

**SPECTRUM OF BENIGN BREAST LESIONS: A CYTOLOGIC STUDY**Nirmala C<sup>1</sup>, Shulbha V. Sejekan<sup>2</sup>, Dayananda B. S<sup>3</sup>**HOW TO CITE THIS ARTICLE:**

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**ABSTRACT: INTRODUCTION:** Open biopsy is widely considered to be the procedure of choice for diagnostic tissue sampling of bone tumors. However, associated disadvantages include in-patient procedure requiring hospitalization, risk of infection, hematoma formation and pathological fractures. As an alternative FNA cytology is increasingly used as a diagnostic modality. It is a challenging technique due to difficulties in approaching bone lesions and obtaining adequate material. **AIMS:** 1. To study the prevalence and distribution of various breast lesions in women of various age groups. 2. To classify the smears into C1-C5 category. 3. To enumerate the difficulties encountered in this study. 4. To emphasize the role of FNAC in diagnostic workup in breast lesions. **MATERIALS AND METHODS:** FNAC was done on 208 cases of breast lesions from September 2011 to July 2012 in department of Pathology, Bowring hospital, BMC&RI, Bangalore. Cases presenting to the OPD with breast lumps were subjected for FNAC. Aspirations were carried out with 10ml disposable syringe with a 22 gauge needle, material was obtained. Aspirates were smeared and few of them were immediately fixed with methanol and stained with H&E, rest of the smears were air dried for MGG staining. The diagnostic criteria C1-C5 as recommended by NHS breast screening program has been incorporated for reporting the slides along with pathological diagnosis wherever possible. **RESULTS:** 1. In countries with limited resources like India, FNAC may be used as the first line of diagnostic tool for evaluating breast lesions. 2. Breast FNA continues its monopoly over core biopsy and open excision biopsy. Benign conditions of breast can be diagnosed easily on FNA if done accurately. The current usage of C1-C5 categories in typing the breast lesions gives a wide scope for pathologist to place the doubtful lesions freely in the categories. However a disease specific diagnosis was preferred by the clinicians. 3. In females the commonest benign lesion encountered was fibroadenoma (43.5%) followed by benign breast disease (20.12%) & fibro cystic disease (11.03%). 4. In males the commonest cause of breast enlargement was benign breast disease (gynaecomastia) (91%) followed by fibroadenoma in (9%).

**KEYWORDS:** Benign breast lesions, FNAC, Cytology.

**INTRODUCTION:** FNAC of the palpable breast lumps has been a reliable and an important diagnostic tool in the branch of breast cytology.<sup>1,2</sup> Its patient benefits are innumerable, mainly because of its cost effectiveness and its provision to give reports on the same day, thus making it an integral part in management of breast lesions.<sup>3,4</sup>

Worldwide awareness of breast cancers have put FNAC in the forefront as the premiere diagnostic tool, thus currently it has been incorporated as one of the parameters in the triple test for breast cancer screening programs.<sup>5</sup>

Breast lesions include both benign and malignant conditions. Benign lesions in breast are by itself very vast and a simple procedure like FNAC helps the pathologist to study the spectrum of changes in benign breast lesions. For clinically and radiologically benign looking breast lesions, FNA is the first sampling method and confirmation of benign diagnosis on FNA has helped in saving time,

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cost and most important relieving the patient anxiety. FNA in cystic lesions have been a blessing for being both diagnostic and therapeutic procedure. It has been helpful in identifying infectious diseases namely breast abscess and mastitis.<sup>4</sup>

The present study is making an effort to provide an insight into the array of benign breast lesions. Significance of our present study has been to highlight the importance of FNA in being a simpler, cheaper and less time consuming sampling technique for preoperative pathological diagnosis compared to core biopsy or open surgical biopsy.

### AIMS & OBJECTIVES:

1. To study the prevalence and distribution of various breast lesions in women of various age groups.
2. To classify the smears into C1-C5 category.
3. To enumerate the difficulties encountered in this study.
4. To emphasize the role of FNAC in diagnostic workup in breast lesions.

