

Retrospective Review of Breast abscess cases in a tertiary hospital in Addis Ababa, Ethiopia
2020



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Addis Ababa, Ethiopia
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A Thesis submitted to the department of Surgery, Saint Paul's Hospital millennium Medical College in partial fulfillment of the requirements for the Specialty program in General Surgery

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Declaration

I, the undersigned declare and affirm that this thesis is my own work. I have followed all ethical principles of scholarship in the preparation, data collection, data analysis and completion of this thesis. All scholarly matter that is included in the thesis has been given recognition through citation. I affirm that I have cited and referenced all sources used in this document. Every serious effort has been made to avoid any plagiarism in the preparation of this thesis. This thesis is submitted in partial fulfillment of the requirement for certificate in general surgery to St.Paul hospital millennium medical college

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Abbreviations

DM- Diabetes Mellitus

HTN- Hypertension

HIV- Human Immunodeficiency Virus

E. coli -Escherichia coli

IV –Intravenous

PO- Per os

LBA- lactational breast abscess

MRSA- Methicillin resistant staphylococcus aureus

MSSA- Methicillin sensitive Staphylococcus aureus

NLBA- Non-Lactational breast abscess

NOM -non-operative management

S. aureus- staphylococcal aureus

S. epidermidis -Staphylococcal edpidermidis

S. Pyogenes -streptococcus pyogenes

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Abstract

Background: Breast abscess is a localized collection of pus within the breast. Breast abscess can be classified into Lactational (LBA) or puerperal and non-lactational breast abscess (NLBA). Lactational breast abscess occurs as a complication of lactational mastitis. Non-lactational breast abscess are categorized according to the location into central (sub-areolar) and peripheral. Underlying structural disease like periductal mastitis is the major predisposing condition for patients with NLBA. The most common pathogen identified is *S. aureus* in LBA although streptococcus and anaerobic flora can also be identified in NLBA. Treatment of breast abscess entails drainage of the abscess either surgically or with aspiration.

Objective: To Assess the pattern of breast abscess in St. Paul Hospital Millennium Medical College.

Methodology: Cross-sectional study design from September 1 2015- August 31, 2020. All patients treated for Breast abscess in the study period were included in the study. Data was collected using a questionnaire by trained medical doctors. Data was entered into SPSS. Data was categorized and presented in Means and Median.

Result: Lactational breast abscess is more common than Non-lactational breast abscess (87.1% Vs 12.9%). Left side occurred in 47.4% while right side occurred in 45.0% and bilateral breast abscess occurred in 7.7% of patients. Most common site of breast abscess was lower outer quadrant accounting for 25.4%. Patients presented at a median duration of 11 days (2-150 days). The children who were breastfeeding were mostly above 2 months of age. 14.4% of patients presented with a ruptured abscess. Comorbidities identified include Diabetes Mellitus in 11.5%, Hypertension in 3.3%, HIV in 2.4% of patients. Diabetes Mellitus was most common comorbidity in NLBA patients. All patients were treated with Incision and Drainage and a median abscess size of 60 ml was drained. The most common type of incision done was periareolar accounting for 29.7%. All patients received antibiotics postoperatively. The most commonly prescribed medication was Cloxacillin accounting for 80.3% while the next most common was augmentin accounting for 19.7% of patients. The most common biopsy finding was abscess in 60.9% of patients for whom it was sent. 97.1% of patients had follow up. 5.8% of patients developed recurrence of their abscess at a median duration of 1 month.

Conclusions: Lactational breast abscess is more common than non-lactational breast abscess. Lactational breast abscess was found more commonly in primiparous women. Documentation of Non-lactational breast abscess as central or peripheral should be done as it has implications in management. Diabetes Mellitus is the most common comorbidity in non-lactational breast abscess and even minor injuries should be cared for appropriately and health seeking behavior should be improved. Treatment with ultrasound guided aspiration should be tried for able and willing patients. Anaerobic coverage should be given for patients with non-lactational breast abscess. Sending specimen for culture and sensitivity should be made a regular practice for tailoring treatment.

1. Introduction

1.1 Background

Breast abscess is a localized collection of pus within the breast. [1] Breast abscess can be classified into Lactational (LBA) or puerperal and non-lactational breast abscess (NLBA). [2] Lactational breast abscess occurs in the setting of a lactating or breastfeeding mother while non-lactational breast abscess occurs due to multiple factors including predisposing conditions like diabetes, smoking and underlying structural breast lesions like duct ectasia. [2] Lactational breast abscess occurs as a complication of lactational mastitis. [3]

Historically lactational mastitis was called 'milk fever'. [4] Lactational Mastitis is inflammation of breast tissue in a breast feeding mother or one who is weaning. [5]. Lactational mastitis can be both infectious and non-infectious. Clinically, this classification is not important as both will be treated the same. However, the classification is based on a study done by Thomsen A. et al. and they classified breast inflammations into milk stasis, non-infectious mastitis and infectious mastitis based on bacterial and leukocyte count from breast milk which was expressed from milk. It is as follows: milk stasis (leukocyte $< 10^6$ /ml of milk and bacteria $< 10^3$ /ml of milk), non-infectious mastitis (leukocyte $> 10^6$ /ml of milk and bacteria $< 10^3$ /ml of milk), and infectious mastitis (leukocyte $> 10^6$ /ml of milk and bacteria $> 10^3$ /ml of milk). [3] The most commonly isolated organism in infectious mastitis is *Staphylococcus aureus* (*S. aureus*). [2, 3, 5].

