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Cytomorphological study of breast lesions with histopathological co-relation

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ABSTRACT

Introduction: Breast Lesions (BLs) are commonly encountered in routine practice and have increased importance due to awareness of breast carcinoma, potential cosmetic disfigurement following surgery, hence BLs are one of indication for fine needle aspiration cytomorphology (FNAC).
Objectives: 1) To study FNAC of various BLs. 2) To evaluate diagnostic accuracy of FNAC in comparison with Histopathology (HP) study.
Materials and Methods: A retrospective study of 4 years included all 103 BLs cases (palpable and n on palpable) presented to Department of Pathology, District Hospital Vijayapur for FNAC, from Jan-2015 to Dec-2018. FNAC study was carried out, diagnosis were categorized. Out of 103 FNAC performed cases, 76 cases were referred to HP examination and diagnosed at Department of PathologyAl-Ameen Medical College Vijayapur. The HP slides were retrieved and analyzed. Data was collected from cytology and HP case records. Cytological diagnosis were compared with HP diagnosis and FNAC diagnostic accuracy was assessed.
Observations: Total of 76 cases were included in the study, there were 74 females and 2 were males with age range of 18-65 years. Out of 76 cases 71 cases correlated with HP diagnosis, with diagnostic accuracy of 93.4% (71/76 cases), with highest number of benign BLs 92.1% (70/76 cases) and 100% correlation to malignant BLs (06/0 6 cases).
Conclusion: Study reveals that there is good correlation of FNAC diagnosis with HP diagnosis. Hence FNAC is a useful, valuable, quick and reliable primary screening technique for breast lesions with high diagnostic accuracy.

1. Introduction

Breast lesions (BLs) are the most common illness in women contributing to a significant proportion of health care spending. Breast cancer is second most common malignant tumour & one of leading cause of death among females. More than 10 laks new cases occurring world wide every year.[1] and in India-75,000 new cases/year.[2] In USA 232,670 new cases and 40,000 deaths observed in 2014. Karyotype & molecular alterations in benign BLs parallel to those of breast carcinoma.[3] If Pre-malignant BLs recognized in early stage, possible to abort development of invasive cancer.[1,4] In recent years there have been outstanding advances in breast cancer management leading to earlier detection of disease and the development of more effective treatment resulting in significant decline in deaths due to breast cancer and improved outcome for women living with disease.[5,6] Hence it is very essential to screen of all BLs. FNAC observed best tool in screening the BLs.[1] FNAC widely accepted due to its high sensitivity, specificity & accuracy.[5,7] FNAC is simple, quick, reliable, inexpensive, OPD procedure and done on both palpable and non-palpable BLs and avoids unnecessary surgery in specific benign

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conditions[5,6] gives rapid and accurate diagnosis.[6] It also plays a major role in pre-operative analysis of BLs[5,7] and provides diagnostic & therapeutic tool in cystic lesions,[4] differentiate all BLs to nonneoplastic and neoplastic (benign, malignant & subtypes also). Combination with mammography, ultrasonography and clinical examination (Triple test)[5,7] forms a good diagnostic triad. FNAC Permits a ancillary studies Hormone receptor analysis, Flow cytometry and Molecular diagnostics[2,7], gives cytological grade of malignant lesion which correlates with HP grading.

2. Objectives

1. To study the cytomorphology of various BLs.
2. To assesses accuracy of FNAC by correlating with HP diagnosis.

3. Materials and Methods

A retrospective study of 4 years from January 2015 to December 2018, included all 103 BLs cases (palpable and non palpable) presented to Department of Pathology, District Hospital Vijayapur for FNAC. Cytology study was carried out, diagnosis were categorized as C1 - C5. Out of 103 FNAC performed cases, 76 cases were referred to HP examination and diagnosed at Department of Pathology Al-Ameen Medical College Vijayapur. The HP slides were retrieved and analyzed. Data was collected from cytology and HP case records. Cytological diagnosis were compared with HP diagnosis and FNAC diagnostic accuracy was assessed. Statistical Analysis were made to find out ability of FNAC to detect presence of malignancy of breast in comparison to HP diagnosis, in terms of True positive, True negative, Diagnostic accuracy, Sensitivity and Specificity.

