. it included 150 patients who presented with palpable breast mass. Already diagnosed cases of carcinoma breast were excluded from the study. A thorough clinical examination of breast was done. The patients were investigated at first by sonomammography and then FNAC. Core biopsy or excisional biopsy of breast mass was done in all cases. The findings were recorded and data analysis was done. Sonomammography report was done according BIRADS protocol. The breast mass histopathology (HPE) report was taken as gold standard and all the results were compared with HPE of the same breast mass. The following values concerning the diagnostic accuracy were calculated:

1. Sensitivity: The possibility of positive USG result that the patient had cancer

2. Specificity: The possibility of negative USG result that the patient had benign lesion.

3. Positive predictive value: The possibility of having cancer when the result of USG is positive.

4. Negative predictive value: The possibility that a tumor is benign when the result of USG is negative.

5. False positive fraction: Benign lesion reported as positive by USG

6. False negative fraction: Cancer reported as negative on USG

7. Accuracy – The proportion of true result (true positive + true negative) among all results

OBSERVATION AND RESULT: Out of a total of 150 patients studied, 148 cases were females and maximum were in the age group of 31- 40 and only two cases were males who were diagnosed as physiological gynaecomastia. The median age of presentation of breast mass was 30 years. Sonomammograhic diagnosis of breast lump suggested that most of the breast masses were benign among which simple cysts and fibroadenomas predominated. Out of all cases, fibroadenomas were 33, simple cyst 44, fibrocystic disease 19, malignany 21 , duct ectasia 11, mastitis 17, galactocele 4 and phyllodes 3 in number. Most of the patients fall in the category of BIRAD 2 and 3. Out of 150 patients, 60 patients were in category 2, 52 in category 3, 16 in category 4 and 22 in category 5 Histopathology suggested that most of the breast masses were benign. Only 28 patients (18.67%) out of 150 were clear cut malignant. 5 patients (3.33%) were doubtful malignant and atypical cells were seen in cytology. 26 patients were fibroadenoma, 18 were fibrocystic disease, 3 phyllodes, 16 mastitis, 4 galactocele, 43 simple cyst, 11 duct ectasia and 28 were malignant.

Table 1: Sonomammography test as compared to gold standard HPE

Sonomammography test	Malignancy	
	Yes	No
Positive	19(TP)	2(FP)
Negative	9(FN)	120(TN)

Sensitivity of Sonomammography= TP/(TP+FN) = 19/(28) = 67.86%

Specificity of Sonomammography= TN/(TN+FP) = 120/(120+2) = 98.36%

PPV= TP/(TP+FP) = 19/(19+2) =90.48%

NPV= TN/(TN+FN) = 120/(120+9) = 93.03%

False positive rate = FP/(TN+FP) = 2/(2+120) = 1.67%

False negative fraction = FN/(TP+FN) = 9/(19+9) = 32.11%

Accuracy = (TP+TN)/Total number of cases = (19+120)/150 = 92.67%

Table 2: FNAC as compared to gold standard HPE

FNAC test	Malignancy	
	Yes	No
Positive	26(TP)	2(FP)
Negative	2(FN)	120(TN)

Sensitivity of FNAC= TP/(TP+FN) = 26/(26+2) = 92.86%

Specificity of FNAC=TN/(TN+FP)=120/(120+2) = 98.36%

PPV=TP/(TP+FP)=26/(26+2)=92.86%

NPV=TN/(TN+FN)=120/(120+2)=98.36%

False positive fraction=FP/(TN+FP)=2/(120+2)=1.67%

False negative fraction=FN/(TP+FN)=2/(26+2)=7.14%

Accuracy= (TP+TN)/Total number of cases= (26+120)/150 = 97.33%

Table 1: showing age and sex-wise distribution of cases.

Age group	Female	Male
<20 years	7	0
20-30	22	2
31-40	68	0
41-50	34	0
51-60	9	0
>60	8	0

Table 2: showing comparisons of resuls of various investigations

Sr. No.	Disease	sonomammography		FNAC		HPE	
		n	%	n	%	n	%
1	Fibroadenoma	33	20.5	27	16.2	27	16.2
2	Fibrocystic disease	19	12.7	18	12.2	18	12.1
3	Phylloides	3	2	3	2	2	1.3
4	Malignancy	21	14.1	28	18.7	28	20.2
5	Simple cyst	44	29.6	43	28.8	42	27.7
6	Duct ectasia	11	7.3	11	7.3	13	8.7
7	Mastitis	17	11.3	16	10.7	15	10.1
8	Galactocele	4	2.6	4	2.7	5	3.4
	Total	150	99.7	150	99.6	150	99.7

Table 3: showing results in all 3 modalities.

	USG		FNAC		HPE		P value
	N	%	N	%	N	%	
Benign	129	86	122	81.3	122	81.3	p>0.05
Malignant	21	14	28	18.7	28	18.7	

Discussion

Breast carcinoma is one of the most common cancer in women causing worldwide mortality and morbidity[15]. The usual symptoms are breast mass or nipple discharge. The surgeon to rule out malignancy should evaluate lump of breast. Evaluation of breast mass includes detailed history, clinical examination, imaging modalities and tissue diagnosis. Histopathology of breast mass biopsy (HPE) includes core biopsy/excisional/incisional biopsy and is the gold standard for making the final diagnosis. But its invasive and painful and hence is frightening to the patient. Also, approximately 80% of breast masses are benign[16] therefore there is need for such diagnostic tool which is minimally invasive, quick, cost effective as well as reliable. Modified triple test or MTT consists of detailed clinical history and examination, sonomammography of breast and FNAC i.e fine needle aspiration cytology. Our study has compared the result of modified triple test with the histopathology of breast mass biopsy of same patient. Sonomammography or USG of breast is very useful investigation and is useful in differentiating malignant masses from benign solid mass[17,18]. BIRADS classification in sonomammography revealed that obtained rate of malignancy in our study is in line with other studies. [19] Fine needle aspiration cytology (FNAC) is an important tool for diagnosing breast lesion. Since sensitivity and specificity rate of FNAC is not 100%, there is off course limitation of this investigation.[20,21]Thus, these unavoidable limitations can further be reduced if we consider clinical examination and radiological findings to make it more reliable, i.e. a modified triple test (MTT). Many studies suggest that MTT is 100% accurate in diagnosing breast

mass, however FNAC is the most important and reliable element of MTT.[22] The mean age of presentation of palpable breast mass is 30 years which is in accordance with other studies[23] and also like other studies sensitivity of clinical examination is approximately 85%.[24]. In our study, benign breast mass was more common and fibroadenoma and simple cyst predominates. [20] followed by palpable the breast mass in 4th decade where carcinoma breast is more common[21] In terms of BIRADS category, category 2 followed by category 3 was more common[24] We found that the result of modified triple test was comparable to the histopathology of palpable breast mass. [23]

Conclusion

The Modified Triple Test is a sufficient and reliable investigation for diagnosing palpable breast mass and biopsy of breast mass should be reserved only for doubtful cases. Of all the three components of the triple test, FNAC is the most accurate. A patient with a concordant benign triple test report can be safely followed up without the need for biopsy. The aim of the modified triple test is to allow the clinician to avoid unnecessary open biopsy and to proceed to definitive therapy if a malignant breast lump is present. In summary, the modified triple test can reliably guide the evaluation and treatment of breast lumps.

Conflict of Interest: Nil

Source of Funding: Nil

Ethical Clearance: Taken from institutional ethics committee

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