MICROBIOLOGY AND SENSITIVITY PATTERN OF LACTATIONAL AND NON-LACTATIONAL BREAST ABSCESS IN SOUTHERN ODISHA

Niranjan Sahoo[1], Nrushing Charan Dash[2], Sasmita Hotta[3], Abinash Kumar Panda[4], Sanjeeb Kumar Pradhan[5], Ravi Teja P[6]

[1]Assistant Professor, Department of General Surgery, MKCG Medical College and Hospital, Berhampur.
[2]Junior Resident, Department of General Surgery, MKCG Medical College and Hospital, Berhampur.
[3]Junior Resident, Department of Microbiology, MKCG Medical College and Hospital, Berhampur.
[4]Assistant Professor, Department of General Surgery, MKCG Medical College and Hospital, Berhampur.
[5]Senior Resident, Department of General Surgery, MKCG Medical College and Hospital, Berhampur.
[6]Junior Resident, Department of General Surgery, MKCG Medical College and Hospital, Berhampur.

ABSTRACT

BACKGROUND

Breast abscess is one of the most frequently encountered cases in the General Surgery OPD among females. This fact can be supported by the fact that 4.6% and 11% of the women in developed and developing countries are affected by breast abscess. Breast abscesses are generally categorised as one of two types: Lactational abscesses and non-lactational abscesses.

MATERIALS AND METHODS

The present study was conducted from December 2015 to January 2017 on female patients visiting the General Surgery OPD of MKCG Medical College and Hospital with presumptive diagnosis of breast abscess. Both lactational and non-lactational females were included in the study. A total of 53 subjects with breast abscess were included in the study. The diagnosis of breast abscess was made from the clinical signs and symptoms of infection. Patients having any benign or malignant disease of breast were excluded from the study.

RESULTS

Of the 53 specimens found positive for bacterial yield, 43 were monomicrobial and only 10 were polymicrobial. Out of the 53 samples collected, only 6 showed anaerobic growth. Most common aerobic Gram positive isolate found in the sample was Staphylococcus aureus followed by Staphylococcus epidermidis. Most common aerobic Gram negative organism isolated was Pseudomonas aeruginosa found in 14 cases followed by Escherichia coli in 10 cases. Anaerobic bacteria were found only in non-lactational breast abscess. Of the anaerobic isolates, 5 are monomicrobial and 1 was polymicrobial. Aerobic Gram positive isolates showed sensitivity to most of the commonly used antibiotics. All the 4 gram negative isolates were found to be 100% sensitive to Piperacillin Tazobactam combination and Imipenem/Cilastatin combination. Pseudomonas was found to be somewhat resistant to Amikacin, Levofloxacin and Cephalosporins. Anaerobes were found to be fully sensitive to Metronidazole, Clindamycin and Piperacillin-Tazobactam combination.

CONCLUSION

Hence, this study shows that bacteria, aerobic as well as anaerobic, play an important role in pathogenesis of this condition. So antibiotic therapy should be recommended to all the patients undergoing drainage of these abscesses irrespective of the lactational status.

KEYWORDS

Lactational Breast Abscess, Antibiotic Sensitivity, Resistance, Aspiration.

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BACKGROUND

Breast abscess is one of the most frequently encountered cases in the general surgery OPD among females. This fact can be supported by the fact that 4.6% and 11% of the women in developed and developing countries respectively.[1] Breast abscesses are more common in women belonging to poor socio-economic status and also in females with co-existing medical disorders such as HIV related disorders and diabetes mellitus.[2]

Breast abscesses are generally categorised as one of the two types: Lactational abscesses and non-lactational abscesses (alternate terminology is puerperal and non-puerperal abscesses). These two types of breast abscess have completely different profiles in terms of aetiology, location, microbiology and relapse pattern.[3]

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Corresponding Author:
Dr. Nrushing Charan Dash,
Junior Resident, Department of General Surgery,
MKCG Medical College and Hospital,
Ganjam, Berhampur– 760004, Odisha.
E-mail: drncdash@gmail.com
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Lactational breast abscess, by definition, are associated with lactation in the puerperium. Specifically, this includes abscesses occurring during pregnancy, lactation or within the first 3 months after cessation of lactation. Acute puerperal mastitis is usually the first step heralding the onset of this condition with incidence of 2.5% to 33% in lactating women.[4] This is because the stasis of breast milk with its high sugar content provides an ideal growth environment for bacteria. Non-lactational abscesses occur almost exclusively in the subareolar or periareolar location. Non-lactational abscesses that occur in the periphery of the breast should be treated similar to lactational abscesses with two primary differences: (1) Broad-spectrum antimicrobial therapy is needed and (2) Biopsy of the abscess cavity is strongly suggested to rule out cancer at the time of open drainage.[3]

The gold standard for the treatment of breast abscesses is surgical incision and drainage and administration of systemic antibiotics.[5,6] Recent studies have suggested that sonographically guided aspiration of breast abscesses plus systemic antibiotic drug therapy may be less invasive with improved cosmetic outcome and a higher cure rate.[7,6]

Figure 1. Non-Lactational Breast Abscess (Periareolar)

Aim of the Study- The aim of the study is to determine the various pathogens causing breast abscess in lactating and non-lactating breast abscess. This study also finds the sensitivity pattern of the pathogens. This knowledge will help in administration of proper antibiotic and better management of the disease.