The major risk factors identified and reported for lactational mastitis is milk stasis and infection. [4] The result of milk stasis is blockage of lactiferous ducts with viscous secretions. This results in a build-up of pressure which will bring about extravasation of milk contents into the interlobular connective tissue. The contents which have extravasated will then bring about inflammation of tissues and mastitis will result. The symptoms and signs of mastitis which are pain, swelling, erythema will come into picture. This non-infectious inflammation will then progress to infectious inflammation if not properly treated at this time. The likely pathway that bacteria find an entry to the site is through cracked nipples. After the development of infectious inflammation delay even of 24 hours prior to the initiation in treatment will result in the development of a breast abscess. [1, 4, 6, 7]

Non-lactational breast abscess are categorized according to the location into central (sub-areolar) and peripheral. Central or sub-areolar non-lactational mastitis and breast abscess was first described by Zuska and referred to as fistulas of lactiferous ducts. It is a form of breast abscess which presents with abscess formation and chronically draining sinuses near the areola. It is thought to occur as a result of duct obstruction due to squamous metaplasia of the epithelial cells lining the lactiferous ducts. This duct obstruction then leads to subareolar duct dilation or duct ectasia which is then followed by inflammation of the surrounding duct, infection of the terminal lactiferous ducts, duct rupture and subsequent peri-areolar breast abscess formation. These abscesses have a chronic course with recurrent obstruction and fistula formation. Biopsy reveals periductal mastitis in such abscesses and smoking and diabetes mellitus (DM) are significant risk factors. Microbiologic analysis reveals mixed flora in most non-lactational breast abscesses. Peripheral non-lactational mastitis and breast abscess are less common and usually develop in older patients with co-morbid conditions like DM, rheumatoid arthritis (RA) women on steroids and others. The most common pathogen identified is *S. aureus* although streptococcus and anaerobic flora can also be identified. [1, 2, 8]

Treatment of breast abscess entails drainage of the abscess either surgically or with aspiration. Traditionally antibiotics are prescribed for all patients but in LBA this issue is more controversial. The current recommendation is aspiration with ultrasound guidance with multiple episodes usually required to achieve resolution of the abscess. Patients require further work up for co-morbid conditions. Histopathology is done in case of NLBA and recurrences in LBA. [1, 2, 16]

1.2 Statement of the Problem

LBA is common conditions affecting women. LBA is more common than NLBA. The prevalence of mastitis globally was reported as 1-10% with the highest incidence in the first few weeks postpartum and LBA occurs in 3-11% of those with mastitis with a reported incidence of 0.1-3% in breastfeeding women. [1] NLBA is a rare clinical entity. The underlying predisposing condition: periductal mastitis is said to be responsible for 1-2% of all symptomatic breast conditions. [9,10]

In a study done in 2017 in India, 124 patients with breast abscess were studied among which 97 women were diagnosed with LBA and the remaining with NLBA. Most were within the age range of 18-34 years. [11]

In a study done in 1995 by Efem SE in Nigeria, review of 299 cases of breast abscess seen over a 10 year period at the university of Calabar teaching hospital; the finding was LBA constituted 95% of breast abscesses while NLBA constitutes about 5%. The high incidence of lactational breast abscess was attributed to the high prevalence of breastfeeding and poor personal hygiene in the low income group in which the disease was more common. The low incidence of non-lactational breast abscess in Nigeria was attributed to the low incidence of cigarette smoking and mammary duct ectasia in Nigerian women [12]

In a retrospective descriptive study done in 2009 in kenyata national hospital on pattern of breast disease, 1172 patients were reviewed and breast abscess accounted for 14.7% of benign and malignant breast conditions which presented to the hospital. [13]

In a retrospective study done in St. Paul's hospital in 2019, breast abscess accounted for 87 patients out of 3061 with a percentage of 2.8% and a mean age of 37 years. This puts it at number 9 in the top general surgery admissions. [14]

Breast abscess is one of the common emergency diagnosis in our hospital ranking 9th. No study however has been done on breast abscess. This study will address how patients with breast abscess present, the treatment given, culture findings, biopsy findings and try to identify which of the risk factors are present in our patients.

1.3 Significance of the Study

This study tried to address the general aspects of breast abscess with relevant clinical data and laboratory findings giving us an overview of the magnitude of the problem. It also gives highlight of the treatment given for patients with breast abscess, follow up and recurrence.

2. Literature Review

2.1 Clinical Presentation, Treatment and Recurrence

In a 10 year retrospective study done in Australia in 2018 on 77 patients on whom 85 abscesses were identified all of which were NLBA. The median age was 45 years and 93.7% were females. Of the 77 patients, 37 (48%) were smokers, 18 (23%) had diabetes mellitus and 9 (11.6%) were Intravenous (IV) drug users. Of the 85 NLBA; 63 (74.1%) received single antibiotics, 18 (21.2%) received double antibiotic coverage. Flucloxacillin was the preferred antibiotic coverage and was prescribed alone in 38 (44.7%) patients and with other agents in 6 (7%) patients. Metronidazole was prescribed in 11 (12.9%) patients making it the second most commonly prescribed antibiotic which was followed by cephalosporin in 9 (10.5%) patients. Vancomycin was prescribed in 6 (7% of patients). Management of the abscesses was non-operative (NOM) in 50 patients (58.5%) and Operative in 35 (41.4%) patients. Of the cases managed with NOM; 24 were managed with antibiotics alone while 26 were managed with percutaneous drainage and antibiotics. Surgical drainage was done for 35 patients and was done as first line for 21 patients. [16]

