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Unusual Variants of Renal Cell Carcinoma-An Institutional Study

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Abstract
Background: Renal cell carcinoma is the most common form of kidney cancer. About 90% of all kidney cancer is attributed to Renal cell carcinoma (RCC). Till near past, RCC was considered as single malignant tumor without any distinguishable morphological characters. But now many variants of RCC have been identified according to cellular characters and arrangement of cancer cells when viewed under microscope. They are different in histomorphologic cytogenetics and molecular features and also in clinical course. The most common type of RCC is clear cell or conventional type which attributes to 72% to 80% of all RCC.
Methods and Results: The present study was carried over a period of 2 years i.e. from 01.09.2014 to 30.08.2016 in Hitech Medical College and Hospital, Bhubaneswar. Unusual variants of RCC which was histomorphologically diagnosed in our Pathology Department was confirmed by Immunohistochemistry. Out of 24 total cases of RCC studied during the above period, the most frequent type is clearcell variant i.e. 18(75%). There were 2(8.3%) cases of RCC mixed with cromophobe cells and 1(4.16%) case each of collecting duct RCC, Highgrade urothelial RCC and Sarcomatoid RCC.
Conclusion: Recognition of variants of RCC is important for patient management in clinical course, prognosis and also in treatment protocol.
Keywords: Renal cell carcinoma, Sarcomatoid, collecting duct, urothelial, chromophobe, papillary

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I. Introduction

Cancer of the kidney amounts to 2% of the total human cancer burden, with approximately 190,000 cases diagnosed each year[1]. Renal cell carcinoma is a group of malignancies arising from the epithelium of the renal tubules[1]. Renal cell carcinoma (RCC) is a tumour of adults with an average age of diagnoses 55 to 60 years[2]. The male to female ratio of adult renal cell carcinoma ia about 2:1 and the incidence of bilaterality is 1%[2]. The classic triad of presenting symptoms are hematuria, pain and flank mass, but nearly 40% of patients lack all of these and present with systemic symptoms, including weight loss, abdominal pain, anorexia and fever[1]. There are several known histologic subtypes of this heterogenous tumour entity with associated distinct molecular alterations and different clinical outcomes[3]. The clear cell renal cell carcinoma is the most common and constitues 70-80% of all renal cancers[4]. Papillary carcinomas account for 10% to 15% of renal cancers[5]. Chromophobe carcinomas represent 5% , collecting duct (Bellini duct) carcinoma represents 1% or less of renal epithelial neoplasms[5]. Approximately 5% to 10% of primary renal tumours originate from the urothelium of the renal pelvis, which range from apparently benign papillomas to invasive urothelial (transitional cell) carcinomas[5]. Sarcomatoid renal cell carcinoma makes up about 1% of all renal tumours in adults[6]. Renal cell carcinoma with rhabdoid features is rarely being reported[7]. It is estimated that more than 30% of patients with RCC have metastatic disease at the time of diagnosis and 30% of organ-confined RCCs will develop metastatic disease after local treatment[8]. Thus, RCC remains a very major challenge. The aim of this study was to present our data of renal cell carcinoma variants and highlight the importance of correct diagnosis as each types carries its individual prognostic value.

II. Methods

The present study was carried out in the Post Graduate Department of Pathology, Hi-Tech Medical College and Hospital, Bhubaneswar, for a period of 2 years from September 2014 to August 2016. All nephrectomy specimens received in histopathology section were grossed after proper measurement. Four sections were taken from the tumour proper, one section of renal capsule and Gerota's fascia and one each from renal vein and ureteric resection margin. Sections from renal parenchyma and from pelvis were also submitted. Each specimen was thoroughly searched for lymphnode or associated abnormality. After processing, blocks were made and 3 to 4 sections of 3-5 micron thickness were cut from each block. All sections were stained with H&E stain and were examined under microscope for detailed histomorphological features. Prognostic parameters like tumor size, furhman nuclear grade, vascular or lymphatic involvement, tumor extension to capsule or surrounding fatty tissue or ureteric resection margin were correlated and tumor stage was recorded. Special stains like PAS stain were done when required. Immunohistochemistry(IHC) for the unusual variants were done for confirmation of the renal cell carcinoma variant.

III. Observation

During the study period, 24 cases of RCC were diagnosed. It ranged from 25 years to 68 years (mean 46 years). Out of 24 cases, 23(95.9%) were male patients and one female patient (4.1%). Out of 24 cases of RCC diagnosed, clear cell variant was most frequent ie 18(75%). There were two cases (8.33%) of RCC mixed with chromophobe cells. One sarcomatoid RCC (4.16%) grade IV was diagnosed on H&E which was later confirmed by IHC- cytokeratin and vimentin. One case was showing rhabdoid features(4.16%). One was diagnosed as carcinoma of collecting ducts of Bellini(4.16%) associated with nephrolithiasis and diagnosis was confirmed by PAS positivity and positive reaction for PAX 8. There was one case of high-grade urothelial carcinoma of renal pelvis(4.16%). Ureteric resection margin, renal vien, gerota's facsial margins were free from tumor extensions in 19 cases (79%). In collecting duct carcinoma, tumor extended to capsule and in sarcomatoid variant, tumor extended to surrounding fatty tissue. Thorough examination of H&E and PAS stain were diagnostic in most of the cases, but in collecting duct carcinoma cytokeratin and PAX8 were employed showing CK19 negativity and PAX8 positivity confirmimg the variant. In sarcomatoid variant, both vimentin and cytokeratin cocktail positivity were obtained.