MATERIALS AND METHODS

The present study was conducted between December 2015 and January 2017 on female patients visiting the General Surgery OPD of MKCG Medical College and Hospital with presumptive diagnosis of breast abscess. Both lactational and non-lactational females were included in the study. A total of 53 subjects with breast abscess were included in the study. The diagnosis of breast abscess was made from the clinical signs and symptoms of infection. Patients having any benign or malignant disease of breast were excluded from the study. A detailed history including history of economic status and menopausal history was recorded. Routine bedside tests and biochemical tests were carried out.

Pus samples were obtained using sterile techniques from the operation theatre, either by incision and drainage or by needle aspiration and were immediately transported in sterile labelled containers to the Department of Microbiology of MKCG Medical College and Hospital. Samples were processed for both aerobic as well as anaerobic organisms. Appropriate microbiological procedures were applied to isolate the organism involved. Sensitivity patterns of the organisms isolated was also determined.

Figure 2. Needle Aspiration of Breast Abscess

RESULTS

A total of 53 patients with breast abscess were assessed, of which 37 were lactational and 16 were non-lactational. The mean age of the patients was found out to be 27.2 yrs., (Range 15 - 41). Bacteriological growth was found in all the samples.

Organisms Isolated- Overall distribution of the bacterial isolates is shown in Table 1. Of the 53 specimens found positive for bacterial yield, 43 were monomicrobial and only 10 were polymicrobial. Out of the 53 samples collected, only 6 showed anaerobic growth.

Aerobic Gram positive bacteria were found in 47.1% cases, i.e. in 25 subjects. Most common aerobic Gram positive isolate found in the sample was Staphylococcus aureus followed by Staphylococcus epidermidis. Staphylococcus aureus was found as sole agent in 13 cases i.e. 24.5%, of which 11 were in lactational women. In 6 (11.3%) subjects, Staphylococcus aureus was found as a mixed infection. Other Gram positive aerobic organism that

were isolated are Enterococcus sps and Streptococcus pyogenes.

Aerobic gram negative were found in 19 (35.8%) cases of monomicrobial infection and 9 (16.9%) cases of mixed infection. Most common aerobic Gram negative isolated was Pseudomonas aeruginosa, found in 14 cases followed by Escherichia coli in 10 cases. Pseudomonas was found as sole agent in 8 (15.0%) cases, of which 7 (13.2%) cases were in lactational women and 1 (1.8%) in non-lactational. Pseudomonas aeruginosa was found as a mixed infection in 6 subjects. Other Gram negative isolates found in samples were Klebsiella sps and Acinetobacter sps.

Anaerobic isolates were found in 6 (11.3%) cases. Anaerobic bacteria were found only in non-lactational breast abscess. Of the anaerobic isolates, 5 are monomicrobial and 1 was polymicrobial. Anaerobe isolate found mostly was Bacteroides sps in 4 specimens followed by Peptostreptococcus sps and Clostridium perfringens.

Type of Growth		Lactational N (%)	Non-Lactational N (%)
Aerobic	**Gram Positive**		
	• Staphylococcus aureus	11 (30.5)	02 (11.7)
	• Staphylococcus epidermidis	03 (8.3)	
	• Enterococcus	01 (2.7)	01 (5.8)
	• Streptococcus pyogenes	01 (2.7)	
	Gram Negative		
	• Pseudomonas aeruginosa	07 (19.4)	01 (5.8)
	• Escherichia coli	03 (8.3)	04 (23.5)
	• Klebsiella	01 (2.7)	01 (5.8)
	• Acinetobacter	02 (5.5)	
Anaerobic	• Bacteroides		03 (17.6)
	• Peptostreptococcus		01 (5.8)
	• Clostridium perfringens		01 (5.8)
Mixed Growth	• Pseudomonas aeruginosa + Escherichia coli	02 (5.5)	01 (5.8)
	• Staphylococcus aureus + Pseudomonas aeruginosa	01 (2.7)	01 (5.8)
	• Staphylococcus aureus + Acinetobacter	02 (5.5)	
	• Staphylococcus aureus + Klebsiella	01 (2.7)	
	• Staphylococcus aureus + Bacteroides		01 (5.8)
	• Klebsiella + Pseudomonas aeruginosa	01 (2.7)	
Grand Total		**36 (100)**	**17 (100)**

Table 1. Pattern of Bacterial Growth in Lactational and Non-Lactational Breast Abscess

Antimicrobial sensitivity pattern- Pattern of sensitivity of aerobic Gram positive isolates is shown in Table 2. Aerobic Gram positive isolates showed sensitivity to most of the commonly used antibiotics. Staphylococcus aureus was found to be sensitive to most of the antibiotics used in the management of breast abscess; 85% and 58% of the isolates of Staphylococcus aureus were found to be resistant to Tetracycline and Levofloxacin respectively. Linezolid, Clindamycin and Vancomycin showed 100% sensitivity towards Staphylococcus aureus; 1 case of MRSA was also found in this study. However, the MRSA isolated was sensitive to Linezolid and Vancomycin. Staphylococcus epidermidis was found to be 100% sensitive to all commonly used antibiotics except tetracycline and levofloxacin, which showed sensitivity of 0% and 33.3% respectively. Enterococcus and Streptococcus pyogenes were found to be 100% sensitive to most of the commonly used antibiotics.