In a 7 year retrospective study done in 2016, a total of 75 patients were analyzed and 50.7% were diagnosed with LBA. The left breast was affected in 52%, the right breast in 45% and bilateral breasts were affected in 3%. Comorbidities found in the patients include DM, HIV, HTN and Asthma. Majority were 21-40 years of age and most presented to the treatment facility in 1-14 days. Almost all of the patients underwent operative management. Antibiotics were given postoperatively in 76-88% of the patients postoperatively and the most commonly prescribed antibiotic was amoxicillin/clavulanic acid accounting for 95%. Recurrence rate was 8% overall and it was 13.5% in the non-puerperal abscess and 2.6% in the puerperal group. [17]

In a study done in Turkey in 2005, 45 patients with LBA were involved in the study where patients were randomized to 1:1 to proceed with either incision or drainage and needle aspiration. Mean age of the patients was 25 (range 17-36), 16 (36%) of the patients were primiparous. Upper Outer quadrant was the most frequent site affected site (35%) and the left breast was affected in 26 (58%) patients. In 14 patients (31%) there was history of cracked nipples prior to development of abscess. The mean duration of symptoms was 6.7-8.05 days. Of the 45 patients, 23 were treated with incision and drainage and 22 were treated with needle aspiration. Of those treated with I&D one patient (4%) developed recurrence. Among those treated with needle aspiration 9 patients required

treatment with I&D. All patients were given ampicillin/sulbactam 375 mg twice daily for 10 days.[18]

In a prospective study done in 2003, 128 nursing women with breast infection were followed and mean age was 28 years ranging from 17-43 years. The mean age in mastitis group was 29 years and the mean age in the abscess group was 26 years. 62.5% of the patients were primipara and 37.5% were multipara. The infection was localized to the upper outer quadrant in 39% of patients. Both breast were affected equally. 17% of the patients had previous cracked nipples. Of the 128 women 102 had mastitis while 26 had breast abscess. All patients were given amoxicillin/clavulanic acid 1 gram twice daily for 1 week. The patients with breast abscess were initially treated with ultrasound guided aspiration with an 18 gauge needle and irrigation with sterile saline and if successful after first aspiration repeated aspiration was done. If however this fails due to thick pus surgical drainage was done under local anesthesia. [6]

In a study done in 1992 by Dixon in UK where eighteen consecutive patients with NLBA were identified and treated in a course of 18 months. Of the abscesses 16 were periareolar and 2 were peripheral. In 10 patients the skin overlying the abscess was erythematous and/or edematous but not thinned and it was aspirated with a 19Fr needle. The volume of the pus ranged from 2 to 35 ml. Some of the patients require repeated aspirations. All patients received amoxicillin/clavulanic acid 375mg three times daily for 14 days. In eight of the patients the overlying skin was erythematous and thinned out. These patients were treated with local anesthetic cream and incision and drainage. 7 of these patients received 375mg three times daily for 14 days, while one patient was treated with cephadrine 500 mg four times a day and metronidazole 200 mg three times a day because of penicillin allergy. A total of 2 patients developed recurrence on follow up for which they were treated. [19]

In a study done in 1973 on 50 patients (2 male patients) with NLBA, 12 patients had peripheral and 38 subareolar abscess. Clinical presentation included pain, localized tenderness, swelling, erythema, induration or fluctuant swelling. Masses, nipple discharge and draining sinus were more common in patients with chronic (symptom duration varied from 1 day to 9 years) or recurrent abscess. In the patients with the 12 peripheral abscess, age ranged from 17-67 years (mean age 37.4 years). The right breast was affected in 5 patients and the left in 7. Duration of symptoms varied from 1 day to 4 weeks. History of trauma history was elicited in 3 patients, known epidermal

cyst in the site of abscess in one patient, of previous paraffin injection the affected breast in one. DM was found in 1 patient and Rheumatoid arthritis in another patient. Treatment consisted of incision and drainage with or without biopsy in 8 patients and excision in 4 patients. Among these 1 patient who was treated with incision and drainage had a recurrence 1 month postoperatively which was treated again with incision and drainage. From the 38 patients with subareolar abscess (includes the two male patients), age ranged from 14-72 years with a mean age of 33.8 years. Right breast was affected in 22 patients and the left in 16. From the 38 patients 27 were treated with incision and drainage and 11 patients were treated with excision. Recurrence was documented in 15 patients, 11 of whom were treated with I&D and 4 of whom were treated with excision. The time to recurrence varied from 5 months to 5 years. [20]

2.2 Microbiology and Histopathology of breast abscess

In a 10 year retrospective study done in Australia in 2018 on 77 patients with NLBA. In 80.3% of patients a single organism was identified while 19.7% were found to be polymicrobial. 42% of the abscesses grew mixed anaerobes and 1/3rd grew Methicillin sensitive *Staphylococcus aureus* (MSSA) while 7% grew MRSA. There was a difference in microbiology of the abscess in relation to the size of the abscess. In Abscesses measuring ≤ 3 cm mixed anaerobes were predominant accounting for 54% while in larger abscesses *S. aureus* was found in 29% and other aerobic microbes found in 33%. [16]

In a study done in 2017 in India, 124 patients with breast abscess were studied among which 97 women were diagnosed with lactational breast abscess and the remaining with non-lactational breast abscess. Culture was grown in 92% of the patient's specimen and showed that *S. aureus* was the most common isolated organism at 83% in lactational breast abscess. Mixed Flora including *Staphylococcus aureus* and Group B Streptococci were grown in non-lactational breast abscess. [11]