IV. Discussion

The incidence of clear cell RCC is 75% in the present study i.e. the most common variant Renal cell carcinoma which correlated with all other previous studies on RCC[8,9]. The chromophobe variant is 8.3% in our study which is slightly higher when compared with other authors. But as other variant like Carcinoma of collecting duct, Urothelial RCC and Sarcomatoid variants are considered, the incidence is much higher when correlated with the incidence mentioned in WHO classification 2004 and with other studies. This may be due to the small sample size in the present study.

V. Conclusion

Years ago, our knowledge about RCC was limited and it was considered as a single disease. Now we know the variants of RCC according to their morphological, immunohistochemical and molecular characters and clinical properties. Different sub types have different clinical outcomes and show different response to therapy. So recognition of these rare variants is essential. In the present study, the case size is small and so the results have limited value. Follow up was not possible in most cases. Study in large scale with proper follow up data will show more light on clinical properties and biological behaviour so that different therapeutic protocol will be made in future as different variants respond differently to therapy.

Declarations
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Conflict of interest: none

References

[1]. Eble J.N., Sauter G., Epstein J.I., Sesterhenn I.A. (Eds.): World Health Organization
[2]. Classification of Tumours. Pathology and Genetics of Tumours of the Urinary System
[3]. and Male Genital Organs. IARC Press: Lyon 2004
[4]. Cohen HT, McGovern FJ. Renal cell carcinoma. N Eng J med 2005;353:2477-2490
[5]. Amen MB, Tamboli P, Javidan J, et al. Prognostic impact of histologic subtyping of adult renal epithelial neoplasms: an experience of 405 cases. Am J Surg Pathol 2002;26:281-91
[6]. Moch H, Gasser T, Amin MB, Torhorst J, Sauter G, Mihatsch MJ. Prognostic utility of the recently recommended histologic classification and revised TNM staging system of renal cell carcinoma: a Swiss experience with 588 tumors. Cancer 2000; 89:604-14
[7]. Algaba F, Akaza H, Lopez Beltran A, et al: Current pathology keys of renal cell carcinoma. Eur Urol 60:634-43,2011.

[8]. Tomera KM, Farrow GM, Lieber MM. Sarcomatoid renal carcinoma. J Urol 1983; 130:657-659.
[9]. Gokden N, Nappi O, Swanson PE, Pfeifer JD, Vollmer RT, Wick MR, Humphrey PA. Renal cell carcinoma with rhabdoid features. Am J Surg Pathol 2000; 24:1329-1338.
[10]. 8.Storkel S, Eble Jn, Adlakha K, Amin M, Blute Ml, Bostwick Dg, Davison M, Delahunt B, Iczkowski .Classification of Renal cell carcinoma. Cancer 1997; 80:987
[11]. 9.Srigley Jr, Eble Jn. Collecting duct carcinoma of kidney. Semin Diagn Pathol 1992; 15:54-67.

Fig.1 showing nephrectomy specimen with an impacted stone(arrow) in collecting duct carcinoma

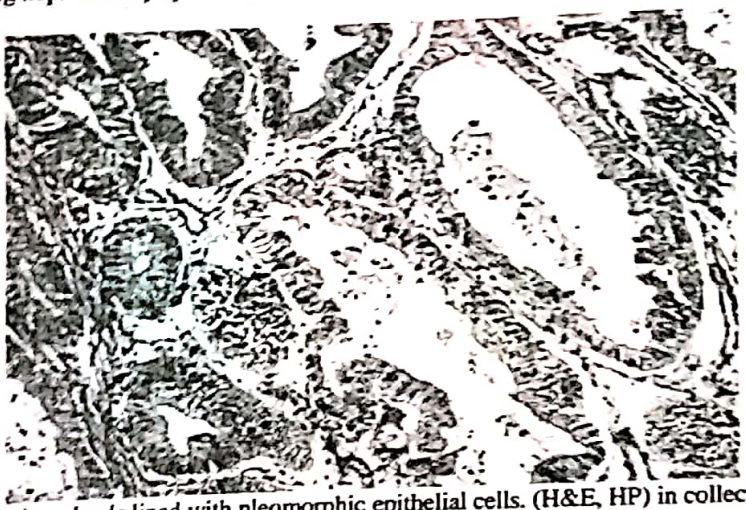

Fig.2 showing glands lined with pleomorphic epithelial cells. (H&E, HP) in collecting duct

