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COMPARISON OF FINE-NEEDLE ASPIRATION CYTOLOGY AND CORE BIOPSY IN SCREEN-DETECTED BREAST LESION

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ABSTRACT

Background: For its safety, reliability, and speed, fine-needle aspiration cytology (FNAC) is often used to assess breast lumps outdoors. Recently, breast lesions are largely diagnosed by Tru-cut biopsies and fine-needle aspiration cytology is decreasing. The present study was undertaken to compare the diagnostic accuracy of Tru-cut Biopsy and Fine Needle Aspiration Cytology (FNAC) in the evaluation of screen-detected breast lesion considering the histological diagnosis from excision specimen being the gold standard. **Methods:** From February 2021 to January 2023, the Department of Oncology, Oncology Teaching Hospital, Baghdad medical city, Baghdad, Iraq, performed this cross-sectional research. The research sequentially included 80 women with screen-detected breast lesions. All patients had FNAC and Tru-cut Biopsy to establish a preliminary (clinical) breast lump diagnosis, followed by histology of the excision biopsy during surgery to confirm it. **Results:** 80 breast lesions-afflicted women aged 55 ± 13 years. 41% of 60+ patients. 90% of women with FNA breast cancer. Breast cancer is diagnosed by core and excisional biopsy in 93.8% of women. No-type invasive ductal carcinoma was most prevalent. FNA is related with core and excisional biopsy in 94.6% of diagnosed breast cancer women. 60% of benign breast disease (core & excisional biopsy) patients had FNA-diagnosed proliferative with atypia. 100% of breast cancer patients over 50 get excisional biopsy. 100% of core biopsy-diagnosed malignant breast cancer patients got excisional biopsy. sensitivity, specificity, and accuracy 100% **Conclusion:** The research found significant diagnostic concordance between FNA and combined biopsy for malignant breast illnesses, with age being a key factor, particularly for women over 50. Core and excisional biopsy procedures match, demonstrating unsurpassed cancer detection accuracy.

KEYWORDS: fine-needle aspiration, cytology, core biopsy, screen, detected, breast carcinoma.

INTRODUCTION

Breast cancer remains one of the most prevalent and extensively studied malignancies worldwide. This disease, characterized by uncontrolled growth of cells in the breast tissue, is a complex of various subtypes, each presenting distinct clinical, morphological, and molecular characteristics. Such heterogeneity has significant ramifications not only in understanding the pathogenesis of breast cancer but also in determining the most efficacious treatment strategies. Precise diagnostic and therapeutic approaches become paramount to deliver personalized care tailored to each patient's unique cancer profile.[1] Pre-operative pathology, serving as a cornerstone in breast cancer management, has seen continuous evolution in techniques and methodologies to ensure accurate diagnosis and staging. An accurate pre-operative diagnosis aids clinicians in determining the scope and extent of the disease, thereby guiding therapeutic choices and predicting potential responses to treatment. Among the tools available for breast lesion work-up, Fine Needle Aspiration (FNA) and Core Needle Biopsy (CNB) have emerged as primary modalities.[2] FNA, as a minimally invasive diagnostic procedure, involves the use of a thin, hollow needle attached to a syringe to extract samples of cells from breast lesions. This technique has found favor among clinicians and patients alike due to its less traumatic nature compared to more invasive diagnostic procedures. One of the most compelling advantages of FNA is its ability to confirm benign clinical and radiological findings. By doing so, it offers a substantial opportunity to circumvent unnecessary surgical interventions, leading

to reduced patient morbidity and healthcare costs.[3] However, while FNA is advantageous in specific contexts, CNB holds its own merit, especially when diagnosing invasive breast cancers. CNB, which entails the removal of a small cylinder of tissue using a hollow needle that may be attached to a spring loaded tool that move the needle in and out of the tissue quickly, or it may be attached to suction device that helps pull breast tissue into the needle, offers a more comprehensive tissue sampling. Such extensive sampling allows for a more detailed histological evaluation. One of the key strengths of CNB is its ability to determine invasiveness of the tumor. Recognizing an invasive breast cancer pre-operatively can streamline the surgical approach. Patients diagnosed with invasive tumors can undergo a single surgical procedure that also includes sentinel node biopsy – a procedure critical in assessing the extent of cancer spread.[4] also other advantage of CNB is understanding of molecular markers like hormone receptors and surface-epithelial growth-factor receptors. These markers have emerged as powerful predictors of disease behavior and response to therapy.[5] This study aimed to compare the efficacy of FNAC and CB in the preoperative diagnosis of breast lesion detected by screening considering the histological diagnosis from excision specimen being the gold standard.