In a study done in India in 2014 on 50 female patients treated for breast abscess, *S. aureus* was identified in 6 patients with LBA and in 4 patients with NLBA. *Staphylococcal epidermidis* (*S. epidermidis*) in 4 patients with LBA and in 3 patients with NLBA. *Streptococcus pyogenes* (*S. Pyogenes*), *Escherichia coli* (*E. Coli*), *Proteus* species, *Pseudomonas aeruginosa* only grew in

NLBA. Anaerobes including peptostreptococcus species, bacteroid species were found in 3 and 2 patients with NLBA respectively. [21]

In a 2007 study done in USA, 44 patients with breast abscess were treated and 46 specimenes were sent for aerobic culture and 8 anearobic culture. Growth was seen in 28 of the 46 specimens making 61% positive yield. *S. aureus* was the most common aerobic organism identified in 12 cultures (32%) with 7(58%) of them being MRSA. Other organisms which were grown include coagulase-negative *Staphylococcus* (16%), diphtheroids (16%), *Pseudomonas aeruginosa* (8%), *Proteus mirabilis* (5%), and other bacteria (22%). *Propionibacterium acnes* and *Peptostreptococcus anaerobius* were the anaerobic bacteria. The antibiogram shows that 74% (14 of 19 isolates) of the cultured bacteria were susceptible to levofloxacin. All MRSA strains were susceptible to clindamycin, trimethoprim-sulfamethoxazole, and linezolid. Of the MRSA strains 2 were susceptible to levofloxacin while the others showed intermediate susceptibility. [22]

In a review done in Saudi Arabia in 2005, 178 patients presented with breast infection of which 76% were lactating and 24% were non-lactating. Age range from 24-52 years. Underlying clinical conditions were found in 60% of the non-lactating group and 50% was granulomatous mastitis, 15.3% was duct ectasia, 3.8% was fat necrosis, 11.5 % had diabetes, 7.6% had breast cancer and 11.5% were pregnant. *S. aureus* was the most common organism in both lactational and non-lactational breast infectinos in this study. Methicillin resistant *staphylococcus aureus* (MRSA) and *mycobacterium tuberculosis* were cultured only in the non-lactational group. [23]

In a study done in Turkey in 2005, 45 patients with LBA were involved in the study where patients were randomized to 1:1 to proceed with either incision or drainage and needle aspiration. Culture was sent from all patients and revealed *staphylococcal aureus* in 55% of cases. [18]

In a study done in 1995 by Efem SE in Nigeria, review of 299 cases of breast abscess seen over a 10 year period at the university of Calabar teaching hospital was done. The commonest pathogen was *S. aureus* while non-lactational breast abscess was caused by anaerobic organisms. [12]

In a study done in 1992 by Dixon in UK where eighteen consecutive patients with non lactational breast abscess were identified and treated in a course of 18 months. *S. aureus* was identified in 4 patients, anaerobic streptococcus found in 4 patients, *Bacteroides* species was found in 6 patients, no growth in culture in 4 patients. [19]

In a retrospective study done in 1992 in UK on 122 women with breast abscess, 85 (70%) NLBA and 37(30%) LBA were identified. In this study 32 women underwent biopsy and of these 25 were identified to have duct ectasia. 21 out of the 25 women with identified duct ectasia occurred in NLBA. [24]

In a study done in 1973 on 50 patients (2 male patients) with non-lactating breast abscess, 12 patients had peripheral and 38 subareolar abscess. Of those peripheral abscess; bacterial culture was collected in 11 patients of whom 6 had no growth. Coagulase positive Staphylococcus in three, coagulase negative Staphylococcus in one and proteus in one. Histologic abnormalities noted were intraductal papilloma and cystic duct dilatation. One of the patients returned with 3 months after treatment with a mass and diagnosed with breast cancer and treated for it. From the 38 patients with subareolar abscess; cultures were obtained in 22 of the cases and revealed no growth in six, coagulase-positive Staphylococcus in eight, and coagulase-negative Staphylococcus in eight. Anaerobic cultures were not obtained. Biopsy was done in 25 patients which revealed sinus tract in 2 specimens, and ductal abnormalities in 13 including duct ectasia in 6 patients, dilated ducts with inflammatory exudate in 7 patients. [20]

3. Objective

3.1 General objective

To describe magnitude, clinical presentation and management of patients with Breast Abscess in St. Paul's Hospital Millennium Medical College

3.2 Specific Objective

To describe the clinical presentation of patients with breast abscess

To describe the treatment provided to patients with breast abscess

To describe the recurrence rate of patients treated for breast abscess

To describe the microbiological and histopathological profile of patients with breast abscess

4. Methods and Materials

4.1 Study Area/Setting

The study was conducted in St. Paul's Hospital millennium medical college. St. Paul's Hospital Millennium Medical College (SPHMMC), which is located in Addis Ababa, Ethiopia. St. Paul's Hospital is the second biggest hospital in Addis Ababa which serves as a referral center for patients from Addis Ababa and all over the country with regular catchment of 5 million people. SPHMMC is located in the northern part of Addis Ababa. This hospital treats a number of emergency general surgery conditions. Among the top 10 conditions treated at our hospital breast abscess accounts for the 9th according to a study done on patterns of admission in our hospital

4.2 Study design

This study is a descriptive cross-sectional study.

4.3 Study Period

This study was conducted by collecting data from September 1 2015- August 31, 2020.

4.4 Source Population/Study (Sample) Population

Source population

All patients treated on emergency basis during the study period

Study population

Patients with Breast abscess who were treated at St Paul's hospital millennium Medical College in the study Period

4.5 Inclusion and Exclusion criteria

Inclusion Criteria

All patients who were treated for breast abscess in St Paul's hospital millennium medical college over the study period.

