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Occurrence and Diversity of Staphylococcus from Women with Breast Abscess and Mastitis

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ORIGINAL STUDY

Occurrence and Diversity of Staphylococcus from Women with Breast Abscess and Mastitis

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ABSTRACT

Mastitis is inflammatory that can effect women at every time, it is predominant occur in women during breastfeeding. *Staphylococcus* are the most common pathogens causative agents of mastitis. The clincal samples were collection from women with different age group from patients who admitted to Al-Hilla General teaching hospital (breast cancer consultation and outpatient clinics) for the period from August 2023 to Januray 2024. This study included 80 patient suffered from breast infection or mastitis, this result show that 45 (56%) from total samples having breast abscesses and 35 (44%) having mastitis. The isolating bacterial causes according of total samples that having *S.aureus* 20 (25%), *S.epidermides* 10 (12.5%), other growth bacteria 20 (25%) and no growth 30 (37.5%).

Keywords: Mastitis, Breast Abscess, S.aureus, S.epidermidis, Lactation, Non-Lactation

1. Introduction

Mastitis is inflammation of the breast and can be classified into lactation and non-lactation mastitis. Lactation mastitis it is predominant type of mastitis. Non-lactation mastitis consist perductal mastitis and idiopathic granulomatous mastitis (IGM) [1].

Lactation mastitis, or puerperium mastitis, is typical belong to lengthy engorgement of milk ducts, with infectious from bacteria entrance during damage in the skin. Patients can develop an area of reddening, painful, and distention and can have an association with systemic symptomatic, most notable fever. This occur most oftenly in the firstly 6 weeks of breastfeed but can occurrence at all time through lactation, with most cases decreasing after 3 months [2].

A breast abscesses is a localizing collection of pyogenic materials in the breast tissue, which can be a complication of infection mastitis (developed in 3–11% of women) or can also be the first presentation of breast infectious [3].

Lactation mastitis development in up to 20% of all breastfeed patients. The most commons causative agent are *S.aureus*, including MRSA, as well as *Streptococci* and *S.epidermidis*. The first stage is usually at the expense traumatize for instance a cracked nipple or nipple abrasion from breastfeed these results in both swell, which compressor the sub areolar breast duct, and bacteria overgrowth on the skin. Bacteria then gain access to the breast during the trauma area and infected the poor draining duct [4].

The bacteria *S.aureus* is considered to be the major etiological factor in bacterial mastitis, and therefore the relevance antibiotic types are effective against it [5].

2. Materials and methods

2.1. Patient specimens

The study consist a total (80) of samples from patients who admitted to Al-Hilla General teaching

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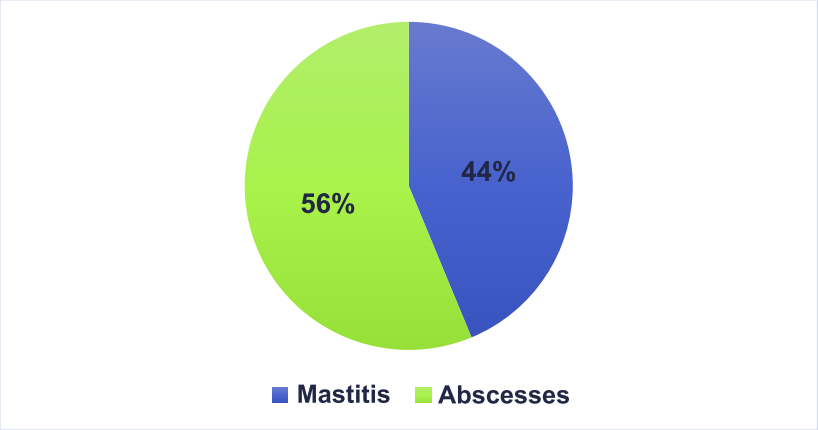

Fig. 1. Frequency distribution of patients according to presentation.

hospital and out-patient clinics for the period from August 2023 to Januray2024.

