Original Research Article

Study of the clinical and cytological spectrum of Granulomatous Mastitis: A Retrospective Study in Bundelkhand Medical College Sagar MP

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Abstract

Background: Granulomatous mastitis (GM) is a benign condition, and therefore its early diagnosis is essential to avoid invasive surgery. The fine needle aspiration cytological (FNAC) features of GM have rarely been discussed in the literature.**Aims and objectives:** To study the various clinical and cytological presentations of GM and its differentiation from neoplastic lesions of the breast, thus avoiding time-consuming histopathological workup of cases.**Materials and methods:** Fifty-two cases of GM diagnosed on FNAC were studied between **2**017 to 2021 retrospectively. The patient history, clinical findings, and the cytology slides of all the cases were retrieved and studied. Patient details including age, sex, presenting symptoms, obstetrics and lactational history, relevant past medical history, and treatment history were collected. The radiological diagnoses when present were also recorded. The patient's age, sex, history of recent childbirth or lactation, duration of symptoms, laterality of lump,nature of lump whether well-defined or diffuse, presence of discharging sinus,presence or absence of nipple retraction, and axillary lymph nodes were noted and analyzed. Cytological findings include the presence of epithelioid cells, as granulomas or in singles, multinucleated giant cells and their morphology, necrosis, caseous and non-caseous, and type of background inflammation of neutrophils, lymphocytes, and macrophages were also studied from the cytology slides.**Results:** All patients with GM except one were females (98.08%) with a mean age of 38 years. The majority had left side lump (69.23%) and the size of lump <5 cm (88.46%). 48 (92.3%) patients had a palpable lump, and 8 (15.38%) had axillary lymphadenopathy. In USG, 28.85% had an abscess, 21.15% had irregular hypoechoic mass, and 15.38% had increased vascularity. On fine needle aspiration, blood mixed aspirate was obtained in 65.38% cases, whereas in 34.62% cases, pus was aspirated. On cytological smears, 30.77% of patients showed the presence of ill-formed granulomas, one case had scattered epithelioid histiocytes, and the rest of the cases had well-formed granulomas. Multinucleated giant cells, containing nuclei ranging from 5 to 8, were present in 2 (3.85%) cases, 27 (51.92%) cases also had a predominance of neutrophils among other inflammatory cells forming microabscesses, and 8 (15.38%) cases showed the presence of benign ductal cells of the breast.**Conclusion:** The common clinical findings include a positive history of recent childbirth or lactation along with results of the firm to hard unilateral palpable lump associated with skinulceration, sinus formation with or without discharge, nipple eversion, or retraction with any associated axillary lymphadenopathy. Epithelioid histiocytes, singly scattered or present as granulomas, multinucleated giant cells along with the background of caseationnecrosis, or neutrophils present in the background are the common cytological features. However, a confident diagnosis requires a multidisciplinary approach based on microbiological investigations, radiological correlation, and histopathological confirmation.

Keywords: FNAC, cytological presentations, childbirth, breast.

Introduction

Granulomatous mastitis (GM) is a rare inflammatory condition of the breast which can clinically mimic breast abscess and carcinoma, thereby creating a diagnostic dilemma[1]. Kessler and Woolloch were the first to describe it in 1972[2].GM can be caused by various etiologies, including tuberculosis, fungal infections, connective tissue disorders, fat necrosis, and sarcoidosis, and is referred to as idiopathic when no identifiable cause can be found. Tuberculous granulomatous mastitis (TGM) is rare, yet it is one of the most common causes of granulomatous mastitis in endemic places like India[3].GM is a benign condition, but GM's clinical and radiological features can mimic both cancer and inflammatory diseases depending on the associated features. Hence accurate diagnosis in these cases is essential to avoid unnecessary biopsies and mastectomies. Incision and drainage and open biopsies in these cases at times lead to non-healing ulcers with sinus formation[4,5].

Fine needle aspiration cytology in breast lumps is an easy, cost-effective method with a rapid diagnosis for the initial triage of the patients[5].The purpose of the study was to study the clinical and cytological spectrum of granulomatous mastitis diagnosed on Fine Needle Aspiration Cytology (FNAC).Here we are presenting a series of 52 cases of granulomatous mastitis diagnosed cytologically over 4 years. Through this study, we intend to study the clinic-cytologic spectrum of granulomatous mastitis and emphasize the role of cytology in the accurate and early diagnosis of these lesions so that unnecessary surgery can be avoided.