Fig 3 collecting duct carcinoma showing PAS stain positivity

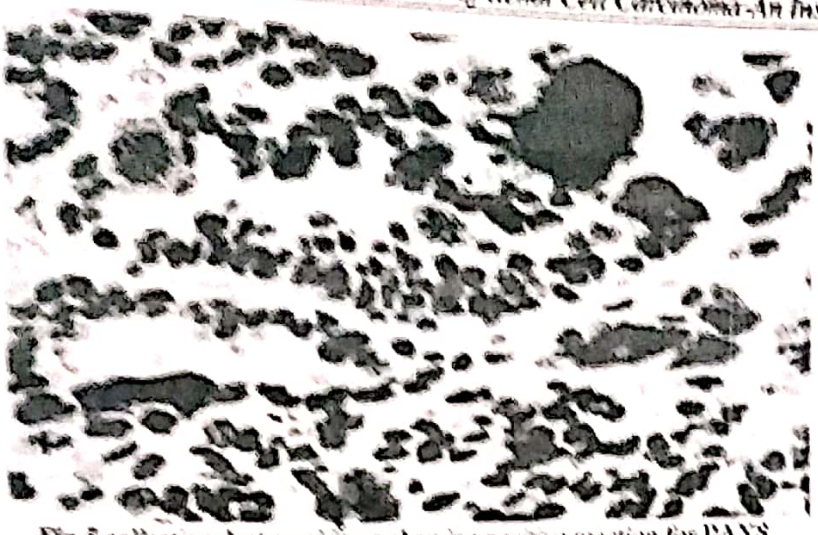

Fig 5 collecting duct carcinoma showing positive reaction for PAS.

Fig 6 sarcomatoid variant RCC (H&E, LP)

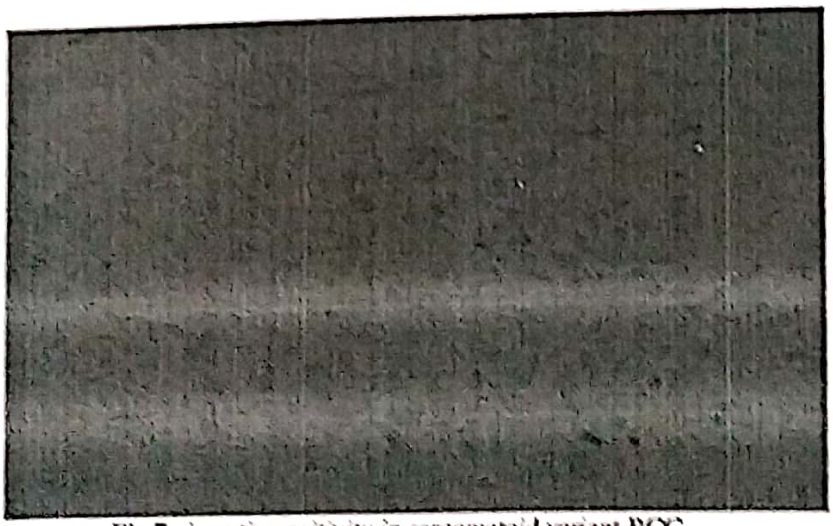

Fig 7 vimentin positivity in sarcomatoid variant RCC

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Diagnostic Utility of FNAC in breast lesions and its correlation with histopathology

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Abstract

Background- *A palpable breast lump is a common diagnostic problem to both general practitioners and surgeons. FNAC is a valuable tool and it's advantage is to provide rapid accurate diagnosis, cost-effective, excellent patient acceptance and minimal or no morbidity. Based on the result of FNAC, further treatment can be plannned in most cases without proceeding for biopsy.*

Aim- *Evaluate FNAC in different type of breast lesions and to compare the result with histomorphological study in the available follow-up and assess the accuracy of FNAC of breast.*

Material And Methods- *The present study was conducted in Pathology Department of Hi-Tech Medical College from August 2014 to July 2017. During the study period, 382 patients who presented with palpable breast lump were included in the study and FNAC was performed. A total of 200 cases were followed up for histoppathology.*

Result- *FNAC of 305 benign and 77 malignant cases were studied. Fibroadenoma followed by fibrocystic disease were most common in benign breast lesions and invasive ductal carcinoma, NOS was most common among malignant breast lesions. Cyto-histological correlation was done in 200 cases: 129 benign and 77 malignant of which 2 benign cases were found to be false negative. Accuracy was found to be 99.02%. A detailed comparative analyses with other authors' study was done.*

Conclusion- *FNAC plays a main role to provide rapid and accurate diagnosis in OPD itself so that definite management decisions can be made straightaway. Diagnostic errors with subsequent inappropriate clinical decisions can be best avoided if clinician use the Triple diagnostic procedure of clinical examination, mammography and FNAC which increase the accuracy for diagnosis of breast carcinomas.*

Keywords- *Breast, FNAC.*

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I. Introduction

Fine needle aspiration (FNA) biopsy of breast was first used in the 1930s by Martin & Ellis and by Stewart at Memorial Hospital [1,2,3], followed in the late 1940s and early 1950s by Adair & Goldwin[4,5]. A palpable breast lump is a common diagnostic problem to both general practitioners and surgeons[6]. FNAC is a valuable tool and can be used to evaluate all palpable and nonpalpable mammographically evident breast lesions[7].

The advantage of FNAC is to provide rapid accurate diagnosis, cost-effective, excellent patient acceptance and minimal or no morbidity[8]. FNAC of breast have average sensitivity of 87% (range of 72-99%), specificity of 98-100%, negative predictive value of 87-99%, and the efficiency of 89-98% [9,10]. False positive rates in the literature are reported to approximately 4%[10]. The combination of palpation, mammography and FNAC (Triple test) has been found to considerably increase the diagnostic accuracy in the breast lesion [11].