3.1. Inclusion criteria

1. Age: 18 – 65 years,
2. With palpable & non palpable BLs.

3.2. Exclusion criteria

1. Age: < 18 &> 65 years.
2. Diagnosed cases of BLs.
3. Recurrence of malignancy.
4. Pregnant patients.

3.3. FNAC Study

Patients with BLs were subjected to FNA procedure after detailed history, general physical examination. Procedure of FNA explained to patient and verbal consent was obtained. The patients were suitably seated for aspiration. The lesion was located, under aseptic precautions the aspirations of the BLs were performed with 23 or 20gauge needle attached to a 5 ml or10ml syringes. The materials collected were smeared directly onto slides, 5-7 slides were prepared, two slides were fixed in alcohol and stained by Pap anicolaou's technique and two slides were stained with Leish man-Giemsa technique. Totally 103 FNA of BLs were done, studied and cytologicallycategorizedin to C1 to C5.

3.4. HP Study

Out of 103 FNAC performed cases, only 76 FNA cases were includedfor HP study, those 76 FNA lesions of excisedspecimens were fixed in Formalin, were referred to Department of Pathology Al-Ameen Medical College Vijayapur. All specimens were processed & stained with Haematoxylin- Eosin stain and conditions giving rise to the chronic granulomatous inflammatory lesions Z-N stain was used, all specimens were studied for tumour type and grading. All 76 cytological diagnosis were compared with HP diagnosis. Statistical Analysis were made for benign and malignant lesions in terms of True positive, True negative, Sensitivity, Specificity and Diagnostic accuracy.

3.5. Observations

Out of 76 FNAC cases subjected HP, 74 females and 02 were males BLs patients. Right BLs 39(51.3%), Left35 (46.0 %) and Bilateral BLs were 02 (2.6%), and majority were over Right upper outer quadrant 28(71.7 %) as in Table 1. Clinical presentation of BLs was mobile painless lump in 52 (68.4%)cases, mobile with painful lump in 17(22.4%), mobile with painful lump with discharges 05 (6.6%) and nipple discharge lesions were in 02(2.6%) cases as in Table 2 . Age wise spectrum of cytological diagnosis shows, benign cases more common in age groups of 18-40, and malignant more common in 50-65years as in Table 3. Cytological diagnosis categorized as C1-C5 as shown in Table 4.

C1 Inadequate(0), C2 Benign 65(85.5%), C3 Atypical probably Benign 04 (5.3%). C4 Suspi cious favour Malignant 01(1.3%) and C5 Malignant 06(7.8 %) as in Table 5. Among Benign cases most common was Fibro adenoma 26(40.6%), followed by Fibrocystic changes14(21.9%), Benign proliferative breast lesion s 09 (12.5%), Breast abscess 05(7.8%), Benign Phyllodes tumour 04(6.2%), Granulomatous mastitis 03(4.7%), Duct papilloma 02(3.1%) and Gynaecomastia 02(3.1%) as in Table 6. Cytological non benign cases were 11(14.5%). Among these 11 cases, Atypical probably Benign BLs 04(5.3%) Suspicious favour malignant01(1.3%), Malignant BLs were06 (7.8%). Among 04(5.3%) Atypical probably Benign BLs, Fibroadenoma with atypical cystic changes were 02, Fibroadenosis with atypical fibrocystic changes 01 and Atypical lobular hyperplasia 01 case. Suspicious favour malign ant01(1.3%)as malignant Phyllodes tumour. Malignant BLs were 06(7.8%) among them Infiltrating ductal carcinoma (IDC) 05 and malignant Phyllodes tumour 01 and most common malignant lesion was IDC 05(6.5%)

as in Table 7.