Exclusion criteria

Patients whose charts have insufficient data will not be included in the study

4.6 Sample size and sampling technique

All Patients who have been treated for Breast Abscess during the study period.

4.7 Study variables

1. Age
2. Sex
3. Education level
4. Trauma
5. Comorbidity
6. Side of breast abscess
7. Duration of Symptoms
8. Site of Abscess
9. Organism grown in culture and susceptibility
10. Biopsy finding
11. Age of child
12. Incision type
13. Amount of Abscess
14. Antibiotics choice
15. Recurrence

4.8 Data Collection

Medical record numbers of patients treated for breast abscess were collected from the Emergency Operation Room log books, both electronic and hard copy. Around 308 medical record numbers were found. Out of these only 209 charts could be recovered from the medical record room. Data extraction format having the specified data variables were prepared. Pretest data collection was done and appropriate adjustments done on the questionnaire by the principal investigator. Medical doctors were trained on the data collection formats and started data collection. Data quality was assured by checking the questionnaire randomly from the collected cards. After data was collected the data was filled into SPSS and categorized into appropriate groups.

4.9 Data analysis

Data was collected from the chart of patients and categorized first into appropriate groups. Collected data was put into SPSS. Normality of the data was checked by histogram. Normally distributed data is presented by mean (SD) and skewed data presented by median (IQR). The data has been presented in tables.

5. Ethical considerations

Ethical clearance was obtained from St. Paul's IRB. There is no conflict of interest between all parties involved in the study.

6. Plan for Data Dissemination

The final result of this study will be submitted to Saint Pauls' Hospital Millenium Medical College, Surgical department. It will also be sent to the respective units who are involved in the care and management patients and researches. Attempts will be made to publish the information on reputable peer reviewed journals.

7. Result

7.1 Sociodemographic characteristics

A total of 280 medical record numbers were found out of which 209 cards were retrieved and included in this study. The sociodemographic characteristics of the study population are presented in table 1. In this study females accounted for 100% of the patients. The age distribution showed that the median age was 25 (range of 15-79). The most common site from which patients came seeking treatment were Addis Ababa (49.8%, n=104) region. Out of the 209 patients the educational status was documented for 129 (61.7%) patients. 21.5% had attended primary school and 24.4% had attended secondary school and 12.9% had attended Higher level education.

Table 1 Sociodemographic characteristics

Age	15-30	81.3% (170)
	31-45	17.7% (37)
	≥ 46	1% (2)
Region	Addis Ababa	49.8% (104)
	Oromia	43.1% (90)
	Others	7.2% (15)
Educational status	No Formal education	2.9% (6)
	Primary school (1-8)	21.5% (45)
	Secondary school (9-12)	24.4% (51)
	Technic/Diploma/College/University	12.9% (27)
	Not Documented	38.3% (80)

7.2 Pattern of Presentation

All the patients came to our hospital with referral. 70.3% of patients received treatment before referral while 24.4% came without receiving any treatment. Of those who received treatment 74.8% (110) were given antibiotics alone while 17.7% (26) received antibiotics and antipain. 47.4% (99) of patients presented with left breast abscess and 45.0% (94) of patients presented with right breast abscess while 7.7% (16) of patients presented with bilateral breast abscess. The most common quadrant in unilateral abscess was LOQ which accounted for 25.4% of patients. Most patients presented after a median of 11 days of symptoms. Out of the patients who received treatment 87.1% (182) were lactational while 12.9% (27) were non-lactational. Among Pregnant patients who developed LBA 4 patients were in their 2nd TM while 5 patients were in their 3rd TM. The median age of the child from patients who came with LBA was 2 months. 48.6% of patients were primiparous mothers. Of all the treated patients 45.9% (96) of patients presented with tachycardia. The median abscess size was 20 cm² by physical examination. 38.3% (80) of patients had fluctuant swelling on presentation while 78.5% (164) had erythema overlying the swelling. 14.4% (30) of patients presented with a ruptured abscess.

Table 2 shows duration of symptoms, lactational status, age of child, para status, pulse rate, abscess characteristics on presentation

Treatment before referral	Received treatment before referral	70.3% (147)
	Didn't receive treatment before referral	24.4% (51)
	Only Diagnosis written on referral	3.8% (8)
	No referral	1.4% (3)
Treatment Given	Antibiotics	74.8% (110)
	Anti-Pain	6.1% (9)
	Antibiotics + Anti pain	17.7% (26)
	Other	1.4% (2)
Side of Abscess	Left	47.4% (99)
	Right	45.0% (94)
	Bilateral	7.7% (16)
Quadrant of abscess for unilateral abscess	UOQ	24.9% (48)
	UIQ	18.1% (35)
	LOQ	25.4% (49)
	LIQ	5.2% (10)
	Not specified	26.4% (51)
Duration of symptoms	Median	11 days (2-150)
	1-14 days	72.8% (155)
	>14 days	24.4% (52)
Type of Abscess	LBA	87.1% (182)
	NLBA	12.9% (27)
Age of Child in months in LBA (lactating only)	< 2 months	35.9% (61)
	≥ 2 months	64.1% (109)
Parity	Para 1	48.6% (84)
	Para 2	28.9% (50)
	Para 3	9.8% (17)
	Para 4	4% (7)
	Parity status not mentioned	8.7% (15)
Tachycardia on presentation	≤ 99	54.1% (113)
	≥ 100	45.9% (96)
Abscess characteristics on physical examination	Ruptured	14.4% (30)
	Erythematous	78.5% (164)
	Swollen	69.9% (146)
	Hot	32.1% (67)
	Tender	77.5% (162)
	Fluctuant	38.3% (80)

7.3 Investigation of patients

From blood profile done 75.6% (158) of patients presented with WBC>10,000. Ultrasound was done for 66% (138) of patients and the finding was abscess in 81.9% (113) of patients. FNAC was done for 13.9% (29) of patients preoperatively and the most common finding was pyogenic abscess in 37.9% (11) of patients.