The present study is to evaluate the FNAC in different type of breast lesions and to compare the result with histomorphological study in the available follow-up and assess the accuracy of FNAC of breast.

II. Material And Methods

The present study was conducted in Pathology Department of Hi-Tech Medical College from August 2014 to July 2017. During the study period, 382 FNAC were performed from 366 females and 16 males. FNA was carried out using 10cc syringe and 23 gauge needle from proper site under manual guidance and aseptic precautions without local anaesthesia. Smears were immediately wet fixed for Pap and H&E and air dried for Diff Quick and then stained.

Among 382 cases subjected to FNAC, 206 were followed for biopsy. In histolopathology, gross findings were noted and multiple serial sections were taken for processing, blocks made and 4-5 µm thick sections were cut and stained with H&E stain. Selective cases were subjected to immunohistochemistry when required to confirm the diagnosis.

III. Observations And Result

Out of 382 cases subjected to FNAC, 305 were reported as benign breast lesions and 77 as carcinomas of breast. Among the 305 benign breast lesions, fibroadenomas account for 137 cases, 81 fibrocystic disease, 8 galactocele, 6 granulomatous lesion, 3 benign phyllodes, 9 ductal hyperplasia, 6 acute nonspecific mastitis, 4 fat necrosis, 2 epidermal cyst, 16 breast abscesses, 16 gynecomastia and benign breast lesions without a specific diagnosis in 16 cases. Among the 77 malignant breast lesions, ductal carcinomas accounted for 71 cases, 4 lobular carcinomas and 2 metaplastic carcinoma.

Out of 305 benign breast lesions, biopsy was done in 129 cases and all malignant lesions were biopsied. The cyto- histological correlation of benign and malignant lesion are depicted in Tables 1,2 and 3.

	Histology						
Cytology	Fibroade -noma	Fibrocystic Disease	Granulo -matous	Phyllodes	Duct papilloma	Gynaeco -mastia	Total
Fibroadenoma	84	2					86
Fibrocystic disease	2	24					26
Granulomatous disease			4				4
Benign phyllodes				3			3
Benign breast lesion		2	1		1		4
Gynecomastia						4	4
Total	86	28	5	3	1	4	127

Table 1 Cyto-histological correlation of benign lesion

	Histology							
Cytology	Invasive Ductal Ca NOS	Tubular Ca	Medullary Ca	Mucinous Ca	Lobular Ca	Tubulo-Lobular Ca	Meta -plastic Ca	Total
Ductal Ca	67	2	1	1				71
Lobular Ca					3	1		4
Metaplastic							2	2
Total	67	2	1	1	3	1	2	77

Table 2 Cyto-histological correlation of malignant lesions

	Histological diagnosis		Total
Cytological diagnosis	Benign breast lesions	Malignant breast lesions	
Benign breast lesions	127	2	129
Malignant breast lesions	00	77	77
Total	127	79	206

Table 3 Cyto-histological correlation of all breast lesions

Out of 129 cases reported in FNAC as benign, 2 were found to be malignant. First, ductal hyperplasia in cytology was diagnosed as invasive ductal carcinoma, NOS in histology. Another case reported as galactocele in cytology was found to be metaplastic carcinoma. Analysis of the results of present study is shown in Table 4 and Table 5.

True Positives (TP)	77
False Positives (FP)	00
True Negatives (TN)	127
False Negatives (FN)	2

Table 4 Analysis of results

Sensitivity = TP/ TP+FN *100 = 77/79*100	97.46 %
Specificity = TN/ TN+FP*100 = 127/127*100	100 %
Positive Predictive Value = TP/ TP+FP*100 = 77/77*100	100 %
Negative Predictive Value = TN/ TN+FP*100 = 127/127*100	100 %
Accuracy Rate = TP+TN/ TP+TN+FP+FN*100 = 204/206*100	99.02 %
False Positive Rate = FP/ FP+TN*100 = 0/127*100	0 %
False Negative Rate = FN/ TP+TN*100 = 2/204*100	0.98%

Table 5 Analysis of results

IV. Discussion

In our study, age of patients ranged from 8-85 years with male to female ratio of 1:23. The oldest case was diagnosed (85 years) as invasive ductal carcinoma, NOS and the youngest (8 years) was juveline fibroadenoma. Similar age group was observed in other studies [13,14,15,16].

In the present study, fibroadenoma was the most commonly diagnosed entity in benign breast lesions. (N = 137, 45%) followed by fibrocystic disease (N = 81, 27%). In males, gynecomastia was the common lesion. This finding correlated with other authors [16,17,18,19].

Among malignant lesions, infiltrating ductal carcinoma was the most common, which correlated with many authors [16,17,18,19,20]. The incidence of benign lesions in the present study were similar to the observations made by Y. D. Choi et al [29], Rocha et al [31] and Ashwin et al[30] whereas the incidence of malignant cases were in comparison with the observation of Ishita Pant et al [17] as depicted in Table 6.

Comparative analyses of cytological diagnoses of benign and malignant breast lesions in our present study with studies done by other authors are tabulated in Table 7and Table 8.

The sensitivity of 97.46% in our present study is comparable to that obtained by Chavda[21] (95.2%), Willis[22] (90%), Suen[23] (95%) and Ritu[24] (96.5%) shown in Table 9.