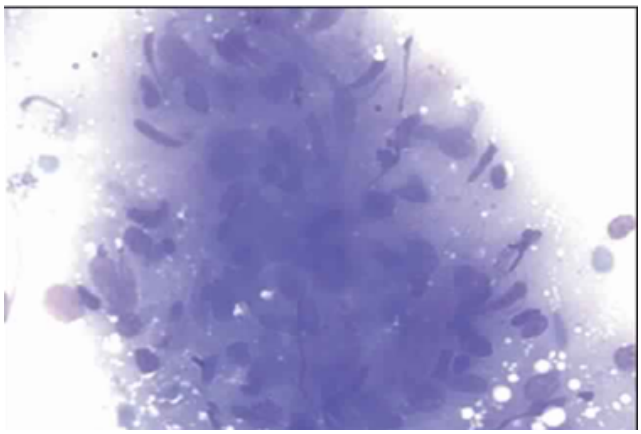

Fig. 1: FNAC granulomatous mastitis

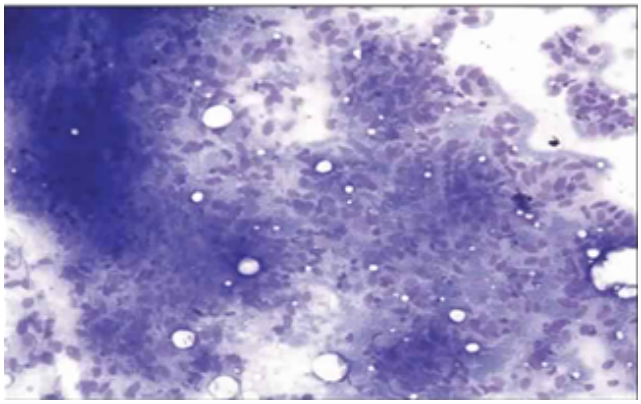

Fig. 2: FNAC benign phylloides tumour

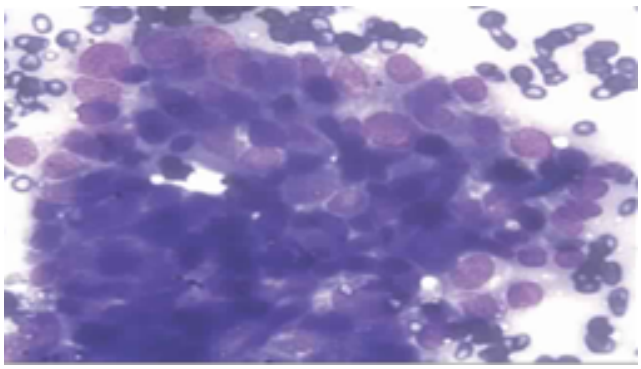

Fig. 3: FNAC atypical proliferating hyperplasia

3.6. HP examination specimens

1. Lumpectomy specimen 54(71.0 %)
2. Biopsy 18(23.7 %)
3. Radical mastectomy 04(5.3 %)

All 76 FNA BLs cases Histological diagnosis made as Table 8 . Out of the total 76(100%) BLs, 71 (93.4%) FNAC BLs were well correlated with HP diagnosis and 05 (6.5 %) were not correlated as shown in Table 9. Among 71 corellated cases, 65 were benign, 06 were malignant as Table 10. All various types of cytologicalbenign(65) BLs well correlated with HPas in Table 11 and different malignant tumours (06) well correlated with HP as in Table 12. Cytological discordance (05), of 04 A typical probably benign cases, all were turned to benign and 01 suspicious favour of malignant Phyllodes tumour was turned to benign Phyllodes tumour on HP study as in Table 13. Total number of histocytological correlation done as in Table 14. Comparative analysis of FNAC diagnosis with HP diagnosis of BLs done as in Table 15. Fibro adenoma was commonest benign tumour (28).

tatistical Analysis were calculated for all 76 cases and FNAC diagnosis were compared with HP diagnosis. For Benign lesions as all 65 cases FNAC diagnoses are confirmed as Benign, hence True positive 100%, True negative 100%, discordancy was for 05 cases, hence Sensitivity was 100% and Specificity was 92.8 %. For Malignant lesions as all 06 cases FNAC diagnosed malignant were confirmed as malignant, hence True positive 100%. True negative 100%,Table 16 hence Sensitivity was 100% and Specificity was 100%. Diagnostic accuracy of FNAC was 93.4% in our study as shown in.Table 18

