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The role of triple test assessment in early breast carcinoma management at Al-Yarmouk teaching hospital

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Abstract

Background: Breast cancer is a health concern for women since this illness threatens women's health and reduced their life span globally employed; early detection tests including the Triple Test (TT) are necessary. The TT consists of imaging in forms of mammography as well as ultrasound in cases of suspicion of breast cancer and biopsy. It is a purpose of this study to assess the applicability of the TT in enhancing accuracy and therapeutic measures and therefore, to discuss its possible consequences regarding medical recommendations and health care polices.

Methods: A cross-sectioned study was implemented at Al Yarmouk Teaching Hospital within one year starting from September 2022 to September 2023, and the research question under study was how the TT has been relevant in the management of breast cancer. The patients selected for the study were female patients presenting complaints related to breast lumps, breast nipple discharge, breast masses visible on palpation as well as axillary involvement. The patients were selected from the assessment or result perspective, from the Mammograms and ultrasounds with signs of potential breast problems. Of the 276 who underwent the screening, 112 were confirmed or probable to have breast cancer. Data collection included undertaking structured interviews and clinical assessments together with diagnostic scans following ethical clearance and participants' consent.

Results: Of 112 participants, majority were in 20–39 years age group (57.2%) and married (77.6%). The earliest detection mode was self-examination, which accounted for 61.6%. The clinical manifestations were lump (66.0%), while on imaging, 58.0% had inconclusive ultrasonography and 71.4 % had micro-calcification in mammography. Cytology was suspicious in 69.6% of cases and histopathology confirmed that 88.4% were ductal carcinoma. Tumor grading revealed that 82.2% of them had Grade II cancer.

Conclusions: This study re-emphasises the TT—clinical breast examination, ultrasonography, and FNAC as a useful method in early breast cancer detection in Iraq. The study recommends the utilization of the TT along with enhancing public awareness, as well as enhancing the training of healthcare service providers in the detection of the disease.

Keywords: Breast carcinoma, triple test, early detection, and diagnostic accuracy

Introduction

Breast carcinoma to date is a significant global public health problem in the female community, hence highlighting the importance of early screening and management techniques. It is a well-cherished fact that early diagnosis is very beneficial in raising the survival ratio as well as implementing the treatments. The gold standard of diagnosis of early breast cancer is the Triple Test (TT) which consists of clinical examination, imaging and tissue sampling; often practicing mammography or ultrasound. These have been used extensively due to their effectiveness in identifying cancer and differentiating between cancerous and non-cancerous conditions ^[1]. Thus, refined early diagnosis poses certain problems in the field of breast cancer diagnosis and treatment of patients.

The research problem that this study aims at solving is the insufficient assessment of the Triple Test applicability in the early stages of breast carcinoma. Even though the TT has been deemed as accurate as other diagnostic tests, differences in its administration and its incorporation into daily practice have led to concerns about the proper application of the TT in early detection and treatment ^[2, 3]. Most research in TT has been performed on the reliability of each of the distinct parts of the TT and the effectiveness of all of them jointly for the current therapeutic determination and the patient outcome in the early-stage breast cancer patients ^[4, 5].

Consequently, this research is important as an attempt to move the knowledge of the topic forward by evaluating an aspect of the TT in managing breast carcinoma in the initial stages. These results can have implications for the principles of clinical practice for breast cancer with an increased ability to diagnose the disease correctly and develop individual recommendations for patients. Moreover, the study could have implications for other health care policies to improve early detection and almost breast cancer related mortality on the international level. Indeed individual aspects of the TT have been investigated in a number of different studies. For instance, CBE is generally considered to be an effective first-stage test, although its specificity is relatively low, particularly in patients with mammary parenchymal densities [6]. Mammography while effective in older women had a better specificity in this population than in younger women [7]. Biopsy, while definitive, is an invasive form of examination and rarely used in this context because imaging may be inconclusive. Several researchers establishing that integrated approaches to the detection of breast cancer enhance its accuracy over those obtained with single modality testing methods [8]. Nevertheless, limited research has systematically examined the utilisation of the TT concurrently in the early instar phases of the disease. This research gap is primarily investigated in the current study, where the impact of this integrated approach on the clinical decision-making process and early phase breast carcinoma patients is assessed.

Objectives of study

1. To evaluate the accuracy of TT in the pre-operative diagnosis of patients with breast cancer.
2. To assess the impact of early diagnosis of breast cancer using TT on detecting the disease in early stages clinically and pathologically so that a more radical management can be implemented to improve prognosis.

