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PRECISION OF TRUCUT BIOPSY IN DETERMINING THE TYPE OF BREAST LESION

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ABSTRACT

Background
Breast lumps are one of the commonest complaints encountered in surgical OPD's. that makes it important to differentiate between benign and malignant conditions before treatment. Our study is an endeavour to find out the accuracy of Trucut biopsy for diagnosis breast lump compared to regular FNAC's.

Materials and methods
55 patients with palpable breast lumps were taken up for this study and subjected to Trucut biopsy and FNAC. Reports were compared with histopathology of the exised lump/mastectomy specimen.

Results: Percent positivity of malignant diagnosis on Trucut biopsy (B5) was 38.18% while that on FNAC (C5) was 25.45%. Thus Trucut biopsy detected 12.73% more malignant cases than FNAC. The suspicious rates for FNAC (C3&C4) expressed as a percentage of the total number of cases was 36.35% compared to the suspicious rate of Trucut biopsy (B3&B4) of just 1.81%. Percentage of benign cases diagnosed on FNAC (C2) was 34.54 while that on Trucut biopsy (B2) was 52.72. Thus there was a 18.18% increase in definitive benign diagnosis by Trucut biopsy over FNAC.

Conclusion: Trucut biopsy detected more breast carcinomas as compared FNAC with a sensitivity of 95.45% as opposed to 63.63%. Though both the techniques were equally specific, Trucut biopsy was able to correctly categorize borderline / inadequate lesions into definitely benign and malignant categories.

Key words: Trucut biopsy, FNAC, Breast lump.

INTRODUCTION:

Diseases involving the breast range from benign to malignant neoplasms, inflammatory conditions to infections, most of which present as lumps in the breast. Various diagnostic methods have been developed to evaluate the breast lumps with the goal of identifying a sensitive, specific and efficient approach to diagnose the exact breast pathology.

AIM AND OBJECTIVES:

1. To compare the sensitivity and specificity of FNAC and Trucut biopsy with histopathological examination of excised breast lump/mastectomy specimen.
2. To find the accuracy of Trucut biopsy and FNAC.
3. To decide the better procedure of the two.

MATERIAL AND METHODS:

STUDY TYPE: Prospective Study: conducted in the Department of General Surgery Acharya Shri Chander College of Medical Sciences and Hospital, Jammu over a period of one year.

STUDY GROUP: A total of 55 patients with clinically palpable breast lump/s were taken up for this study.
A detailed clinical history and examination was done using a standardized proforma.
INCLUSION CRITERIA: Patients with a positive clinical examination (palpable breast lump/nodularity) were subjected to simultaneous Trucut biopsy and FNAC by the same surgeon.

EXCLUSION CRITERIA:

Patients with inflammatory breast lesions.
Ulcerative or fungating growth.
Male patients were excluded from this study.

OBSERVATIONS:

A total of 55 patients with palpable breast lumps were subjected to simultaneous Trucut biopsy and FNAC in this study and histopathology was available for 50 cases.
The patients ranged in age from 16 to 76 years.
Lesions ranged in size from 2 to 12 cm grossly.
46 patients (83.63%) had a single lump in either breast.
9 patients (16.36%) had multiple lumps, out of which 8 patients had multiple lumps in a single breast while 1 patient had multiple lumps in both the breasts.
Trucut biopsy and FNAC diagnosis have been categorized as shown in Tables below.

Table I : Reporting Categories for FNAC and Trucut Biopsy:

Cytology reporting	**Trucut biopsy reporting**
C1 Unsatisfactory only	B1 Unsatisfactory/Normal tissue
C2 Benign	B2 Benign
C3 Atypia probably benign malignant	B3 Benign, but of uncertain Potential
C4 Suspicious of malignancy	B4 Suspicious of malignancy
C5 Malignant	B5 Malignant

Table II : Distribution of cases according to FNAC & Trucut biopsy diagnosis:

FNAC	Cases	%	Specific Cytology Diagnosis				Trucut biopsy	Cases	%
C1	2	3.63	-	-		-	B1	4	7.27
C2	19	34.54	FA(13)	BPT(3)	BBL(3)	SA(1)	B2	29	52.72
C3	17	30.90	PBD(10)	PBD-A(6)	LC-A(1)		B3	0	0
C4	3	5.45	SM(3)				B4	1	1.81
C5	14	25.45	DC(10)	LC(4)			B5	21	38.18
TOTAL	**55**	**100**						**55**	**100**

BBL: Benign breast lesion, FA: Fibroadenoma, BPT: Benign phyllodes tumor, PBD: Proliferative breast disease, PBD (A): Proliferative breast disease with atypia, LC-A: Low cellularity with atypia, SM: Suspicious for malignancy, DC: Duct carcinoma, LC: Lobular carcinoma, C1/B1: unsatisfactory, C2/B2: Benign, C3: atypia probably benign, B3: Benign, but of uncertain malignant potential, C4/B4: Suspicious for malignancy, C5/B5: Malignant.

Table III : Distribution of cases according to Trucut biopsy diagnosis- Category B2 & B5:

Diagnosis B2	No. of Cases	%	Diagnosis B5	No. of Cases	%
BBL	4	13.79	IDC	15	71.42
FA	13	44.82	ILC	5	23.8
FCC	5	17.24	MPT	1	4.76
LIPOMA	1	3.44	-	-	
BPT	3	10.34	-	-	
SA	1	3.44	-	-	
Duct Ectasia	1	3.44	-	-	
Chronic Mastitis	1	3.44	-	-	
TOTAL	**29**	**100**		**21**	**100**

BBL: Benign breast lesion, FCC: Fibrocystic change, SA: Sclerosing adenosis, FA: Fibroadenoma, BPT: Benign phyllodes tumor, IDC: Infiltrating duct carcinoma, ILC: Infiltrating lobular carcinoma, MPT: Malignant phyllodes tumor, B2: Benign, B5: Malignant.

Table IV : Comparative study of FNAC and Trucut biopsy:

FNAC	**Trucut biopsy**					
	B1	B2	B3	B4	B5	Total
C1		1			1	2(3.63%)
C2	2	16			1	19(34.54%)
C3	2	11		1	3	17(30.90%)
C4		1			2	3(5.45%)
C5					14	14(25.45%)
Total	**4(7.27%)**	**29(52.72%)**	**0**	**1(1.81%)**	**21(38.18%)**	**55(100%)**

\FNAC: Fine needle aspiration cytology, Trucut biopsy: Core needle biopsy, C1: unsatisfactory, C2: Benign, C3: atypia probably benign, C4: Suspicious of malignancy, C5: Malignant.

Table V: Statistical analysis for FNAC and Trucut biopsy:

FNAC	**Histopathology**		**Total**	**Trucut biopsy**	**Histopathology**		**Total**
	Malignant	Non-Malignant			Malignant	Non-Malignant	
Malignant	14	0	14	Malignant	21	0	21
Non-Malignant	8	28	36	Non-Malignant	1	28	29
Total	**22**	**28**	**50**	**Total**	**22**	**28**	**50**

FNAC: Fine needle aspiration cytology, Malignant : (C5/B5 category), Non-Malignant : (C1-C4/B1-B4 category).

RESULTS:

Trucut biopsy and histopathology of C1 (unsatisfactory) category of FNAC:

2 cases were unsatisfactory (C1) on FNAC.

Their Trucut biopsy and histopathology diagnoses were concordant (infiltrating duct carcinoma (IDC) and lipoma).

Trucut biopsy and histopathology of C2 (benign) category of FNAC:

19 cases were benign (C2) on FNAC.

Trucut biopsy was done in all cases while histopathology was available for 16 cases. Cytology-Trucut biopsy-Histopathology concordance was seen in 14 cases consisting of fibroadenoma (n=12) , benign phyllodes tumor (n=2) and benign breast lesion(n=1).

1 case was discordant and was diagnosed as benign phyllodes tumor (BPT) on FNAC but was given a diagnosis of malignant phyllodes tumor (MPT) on Trucut biopsy and histopathology.1case diagnosed as fibroadenoma on both FNAC and Trucut biopsy lost follow up.