In the present study, the positive predictive value was 100% with no false positive and false negative rate was 0.97 % which was comparable to Chavda J[21] (PPV=100%, FP=0, FN=1.5%) shown in Table 9. In the present study, there was no false positive giving specificity of 100% and positive predictive value of 100% which is comparable with Chavda J[21], Ritu[24], Silverman[8], Wollenberg[25], Barrow[26], Tiwari[27] shown in Table 9. Thus false positive diagnoses is relatively rare in breast FNA if the interpretation are made by experienced pathologists.

Author name	Rocha[31] (1997)	IshitaPant[17] (2003)	Y D Choi[29] (2004)	Ashwin[30] (2015)	Present study
Period	4 years	1 year	4 years	2 years	3 years
Breast Lesions					
Benign	641 (76.58%)	85 (68%)	981 (75.64%)	319 (77.24%)	305 (79.84%)
Malignant	99 (11.83%)	25 (20%)	182 (14.03%)	76 (18.4%)	77 (20.15%)

Table 6 Comparative Analysis of Breast lesions

Cytological diagnosis	Sreenivas[32] (1989) N = 222		Rocha[31] (1997) N = 837		Pinto[16] (2004) N = 582		Ashwin[30] (2015) N = 413		Present study N = 382	
	no	%	no	%	no	%	no	%	no	%
Fibroadenoma	69	31.08	177	21.15	166	28.52	128	30.99	137	35.86
Fibrocystic disease	-	-	285	34.05	23	3.95	91	22.03	81	21.20
Galactocele	5	2.25	-	-	-	-	14	3.40	8	2.09
Granulomatous lesion	2	0.9	-	-	2	0.34	6	1.46	6	1.57
Benign phyllodes	-	-	-	-	5	0.86	3	0.73	3	0.78
Ductal hyperplasia	-	-	-	-	-	-	-	-	9	2.35
Acute non-specific mastitis	-	-	-	-	-	-	7	1.69	6	1.57
Microfilaria	3	1.35	-	-	-	-	1	0.24	1	0.26
Fat necrosis	1	0.45	-	-	-	-	3	0.73	4	1.05
Epidermal cyst	-	-	-	-	-	-	7	1.69	2	0.52
Breast abscess	17	7.66	58	6.93	12	2.06	27	6.54	6	1.57
Gynecomastia	1	0.45	26	3.11	13	2.24	9	2.18	16	4.18
Benign breast lesion	-	-	-	-	-	-	6	1.45	16	4.18
Duct ectasia	-	-	-	-	-	-	3	0.73	-	-
Acessory breast tissue	-	-	-	-	-	-	12	2.91	-	-
Intramammary lymph node	-	-	-	-	-	-	1	0.24	-	-
Duct papilloma	-	-	-	-	-	-	2	0.48	-	-
Total	98	44.14	546	65.24	221	37.96	319	77.24	305	79.22

Table 7 Comparative Analysis of Benign Breast lesions

Cytological Diagnosis	Ishita Pant[17] (2003) N = 125		Pinto[16] (2004) N = 582		Ashwin[30] (2015) N = 413		Present study N = 382	
	No	%	No	%	No	%	No	%
IDC, NOS	20	16	167	28.69	69	16.71	67	17.54
Tubular Ca	-	-	-	-	-	-	2	0.52
Medullary	-	-	-	-	-	-	1	0.26
Mucinous	2	1.6	3	0.52	3	0.73	1	0.26
Classical lobular	-	-	1	0.17	1	0.24	3	0.79
Tubulolobular	-	-	-	-	-	-	1	0.26

Metaplastic	-	-	-	-	-	-	-	-
Paget's	2	1.6	-	-	-	-	-	-
Inflammatory Ca	1	0.8	-	-	1	0.24	3	0.52
Recurrent Ca	-	-	-	-	-	-	-	-
Total	25	20	171	29.38	3	0.48	-	-
					76	18.40	77	20.16

Table 8 Comparative Analysis of Malignant Breast lesions

Study	No of FNAC	Sensitivity	Specificity	PPV	NPV	Accuracy %
Silvermann[11] (1989)	80	96	100	100	98	99
Sampat[28] (1997)	1120	96	100	100	89.50	97
Rocha[29] (1997)	837	93.8	98.31	93.70	-	97.40
Y D Choi[30] (2004)	1297	77.7	99.3	98.4	88	91.1
Pinto[16] (2004)	1582	97.8	100	100	98.6	99.1
Ashwin[31] (2015)	413	96.97	100	100	98.63	99.05
Present study	382	97.46	100	100	100	99.03

Table 9 Comparative Analysis of Breast lesions by different authors

V. Conclusion

The present study concludes that FNAC of breast is valuable diagnostic tool and plays main role to provide rapid and accurate diagnosis in OPD itself so that definite management decisions can be made straightaway. FNAC enables us to differentiate benign from malignant lesions with high sensitivity, specificity and diagnostic accuracy.

Diagnostic errors with subsequent inappropriate clinical decisions can be best avoided if clinician use the Triple diagnostic procedure of clinical examination, mammography and FNAC which increase the accuracy for diagnosis of breast carcinomas.