Patients and Methods

Study Design: Study Design: This study used cross-sectional design to assess the utility of the TT assessment in the early management of breast carcinoma.

Study Setting and Timing: The study was carried out at the surgical consultant clinic for early diagnosis of breast malignancy in Al-Yarmouk Teaching Hospital, Baghdad, Iraq. Data collection was done for one year from September 2022 to September 2023.

Study Population: The study participants were covered woman of any age group with presenting complaints of breast lumps, nipple discharge, breast pain, and change in skin of the breast, or swelling in axillary region. Details included were any clinical, mammographic or ultrasonographic features suggestive of breast disease, while those with non-breast complains, inadequate investigations or those who refused consent were excluded from the study.

Sampling Method & Size: The participants were recruited with convenient sampling method whereby participants were either referred or attending the clinic. A total of 276 patients were initially evaluated. Of these, 218 exhibited clinical evidence of breast disease and underwent further diagnostic procedures. Ultimately, 112 patients were positively diagnosed or suspected of having breast carcinoma and were included in the analysis. The sample

size was determined based on a review of similar studies and feasibility.

Data Collection Methods: Detail information was obtained using self-administered questionnaires, while clinical information and breast imaging results (mammogram or ultrasound) and physical examinations were obtained from the researchers. Those with suspicious or malignant appearing detections on imaging tests underwent FNAC or excisional biopsy, or core biopsy as needed. Diagnostic tool validity and reliability were anchored on set norms, standards, and standard operating procedures. Location, size, type of surgery, and pathological node status as well as tumour type and grade along with the pathological stage of any tumour identified were noted.

Ethical Considerations: The study was granted ethical clearance from the authorities at Al-Yarmouk Teaching Hospital. All participants gave written informed consent before to being recruited into the study.

Data Analysis: Statistical analysis of the data was done using the SPSS version 26. Patient demographics and clinical characteristics were described using descriptive statistics. A regression analysis was conducted to determine the factors associated with malignant cytology findings

Results

The study included 112 participants, with regards ages, 2.7% of the participants were ≤ 19 years, 57.2% 20–39 years, 30.3% 40–59 years and 9.8% ≥ 60 years. The majority were married with 77.6%, while 22.4% were unmarried. For parity, 2.6% were childless, 86.7% had 1-4 children, and 10.7% had 5 or more children. With regards to their employment status, 63.3% had paid work and 36.7% were home makers. Significantly, 18.7% of the participants were smokers while 81.3% of participants were non-smokers. Also, 42.8% was taking drugs (contraceptive pills) while 57.1% was not taking drugs. (Table 1)

Table 1: Demographic and Clinical Characteristics of Study Participants

Variable	N=112 (%)
Age in years	
≤ 19	3 (2.7)
20- 39	64 (57.2)
40- 59	34 (30.3)
≥ 60	11 (9.8)
Marital status	
Married	87 (77.6)
Un-married	25 (22.4)
Parity	
Childless	3 (2.6)
1-4 Children	97 (86.7)
≥ 5 Children	12 (10.7)
Occupation	
Employed	71 (63.3)
Housewife	41 (36.7)
Smoking	
Yes	21 (18.7)
No	91 (81.3)
Drugs Pills (contraceptive)	
Yes	48 (42.8)
No	64 (57.1)

Clinical presentation and findings of breast complaint among 112 participants; 69 (61.6%) found the complaint during self-examination, 18 (16.0%) during routine examination, 15 (13.3%) accidentally, and 10 (8.9%) through other means. The majority of females described their chief complaint as lump in 66.0% of participants followed by pain in 10.7% then increase in size in 1.7%, nipple discharge in 8.9% and axillary complaints in 8.0% and other complaints in 4.4%. From clinical assessment, 91.0% had a mass, 33.9% nipple change, 11.6% axillary mass and 6.5% skin change. Concerning location of the mass, 56 (50.0%) were located in the upper outer quadrant, 42 (37.5%) in the lower outer, 3 (2.7%) in the upper inner, 5 (4.5%) in the lower inner and 6 (5.3) in the central region. (Table 2)

Table 2: Clinical Presentation and Findings in Breast-Related Complaints

Variable	N=112 (%)
Clinical presentation	
After self-examination	69 (61.6)
Routine examination	18 (16.0)
Accidental	15 (13.3)
Others	10 (8.9)
Chief complaint	
Lump	74 (66.0)
Pain	12 (10.7)
Increase size	2 (1.7)
Nipple discharge	10 (8.9)
Axillary	9 (8.0)
Others	5 (4.4)
Clinical findings	
Mass	102 (91.0)
Nipple abnormality	38 (33.9)
Axillary mass	13 (11.6)
Skin abnormality	7 (6.5)
Position of the mass	
Upper outer	56 (50.0)
Lower outer	42 (37.5)
Upper inner	3 (2.7)
Lower inner	5 (4.5)
Central	6 (5.3)