Table 3 shows the results of investigations sent for patients who received treatment during the study period.

WBC	>10,000	75.6% (158)
	<10,000	23% (48)
Ultrasound done	Yes	66% (138)
	No	33.5% (70)
Ultrasound finding	Abscess	81.9% (113)
	Mastitis	29% (40)
	Other diagnosis	15.2% (21)
FNAC done	Yes	13.9% (29)
	No	86.1% (180)
FNAC result	Abscess	62.1% (18)
	Mastitis	10.3% (3)
	Granulomatous Mastitis	10.3% (3)
	Other	17.2 (5)

7.4 Risks present in patients

Trauma was present in 4.8% of patients who presented with Breast abscess. 18.6% (39) of patients were found to have comorbidity. DM was present in 11.5% (24) of patients (48.1% in NLBA). HIV was identified in 2.4% (5) of patients (7.4% in NLBA).

Table 4 shows the risks identified for the patients

History of trauma	Present	4.8% (10)
	Absent	69.4% (145)
	Not Mentioned	25.8% (54)
Comorbidity	DM	11.5% (24)
	HTN	3.3% (7)
	HIV	2.4% (5)
	Other	1.4% (3)
Comorbidity in NLBA (Non-lactating + Not pregnant)	DM	48.1% (13)
	HTN	7.4% (2)
	HIV	7.4% (2)
	Other	3.7% (1)

7.5 Treatment given

Incision and drainage was done for all patients. The type of incision done most commonly was periareolar and it accounted for 26.8% (56) of incision choice. The other most common incision types in decreasing order were radial, curvilinear, over the abscess and cruciate. The type of anesthesia used most commonly was light sedation and general anesthesia. The median size of abscess drained was 60 ml. Intravenous antibiotics were prescribed for 98.1% of patients and the most common antibiotics prescribed was Ceftriaxone. The most common antibiotics prescribed on discharge was cloxacillin in 80.3% (167) of patients. Out of the 27 patients treated for NLBA 1 patient was given po cloxacillin with metronidazole, 15 patients were treated with cloxacillin alone and 11 patients were treated with augmentin. The Pus was sent for analysis in 1.9% of patients and biopsy was sent in 24.9% (52) of patients. Overall the biopsy finding was collected by 44.2% (23) of patients for whom biopsy was sent. Of the biopsies collected the most common finding was abscess (60.9%, 14). Out of 27 patients treated for NLBA biopsy was sent for 51.9% (14) patients while it was not sent for 48.1% (13) of patients. It was collected by 35.7% (4) of patients for whom it was sent while not collected by 64.3% (9) of patients. From those who collected their biopsy finding was Abscess in 14.3% (2) patients.

Table 5 shows the treatment given for patients

Incision and Drainage	Done	100% (209)
	Not done	0
Types of Incision	Periareolar	29.7% (62)
	Radial	25.4% (53)
	Curvilinear	17.2% (36)
	Over the abscess	1.9% (3)
	Cruciate	0.5% (1)
	Not Mentioned	25.8% (54)
Type of Anesthesia	Light Sedation	49.8% (104)
	General anesthesia	49.8% (104)
	Local anesthesia	0.5% (1)
Abscess drained in ml	Median abscess drained in ml	60 ml (5-800 ml)
Abscess drained in NLBA	Median abscess drained in ml	50ml (10-200 ml)
Post-operative antibiotics	Intravenous	98.1% (205)
	Per Os	1.9% (4)
Post Op Intravenous Antibiotics	Ceftriaxone	68.8% (141)
	Metronidazole	26.5% (54)
	Cloxacillin	30.7% (63)
Antibiotics prescribed on discharge	Cloxacillin	80.3% (167)
	Metronidazole	0.5% (1)
	Augmentin	19.7% (41)

Antibiotics prescribed on discharge in LBA (Lactating + Pregnant)	Cloxacillin	83.4% (151)
	Metronidazole	0%
	Augmentin	16.6% (30)
Antibiotics prescribed on discharge in NLBA	Cloxacillin	59.3% (16)
	Metronidazole	3.7% (1)
	Augmentin	40.7% (11)
Total duration of IV antibiotics	One day	56.6% (116)
	Two days	43.4% (89)
Culture	Sent	19.1% (40)
	Not sent	80.9% (165)
Gram stain	Done	0.5% (1)
	Not done	99.5% (208)
Biopsy	Sent	24.9% (52)
	Not sent	75.1% (157)
Biopsy collected	Collected	44.2% (23)
	Not collected	55.8% (29)
Biopsy Finding	Mastitis	21.7% (5)
	Abscess	60.9% (14)
	Lactational Adenoma	8.7% (2)
	Duct Ectasia	4.3% (1)
	Fat Necrosis	4.3% (1)
Biopsy in NLBA	Sent for	51.9% (14)
	Not sent	48.1% (13)
	Collected	35.7% (5)
	Not collected	64.3% (9)
	Most common	Abscess (14.3%, 2)

7.6 Follow up and recurrence

100% of patients came for follow up and out of those who came 97.1% (201) of patients had completed their follow up and were discharged. 5.8% (12) of patients had a recurrence of their abscess, all recurrences occurred in LBA. The median time of recurrence was 1 month.