The remaining two C2 cases showed unsatisfactory material (B1) on Trucut biopsy. Since the radiology/clinical examination was benign, no further intervention was done.

Trucut biopsy and histopathology of C3 (Atypia probably benign) category of FNAC:

17 cases were atypical (C3) on FNAC. Trucut biopsy was performed for all the 17 cases while histopathology was available for 15 cases. 8 cases were classified as benign on Trucut biopsy (B2) and histopathology.

These were diagnosed as Fibrocystic Change (FCC) (n=5), Sclerosing Adenosis (SA) (n=1), Benign Phyllodes Tumour (BPT) (n=1), lipoma (n=1). 1 case diagnosed as Benign Breast Lesion (BBL) on

Trucut biopsy turned out to be FCC on histopathology. 2 cases were given a malignant diagnoses of Infiltrating Ductal Carcinoma (IDC) on Trucut biopsy (B5) and histopathology.
1 case diagnosed as suspicious for malignancy (B4) on Trucut biopsy turned out to be malignant, IDC – Grade II on histopathology. 1 case diagnosed as low cellularity with atypia (LC-A) on FNAC turned out to be IDC on both Trucut biopsy & histopathology.
Out of 17 cases, 2 cases were placed in the B1 (unsatisfactory) category on Trucut biopsy. The subsequent histopathological diagnoses of both cases turned out to be FCC. 2 cases with a B2 Trucut biopsy diagnosis of chronic mastitis & duct ectasia with benign radiology were not excised for obvious reasons.

Trucut biopsy and histopathology of C4 (suspicious of malignancy) category of FNAC: 3 cases were suspicious (C4) on FNAC. Their Trucut biopsy and histopathology diagnoses were concordant in all the cases. One case was diagnosed as IDC, one case as infiltrating lobular carcinoma (ILC) and one case as benign phyllodes tumour.

Trucut biopsy and histopathology of C5 (malignant) category of FNAC: 14 cases were malignant (C5) on FNAC. Trucut biopsy and histopathology was available for all the cases. Cytology-Trucut biopsy-Histopathology concordance was seen in all cases consisting of IDC (n=10), ILC (n=4).
Statistical analysis of FNAC and Trucut biopsy was done using **Mc Nemar's** Chi square test (Table V). Cases for which final histopathology was available were analysed.
They were divided into malignant (C5&B5) and non-malignant (C1-C4 & B1-B4) categories for both FNAC and Trucut biopsy. Mc Nemar's Chi square for FNAC was 8, $p<0.05$, i.e. significant.
This indicates that there was a statistical difference between the diagnoses offered by histopathology and FNAC, which was also reflected by the false negative rate of FNAC of 36.36%.
McNemar's Chi square for Trucut biopsy was 1.00, $p=0.3173$, i.e. not significant.
This indicates that there was no statistical difference between the diagnoses offered by histopathology and Trucut biopsy, which was also reflected by the false negative rate of Trucut biopsy of 4.54% and no false positive results.
The sensitivity and specificity for FNAC was 63.63% and 100% respectively while that for Trucut biopsy was 95.45% and 100% respectively.
Positive predictive value (PPV) and negative predictive value (NPV) for FNAC was 100% and 77.77% respectively while the respective values for Trucut biopsy were 100% and 96.55% in this study.

DISCUSSION:

Studies regarding the comparison of Trucut biopsy and FNAC in palpable breast lumps within the same patient population are relatively scarce whereas those of screen-detected breast lesions are plenty.
We therefore decided to test the utility of Trucut biopsy as compared to FNAC in palpable breast lumps.

Many surgeons are reluctant to accept the cytological report as the only criterion for performing definitive surgery since no distinction is possible between infiltrating and non infiltrating lesions and also because certain cases of clinically apparent malignancy require preoperative chemotherapy based on estrogen and progesterone receptor (ER and PR) and c-erb-B2 status.

Percutaneous core needle biopsy (Trucut biopsy) is an accurate test for sampling breast lesions and is therefore increasingly replacing fine needle aspiration cytology (FNAC) in breast diagnosis.
The sensitivity of FNAC in detecting malignancy was 63.63% in this study, which is similar to other studies. The specificity and positive predictive value of FNAC was found to be 100% i.e., the

cases that were assigned to C5 (malignant) category in fact proved to be malignant on subsequent histopathology which is comparable with other studies.