**MATERIALS AND METHODS:** The present study is a descriptive study conducted in the department of pathology in Bowring & Lady Curzon Hospital. All the patients attending the clinical outpatient department presenting palpable breast lumps identified by patient themselves and by the clinicians have been included in this study. A total number of 208 cases have been included in our study for a period of one year.

All the patients were asked history pertaining to the breast lesions, duration, history of lactation, injury, previous surgery to trace any relevant etiological factors. They underwent clinical examination of the breast to assess laterality, if lesions were unilateral or bilateral, well defined/ill defined, size of lump, mobility, secondary skin changes, nipple discharge/retraction and for axillary lymph node enlargement.

The FNA procedure is performed by the pathologists in the department of pathology, Bowring & Lady Curzon Hospital. FNA is performed using 22 gauge disposable needles with application of vacuum under aseptic precautions. Aspiration from more than one site has been done. The aspirated content was smeared on glass slides, fixed with alcohol (95% ethyl alcohol) and some slides were air dried. The number of slides varied with case. On a regular basis H & E and Giemsa staining was done, in case of a purulent aspirate, Zeil Nelson staining for acid fast bacilli was also performed. Each smear was numbered, labeled, mounted accordingly and examined under microscope. The diagnostic criteria C1-C5 as recommended by NHS breast screening program has been incorporated for reporting the slides.

**RESULTS:** The total number of FNA performed in the study period were 2090, out of which breast FNA's constituted 208(9.95%) of the total cases. Benign lesions of the breast constituted 165(79.3%) and malignant counterparts were 43(20.4%). Out of these 165 cases 154 (93.3%) were females and 11 (6.7%) were males giving female to male ratio as 14:1. The age ranged from 11-62yrs in females and 11-60yrs in males. Most of the lesions were seen in age group of 21-30yrs in females and 11-20 yrs in males.

Ninety nine cases (60%) cases in 165 aspirates had palpable lump size of less than 2 cm and 55 cases (33.4%) had palpable lump size of more than 2 cm. No palpable lumps/lumpy breasts were seen in 06 cases (3.6%).

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The aspirates were hemorrhagic in 156 cases and serous fluids were obtained in 09 cases.

Among the total of 208 aspirates, 03 were in C1 category, 154 in C2, 08 in C3, 04 in C4 and 39 in C5 category.

In 11-20 years of age group, 30 cases were seen. Commonest lesions encountered in this group was fibroadenoma in 20 cases (66.66%), 05 cases (16.66%) of benign breast disease, 02 (6.66%) case of fibrocystic disease, 02 case (6.66%) of breast abscess and 01 case (3.33%) of phylloides.

In 21-30 years of age group, the total number of cases was 62. Maximum benign breast lesions were seen in these age groups. Fibroadenoma is commonest seen in 27 cases (43.54%), benign breast disease in 15 cases (24.19%) and atypical ductal hyperplasia in 04 cases (6.45%), breast abscess in 04 cases (6.45%), galactocele in 04 cases (6.45%), mastitis in 03 cases (4.83%), fibrocystic disease in 02 cases (3.22%), intraductal papilloma in one case (1.61%), phylloides in one case (1.61%). In 31-40 years of age group, 34 cases were encountered. Fibroadenoma was seen in 14 cases (41.17%), benign breast disease in 08 cases (23.52%) and fibrocystic disease in 06 cases (17.64%) breast abscess in 03 cases (8.82%), one case of mastitis (2.94%), one case of mammary duct ectasia (2.94%) and one case of atypical ductal hyperplasia (2.94%).

In 41-50 years of age group, 21 cases were seen, out of which fibroadenoma was seen in 05 cases (23.80%), fibrocystic disease seen in 04 cases (19.04%), 03 cases each of benign breast disease (14.28%), atypical ductal hyperplasia (14.28%), breast abscess (14.28%), one case each of intraductal papilloma (4.76%), mastitis (4.76%) and one case of phylloides (4.76%).

In 51-60 years of age group, 06 cases were recorded; fibrocystic disease was the predominant seen in 03 cases (50%), fibroadenoma in one case (16.66%) and mastitis in one case (16.66%), intraductal papilloma in one case (16.66%).

More than 60 years of age single case (0.6%) of fibrocystic disease was seen.