Table 6 shows the follow up and recurrence of patients

Follow Up	Yes	100% (209)
	No	0
Discharged from follow up	Discharged	97.1% (201)
	Discontinued	2.9% (6)
Recurrence	Yes	5.8% (12)
	No	94.2% (196)
Time of recurrence	Median time in months	1 month

8. Discussion

This study showed that LBA is more common than NLBA (87.1% vs 12.9%) which is somewhat different than the study done by Efem in Nigeria which showed LBA prevalence is 95% and NLBA was 5% and different from the study done in Kenya by Mwenda where 50.7% of patients had LBA; it is different from Saudi Arabia where 76% were LBA and 24% were non-lactating while in a study done in UK 70% were NLBA and 30% were LBA. The significant difference in prevalence between UK and our study could be related to the smoking prevalence which is higher there and the low number of LBA could be due to proper breastfeeding techniques that clients are made aware of and that this practice should be intensified in our country as well. [12, 17, 23, 24]

The left breast was affected in 47.4%, the right in 45% and bilateral breast was affected in 7.7% of patients which is similar to other studies done in Kenya by Mwenda and others where the left breast was affected in 52%, the right breast in 45% and bilateral breasts were affected in 3%. Bilateral breast abscess occurred in 7.7% of patients which is more in our study. The study done in Turkey by Eryilmaz et al. showed 58% of the time the left breast was affected. [17, 18] The most common site for the breast abscess was the LOQ in 25.4% of patients which is in contrast to UOQ site of 35% in another study done by Eryilmaz et al. This could be to the fact that in 26.4% of patients the quadrant of abscess was not specified. [18]

History of trauma was elicited in 4.8% of patients which is more in our study as compared to other literature done by Ekland et al where trauma was elicited in 3 patients. The cause of trauma could not be determined by our study but this should be looked into and advice and counseling should be given as appropriate. [20]

The median duration of symptoms was 11 days and most (72.8%) presented within 1-14 days of symptoms which is different to a study done in Turkey where mean duration of symptoms was 6.7-8.05 days. Patients in developing countries like ours could be seeking healthcare late. In addition to coming late patients in developing countries could try different home remedies and herbal medications before coming to healthcare. This might be the reason that our patients are coming after a delayed presentation and coming with a ruptured abscess. [18]

The most common age of the child in which LBA occurred is beyond 2 months which is in contrast to literatures which suggest that it occurs mostly in the first few weeks of lactation. The fact that patients are coming late to seek treatment could be a reason for this contrast. [9, 10]

The clinical presentation of the patients included hot, swollen, tender, erythematous and fluctuant swelling similar to a study done by Ekland et al. which showed patients presented with pain, localized tenderness, swelling, erythema, induration or fluctuant swelling. [20]

Comorbidities detected included DM, HIV and HTN. In our study diabetes was identified in 48.1% of patients with NLBA which was higher as compared to the study done by Saboo et al. in Australia where it was identified in 23% of patients with NLBA. In USA study done by Monica R et al. 72% of patients treated with NLBA had DM. Hence, patients with diabetes mellitus should be given appropriate health education like treating minor injuries, seeking health care early, achieving good glucose control and avoiding bad habits like smoking. [16, 25]

Incision and drainage was done for all patients which is contrast to recent recommendation to treat patients with breast abscess and normal overlying skin with needle aspiration. [1, 2, 16, 26] The median abscess drained in NLBA was 50ml which is higher than the study done by Dixon JM et al. where only 2-35 ml of abscess was drained. According to current recommendation ultrasound guided aspiration should be the first line of treatment. However this require patients' cooperation and understanding for continued follow-up. This could be done by point of care ultrasound done by the surgeon or by radiologists. Thought into this mode of treatment should be initiated and tried. [19] .

Post-operative po antibiotics were given for all patients and the most commonly prescribed medication was Cloxacillin in 80.3% of patients which was in contrast to study done by Mwenda and others where Augmentin was prescribed in 95% of patients. In our study in NLBA the most common prescribed antibiotic was cloxacillin in 59.3% of patients which was similar to another study done by Saboo et al. where Flucloxacillin was the preferred antibiotic coverage and was prescribed alone in 44.7% patients. In a study done by Turkey on LBA ampicillin.sulbactam was prescribed for all patients which was in contrast to our study where in 83.4% of patients cloxacillin was the most common prescribed antibiotic. Additionally out of the 27 patients treated for non-lactational breast abscesss, 15 were given cloxacillin alone without anaerobic coverage. This practice is not supported by literature as anaerobic coverage is required in patietns with breast abscess. The difference in prescription of antibiotics could be related to the fact that penicillinase resistant staphylococcus aureus are believed to be higher in our country even though we don't have community biograms done at a national level. [16, 17]

Biopsy was sent for 51.9% of patients with NLBA which should have been sent for all. The biopsy which was sent was not collected for all and 90.4% patients for whom biopsy was sent were discharged from follow up, this means the physician discharged the patient without seeing the result. Out of the 5 patients for whom biopsy was collected abscess was found in 2 patients, duct ectasia in 1, fat necrosis in 1 and mastitis in 1 patient which was different from finding in other literatyre which showed revelead sinus tract in 2 specimens, and ductal abnormalities in 13 including duct ectasia in 6 patients, dilated ducts with inflammatory exudate in 7 patients. It is important to send specimen for culture and sensitivity testing in patients treated with a breast abscess to give specific treatment. This practice should be routine for all patients and the results can help and be extrapolated to the community level and can help change our management. The follow up of patients with non-lactaitonal breast abscess should include mammography in those above age 35 who present with peripheral abscesses. In addition to this the description of breast abscess which occur in non-lactational period should be reported as peripheral or central as this give a clue to the cause and has management implications. While peripheral abscess are associated with medical co-morbidities central or periareolar abscess occur majorly in smokers or rarely in those with underlying maliganncy. [2, 20] From the total 5.8% of patients developed recurrence of their abscess which was similar to a study done by Mwenda et al. where 8% of patients developed recurrence. The recurrence in NLBA in our study was none while in a study done by Mwenda et al. it was 13.5%. The recurrence in LBA in our study was 6.6% while in a study done by Mwenda et al. it was 2.6% which was higher in our study while in a study done by Eryilmaz R et al. 4% developed recurrence. The recurrence could be related to inadequate treatment, early closure of the cavity so adequate debridement should be done at the time of treatment and also

packing the cavity with gauze while on wound care could be a way to solve the problem. This will require education of centers who give wound care for our patients after being discharged. [17, 18]