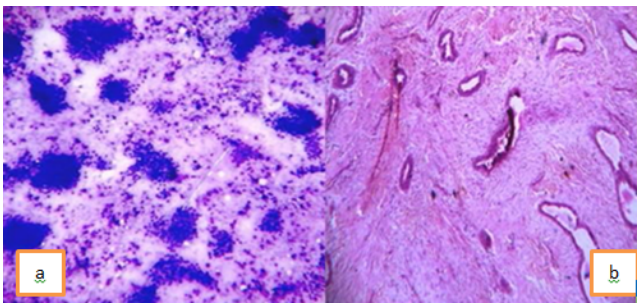

Fig. 4: Smears o f fibroadenoma (10X) (a) FNAC,(b) HP

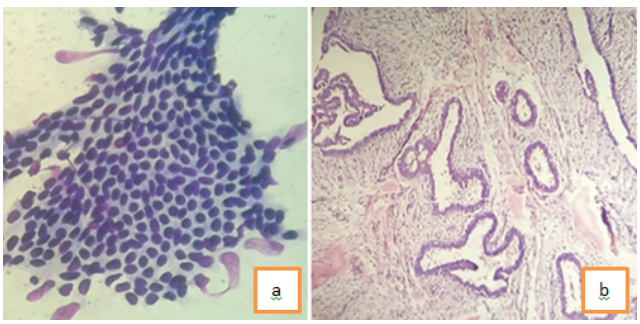

Fig. 5: Smears o fibroadenoma (40x). (a) fnac, (b) histopathology

Table 1: Observations

Age	**Range 18 - 65 years**	
Sex:	FEMALE	74 (97.4%)
	MALE	02 (2.6%)
SITE	RIGHT BREAST	39 (51.3%)
	Left Breast	35 (40.0%)
	Bilaterl Breast	02 (2.6%)
	Common: Upper outer quadrant of Right breast	28 (71.9%)

Table 2: Observations clinical presentation of breast lesions (n-76)

Clinical Presentation On	**Number of Cases**	**Percentage**
Mobile Painless lump.	**52**	68.4
Mobile with Painful lump.	17	22.4
Mobile with Pain & Discharge lump.	05	6.5
Nipple Discharge.	02	2.6
Total	76	**100**

Table 3: Observations age wise cytological spectrum of breast lesions (n-76)

Year	**Benign**	**Atypical**	**Suspicious**	**Malignant**	**Inadequet**	**Total**
18-20	19	**–**	**–**	**–**	**–**	19
21-30	28	01	**–**	**–**	**–**	29
31-40	13	02	**–**	**–**	**–**	15
41-50	03	02	01	01	–	07
51-60	02	00	**–**	**03**	**–**	05
61-65	00	00	–	02	–	02
TOTAL	65	05	01	06	–	76

Table 4: Categorisation of FNAC Breast Lesions

Cytology categories	**Types**
C1	Inadequate
C2	Benign
C3	Atypical, probably benign
C4	Suspicious favour malignancy
C5	Malignant

Table 5: Observations: cytological spectrum of breast lesions (n-76)

Cytological types	**N**	**Percentage (%)**
C1 Inadequate	00	00
C2 Benign	65	85.5
C3 Atypical probably benign	04	5.3
C4 Suspicious with malignancy	01	1.3
C5 Malignant	06	7.9
TOTAL	76	100

Table 6: Observations c 2 :cytological spectrum of benign breast lesions: (n-65) (85.5%)

Fibroadenoma	**26 (40.6%)**
Fibrocystic diseases	14 (21.9%)
Benign proliferative breast diseases	09 (12.5%)
Breast abscess	05 (7.8%)
Benign Phyllodes tumours	04 (6.2%)
Granulomatous mastitis	03 (4.7%)
Duct papilloma	02 (3.1%)
Gynaecomastia	02 (3.1%)

Table 7: Observations cytological spectrum of non benign breast lesions: (n-11)(14.5%)

C3	**Atypical probably benign(04)**	**Fibro adenoma with atypical cystic change. (02)**
		Fibro adenosis with atypical fibrocystic change (01)
		Lobular atypical hyperplasia (01)
C4	**Suspicious of malignant (01)**	Phyllodes tumour (01)
C5	**Malignant (06)**	IDC (5)
		Malignant phyllodes (01).

Table 8: Histopathologic spectrum of BLs (n -76)

Histopathologic diagnosis	**Number of cases**	**Percentage(%)**
Inadequate	00	00
Fibroadenoma	28	36.8
Fibrocystic changes	15	19.7
Benign Proli ferative diseases	10	13.1
Breast abscess	05	6.5
Benign Phyllodes	05	6.5
Granulomatous mastitis	03	03
Duct papilloma	02	02
Gynaecomastia	02	02
Atypical probably benign	–	–
Suspicious of malignant	–	–
Infiltrating ductal carcinoma	05	6.5
Malignant Phyllodes	01	1.3

Table 9: Comparision of fna diagnosis with hp diagnosis (n -76)

Cordancy with HP	71(93.4%).(65 benign + 06 malignant)
Discordancy with HP	05 (6.5%).

Table 10: Cyto-histopathological correlation of breast lesions (n-71)

Types of BLS	**Cytological Diagnosis**	**Histopathological Diagnosis**
Benign	65	65
Malignant	06	06

Table 11: Cytological variousbenign cases confirmed on histopathology diagnosis (n -65).