Materials and Methods

The current study was performed at the Cytopathology section Department of Pathology, Bundelkhand Medical College Sagar, over 4 years from Feb 2017 to Feb 2021. Fifty-two cases were retrieved from the archives of the cytopathology section. All cases reported as GM on cytology were included in the study.The patients presented to

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the surgical outpatient department with a breast lump and were referred to the cytopathology laboratory. FNACof the lump was performed, and smears were evaluated. In all the cases, cytological parameters were assessed, including the presence of epithelioid cell granulomas, histiocytes, multinucleated giant cells, necrosis, and neutrophils. The clinical details, including gender, age, obstetrics, lactational history, relevant past medical history, and treatment history, were collected from the case files.

The findings on the local clinical examination like site and side of lump, size of the lump, duration of symptoms, associated tenderness and other signs of inflammation, presence of skin ulceration, sinus formation with or without discharge, nipple eversion or retraction along with any associated axillary lymphadenopathy was noted. The radiological diagnoses when present were also recorded.

Cytological parameters assessed included the presence of epithelioid histiocytes, whether in clusters (as granulomas) or scattered singly, followed by predominantly lymphocytes, histiocytes with or without neutrophils, multinucleated giant cells, and well defined or ill-defined granulomas. With a background of caseation or non-caseous necrosis.All the data analysis was performed using IBM SPSS ver. Software. Cross tabulation and frequency distribution were performed to prepare the tables. PRISM software was used to prepare graphs. Quantitative data were expressed as mean and standard deviation, and categorical data were expressed as numbers and percentages.

Results

All the patients except 1 were female with a mean age of 38 years. In 16 out of 52 cases, the lesion was in the right breast, and 36 were on the left side, while the size of the lump varied from 1 to 5 cm in diameter.

The duration of the lump ranged from 1 month to two years. All the cases had varied clinical presentations, with few showing an irregular hard lump with nipple eversion and retraction, raising the suspicion of malignancy. Some were presented as tender diffuse mass with sinus formation on the skin were given a provisional clinical diagnosis of an abscess.Ultrasonography was performed in 24 cases, with abscess, irregular hypoechoic mass, enhanced vascularity, and lobulated mass all being reported, posing a problem. Table I and table 2 show the clinical and cytopathological features of all the cases.Except in 18 cases where pus was aspirated, all fine needle aspirations yielded blood mixed aspirate. On cytological smears, 16 patients had ill-formed granulomas. One case had scattered epithelioid histiocytes. The remaining cases had well-formed granulomas, 2 cases had no necrosis, and 1 case had patchy necrosis. In two cases, large multinucleated cells with nuclei ranging from 5 to 8 were found.In twenty-seven cases, neutrophils predominated over other inflammatory cells generating microabscesses. The existence of benign ductal cells in the breast was found in 8 of the patients.

Table 1: Clinical presentations of granulomatous mastitis

Parameters		No of patients	Percentage
Age, years	<40	48	92.31
	≥40	4	7.69
Sex	Male	1	1.92
	Female	51	98.08
History of recent childbirth or lactation	Yes	40	76.92
	No	12	23.08
Duration of symptoms, months	≤1	38	73.00
	>1	14	27.00
Laterality of lump	Right	16	30.77
	Left	36	69.23
Size of lump, cms	<5	46	88.46
	≥5	6	15.38
Palpable lump	Yes	48	92.3
	No	4	7.7
	Well defined	36	69.2
	Ill defined	16	30.8
Nipple retraction/eversion		4	7.69
Discharging / non-discharging sinus		3	5.77
Axillary lymphadenopathy		8	15.38
Type of aspirate on FNAC	Blood mixed	34	65.38
	Pus-like	18	34.62
USG findings (n=24)	Abscess	15	28.85
	Irregular hypoechoic mass	11	21.15
	Increased vascularity	8	15.38
	Lobulated mass	6	11.54

Table 2: Spectrum of cytological features of all the cases of GM

Cytological features		No of cases	Percentage
Epitheloid cells	In clusters	51	98.08
	Scattered	1	1.92
Presence of ductal cells		8	15.38
Granuloma formation	Well defined	36	69.23
	Ill-defined	16	30.77
Multinucleated giant cells		2	3.85
Background inflammation	Predominantly lymphocytes	25	48.08
	Predominantly neutrophils	27	51.92
Background necrosis	Caseous /non-caseous	28	53.85