In females among the 154 breast lesions, most common was fibroadenoma encountered in all age groups comprising of 67 cases (43.5%). Next commonest was benign breast disease seen in 31 cases (20.12%), followed by fibrocystic disease in 17 cases (11.03%), breast abscess in 11 cases (7.14%), mastitis in 06 cases (3.89%), atypical ductal hyperplasia in 08 cases (5.19%), galactocele in 04 cases (2.59%), intraductal papilloma in 03 cases (1.94%), phylloides in 03 cases (1.94%) and single case (0.64%) of mammary duct ectasia.

In males, 8 of 11 cases were benign breast disease (72.7%) and single case of fibroadenomas (9.1%) has been reported in our study, the most common age group affected in males were in 11-20 age group. Two (18.2%) cases yielded inadequate material.

**DISCUSSION:** The present study has emphasized more on the benign conditions prevalent in our set up.

Maximum number of cases was less than 2 cm, which accounted to 60% and more than 2 cm in 33.4%. Similar observations were noted in study conducted by Rakshinda et al.<sup>5</sup>

In our study only 1.44% of cases had inadequate ductal epithelial cells for cytological diagnosis to be made. They were included in C1 category. Sudarat n et al<sup>6</sup> in their study had inadequate sample rate as 4.2%, Rakhshindah B et al<sup>5</sup> in their study had inadequacy rate as 13.6%, Taha M M et al<sup>2</sup> had 13.6% as inadequacy rate.

Inadequate aspirate could be attributed to wrong technique, inexperience of the aspirator, type of lesion<sup>6</sup>. Few benign lesions with extensive fibrosis, sclerosis, adenosis and collagenous

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lesions, due to nature of lesion inadequate material is obtained<sup>5</sup>. The rate of sampling error and inadequacy is seen in small lesions less than 1 cm and in inaccessible sites which are deeply located<sup>5</sup>. Limitations with FNAC interpretation is mainly due to poor cellularity seen in breast tumors with fibrotic stroma which is inherent to breast lumps.<sup>7</sup>

The rate of unsatisfactory aspirates in our study has been very less compared to other studies. One of the reasons for such low rate was that we repeated the sampling from two or more sites. Immediate wet smears were examined for adequacy and repeated if found inadequate. Inadequate smears were categorized only after ultrasound examination of the breast lumps, in which blind FNA's didn't yield any material.

In our study the benign lesions in C2 category comprised 74.04% of all lesions. In study conducted by Sudarat N et al 53.9% of lesions were benign in nature.<sup>6</sup> In a study conducted by Ahmed O A et al,<sup>8</sup> out of 759 cases in Sudan, benign lesions were 423(55.86%) and 248(32.67%) were malignant and 10 % of cases showed normal breast tissue.

In all the studies most common was the fibroadenomas. Of the benign lesions, fibroadenomas constituted 43.5%. Most cases were in the age group of 11-40 years. In the study conducted by Ahmed O A et al,<sup>8</sup> 86.46% were fibroadenomas, study Rakhshindah B et al<sup>5</sup> showed 67.7% were fibroadenomas and in study conducted by Taha M M et al <sup>2</sup> 59.4% were fibroadenomas.

In our study 20.12% of cases were categorized as benign breast disease, more commonly in 21-40 years of age group. Those cases which could not be categorized as any specific breast disease on cytology with scanty aspirates with few clumps of benign ductal epithelial cells with or without adipose tissue fragments were categorized in this group in our study. These lesions included normal breast, fibroadenosis, gynaecomastia and few cases of fibrocystic disease but could not be specifically typed on FNAC.

In our study, 11.03% of cases were fibrocystic disease. These aspirates were mostly straw colored cyst fluid and smears showed cyst macrophages with benign ductal cells and distributed overall age group from 11-60 years, but more in 31-40 years of age group. The study conducted by Rakhshindah B et al<sup>5</sup> showed fibrocystic disease in 16.37%, Ahmed O A et al<sup>8</sup> showed 9.06% showed fibrocystic disease, study conducted by Taha M M et al<sup>2</sup> showed 27% of cases having fibrocystic disease.