The ultrasonography result of the study revealed that out of 38, 9 and 65 were solid, cystic and mixed respectively the percentage were 34.9%, 8.0%, and 59.0% respectively. For the mammography findings, 80 cases, 71.4% of patients had micro-calcification while 39 patients, 34.8% had mass less than 2cm in size, 32patients, 28.6% had mass greater than 2cm in size 13 patients, 11.6% had regular margins and 58 patients, 51.8% had irregular margins. (Table 3)

Table 3: Ultrasonography and Mammography Findings in Breast Cancer Diagnosis

Variable	N=112 (%)
Ultrasonography	
Solid	38 (34.9)
Cystic	9 (8.0)
Mixed	65 (58.0)
Mammography (more option use)	
Micro-calcification	80 (71.4)
Mass < 2 cm	39 (34.8)
Mass > 2 cm	32 (28.6)
Regular border	13 (11.6)
Irregular border	58 (51.8)

On comparison to cytology findings obtained from FNA in breast carcinoma diagnosis, the percentage of benign cytology was 0%; suspicious cytology was 69.6% while the malignant cytology was 30.4%. A total of 210 subjects had histopathological confirmation where ductal carcinoma was detected in 186 (88.4%) patients, alveolar carcinoma in 11 (5.4%) and inflammatory carcinoma in 5 (2.6%) and other types in 8 (3.6%). Based on tumor grading, 11.6% were G I, 82.2% were G II and 6.2% were G III. (Table 4)

Table 4: Cytology and Histopathology Findings in Breast Carcinoma Diagnosis

Variable	N=112 (%)
Cytology FNA	
Benign	0 (0.0)
Suspicious	78 (69.6)
Malignant	34 (30.4)
Histopathology	
Ductal ca.	99 (88.4)
Alveolar ca.	6 (5.4)
Inflammatory ca.	3 (2.6)
Others	4 (3.6)
Grading of tumor	
G I	13 (11.6)
G II	92 (82.2)
G III	7 (6.2)

The logistic regression analysis in table 5 revealed that participants aged ≥40 years had significantly higher odds of having malignant cytology findings (OR: 3.25 95% CI: 1.65–6.42, p = 0.001). Smoking was also positively associated with malignancy, with smokers having 2.14 times the odds of malignant findings compared to non-smokers (95% CI: 1.02–4.51, p = 0.041). Mass size >2 cm demonstrated the strongest association, increasing the odds of malignancy by 5.76 times (95% CI: 2.2–12.58, p = 0.001), irregular margin (OR 4.22, 95% CI 1.95-9.12, p = 0.001), histopathological features suggestive of ductal carcinoma (OR 3.85; 95% CI 1.72-8.63, p = 0.001), and grade 3 (OR 2.64; 95% CI 1.15-6.00, p = 0.022). While the use of contraceptive pills showed a marginally significant association (OR: 1.95, 95% CI 0.99-3.85, p = 0.052). Age, smoking, mass size, irregular borders, and histopathological subtype were identified as significant in determining malignant cytology findings.

Table 5: Logistic regression analysis of factors associated with malignant cytology findings

Variable	Odds Ratio	95% CI	p-value
Age (≥40 years)	3.25	1.65–6.42	0.001
Marital Status (Married)	0.78	0.39–1.57	0.482
Parity (≥5 children)	1.32	0.62–2.81	0.464
Occupation (Employed)	0.67	0.35–1.27	0.223
Smoking (Yes)	2.14	1.02–4.51	0.041
Drug Pills (Yes)	1.95	0.99–3.85	0.052
Mass Size (>2 cm)	5.76	2.64–12.58	0.001
Irregular Border	4.22	1.95–9.12	0.001
Histopathology (Ductal carcinoma)	3.85	1.72–8.63	0.001

Discussion

This study was undertaken with the objective of identifying the clinical and diagnostic profile of breast carcinoma in 112 cases Limited to clinical data, ultrasound and mammography, cytology, histological features and grading

of the tumors. The main findings presented a high rate of suspicious cytology, the majority of ductal type carcinoma, and a majority of the tumours with Grade II. The study answered the research question in the following ways; The major trend proved that self-examination was the primary diagnosed technique for the presence of breast issues while ultrasonography and mammography exposed an unpredictable number of mixed masses and micro-calcifications, which are both significant markers of malignancy. From this study, agrees with the findings cited in previous research studies that have insisted in the ability of self-examination for early detection of the disease – breast cancer. For example, Smith et al study showed that screening through self-examination emerged as the most common methodologies among women with the initial symptoms of breast cancer [9].