References

[1]. Martin HE, Ellis E B. Biopsy by needle puncture and aspiration. *Ann Surg.* 1930 Aug;92(2):169-81
[2]. Martin HE, Ellis E B. Aspiration Biopsy. Surgery, Gynecology and Obstretics 1934;59;578-589
[3]. Stewart F.W. The diagnosis of tumors by aspiration. AM J Pathol 1933;9:801-812
[4]. Adair FE. Surgical problems involved in breast cancer Ann R Coll Surg Engl 1949;4: 360-380
[5]. Godwin JT. Aspiration biopsy; technique and application Ann NY Acad Sci 1956;63: 1348-1373
[6]. SR Orell, GF Stenet , Max N-J Walters, D Whitaker Manual and Atlas of Fine needle Aspiration Cytology 3rd edition. London. Churchill Livingstone; 1999;-1-8
[7]. Langmuir VK, Cramer SF, Hood ME. Fine needle aspiration cytology in the management of palpable benign and malignant breast disease: Correlation with clinical and mammographic findings. Acta Cytol 1989, Jan-Feb;33(1):93-98
[8]. Silverman JF1, Lannin DR, O'Brien K.et al. The triage role of fine needle aspiration biopsy of palpable breast masses. Diagnostic accuracy and cost-effectiveness. ActaCytol. 1987 Nov-Dec;31(6):731-6.
[9]. Norton LW, Dans JR, Wiens JL, et al. Accuracy of aspiration cytology in detecting breast cancer. Surgery 1984;96: 806-814
[10]. Silverman JF Diagnostic accuracy, cost effectiveness and triage role of fine- needle aspiration, biopsy in the diagnosis of palpable breast masses Breast J 1995;1: 3-8
[11]. Silverman JF1, Finley JL, O'Brien KF ,etal: Diagnostic accuracy and role of immediate interpretation of fine needle aspiration biopsy specimens from various sites. ActaCytol. 1989 Nov-Dec;33(6):791-6.
[12]. Dixon JM, Anderson TJ, Lamb J, Nixon SJ fine needle aspiration cytology in relation to clinical examination & mammography in the diagnosis of solid breast masses. British journal of Surgery 1984;7:593-596.
[13]. Shirish S Chandanwale, Kanika Gupta, Arpana A DharwadkarPattern of palpable breast lesions on fine needle aspiration: A retrospective analysis of 902 cases. Journal of Medlife health 2014 Oct-Dec 5 (4) 186-191.
[14]. Kumar R, A clinicopathologic study of breast lumps in Bhairahwa Nepal. Asian Pac J Cancer Prev. 2010;11(4):855-8.
[15]. Ahmed HG, Ali AS, Almobarak AO. Utility of fine-needle aspiration as a diagnostic technique in breast lumps. Diagn Cytopathol. 2009 Dec;37(12):881-4.
[16]. Pinto RG, Kulwant S. A statistical analysis of five needle aspiration biopsies in palpable benign (neoplastic and non neoplastic) breast lesions J Cytol 2004;21: 64,7.
[17]. Ishita P Singh PK. Cytomorphologic study of palpable breast lesions and histopathologic correlation J Cytol 2003;20: 129-32.
[18]. Swapan KR, Ranjana B. FNAC of breast with reference to topography and nuclear grading in malignant lesions. J Cytol 2002;19: 187-92.
[19]. Yalavarthi S, Tanikella R, Prabhala S, Tallam US. Histopathological and cytological correlation of tumours of breast. Med J D Y Patel University 2014;7: 326-331.
[20]. Dash A, Mohanty R, Mallik R, Dash K. Aspiration smear pattern as a predictor of biological behavior in breast carcinoma J Cytol 2005;22: 19-21.
[21]. Chavda J et al. A study of Cyto-Histological Correlation of Breast lesions. NJIRM 2013;4(2):54-56.
[22]. Willis S.L, Ramzy I: Analysis of false results in a series of 835 FNA of breast lesions. Acta Cytol 1995;39:858-864.
[23]. Suen MWM, Chan MKM; The role of FNAC in the diagnosis of breast lesions. HKMJ 1996;2:62-67.
[24]. Ritu Mahajan: FNAC of breast lesions with clinical and histopathological correlation. Dissertation submitted to M.S. University Baroda in 1998.