In our study 11 cases (7.14%), showed breast abscess in 21-50 years. In the study conducted by Taha M M et al<sup>2</sup> 4.2% showed chronic abscess, study conducted by Sudarat N et al<sup>6</sup> showed 7.14% as abscess and study conducted by Ahmed O A et al<sup>8</sup> showed 21.45% cases. Breast abscess showed acute inflammatory cells, foreign body giant cells, necrotic background and cyst macrophages suppurative abscess, fat necrosis, granulomatous mastitis and secondary infection of cysts in fibrocystic disease were included in this group. In younger age group breast abscess were associated with lactation and secondary infection of galactocele.

In the older age group central areas of tumor necrosis aspirated showed only necrotic material with acute inflammatory cells. These cases should be searched for atypical cells or malignant cells<sup>9</sup>. Hence these cases were coupled with further investigation of ultrasound and mammography. Repeat FNAC was done under ultrasound guidance from solid areas were done and some cases yielded positive for malignant cells which otherwise not seen on the first aspirate.

In our study atypical ductal hyperplasia (C3 category) was seen in 5.19% of cases. Smears in these cases showed moderate cellularity with ductal cells, benign in nature with crowding and variation in size of epithelial cells. The study conducted by Sudarat N et al <sup>6</sup> showed 3.06% of atypical

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ductal hyperplasia. Raafat A H et al<sup>10</sup> 0.32 % (1/310) as atypical ductal hyperplasia in their study. It may be difficult to give a definitive diagnosis of atypical ductal hyperplasia on FNAC alone, so it is necessary to do a cell block with residual aspirate or perform a core biopsy to distinguish between a typical and atypical hyperplasia.<sup>10</sup>

Our study showed suspicious in 1.92% in C4 category. Other studies showed variable results in C4 category, namely Rakhshinda et al in their study found 10.3% in 464 cases, Sudarat N et al<sup>6</sup> had 17% in 190 cases, Taha M M et al<sup>2</sup> found 9.1% in 66 cases. The cases in suspicious category were repeated to obtain better yield and core needle biopsy was also performed, to ascertain the nature of the lesion, which turned out to be malignant.

FNAC can be used for the diagnosis of inflammatory swellings of the breast such as breast abscess, granulomatous mastitis including tuberculosis where special stains like Zeil Nelson stain can be used to identify tubercle bacilli<sup>11</sup>.

Core needle biopsy of breast has taken over FNAC as primary diagnostic test in the developed countries.<sup>12</sup>

However, FNAC is a simple, less invasive and low cost procedure hence has retained its popularity in the developing countries. Core needle biopsy may be used as a second line diagnostic tool in lesions which yields insufficient cells and equivocal diagnosis.<sup>13,14</sup>

Thus FNAC requires an excellent aspirator to obtain satisfactory material and breast cytopathologic expertise in interpreting the breast aspiration.<sup>15</sup>

Though the cases were reported in C1-C5 category, a specific cytologic diagnosis was given in cases wherever possible. The clinicians in our hospital preferred the disease specific diagnosis of benign breast disease to the C1-C5 category.

**CONCLUSIONS:** In countries with limited resources like India, FNAC may be used as the first line of diagnostic tool for evaluating breast lesions.

Unsatisfactory samples are obtained on FNAC when the lesions contain abundant fibrotic or desmoplastic stroma leading to sampling error, even in the hands of experience pathologists.

Breast FNA continues its monopoly over core biopsy and open excision biopsy. Benign conditions of breast can be diagnosed easily on FNA if done accurately. The current usage of C1-C5 categories in typing the breast lesions gives a wide scope for pathologist to place the doubtful lesions freely in the categories. However a disease specific diagnosis was preferred by the clinicians.

In females, the commonest benign lesions encountered were fibroadenoma (43.5%), followed by benign breast disease (20.12%) and fibrocystic disease (11.03%).

In males, the commonest cause of breast enlargement was benign breast disease (gynaecomastia) (72.75%), followed by fibroadenoma (9.1%).

### REFERENCES:

1. Venugopal K, Pratap Balakrishna, Nikshita N. FNAC Accuracy in Diagnosis of Breast lesions. *Journal of Evolution of Medical and Dental Sciences* 2014; Voln 3(12), March 24: 3062-3068.
2. Taha M M Hassan, Anil Mohan Rao S. Does Fine needle Aspiration Cytology of the Breast Is Still an Accurate Diagnostic Technique for Breast Lumps? *IOSR Journal of Dental and Medical Sciences* 2014; 13(5): 37-44.