The high incidence of suspicious cytology (69.6%) is in line with studies showing the importance of FNA in diagnosing breast cancer, with a large portion of cases initially classified as suspicious before definitive histopathological diagnosis. This is similar to evidence by Alhassan et al., where they pointed out that suspicious cytology is prevalent because developing countries may lack sophisticated diagnostic technologies [10]. Moreover, the histopathological outcomes revealed that the majority of cases (88.4%) were ductal carcinoma, this finding is consistent with the global data; DCIS and IDC are the most prevalent subtypes of breast cancer [11]. In contrast, alveolar carcinoma is (5.4 %), a comparatively low finding when compared with the findings of other researchers, who have observed ductal carcinoma in more than 90 percent of the patients [12]. The tumor grading distribution also supports existing literature, with a majority of cases being Grade II, reflecting a moderate differentiation status, which is typical in breast carcinoma diagnoses [13].

The clinical findings of mass, nipple abnormalities, and axillary mass also align with the commonly reported symptoms of breast cancer. In contrast, the relatively lower percentage of axillary masses (11.6%) might reflect early-stage detection, as studies by Thomas *et al.* show axillary involvement tends to increase with tumor progression [14]. Furthermore, the observation of mixed masses (58%) on ultrasonography and the presence of micro-calcifications (71.4%) on mammography are typical of malignancies, consistent with findings by Li *et al.* and other major breast cancer diagnostic studies [15]. The results underscore the role of these imaging modalities in identifying potential malignancies in asymptomatic women.

The high rate of suspicious cytology findings can be explained by the nature of breast carcinoma, where cytological sampling often reveals atypical cells but may not provide definitive malignant confirmation without further histopathological evaluation. This underscores the importance of combining cytology with histopathology to reach an accurate diagnosis. The dominance of ductal carcinoma could be due to its higher incidence compared to other subtypes, which is a consistent finding in breast cancer epidemiology worldwide. The distribution of tumor grades, with the majority being Grade II, suggests that the population studied may have been diagnosed at an intermediate stage, where tumors are still responsive to treatment but may not be in the early or highly aggressive phases.

The clinical symptoms including breast lump, pain and nipple discharge are some of the manifestations which patients present with breast cancer. This shows that breast issues and self-examination remained the most frequently used method to discover breast problems, proving that awareness programs advocating early check-ups are still essential. The mixed masses seen in ultrasonography and the micro-calcifications in mammography reflect the heterogeneity of the tumors and are accepted as features for malignancy. Consequently, the results of the present study underscore early detection of breast carcinoma particularly from the habit of breast self-examination. The majority of patients with the Grade II tumors, which means that intervention is beneficial as these tumors can turn malignant if they are not treated. The high percentage of cases which had suspicious cytology underscores the need for follow-up workup and again re-asserts the value of integrating cytology, histopathology, and imaging studies in arriving at the final diagnosis. These findings also have clear clinical implications: techniques to detect breast cancer at an early stage, such as annually mammography and self-examination, should be utilized more in the breast cancer prevention campaigns. However, current imaging techniques like ultrasonography and mammography were also found useful in physical diagnosis of early breast cancer for women who present with complaints that may have multiple causes.

Conclusions

Resulting from this study is the establishment of the TT comprised of clinical breast examination (CBE), ultrasonography, and FNAC as a valuable tool on breast cancer early diagnosis and management especially in Iraq environment deficiencies. The findings show that self-examination is the most reported approach to discovering breast concerns, while ultrasonography and mammography efficiently highlight critical markers of malignancy including mixed masses and micro-calcifications. A comparably large number of suspicious cytology results and ductal carcinoma was identified, thus supporting the use of the TT as a tool for breast cancer identification. This emphasizes the diagnostic performance of this combined model with high sensitivity and specificity; the results of which constitute a potential solution to prevent long diagnostic latency periods and enhance treatment for patients. Considering the difficulties in diagnosing the cancer stage and scarcity of the powerful diagnostic modalities, the study recommends implementing the TT into ordinary clinical practice throughout Iraq, particularly in the regions with a lack of the necessary equipment. It also recommends increasing public awareness of self-examination and providing healthcare providers with training in using the TT.

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