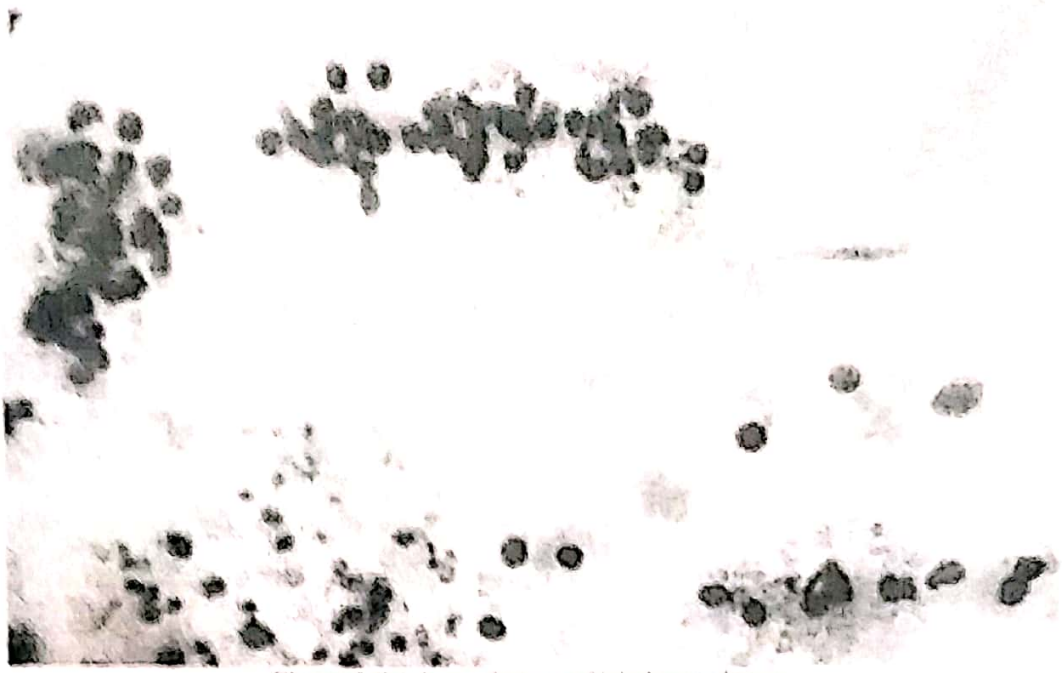

Figure 3 Cytology of a case of lobular carcinoma

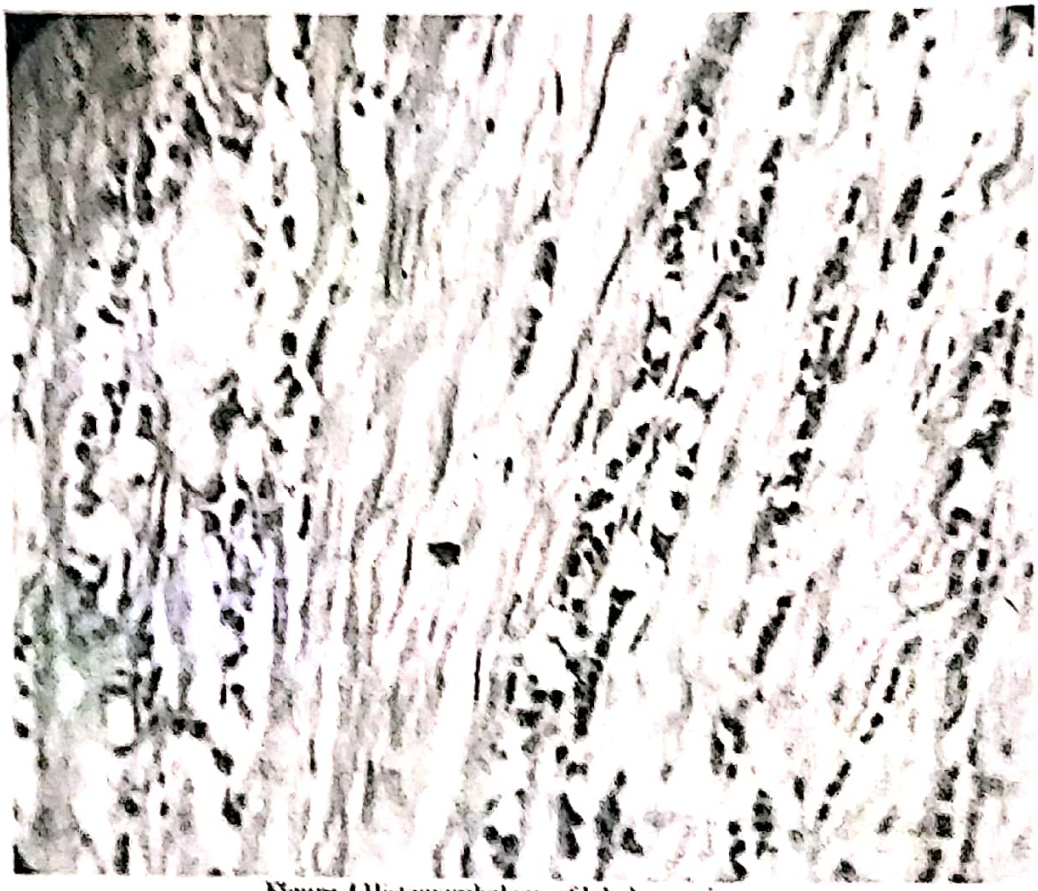

Figure 4 Histonkophology of lobular carcinoma