However, a significant number of cases (eight) were missed/ under diagnosed on FNAC in this study, which is reflected by the false negative rate of FNAC of 36.36% and a negative predictive value of 77.77%. They were placed in C1 (1 case), C2 (1 case), C3 (4 cases) and C4 (2 cases) categories.

The cases that were placed in C1 and C2 categories and were later found out to be malignant on Trucut biopsy were missed on FNAC due to sampling error. **Garg S et al (2007)** found that the sensitivity and specificity of FNAC for malignant diagnosis was 78.15% and 94.44% respectively and of Trucut biopsy was 96.5% and 100% respectively.

But Trucut biopsy had a slightly higher specimen inadequacy rate (8%). Trucut biopsy improved diagnostic categorization over FNAC by 18%. Tumor grading in cases of IDC showed high concordance rate between Trucut biopsy and subsequent excision biopsy (94.44%) but low concordance rate between Trucut biopsy and FNAC (59.1%).

Trucut biopsy is superior to FNAC in the diagnosis of breast lesions in terms of sensitivity, specificity, correct histological categorization of the lesions as well as tumor grading.

In a study by **Homesh NA et al(2005)** it was reported that FNAC sensitivity was 66.66%, 81.8% specificity, 75.7% accuracy, positive predictive value (PPV) 100% and negative predictive value (NPV) 90%, while in core needle breast biopsy sensitivity was 92.3%, 94.8% specificity, 93.4% accuracy, PPV 100% and NPV 100%.

The diagnostic accuracy of CNB was higher than the FNAC, which was statistically significant ($p<0.05$).

In this study, one case, that of malignant phyllodes tumor, deserves special mention as it was diagnosed as benign phyllodes tumor on FNAC whereas the malignant change was picked up by Trucut biopsy.

As stated by **Jacklin et al (2006),** the accuracy of FNAC in the diagnosis of phyllodes tumor of the breast depends on an adequate and representative sample.

Sampling problems can arise in phyllodes tumors because of the heterogeneous nature of these tumors which means that the sampling should be thorough to minimize the risk of sampling error, both with FNAC and Trucut biopsy.

Trucut biopsy was able to correctly categorize C3 and C4 cases into either benign or malignant categories. B3 category had no case as compared to the C3 category of FNAC that had 17 cases.

This implies that the lesions diagnosed as C3 or C4 on FNAC should be confirmed by a biopsy.

In a study done by **Shannon J et al (2001)** who concluded that conversion to core biopsy for the preoperative diagnosis of breast lesions increases specificity and reduces inadequate and suspicious rates.

Besides, none of the cases placed in the B2 category were found out to be malignant on FNAC/histopathology, also none of the B4 cases had a malignant FNAC diagnosis. Thus FNAC was unable to improve upon any of the diagnoses offered by Trucut biopsy in any of the categories. On the contrary, Trucut biopsy improved the preoperative diagnosis more often than did FNAC. In a study done by **Kooistra B et al (2009)**, it was found that Trucut biopsy improved the preoperative diagnosis more often than did repeat FNAC (78.0% vs. 54.8%, odds ratio = 2.9, $P < .001$).

When corrected for patient age, appearance on mammogram (mass or not), clinical findings (palpable or not), tumor size, and aspiration mode (freehand vs. image guided), this difference slightly increased (odds ratio = 3.0, $P = .001$). It was concluded that Trucut biopsy should be performed after an indeterminate FNAC of a breast lesion to obtain a reliable and clear preoperative diagnosis.

In a study done by **Gargi TIKKU and Pradeep UMAP (2015)**, it was concluded that core needle biopsy detected more breast carcinomas as compared to fine needle aspiration cytology with a sensitivity 95.83% as opposed to 64.58%.