Milk and abscesses samples were collected from patients that admitted the (Breast cancer consultation and outpatient clinics) with perfect symptomatic as reddening and painful in the breast that are suspected to breast infection after the diagnostic by physician.

2.2. Patient specimen collection

The Samples (80) were collection by physician depended on the following steps and questionnaire as shown in, according to references [6].

1. Collected all samples of patient with questionnaire includes (age, martial statuse, resdiance, menstrual history, number of children, lactating or non-lactating, medical disease and hormonal use).
2. Localized of the seat of abscesses by clinical examine or by Ultra sound.
3. Sterilizer of the area by povidone iodine 10% and usage of syringe 10cc of 21 or 23gaug needle to get on the sample of abscesses.
4. If a signal of mastitis without evidenced of abscesses formating on clinically backgrounding and U/S confirmation the samples from milk of breast.
5. Taking nipple discharge milk as a sample after sterilized of the nipple, which was putted in the tubes or swab.
6. Pouring the milk or abscesses in plain tube contain to phosphate buffer to prevent drying formation, after that we plant the laboratory mode 1 hrs. for bacterial diagnosis. The specimens were collected from patients for bacteriology analyzation in a proper way to avoid any possible contaminated.

These were taken and closed it then transported to laboratory the college of medicine, Colonies of different morphology were isolated from culturing on blood agar, Mannitol Salt agar and other medium then incubation at 37°C for 24 hour.

2.3. Ethical approval

The necessary ethical approval was obtained by verbal consent from patients. This study was approved by the committee of publication ethics at College of Medicine, Babylon Province, Iraq, approved this study under the reference number BMS/0203/016 dated on June 21, 2023.

2.4. Identification and isolate bacteria

Identification and diagnosis of staphylococcus isolates according to MacFaddin [7].

2.5. Statistical analyses

Statistical analyses were performed by using statistical analysis software (Statistical Package for the Social Science) (SPSS) version 26. Therefore, performed by using One-way ANOVA using Least significant difference (LSD) test at ($P < 0.05$).

3. Results

The result show that (56%) from total samples having breast abscesses and (44%) having mastitis as shown in Fig. 1.

The results showed the most isolated bacterial types were *S.aureus* (25%), *S.epidermides* to (12.5%), other growth bacteria to (25%) and no growth for (37.5%), as shown in Table 1.

Table 1. Numbers and percentages of *S.aureus* and *S.epidermides* Isolates from patients with breast infection.

	Bacterial growth				
Total No. of sample	*S. aureus* (%)	*S. epidermides* (%)	NO growth (%)	Other bacteria growth (%)	Total percentage (%) of isolation
80	20 (25%)	10 (12.5%)	30 (37.5%)	20 (25%)	100%
P value			0.019*		

Table 2. Frequency distribution of patients according to age groups.

Age/years	Mastitis (%)	Abscess (%)	Total (%)	P value
20–30	25 (71.43%)	18 (40%)	43 (53.75%)	
30–40	10 (28.57%)	15 (33.3%)	25 (31.25%)	
40–50	0 (0%)	7 (15.5%)	7 (8.75%)	0.004*
50–60	0 (0%)	5 (11.1%)	5 (6.25%)	
Total	35	45	80 (100%)	
P value	0.001*	0.016*	0.001*	

Table 3. Numbers and percentage of mastitis among age and type of bacteria causes.

Age/ years	Mastitis	*S.aureus* (%)	*S. epidermides*	Total (%)	P value
20–30	25	4 (16%)	2 (8%)	6 (24%)	
30–40	10	1 (10%)	2 (20%)	3 (10%)	
40–50	0	0	0	0	0.343
50–60	0	0	0	0	
Total	35	5	4	9	
P value		0.180	.....	0.317	

Table 4. Numbers and percentage of abscess among age and type of bacterial causes.