Cytological diagnosis of bls.	**Number of cytological diagnosis (n-65).**	**Number of hp diagnosis (n-65).**
Inadequate	00	00
Fibroadenoma	26	26
Fibrocystic changes	14	14
Benign Proliferative diseases	09	09
Breast abscess	05	05
Benign Phyllodes	04	04
Granulomatous mastitis	03	03
Duct papilloma	02	02
Gynaecomastia	02	02
Total	65	65

Table 12: Fnacmalignant lesions confirmed on histopathology (n-06).

S.No.	**Malignant diagnosis**	**No. Of fnac diagnosis(06)**	**No. of HP diagnosis(06)**
01	IDC	05	05
02	Malignant Phyllodes	01	01

Table 13: Cytohistopathological discordance of cases - 05(6.6%)

Cytological category	Number of cases	Cytological diagnosed discordance cases (05)	In hp study alldiscordance bls diagnosed as benign.(05)
C3 Atypical probably benign.	04	Fibroadenoma with atypical cysticchanges(02). Fibroadenosis with atypical fibrocystic changes (01). Atypical lobular hyperplasia (01).	Fibroadenoma(02). Fibrocystic changes (01). Lobular hyperplasia (01)
C4 Suspicious of malignant.	01	Suspicious of malignant Phyllodes tumour (01).	Benign Phyllodes tumour (01)
Total	05	05	05

Table 14: Total cyto-histopathological diagnosis of breast lesions (n-76)

Types of BLS	Cytological diagnosis	Histopathological diagnosis
Benign	65	(65+ 05)70
Malignant	06	06

Table 15: Comparative analysis of FNAC diagnosis with HPdiagnosis BLs.(n-76)

Cytological diagnosis of bls(76).	Fnac cordancy with hp diagnosis bls(71)	Fnac c3 &c4 bls discordinance were turned to benignonon hp study bls(05)	Total hp diagnosis bls(76)
C1.Inadequate (00).	00	00	00
C2.Fibroadenoma(26).	26	02(C3)	28
Fibrocystic changes(14).	14	01(C3)	15
Benign Proli ferative diseases(09).	09	01(C3)	10
Breast abscess(05).	05	–	05
Benign Phyllodes(04).	04	01(C4)	05
Granulomatous mastitis(03).	03	03	03
Duct papilloma(02).	02	–	02
Gynaecomastia(02).	02	–	02
C3.Atypical probably benign(04).	–	–	–
C4.Suspicious of malignant(01).	–	–	–
C5.Infiltrating ductal carcinoma(05).	05	–	05
Malignant Phyllodestumour(01).	01	–	01
Total	71	05	76

Table 16: Statistics of cytohistopathology study of BLs (n-76)

Test result of BLs	True diagnosis		Total	Percentage (%)
	+ve	-ve		
Malignant	06	00	**06**	7.89
Benign	65	00	**65**	85.5
Total	71	00	**71**	**93.4**

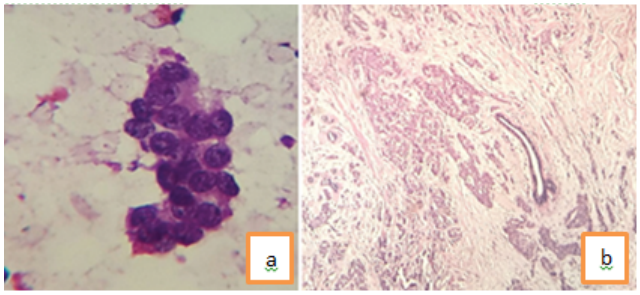

Fig. 6: Smears of infiltrating ductal (40 X). (a) FNAC, (b)HP

4. Discussion

BLs are one of commonest illness presented by patients to the surgery. Early diagnosis of BL is important. FNAC has been widely used in detecting the presence or absence of cancer pre-operatively and as a guide to starting the specific treatment.[8] FNA today occupies an extremely important role in preoperative evaluation of BLs and in most centres patient management is decided on the basis of the cytological report.[9] Although prior cytological typing of breast carcinoma may have little influence on the surgical management of a case, awareness of certain types of carcinoma is necessary to correctly identify these lesions. Further more reconfirmation of prognostically favourable histological types is necessary to select patient for pre-operative chemotherapy,[9] cytology plays an important role in benign lesions of breast, in the distinction of proliferative, inflammatory and granulomatous lesions.

All the patient in the present study were subject to FNAC using syringes with a 23 and 20 number needles, with no discomfort or unto ward side effects, so because of good needling technique all samples yielded adequate material, hence inadequate sampling rate is 0% in our study, but it was 2% reported in similar study done by Hebbar AK et al.[10] Patel J[11] reported that FNAC results were influenced by the number needle maneuvers jabbing, more the number of to and fro of the needle more chances of getting an adequate material.