9. Strength and limitation of the study

9.1 Strength of the study

As a major strength this study tried to address one of top ten general surgery emergency admissions in st paul's hospital millennium medical college. We have included several variables which give a good overview of the patients' patterns of presentations.

9.2 Limitation of the study

The major limitation of this study was that it was not able to meet its fourth objective, i.e to determine the microbiological and histopathological profile of patients with breast abscess.

10. Conclusion and recommendation

10.1 Conclusion

Lactational breast abscess is more common than Non-lactational breast abscess. Lactational breast abscess was found to be common in primiparous women. Non-Lactational breast abscess should be documented as central or peripheral should be done as it has implications in management. The most common site is LOQ. Diabetes Mellitus is the most common comorbidity in NLBA and even minor injuries should be cared for appropriately and health seeking behavior should be improved. Treatment with ultrasound guided aspiration should be tried for able and willing patients. Medications with activity against anaerobes should be given for all patients treated with Non-lactational breast abscess. Follow up of patients with NLBA should be improved including mammography for patients with NLBA and presenting after the age of 35. Sending specimen for culture and sensitivity should be made a regular practice for specific treatment and to prevent recurrence.

10.2 Recommendation

- Improve appropriate and relevant data filling by both physicians and nurses.
- Use a checklist for patients with breast abscess so that relevant data will not get lost
- Keep charts at the Medical record room appropriately.
- Treatment with ultrasound guided aspiration should be considered for able and willing patients.
- Training should be given to residents about standards of care in Non-lactational breast abscess.
- Further study should be done if there is any association between primiparity and Lactational breast abscess.
- Make culture taking and biopsy routine.

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Name of Data Collector	Signature
Hospital	Year of Patients treatment A)2009 B)2010 C)2011 D)2012
MRN _____ Age _____	A) Male B) Female Region _____
Highest educational level of patient	_____
Did the patient receive treatment before referral?	A) Yes B) No C) Not specified
What kind of treatment was given?	A) Antibiotics B)Specify if Other _____
Which breast is affected with the abscess?	A) Right B) Left C) Bilateral
Where is the abscess?	Specify quadrant A) UOQ B) UIQ C) LOQ D) LIQ
Was there any history of Trauma?	A) Yes B) No C) Not Mentioned
Duration of symptoms?	_____
Is the mother lactating? How old is the child? Para status?	A) Yes B) NO Age of child _____ Para status _____ -
Is the mother pregnant? What trimester?	A)Yes B) NO Trimester of mother _____
Any Identified Co-morbidity	A)HTN B) DM C) HIV D) Other identified _____
Presentation: Write Pulse rate, Size of abscess, and WBC (N%)	Pulse rate _____ Abscess size _____ WBC(N%) _____
Characteristic of the Abscess on Physical examination	A) Erythematous B) Swollen C) Tender D) Hot E) Fluctuant
Were there LAPS	A) Yes B) No
Was the abscess ruptured?	A) Yes B) No
Was Ultrasound done?	A) Yes B) No
What was the finding?	_____
Was FNAC done prior to treatment	A) Yes B) No
What was the FNAC result?	_____
Is there history of underlying Breast disorder	A) Yes B) No
What is the breast disorder?	A) Fibroadenoma B) Other _____
Was Incision and Drainage done?	A) Yes B) No
What type of incision was done?	A) Over the Abscess B) Periareolar C)Radial D)Curvilinear E) Other _____
How much Abscess was drained? (ml)	_____
What type of anesthesia was used	A) Local Anesthesia B) Light Sedation C) General Anesthesia
Was Antibiotics Prescribed	A) Yes B) No
What antibiotics were prescribed? (Immediate Post op period) and how many days did they take it	A) Ceftriaxone 1 gm IV bid B)Metronidazole 500 mg IV tid C) Cloxacillin 500 mg iv qid D) Only PO Antibiotics were given Days of IV antibiotics _____
Was Culture sent?	A) Yes B) No
Organisms grown in Culture result (SA for Staphylococcus aureus, others list full bacteria name)	_____ _____ _____
Was gram stain sent? Finding	A) Yes B) No Result _____
Bacteriology susceptibility of Organisms	_____ _____ _____
Was Biopsy sent?	A) Yes B) No
Biopsy finding	_____
What antibiotics were prescribed on Discharge	A) Cloxacillin 500 mg poqid B) Metronidazole 500 mg potid C) Augmenting 625 mg potid D) Augmentin 1gm po bid E) Other _____
Total Stay in days	_____
Was there a follow up?	A) Yes B) No
How many follow ups did the patient have?	A) 1 B) specify if other _____
Was the patient discharged from follow UP?	A) Yes B) No
Was there a recurrence of the abscess?	A) Yes B) No
When was the recurrence? (w-weeks/ m-months)	_____

12. Annexes