

Usefulness of Tru-Cut biopsy in the diagnosis of breast lesions

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Abstract

Introduction: Breast cancer is the most common malignant lesion in women. Tru-cut biopsy (TCB) is an accurate, reliable and a safe method of establishing the diagnosis in patients with breast lesions.

Aim: The study was undertaken to assess the diagnostic accuracy of TCB in breast lesions.

Material and Methods: A histopathological study was carried out on fifty-five patients who had undergone TCB of breast masses at Sheth L.G. General Hospital, AMC MET Medical College, Ahmedabad, Gujarat, India, from June- 2016 to May- 2018. The lesions were categorized & exact diagnosis was rendered whenever possible. Comparative statistical analysis was made between TCB specimens & post operative histopathology specimens whenever available.

Results: Total 55 TCB cases were studied; of which 32 were benign and 15 were malignant. One case fell into atypical / indeterminate category & two cases fell in suspicious malignant category. Five TCBs were inadequate for reporting. Amongst the benign category, fibroadenoma & amongst the malignant category, invasive ductal carcinoma, not otherwise specified type were the predominant lesions. In malignant lesions gradation, 85.7% agreement was found between TCB & post operative histopathology specimens. The sensitivity, specificity, positive predictive value (PPV), negative predictive value (NPV) & accuracy of TCBs were 83.3%, 100%, 100%, 91.4% and 94%, respectively.

Conclusion: TCB can be used as the initial investigation of choice for pre-operative diagnosis of breast lesions since it provides a sufficient amount of tissue to make an accurate histopathological diagnosis. Tumor type & grade are highly correlated with post surgical specimen reports.

Keywords: Breast lesions, Benign, Malignant, Tru cut biopsy, Histopathology.

Introduction

Breast cancer is the most common type of cancer in Indian females.¹ The advent of core needle or tru-cut biopsy (TCB) has resulted many surgeons switching to TCB since it provides a sufficient amount of tissue for the pathologists to make an accurate histopathological diagnosis. It is now becoming the initial investigation of choice for the pre-operative diagnosis of breast lesions.² TCB can provide all the necessary details to guide both the surgeon and the oncologist in designing an appropriate therapeutic strategy for management of patients with breast masses.³ This study was aimed at evaluating the diagnostic accuracy of TCB in the breast lesions.

Material and Methods

A prospective histopathological study was carried out on a total 55 patients who had undergone TCB of breast masses for a study period of two years; from June- 2016 to May- 2018 at Sheth L.G. General Hospital, AMC MET Medical College. Relevant clinical & imaging findings were noted. The core needle biopsy specimens received in histopathology laboratory were examined grossly & fixed in formalin. They were

processed by routine paraffin embedding method & stained by Hematoxylin and Eosin (H & E) stain. Microscopic examination was done & each case was categorized as per the criteria laid down by the National Breast Cancer Centre 2004.⁴ The specific diagnosis was rendered as far as it was possible. The invasive ductal carcinoma was graded as per Nottingham modification of Bloom-Richardson system. The histopathological reports of TCB specimens were compared with the histopathological reports of follow up surgical procedures like lumpectomy, radical mastectomy etc; whenever available. Statistical analysis was done using standard statistical analyser.⁵ The research was approved by the Institutional Review Board (IRB).

Results

The age range of patients studied for TCBs of breast masses ranged from 16-76 years with median age being 46 years.

Table-1 depicts the categories and specific diagnoses rendered in the study.

Comparative analysis of TCBs and postsurgical histopathology results was shown in table-2.

Table 1: Histopathological categories & specific diagnoses reported on TCB

Category	No of cases, n=55(100%)	Specific diagnosis	No of cases n (%)	
1. Inadequate/ Inconclusive	5 (9.1%)	-	-	
2. Benign	32 (58.2%)	Fibroadenoma	20 (40%)	
		Fibrocystic disease	06 (12%)	
		Inflammatory lesions	Duct ectasia (n=1)	05 (10%)
			Acute mastitis (n=2)	
			Granulomatous mastitis(n=2)	
Phylloides tumour	01 (2%)			
3. Atypical/ Indeterminate	01 (1.8%)	Possibility of Sclerosingadenosis	01 (2%)	
4. Suspicious of malignancy	02 (3.6%)	Suspicious of Ductal carcinoma in situ(DCIS)	01 (2%)	
		Atypical ductal epithelial hyperplasia	01 (2%)	
5. Malignant	15 (27.3%)	Invasive ductal carcinoma,not otherwise specified type (IDC,NOS type)	14 (28%)	
		Mucinous carcinoma	01 (2%)	

Table 2: Comparative analysis of TCBs and postsurgical histopathology results

TCB		Histopathological study of post surgical specimens		TP	TN	FP	FN
Category	Number of cases	Benign	Malignant				
1. Inadequate/ Inconclusive	5	-	-	-	-	-	-
2. Benign	32	31	1	00	31	00	01
3. Atypical/ Indeterminate	1	1	-	00	01	00	00
4. Suspicious of malignancy	2	-	2	00	00	00	02
5. Malignant	15	-	15	15	00	00	00
Total	55	32	18	15 (30%)	32 (64%)	00 (00%)	03 (6%)

(TP= True positive, TN= True negative, FP= False positive, FN = False negative)

For comparison purpose, 5 cases of Inadequate/ Inconclusive category were excluded & so the correlation was obtained in 50 cases out of total 55 TCB specimens.