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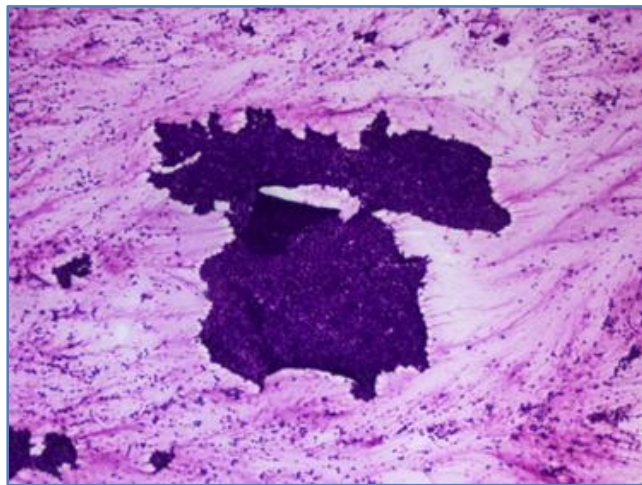
3. Nasar Y A, Hafsah A A, Usha R A. Fine Needle Aspiration Cytology of 108 Breast Lesions with Histopathologic Correlation: A Retrospective Study. *Annual Research and Review in Biology* 2014; 4(21): 3244-3250.
4. Malini Harigopal and David C. Chheing. Breast cytology: Current Issues and Furture Directions. *The Open Breast Cancer journal* 2010; 2: 81-89.
5. Rakhshindah Bajwa and Tariq Zulfiqar. Association of Fine Needle Aspiration Cytology with Tumor Size in Palpable breast Lesions. *Biomedica* 2010; 26:124-129.
6. Sudarat N, Somneuk J, Siriwan T. Accuracy of Fine Needle Aspiration Cytology from Breast Masses in Thailand. *Asian Pacific Journal of Cancer Prevention* 2009; 10: 623-626.
7. Yun Gong. Breast Cancer: Pathology, Cytology and Core Needle biopsy Methods for Diagnosis. *Breast and Gynecological Cancers: An Integrated Approach for Screening and Early Diagnosis in Developing Countries* 2013; 19-37.
8. Ahmed O A, Taiseer M E, Mohammad H E et al. Cytomorphologic Patterns of Breast Lesions in Sudanese Patients: Lessons Learned from Fine Needle Aspiration Cytology. *Asian Pacific Journal of Cancer Prevention* 2014; 15: 3411-3413.
9. P K Shukla, Naveen Thapliyal, Saloni Upadhyay, Usha Joshi, Sanjay Chufal. Reliability of Fine Needle Aspiration Cytology (FNAC) in Very Small Breast Lumps. *Indian Medical Gazette* 2012; 92-95.
10. Raafat A H, Abdelmonem A H et al. Fine Needle Aspiration Cytology and Cell Block Study of various breast lumps. *American Journal of Biomedical and Life Sciences* 2014; 2(1): 8-17.
11. Bukhari M H, Arshad M, Jamal S et al. Use of Fine Needle Aspiration in the Evaluation of Breast lumps Pathology. *Research International* 2011.
12. Willams S M, Van deurzen C H M, Van Diest P J. Diagnosis of breast lesions: Fine needle aspiration cytology or core needle biopsy? A review. *J Clin Pathol* 2012; 65(4): 287-292.
13. Sang-mo park, Dong-whalee, So-young jin, Dong-wonkim, Yoon-mijeon & In-ho Choi. Fine Needle Aspiration Cytology as the first diagnostic modality in breast lesions. A comparison with core needle biopsy. *Basic & Applied Pathology* 2010; 3: 1-6.
14. Qureshi H, Amanullah A, Khan K M, Deeba F. Efficacy of Fine Needle Aspiration Cytology in the Diagnosis of Breast Lumps. *JPMI* 2007; 21: 301-304.
15. Radhakrishna S, Gayathri A, Chegn D. Needle Core biopsy for breast lesions. An audit of 467 needle core biopsy. *Indian Journal of Medical and Paediatric Oncol.* 2013; 34: 252-256.