METHOD

Cross sectional study of 80 females with breast lesions, the data collected at Department of oncology, oncology teaching Hospital, baghdad medical city, Baghdad, Iraq, over a period from February 2021 to January 2023. All females asked about age, and all females were undergoing FNA diagnosis and Core biopsy and Excisional Biopsy. Statistical analysis done by SPSS 22, frequency and percentage used for categorical data, mean, median and SD for continuous data. Chi-square used for assessed association between categorical variables. T test used for evaluation differences between mean and median of continues variables. P-value less or equal to 0.05 is consider significant.

RESULTS

Cross sectional study of 80 females with breast lesions, mean age of them 55 ± 13 years old. 41% of patients at age group 60 years and more. 90% of females diagnosed as carcinoma of breast by FNA. 93.8% of females diagnosed as carcinoma of breast by core biopsy and excisional biopsy. As shown in table 1.

Table 1: Distribution of patients according to study variables.

Variables		Frequency	Percentage
Age group (years)	***30-39***	10	12.5
	40-49	22	27.5
	50-59	15	18.8
	≥60	33	41.3
FNA	***Benign***	1	1.2
	Malignant	72	90
	proliferative breast disease with atypia	7	8.8
Core biopsy	***Benign***	5	6.3
	Malignant	75	93.8
Excisional Biopsy	***Benign***	5	6.3
	Malignant	75	93.8

According to fig 1-3 below, 90% of females diagnosed as mammary carcinoma, as diagnosis done by FNA. 82.5% of females diagnosed as invasive ductal carcinoma of no special type, as diagnosis done by core & excisional biopsy.

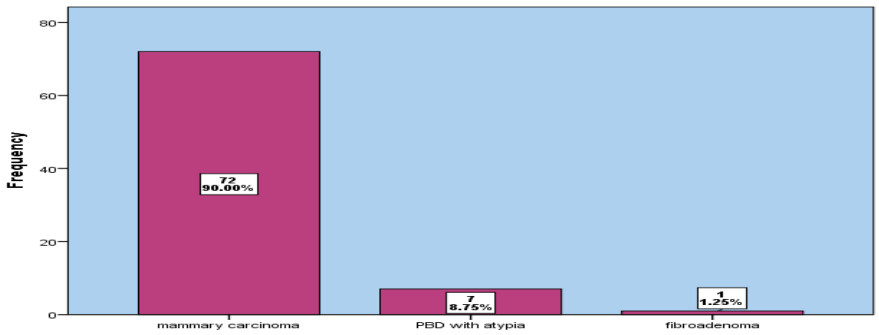

Fig 1: Distribution of females as diagnosis done by FNA.