Table-2 shows that, all 15 malignantly categorized cases were diagnosed as malignant lesions in the post surgery histopathology. Amongst 32 benign category cases, 31 were proved to be benign; while one case of acute mastitis was proved to be malignant on subsequent excision specimen report. One case of atypical/ indeterminate category was proved to be benign. Two cases which fell in suspicious malignant category were proved to be malignant.

From these observations, the sensitivity, specificity, PPV, NPV & accuracy of Tru cut biopsy calculated were 83.3%, 100%, 100%, 91.4% & 94%, respectively.

In each 14 cases of invasive ductal carcinomas, not otherwise specified type (IDC, NOS type), histopathological grade was given by Nottingham modification of Bloom-Richardson system & was

compared with the grade given in post surgical specimen reports (Table-3). Mucinous carcinoma was not graded as it is a good prognostic variant of breast carcinoma.

Table 3: Correlation of tumour grade between TCBs & post-surgical specimens

Tumour Grade on TCB (n=14)	Tumour grade on post surgical specimens (n=14)		
	Grade-1	Grade-2	Grade-3
Grade 1	00	-	-
Grade 2	10	00	08
Grade 3	04	00	04

There was 85.7% agreement with respect to tumour grade between core biopsy & post surgical specimen reports. Only 80% of grade 2 carcinomas showed concordance, but 100% of grade 3 tumors showed agreement between core and excision results.

Tumour type showed 94% correlation between TCB & post surgery specimens.

Discussion

Many studies have confirmed the usefulness of core biopsy for diagnosis of breast cancer. In the present study, 5 cases were fallen in inadequate/ inconclusive category. This was mainly due to not obtaining of breast parenchymal cells and obtaining only fibroadiposestroma in received specimens. Out of total 32 benign cases, one case of acute mastitis was later on proved to be malignant. This might be due to sampling error. Cases of categories 3 & 4 are considered in grey zone as they may pose problem & they frequently give false results. In our study, one case reported as atypical/ indeterminate category (category-3) was due to sclerosing adenosis like morphology. However, due to limited sampling it was not possible to render confirmed benign diagnosis on TCB. This case finally proved to be sclerosing adenosis in final excision specimen. In this study, two cases fell into suspicious malignant category (Category-4) on TCB, were proved to be IDC in post surgical specimens. Again, due to limited sampling they were diagnosed as suspicious malignant lesions on TCBs. All 15 malignant categorized lesions (Category-5) were diagnosed as malignant lesions.

Thus, limited sampling is the principal cause of false results on TCBs. Sometimes, crushing artefacts may also pose problem in reporting TCBs as they distort the cell morphology.

Table 4: Comparison of sensitivity & specificity of TCBs in different studies

Study	Sensitivity	Specificity
Lacambra et al ⁶	96%	99%
Ahmed et al ⁷	94.64%	91.3%
Bdour et al ⁸	97%	100%
Brunner et al ⁹	95%	100%
Kulkarni et al ¹⁰	97.7%	94.2%
Homesh et al ¹¹	92.3%	94.8%
Rikabi and Hussain ¹²	95.1%	100%
Present study	83.3%	100%

In most of the studies including ours, specificity is higher as compared to sensitivity (Table-4). This suggests that, the rate of true negative results is high with low false positive results. In our study, 85.7% agreement was found with respect to tumour grade of invasive ductal carcinomas between TCBs & post surgical specimen reports (Table-3). Gavin C. Harris et al noted 67% agreement with respect to tumour grade.¹³ In the present study, Grade 1 carcinomas were not found in both TCB and post-surgical specimens. The concordance rate observed for Grade 2 & Grade-3 carcinomas were 80% of and 100% respectively

between TCBs & final excision specimen reports (Table-3). In the study of Gavin C. Harris et al, only 60% of grade-1 & grade-2 carcinomas showed concordance; while 84% of grade-3 carcinomas showed agreement between the core & excision results.¹³

These findings correlate well with our results of obtaining higher agreement in grade-3 carcinomas with respect to tumour grade between TCBs & final excision biopsy results.

The ideal approach for women with suspicious breast lump is the triple assessment approach including; clinical, cytology, and mammography. But this assessment is not sufficient for decision of treatment because cytology reveals only the cellular features of the tissue & it still has percentage of uncertainty regarding histopathological type & grade of tumours. Tru cut biopsy shows the whole architecture of the tissue; which facilitates tumour grading & specific typing; all of these are of great importance for correct preoperative evaluation.

Conclusion

TCB is an accurate, reliable and a safe method of establishing the diagnosis in patients with breast lesions. The tumor type & grade obtained by TCBs are highly correlated with subsequent post surgical histopathology reports. Thus, TCB is of great value in preoperative diagnosis of breast cancers. In spite of few limitations like tissue inadequacy or non-representative samples and crushing artifacts; TCB proves to be an essential part of management for palpable breast lesions which can guide both the surgeons and oncologists.

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