	Suppurative	24	46.15
ZN Staining / TB PCR / CBNAAT	Positive	18	34.62
	Negative	36	69.23

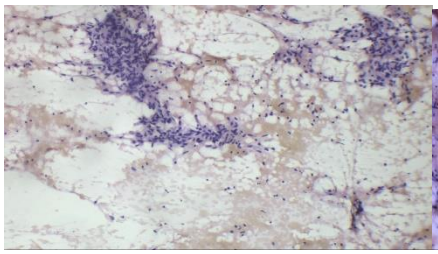

Fig 1: H & E-stained smears showing ill-formed granuloma with patchy necrosis (Low power view)

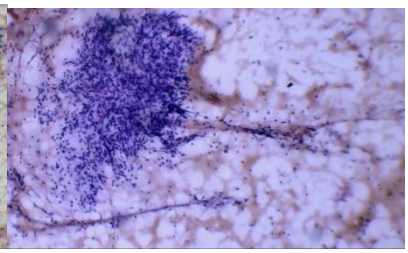

Fig 2: H & E-stained smears showing well-formed granuloma in a background of degenerated inflammatory cells (low power view)

Discussion

The disease under study mainly occurs in women of reproductive age and may be associated with lactation or postpartum. Affected women are nearly always parous and usually present in their early thirties with progressive onset ofbreast lump[6]. All patients in the present study were in the reproductive age group associated with recent childbirth or lactation history.The most common clinical presentation is a firm, unilateral, discrete breast mass, often associated with inflammation of the overlying skin. The disease course is characterized by slow resolution, occasionally with intermittent abscess or discharging sinus formation. It is well known for its problematic clinical presentation as a hard breast lump with or without nipple retraction, particularly in young women, thereby acting as a mimic of carcinoma clinically, as documented by several authors[7].Regional lymphadenopathy may be present in up to 15.38% of cases in our study; 6 patients were misdiagnosed clinically as carcinoma and about 12 others as breast abscess.FNAC is the primary investigation for breast lesions, so awareness about GM is a must among cytopathologists. The common cytological features that have been evaluated include necrosis, giant cells, epithelioid histiocytes, granulomas, and neutrophils present in the background. FNAC may not always differentiate between idiopathic and other granulomatous diseases of the breast, and a confident diagnosis may require histological samples, negative microbiological investigations, and clinical correlation.Several studies from throughout the world were discovered during our exhaustive search of the literature on GM. In 2012, Seo et al. conducted a retrospective assessment of the medical records of 68 patients with GM. FNAC was conducted in 30 cases with histology in all 68 patients, with TBM (tuberculous mastitis) being the final diagnosis in 10 cases and IGM in the remainder [8]. Over six years, Helal et al. evaluated 65 instances of IGM. They've described IGM's cytomorphological and histomorphological characteristics[9]. They underlined the value of cytology in identifying such lesions. Over eight years, Ail et al. collected 21 instances of granulomatous mastitis detected on cytology, 16 of which were nonspecific GM and five of which were TBM. They discovered that 25% of nonspecific GM cases and 60% of TBM cases had a clinical suspicion of malignancy, with another 30% having a radiological suspicion[10]. In this investigation, we looked at 18 instances of GM over three years who tested positive for ZN staining, TB PCR, and CBNAAT. In all cases, cytological characteristics were assessed using specific procedures such as the ZN and PAS stain. Wherever possible, the histopathological correlation was used. The ZN stain/ Tuberculosis-Polymerase chain reaction (TB-PCR) identified four out of ten cases as tuberculous mastitis, whereas the remaining six cases were IGM.

Conclusion

GM is a common lesion in India particularly in our setting owing to the high prevalence of tuberculosis in this region so awareness about the various clinical and cytopathological presentations is a must among clinicians andcytopathologists. For this FNAC is a primary, costeffective,simple, and rapid technique for making a preliminary diagnosis of GM with support from clinical and radiological findings. Even in the absence of granulomas, a diagnosis of GM should be considered when substantial numbers of epithelioid histiocytes are observed in smears. However final diagnosis rests on tissue biopsyi.e.histopathological confirmation and microbiological reports to delve further into its etiology (whether infective granulomatous mastitis or idiopathic GM) which is essential for appropriate treatment and favourable outcome.

Conflict of Interest: Nil Source of support:Nil

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