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DIAGNOSTIC EFFICACY OF FNAC AND TRUCUT BIOPSY AS COMPARED TO POSTOPERATIVE HISTO-PATHOLOGICAL REPORT IN CASES OF CLINICALLY PALPABLE BREAST LUMPS AT A TERTIARY CARE CENTER

General Surgery

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ABSTRACT

Introduction: Breast lump is one of the common complaints in surgical practice. The diagnostic validity can be increased by combining various preoperative tests (like clinical examination, radio-diagnosis, fine-needle aspiration cytology, and TRUCUT biopsy). These methods should distinguish between benign and malignant lumps in outpatient department. **Aims And Objectives:** In the present study, we aimed to analyse the sensitivity, specificity, and positive and negative predictive values of FNAC and Trucut biopsy as compared to postoperative histopathological report. **Methodology:** This study is about validity of diagnostic methods for palpable breast lump, undertaken in the surgery department in a tertiary care centre. Data was collected by extensive history taking, clinical examination, FNAC, TRUCUT biopsy, and post-operative histopathology. **Results:** The sensitivity of FNAC in detecting malignancy was 83.78%, while that of Trucut biopsy was higher at 94.59%. Both modalities showed 100% specificity and positive predictive value (PPV). However, the negative predictive value (NPV) was significantly higher for Trucut biopsy (86.67%) compared to FNAC (68.42%). **Conclusion:** Trucut biopsy offers superior diagnostic performance compared to FNAC, particularly in terms of sensitivity and negative predictive value. A combined, stepwise approach using FNAC followed by Trucut biopsy in equivocal cases ensures both efficiency and accuracy in the preoperative evaluation of breast lumps.

KEYWORDS

INTRODUCTION

Breast lump is one of the common complaints in surgical practice. The breast lumps have multiple factors affecting the aetiology and clinical presentation ranging from a simple cyst, benign tumour, and malignancy. All breast lesions are neither malignant nor all benign lesions progress to cancer; however, the diagnostic validity can be increased by combining various preoperative tests (like clinical examination, radio-diagnosis, fine-needle aspiration cytology, and TRUCUT biopsy). The methods for diagnosis of breast lumps should be accurate, quick, less invasive and affordable. These methods should distinguish between benign and malignant lumps in outpatient department (OPD). So that, patients are more compliant and surgeons can better decide about the definitive management.

Both FNAC and trucut biopsy are OPD procedures and do not require general anaesthesia, so they have replaced incisional and excisional biopsy in diagnosing a breast lump. FNAC is comparatively cheaper and quicker investigation but it fails to provide information regarding the hormone receptors, grade, histopathological type and immunohistochemistry which is essential for surgeons and oncologists to decide treatment. Trucut biopsy provides much more tissue for examination and provides information essential for deciding treatment.

The study is undertaken to compare the results of FNAC and Trucut biopsy with final histopathology.

Aims And Objectives

1. To analyse sensitivity, specificity, positive and negative predictive values of fine needle aspiration cytology as compared to postoperative histo-pathological report.
2. To analyse sensitivity, specificity, positive and negative predictive values of tru-cut biopsy as compared to postoperative histo-pathological report.

MATERIALAND METHODS

The study was undertaken after approval from Ethical committee & Institutional Review Board and obtaining informed written consent from the patients.

Place Of Study: -
Tertiary care centre, Department of General Surgery, RNT Medical College, Udaipur, Rajasthan

Study Type:
Hospital based study.

Study Design:
Observational study

Sample Size: 50 cases

Sample size is calculated using statistical software Epi info with 8% prevalence of disease, 87 % diagnostic accuracy and assuming 10% allowable error.

The study group consists of patients with clinically palpable breast lumps visiting the OPD and admitted in the General Surgery department.

Inclusion Criteria:
Patients Were Enrolled After They Provided Written Consent And Meet Eligibility Criteria As Follows-
All patients with clinically palpable breast lumps in the age group above the 16 years visiting the surgical OPD/IPD, giving consent for TRUCUT biopsy and FNAC pre -operatively and HPR post operatively.

Exclusion Criteria:
- Patients not consenting to be a part of this study.
- Patients below 16 years age.
- Patient with acute and tender breast lump like breast abscess.
- Patients who were on chemotherapy.

Data Collection:
A patient presenting with palpable breast lump is subjected to detailed clinical history with physical examination and the relevant information is entered in proforma. After obtaining informed and written consent from the patient, FNAC and trucut biopsy from the breast lump are performed after explaining the procedures to the patient. FNAC report, trucut biopsy report and postoperative histo-pathological report were collected and their findings compared.

The Statistical Data Was Analysed Using
Sensitivity = True Positive/ True Positive + False Negative x 100
Specificity = True Negative/ True Negative + False Positive x 100
Positive Predictive Value = True Positive/ True Positive + False Positive x 100
Negative Predictive Value = True Negative/ True Negative + False Negative x 100

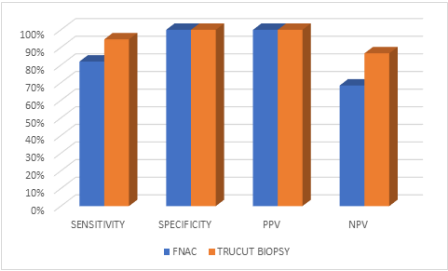
RESULTS

In our study of 50 patients with clinically palpable breast lumps, FNAC reported 38% benign, 54% malignant, and 8% suspicious results. Trucut biopsy, in contrast, reported 30% benign and 70% malignant cases, with no suspicious outcomes. Final histopathological examination confirmed 26% benign and 74% malignant lesions.