Our study reflected in the statistical analysis using Mc Nemars Chi-square test that there was a concordance between the diagnoses offered by Trucut biopsy and histopathology, whereas any discordance between FNAC and histopathology diagnoses was quite apparent.
The inadequate rate (B1) of Trucut biopsy in this study was 7.27%. This inadequate rate was slightly higher than that seen in the studies of **Shannon J et al (2001)** and **Poon and Kocjan (2008)** who reported an inadequate rate of 5% and 2.3% respectively. Comparing the inadequate rates of Trucut biopsy and FNAC by **Pearson's** Chi square test (p=0.122) showed no statistical difference between Trucut biopsy and FNAC as far as the number of reported inadequate cases were concerned.

CONCLUSION:

Percent positivity of malignant diagnosis on Trucut biopsy (B5) was 38.18% while that on FNAC (C5) was 25.45%. Thus Trucut biopsy detected 12.73% more malignant cases than FNAC.
The suspicious rates for FNAC (C3&C4) expressed as a percentage of the total number of cases was 36.35% compared to the suspicious rate of Trucut biopsy (B3&B4) of just 1.81%.
Percentage of benign cases diagnosed on FNAC (C2) was 34.54 while that on Trucut biopsy (B2) was 52.72. Thus there was a 18.18% increase in definitive benign diagnosis by Trucut biopsy over FNAC.
Thus we conclude that Trucut biopsy detects more breast carcinomas as compared to FNAC in palpable breast lumps and correctly categorizes borderline / inadequate breast lumps on FNAC into benign & malignant categories.
This reduces indeterminate results and treatment delays and can therefore be used as an alternative to open biopsy.

REFERENCES:

1. Garg S, Mohan H, Bal A, Attri AK, Kochhar S. A Comparative analysis of core needle biopsy and fine-needle aspiration cytology in the evaluation of palpable and mammographically detected suspicious breast lesions. Diagn Cytopathol. 2007;35:681-9.
2. Homesh NA, Issa MA, El-Sofiani HA.The diagnostic accuracy of Fine Needle Aspiration Cytology versus core needle biopsy for palpable breast lump(s).Saudi Med J.2005 Jan;26(1):42-6.
3. Hukkinen K, Kivisaari L, Heikkilä PS, Von Smitten K, Leidenius M. Unsuccessful preoperative biopsies, fine needle aspiration cytology or core needle biopsy, lead to increased costs in the diagnostic workup in breast cancer. Acta Oncol. 2008;47:1037-45.
4. Jacklin RK, Ridgway PF, Ziprin P, Healy V, Hadjiminas D, Darzi A. Optimising preoperative diagnosis in phyllodes tumour of the breast. J Clin Pathol. 2006;59:454-9.
5. Kocjan G. Needle aspiration cytology of the breast: Current perspective on the role in diagnosis and management. Acta Med Croatica. 2008;62:391-401.
6. Kooistra B, Wauters C, Strobbe L et al.Preoperative cytological and histological diagnosis of breast lesions: A critical review.Eur J Surg Oncol.2010 Oct;36(10):934-40.
7. Poole G H. Diagnosis of breast cancer with core-biopsy and Fine Needle Aspiration Cytology. Australian and New Zealand Journal of Surgery 1996 Sep Vol.66 Issue 9:592-594.
8. Poon C, Kocjan G. O-6 respective roles of fine needle aspiration cytology and core biopsy in diagnosis of symptomatic breast lesions. Cytopathology. 2006;17:17.
9. S M Willems, C H M van Deurzen, P J van Diest. Diagnosis of breast lesions: fine-needle aspiration cytology or core needle biopsy? A review. Group.bmj.com 2011Oct29.
10. Shannon J, Douglas-Jones AG, Dallimore NS. Conversion to core biopsy in preoperative diagnosis of breast lesions: Is it justified by results? J Clin Pathol. 2001;54:762-5.
11. Willems SM, van Deurzen CH, van Diest PJ. Diagnosis of breast lesions: Fine needle aspiration cytology or core needle biopsy? A review. J Clin Pathol. 2012;65:287-92.
12. Kline TS, Kline IK, Howell LP. Guides to Clinical Aspiration Biopsy Breast. Philadelphia: Lippincott Williams & Wilkins Publishers, 1999.