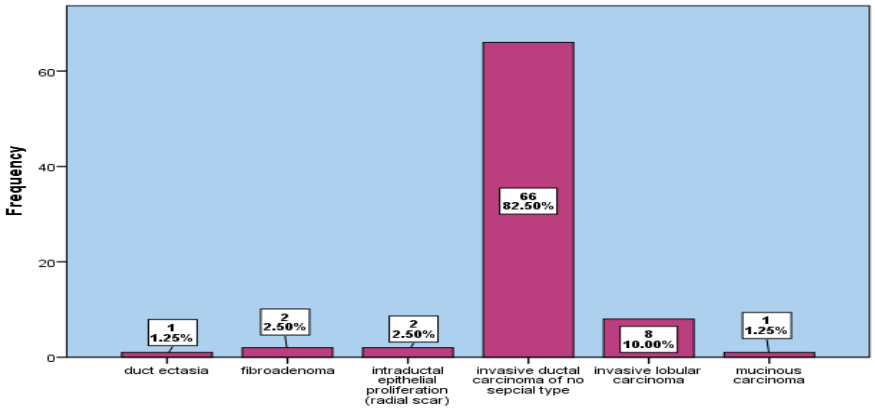

Fig 2: Distribution of females as diagnosis done by core biopsy

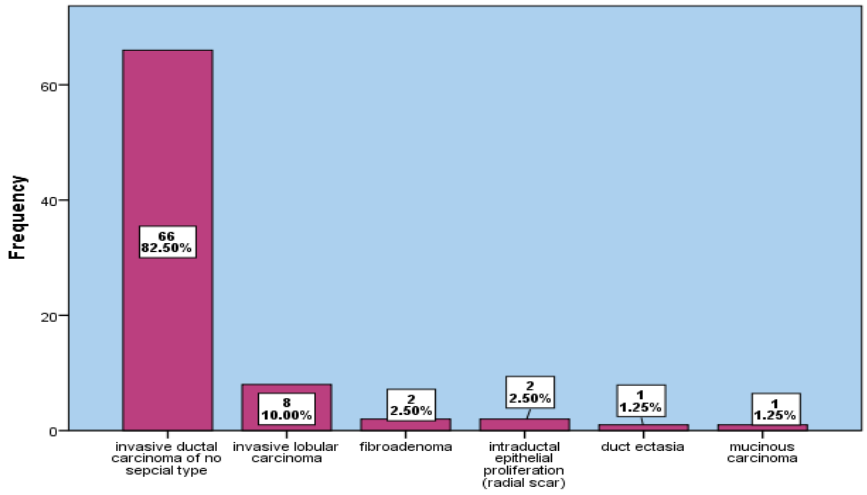

Fig 3: Distribution of females as diagnosis done by excisional biopsy.

As shown in table 2; there is significant association between (core & excisional biopsy) and FNA, 71 breast lesions (94.6%) of females diagnosed as malignant breast disease also by (core & excisional biopsy) diagnosed as malignancy by FNA, 3 breast lesions(60%) of females diagnosed as benign breast disease also by (core & excisional biopsy) diagnosed as proliferative with atypia (PWA) by FNA while 4 breast lesions(5.4.%) of females diagnosed as malignant breast disease also by (core & excisional biopsy) diagnosed as proliferative with atypia (PWA) by FNA.

Table 2: Association between (core & excisional biopsy) and FNA.

Variables		FNA			Total	P-value
		Benign	Malignant	PWA		
Core biopsy	**Benign**	1 20.0%	1 20.0%	3 60.0%	5 100.0%	**0.0001**
	Malignant	0 0.0%	71 94.6%	4 5.4%	75 100.0%	
Excisional biopsy	**Benign**	1 20.0%	1 20.0%	3 60.0%	1 20.0%	**0.0001**
	Malignant	0 0.0%	71 94.6%	4 5.4%	0 0.0%	

P-value ≤ 0.05 (significant).

As shown in table 3; there is significant association between age group and Excisional biopsy, 100% of females at age 50 and more diagnosed as breast Ca. under Excisional biopsy.

Table 3: Association between age group and Excisional biopsy.

Variables		Excisional biopsy		Total	P-value
		Benign	Malignant		
Age groups Years	*30-39*	2	8	10	**0.037**
		20.0%	80.0%	100.0%	
	40-49	3	19	22	
		13.6%	86.4%	100.0%	
	50-59	0	15	15	
		0.0%	100.0%	100.0%	
	≥60	0	33	33	
		0.0%	100.0%	100.0%	

P-value ≤ 0.05 (significant).

As shown in table 4; there is high significant association between core & excisional biopsy, 100% of females diagnosed as malignant breast disease by core biopsy are also diagnosed as malignant breast disease by excisional biopsy. With 100% sensitivity and 100% specificity and 100% accuracy.

Table 4: Association between core & excisional biopsy.