Diagnosis/Age	11-20	21-30	31-40	41-50	51-60	>60	Total
<b>Female</b>							
Inadequate		1					1
Fibrocystic Disease	2	2	6	4	3	1	18
Fibroadenoma	20	27	14	5	1		67
Intraductal Papilloma		1		1	1		3
Breast abscess	2	4	3	3			12
Mastitis		3	1	1	1		6
Phylliodes	1	1		1			3
Galactocele		4					4

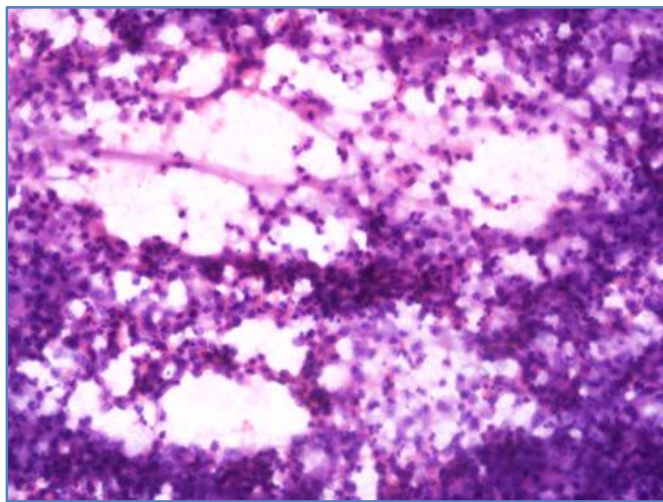
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Mammary duct ectasia			1				1
Benign Breast disease	5	15	8	3			31
Atypical Ductal hyperplasia		4	1	3			8
<b>Total</b>	<b>30</b>	<b>62</b>	<b>34</b>	<b>21</b>	<b>6</b>	<b>1</b>	<b>154</b>
<b>Male</b>							
Inadequate			2				2
Fibroadenoma	1						1
Benign Breast disease	3	1	1		3		8
<b>Total</b>	<b>4</b>	<b>1</b>	<b>3</b>		<b>3</b>		<b>11</b>

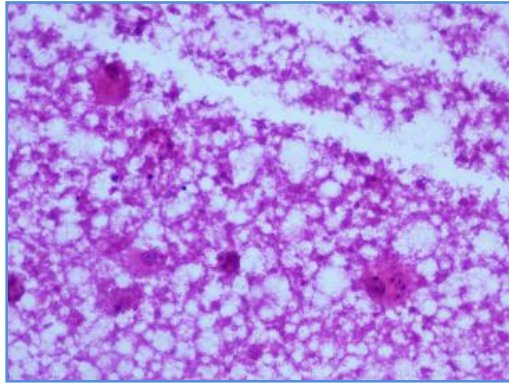
Table 1: Distribution of various lesions in different age groups



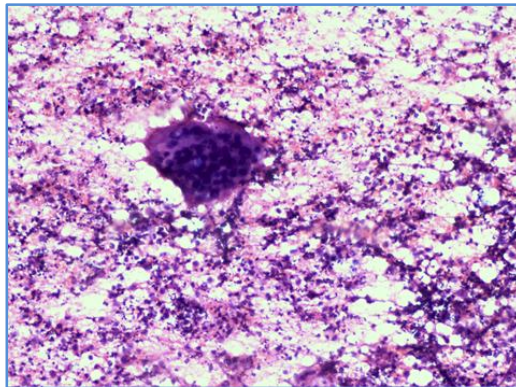
**Fig. 1: Fibroadenoma FNAC smear showing monolayer of benign ductal cells and plenty of bare nuclei in the background. Giemsa stain, 20x.**



**Fig. 2: Breast abscess FNAC smear showing necrotic background with sheets of neutrophils. H&E Stain, 20x**



**Fig. 3: Fibrocystic disease. FNAC smear showing proteinaceous background with cyst macrophages. H & E stain, 40x**



**Fig. 4: Granulomatous mastitis. FNAC smear showing necrotic background with multinucleate giant cells. H & E stain, 40x**

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