Age/ years	Abscesses	*S.aureus*	*S. epidermides*	Total (%)	P value
20–30	18	6 (33.33%)	1 (5.55%)	7 (38.88%)	
30–40	15	3 (20%)	2 (13.33%)	5 (33.33%)	
40–50	7	3 (42.85%)	1 (14.28%)	4 (57.13%)	
50–60	5	3 (60%)	2 (40%)	5 (100%)	0.714
Total	45	15	6	21	
P value		0.615	0.881	0.824	

All samples after diagnosis which that the highly percentage of sample were collected from patient with range age (20–30) years, This may be due to most women having high rate of delivery and lactation with this age group which due to reproduction activity in this age group.

The current study found highly rate of isolation belong to *S.aureus* and *S.epidermides* (66.67%) isolated from positive culture to mastitis cases among to age group ranging from (20–30).

The study found that highly rate belonged to *S.aureus* and *S.epidermides* (33.33%) isolated from positive culture among to age group (20–30).

A total of (80) samples collected from mastitis and abscesses the distribution according to lactating and non-lactating women,and the results show the highest rate belong to lactating women with mastitis and abscesses.

4. Discussion

Breast infections are the most common benign breast problem through pregnancy and the puerperal [3].

Infection mastitis is a common condition that influence up to 33% of lactation women. Numerous risk factors have been assume to be strong association with breast abscesses, nipple infection, and non-puerperal mastitis association with childbirth [8].

This results may be consistent with in Al-Qadisiyah, [9]. They found 23 bacterial isolates of the staphylococcus aureus were isolating from the total number of specimens (85) cases of breast abscess in women with 27% isolating rate. Found that the predominant pathogens in mastitis were Staphylococcus aureus with rate (23.6%) and Staphylococcus epidermidis (10.7%) [10].

According to bacteria culturing from human milk samples *S.epidermidis* has been suggest as a predominance species of subacute mastitis as well as other coagulase negative staphylococci and *virdans streptococci* [11].

The potential for *Staphylococcus aureus* to invasion mammary epithelial cell through mastitis play a role in the pathogenicity of *S. aureus*,bacteria cell can hiding from the hosts immune system, Mammary epithelial cell have a structure called fibronectin binding protein that can binding to the fibronectin on the mammary epithelial cell [12].

The commonly associate pathogens with acute mastitis is *S. aureus* and infectious in this family is association with the developed of mastitis, which may be transferring from women's hand to breast. Blocked ducts were considered to increased risk factor of developed mastitis by several study, blocked ducts can caused engorgement, milk stasis, and potently lead to mastitis [13].

Breast abscesses development in 3% to 11% of women with mastitis in breastfeeding women. Cases due to *S. aureus* are the most common and the majority of isolating strains, Less common are cases due to coagulase-negative staphylococci. Risk factors for

Table 5. Rate of infection distribution among lactating and non-lactating mothers.

	Abscess (%)		Mastitis (%)	
Age	Lactating	Non-Lactating	Lactating	Non-Lactating
20–30	6 (13.33%)	12 (26.66%)	20 (57.1%)	0
30–40	4 (8.88%)	11 (24.44%)	10 (28.57%)	0
40–50	0	7 (15.55%)	0	5 (14.28%)
50–60	0	5 (11.11%)	0	0
Total	10	35	30	5
P value	0.180		0.001*	

breast abscesses are: age at delivery, primiparity, gestational age greater than 41 weeks, previously mastitis, cracked nipples, breastfeeding difficult through hospital remain and working mothers [14].

Breast abscesses are generally divided into different categorized. These includes lactation (puerperium) and non-lactation (non- puerperium). The pathophysiological of breast abscess involving the obstruction or blockage of the lactiferous sinuses, whereby storage for milk during the puerperium period for women. This lead to the formation of abscesses. Causal of breast abscess in non-lactating women. The commons organism that caused breast abscesses is *Staphylococcus aureus* [15].

5. Conclusion

Staphylococcus aureus is the most significant mastitis problem. It is often the cause of breast abscess in non-lactating women, recurrent clinical mastitis, and damaged mammary gland tissue.

Conflict of interest

The authors declared no conflict of interest in the manuscript.

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