Variables		Excisional biopsy		P-value
		Benign	Malignant	
Core biopsy	Benign	5	0	**0.0001**
		100.0%	0.0%	
	Malignant	0	75	
		0.0%	100.0%	

Sensitivity= 100%, Specificity= 100%, accuracy= 100%

DISCUSSION

The cross-sectional study provides a comprehensive insight into the diagnostic capabilities of Fine Needle Aspiration (FNA) and Core Needle Biopsy (CNB), as well as excisional biopsy, in a cohort of 80 females presenting with breast lesions. The study underscores the significance of the choice of diagnostic modality in ensuring accurate lesion characterization and management planning. With a mean age of 55 ± 13 years, it's evident that the majority of the cohort falls into the age group commonly associated with an increased risk of breast cancer.[6,7] The finding that 41% of patients were aged 60 years and above further emphasizes the heightened vulnerability of this subset to breast malignancies. The use of FNA revealed a carcinoma diagnosis in 90% of the females. Historically, FNA has been an invaluable tool in the preliminary assessment of breast lesions due to its minimal invasiveness and rapid results. However, its limited ability to provide tissue architecture often restricts the comprehensive characterization of lesions, which might explain why a lower percentage of females were diagnosed with carcinoma using FNA compared to CNB and excisional biopsy.[8,9] CNB, on the other hand, combined with excisional biopsy, yielded a carcinoma diagnosis in a remarkable 93.8% of females. The higher rate of carcinoma diagnosis with CNB can be attributed to its ability to offering a more detailed histological evaluation. This enables a clearer distinction between benign and malignant lesions and facilitates a more nuanced sub classification of malignant tumors. The results of our study echo previous research which has highlighted the superior diagnostic accuracy of CNB compared to FNA.[10] Furthermore, the specific diagnosis of invasive ductal carcinoma of no special type in 82.5% of females (as determined by core and excisional biopsy) provides a deeper understanding of the disease spectrum within the cohort. Invasive ductal carcinoma is recognized as the most common subtype of breast cancer, accounting for about 75-80% of all breast cancer diagnoses.[11] Its presence in such a high proportion of the cohort aligns with its global prevalence.

This study offers a robust exploration of the association between different diagnostic techniques in the context of breast lesions, particularly emphasizing the correlation between Fine Needle Aspiration (FNA) and Core Needle Biopsy (CNB) coupled with excisional biopsy. One of the standout observations from the presented data is the high congruence between FNA and CNB and excisional biopsy methods in diagnosing malignant breast diseases. Specifically, an impressive 94.6% of females diagnosed as having malignant breast disease by CNB and excisional biopsy methods were also identified as malignancy by FNA. This overlap speaks to the reliability and diagnostic concordance between these techniques when detecting malignancies.[12] Yet, an intriguing difference surfaces when evaluating benign diagnoses. Among females diagnosed with benign breast disease by the CNB and excisional biopsy, 60% were diagnosed as proliferative with atypia (PWA) by FNA. PWA signifies a heightened risk for breast cancer development in subsequent years, thus shedding light on the critical role of FNA in the risk stratification of breast lesions.[13] Another pivotal observation focuses on the

influence of age on breast cancer diagnosis. The data reflects that 100% of females aged 50 and above were diagnosed with breast cancer under excisional biopsy. Age is a well-established risk factor for breast cancer, with increasing age corresponding to elevated risks.[14] This result further reinforces existing literature indicating that vigilance in breast lesion assessment is especially crucial for the older demographic. Additionally, a striking finding from the data is the perfect association between core and excisional biopsy results in diagnosing malignant breast diseases. This 100% sensitivity, specificity, and accuracy underscores the diagnostic harmony between these methods. In essence, when one method detects malignancy, the other corroborates it consistently. This significant correlation reaffirms the reliability of these diagnostic modalities, echoing previous research emphasizing the synergistic use of multiple biopsy techniques to bolster diagnostic confidence.[15]

CONCLUSION

The study underscores the diagnostic concordance between Fine Needle Aspiration (FNA) and the combined Core and Excisional Biopsy techniques in detecting malignant breast diseases, with a remarkable 94.6% overlap. However, discrepancies emerge in benign lesion characterizations, where 60% of those deemed benign via biopsy were classified as proliferative with atypia (PWA) by FNA, highlighting the potential of FNA in discerning subtle atypical features. Age emerges as a significant determinant in breast cancer diagnosis, with every female aged 50 and above being diagnosed with breast cancer via excisional biopsy. Most notably, there's a perfect diagnostic alignment between core and excisional biopsy in identifying malignant breast diseases, reinforcing their reliability and precision in breast lesion assessment.

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