In our study age range of patients from 18-65 years, maximum numbers of patients were found in 21-30,followed by 18-20 and 31-40 years respectively. But in Rathi Met al[12] reported in the study maximum incidence of BLs were in 30-39 years. Benign lesions were observed in all age groups but were most common in 18-30 years patients. Commonest age group for malignant lesions in 51-60 and 61 -65 years in our study as Table 3.

There was notable female predominance (F -74, M- 02) of the lesions in our study as similar in Vasudev et al study.[13] In the present study right breast (39)was most commonly affected than left breast (35) and bilateral(02) involvement seen as similar to study done by A. C Shrivatsav[14] Majority symptoms was painless mobile lump(52), [3.8]. Majority of the BLs situated in right breast upper outer quadrant in both benign (24)cases as well as malignant (04) cases[15] In present study Benign BLs (70) were highest and malignant (06) were lowest as in Table 14 and similar to other studies.[16,17] This highest number of benign than malignant lesions cases may be due to good follow up or more awareness among the patients. Most common lesion noted in our study was Fibroadenoma(28) as a benign tumour, this was followed by fibrocystic diseases and all male (02) patients diagnosed as Gynaecomastia, which commonest benign lesion among male BLs. as similar findings noticed by Deshapande K.[18] In our study all FNAC benign (65) & ma lignant (6) casesconfirmed with HP[3] Present study showed that among the malignant lesion, IDC was the commonest lesion as similar finding was observed in other studies[10,18]. In present study cytologically observed atypical probably benign (04) cases were diagnosed as benign lesions as Fibroadenoma (2), Fibrocystic change (1) and proliferative lobular hyperplasia(1). In these atypical probably benign (04) lesions, few cells were showing nuclear atypia with scanty bipolar cellswhich was due to proliferation process, in some cases exact cause of atypia cannot be determined.

In our study, cytologically suspicious of malignant Phyllodes (1) case was diagnosed as benign Phyllodes tumour in HP study, the cause might be hitting the area which was showing hyperplasia of stromal cells with nuclear atypia.

In our study, 76 FNAC diagnosis were compared with HP diagnosis. With respect to malignant lesions, FNAC malignant lesions diagnosis compared with HP diagnosis, as all FNAC malignant 06 cases were confirmed as malignant only, so True positive were 100%, we found Sensitivity as 100%. As there was no lesion which was found negative on FNAC and turned to positive as malignant in HP study, so True negative cases 100 %, hence Specificity of FNAC was 100%. Diagnostic accuracy was 93.4%, as there was cordancy with HP for 71 cases (71; 65 benign + 06 malignant cases) as Tables 9 and 10.

In present study more number of benign and less number of malignant lesions found cytohistopatho logically as similar studies done by various authors in Table 17[19–22]. In our study for malignant lesions, Sensitivity was 100%, and Specificity was 100% and Diagnostic accuracy was 93.4%, which were highest when compared to statistics of other similar studies done by various authors,[22–26] our study statistics were relatively yielded good results as shown in. Table 18

5. Conclusion

1. FNAC is very good simple tool to differentiate BLs.
2. FNAC is a easy, safe, repeatable simple OPD procedure.

Table 17: Comparision of histopathological diagnosis with other studies

Study	Benign(%)	Malignant(%)	Total
Present study	70 (92.1%)	06 (7.9 %)	76
Jayawant et al	177 (83.8%)	34 (16.1%)	211
Kim et al	153 (62.2%)	93 (37.8%)	246
Park and Ham	107 (54.0%)	91 (45.9%)	198
Mohammed al	61 (65.6%)	32 (34.4%)	93

Table 18: Comparision of our statistics with similar studies

Study	Sensitivity	Specificity	Dignostic Accuracy
Present study	**100 %**	**100 %**	**93.4%**
Mohammed at al	78.1%	94.4%	91.1%
Rubin at al	87.0%	100%	100%
Choi et al	90.0%	100%	100%
Zuk JA et al	70.6%	87.5%	95.2%
Bhavya P. et al	98.8%	96.3%	97.4%

3. It yields a definite diagnosis when compared to histopathology reports.
4. It is very good tool w hen compared with Histopathological study. It yielded a high diagnostic accuracy (93.4%) with high sensitivity and specificity.
5. Hence it can be considered as very good diagnostic tool in diagnosis of breast lesions.

6. Source of Funding

None.

7. Conflict of Interest

None.

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