Table 1. Comparison of Sensitivity, Specificity, Positive Predictive

Value (PPV), Negative Predictive Value (NPV) and Diagnostic Accuracy of FNAC & Trucut Biopsy:

	Sensitivity	Specificity	PPV	NPV	Diagnostic accuracy
FNAC	83.78%	100%	100%	68.42%	88%
TRUCUT BIOPSY	94.59%	100%	100%	86.67%	96%



The above table and bar chart compare the diagnostic performance parameters of **FNAC** and **Trucut Biopsy** in detecting breast lesions, using histopathology as the gold standard.

- **Sensitivity** for Trucut Biopsy is **94.59%**, higher than FNAC's **83.78%**, indicating that Trucut Biopsy is better at correctly identifying malignant cases.
- **Specificity** and **Positive Predictive Value (PPV)** are both **100%** for both techniques, showing that neither method falsely diagnosed any benign cases as malignant.
- **Negative Predictive Value (NPV)** for Trucut Biopsy is **86.67%**, which is higher than FNAC's **68.42%**, meaning Trucut Biopsy is more reliable in ruling out malignancy when the result is benign.
- **Diagnostic Accuracy** for Trucut Biopsy is 96%, which is higher than FNAC's 88%, meaning that Trucut Biopsy provides a more reliable overall diagnosis and reduces the risk of false negatives compared to FNAC.

DISCUSSION

FNAC, being minimally invasive, rapid, and cost-effective, has long been employed as a first-line diagnostic tool for evaluating breast lumps. It provides cytological details based on cellular morphology. However, FNAC may fall short in terms of diagnostic accuracy due to its inability to assess tissue architecture, often leading to indeterminate or suspicious results. Trucut biopsy, on the other hand, offers a more comprehensive histological evaluation, capturing tissue architecture and allowing for more accurate subtyping and grading of tumors.

In our study of 50 patients with clinically palpable breast lumps, FNAC reported 38% benign, 54% malignant, and 8% suspicious results. Trucut biopsy, in contrast, reported 30% benign and 70% malignant cases, with no suspicious outcomes. Final histopathological examination confirmed 26% benign and 74% malignant lesions.

Diagnostic performance metrics showed that FNAC had a sensitivity of 83.78%, specificity of 100%, PPV of 100%, and NPV of 68.42%. Dalvi AV, Borse H[1] in their study observed that sensitivity, specificity, PPV and NPV of FNAC as compared to histopathology are 94.4%, 100%, 100%, 96% respectively. Rajan et al.[2] in their study observed that sensitivity, specificity, PPV and NPV of FNAC as compared to histopathology are 87.0%, 96.0%, 90.9%, 94.1% respectively.

Trucut biopsy outperformed FNAC with a sensitivity of 94.6%, specificity of 100%, PPV of 100%, and NPV of 86.67%. These findings underscore the superior diagnostic accuracy of Trucut biopsy, especially in ruling out malignancy. Dalvi AV, Borse H in their study observed that sensitivity, specificity, PPV and NPV of trucut biopsy as compared to histopathology are 93.5%, 98%, 95.6% and 97% respectively. Youk et al.[3] in their study showed TRUCUT biopsy is an accurate and reliable method to diagnose breast lumps, with sensitivity (96%) and compare well with those determined by surgical excision. Martins EC et al.[4] in their study observed the accuracy rate of TRUCUT biopsy as 95%. Smith DL et al.[5] observed concordance in 100% malignant cases. Crystal et al.[6] observed the sensitivity of TRUCUT biopsy for the diagnosis of breast cancer as 96.3%.

The 100% specificity and PPV observed in both FNAC and Trucut biopsy suggest that a positive result from either test is highly reliable for diagnosing malignancy. However, the lower NPV of FNAC indicates a higher chance of false negatives, which may delay treatment and adversely affect prognosis. This highlights the need for careful interpretation of FNAC results, especially in the context of high clinical suspicion.

Trucut biopsy provides tissue cores that retain the histological architecture, enabling more definitive diagnosis, grading, and even receptor status evaluation through immunohistochemistry. This capability is crucial in today's era of personalized medicine where treatment is increasingly tailored to tumor biology.

The 8% of FNAC cases that were labelled as suspicious in this study all turned out to be malignant on final HPE. This again reflects the limitation of FNAC in borderline cases and supports the practice of following up suspicious FNAC results with either a Trucut biopsy or excisional biopsy.

FNAC, despite its limitations, continues to serve as an effective preliminary diagnostic tool due to its simplicity, low cost, and speed. However, the limitations in sensitivity and NPV necessitate cautious interpretation of negative or suspicious results. In such scenarios, Trucut biopsy should be employed to ensure diagnostic accuracy. Its ability to provide more detailed histological information also aids in better surgical planning and therapeutic decisions.

The integration of imaging modalities such as ultrasound or mammography with FNAC and Trucut biopsy (i.e., triple assessment) has been shown to enhance diagnostic precision and is recommended when available.

The role of image-guided FNAC and Trucut biopsy should also be explored to reduce sampling errors and enhance diagnostic reliability.

CONCLUSION

Trucut biopsy was able to give histological diagnosis and results with diagnostic accuracy of 96% as compared to FNAC's accuracy of 88%. Trucut biopsy also gives further information about tumor type, grade, lympho vascular invasion and receptor status.

Trucut biopsy offers superior diagnostic performance compared to FNAC, particularly in terms of sensitivity and negative predictive value. Histopathological confirmation remains the gold standard and is essential for definitive diagnosis and treatment planning.

A combined, stepwise approach using FNAC followed by Trucut biopsy in equivocal cases ensures both efficiency and accuracy in the preoperative evaluation of breast lumps. The ultimate goal remains timely and accurate diagnosis to guide effective treatment and improve patient outcomes.

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