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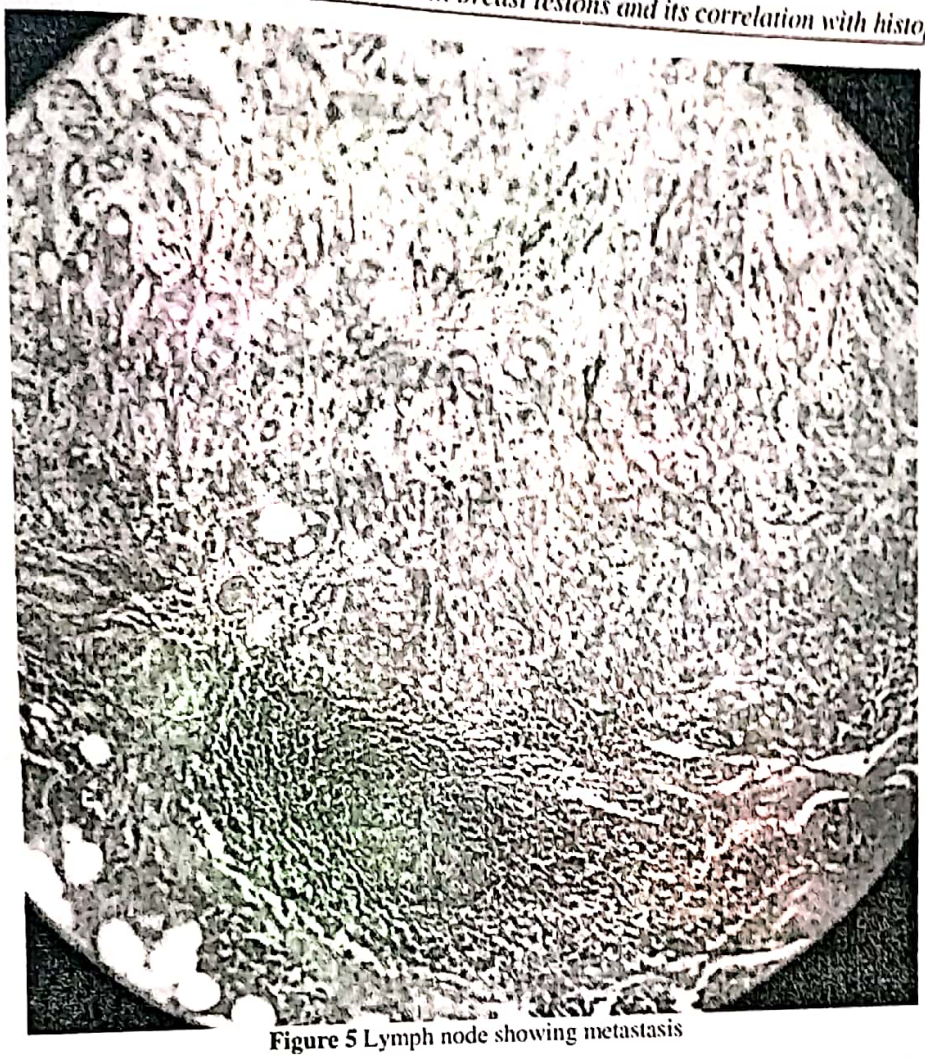

Figure 5 Lymph node showing metastasis

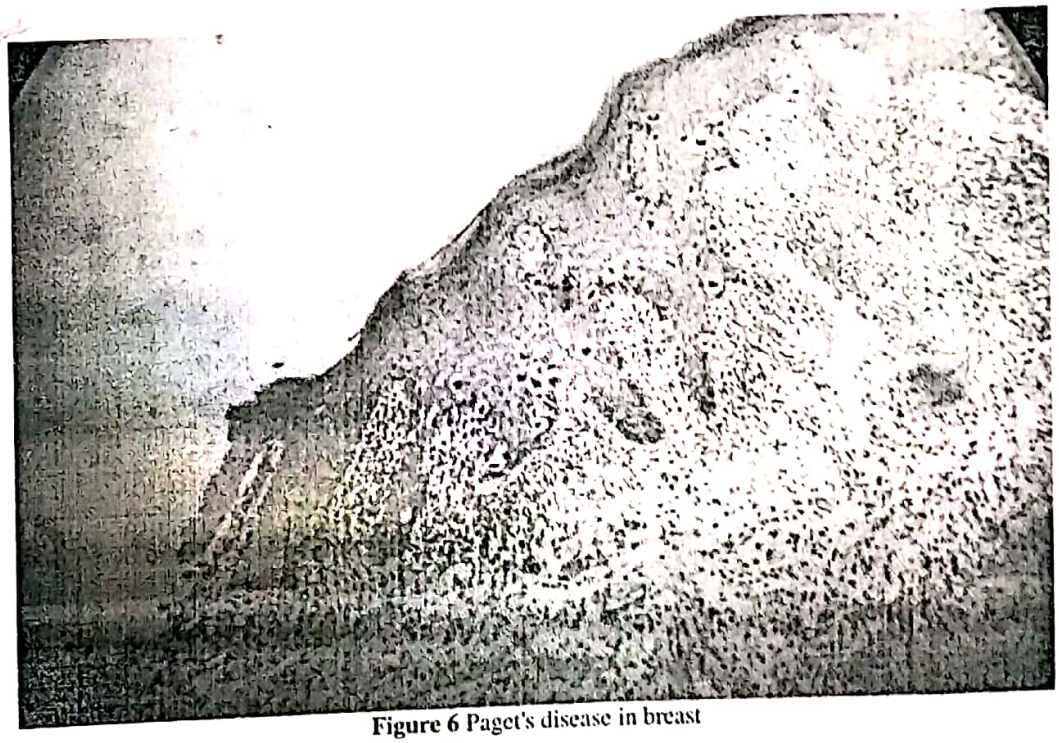

Figure 6 Paget's disease in breast