Organism / Antimicrobials	Staphylococcus aureus n=19	Staphylococcus epidermidis n=3	Enterococcus sps n=2	Streptococcus pyogenes n=1
Amoxyclav	18 (94%)	03 (100%)	-	01 (100%)
Ampicillin + Sulbactam	-	-	01 (100%)	01 (100%)
Ceftriaxone + Sulbactam	18 (94.7%)	03 (100%)		
Methicillin	18 (94%)			
Clindamycin	19 (100%)	03 (100%)		00 (00)
Erythromycin	14 (73.6%)	02 (66.6%)	00 (00)	00 (00)
Linezolid	19 (100%)	03 (100%)	02 (100%)	01 (100%)
Levofloxacin	08 (42.1%)	01 (33.3%)		00 (00)
Tetracycline	03 (15.7%)	00 (00)	01 (50%)	00 (00)
Vancomycin	19 (100%)	03 (100%)	02 (100%)	01 (100%)

Table 2. Antimicrobial Sensitivity Pattern of Gram-Positive Cocci Isolates

Pattern of sensitivity of aerobic Gram negative isolates is shown in Table 3.

All the 4 gram negative isolates were found to be 100% sensitive to Piperacillin-Tazobactam combination and Imipenem-Cilastatin combination. Pseudomonas was found to be somewhat resistant to Amikacin, Levofloxacin and Cephalosporins. E. coli and Klebsiella were sensitive to Amikacin and Cephalosporins. Acinetobacter species has a similar sensitivity spectrum as that of Pseudomonas.

Organisms / Antimicrobial	Pseudomonas aeruginosa n= 14	Escherichia coli n =10	Klebsiella pneumoniae n = 4	Acinetobacter sps n = 2
Amikacin	07 (50%)	10 (100%)	04 (100%)	01 (50%)
Amoxicillin+ Clavulanic acid	00 (00)	00 (00)	00 (00)	00 (00)
Ceftriaxone + Sulbactam	02 (14.2%)	08 (80%)	02 (50%)	01 (50%)
Cefixime	-	09 (90%)	03 (75%)	00 (00)
Cefotaxime	-	09 (90%)	03 (755)	-
Ceftazidime	10 (71.4%)	-	-	01 (50%)
Imipenem + cilastatin	14 (100%)	10 (1005)	04 (1005)	02 (100%)
Levofloxacin	09 (64.25)	09 (90%)	-	01 (50%)
Piperacillin + Tazobactam	14 (100%)	10 (100%)	04 (100%)	02 (100%)

Table 3. Antimicrobial Sensitivity Pattern of Gram-Negative Bacilli Isolates

Pattern of sensitivity of anaerobic isolates is shown in Table 4.

Anaerobes were found to be fully sensitive to Metronidazole, Clindamycin and Piperacillin-Tazobactam combination.

	Bacteroides n = 3	Peptostreptococcus n = 1	Clostridium perfringens n = 1
Amoxicillin + Clavulanic acid	1 (33.33%)		
Metronidazole	3 (100%)	1 (100%)	1 (100%)
Piperacillin + Tazobactam	3 (100%)	1 (100%)	1 (100%)
Clindamycin	3 (100%)	1 (100%)	1 (100%)

Table 4. Antimicrobial Sensitivity Pattern of Anaerobic Bacterial Isolates

DISCUSSION

Bacterial isolates- This study showed that Gram positive aerobic isolates, particularly Staphylococcus aureus is the most common bacterial isolate found in breast abscess cases. This finding is similar to the findings of Sandhu GS et al.[2] This finding is also similar to the findings in other studies.[8] MRSA strains were also isolated in 6% of Staphylococcus aureus isolates. This prevalence of MRSA is less compared to the study of Benwan KA.[9]

Pseudomonas aeruginosa was found to be the dominant gram negative aerobe found in 14 cases. This followed by Escherichia coli was found in 10 cases. This finding tally well with the finding of Benwan KA.[10]

The present study showed that anaerobes are absent in lactating breast abscess samples. Most common isolate found was Bacteroides. Other anaerobes found were Peptostreptococcus and Clostridium perfringens. This finding is similar to the finding of Benwan KA. No anaerobes were recovered from lactational breast abscesses. This finding is confirmed by a study in 1979,[11] which also reported no anaerobes in lactating breast abscesses.

Sensitivity pattern of this study shows that the Gram positive organisms are susceptible to most of the antibiotics. MRSA isolates were sensitive to Linezolid and Vancomycin. Gram negative isolates were somewhat resistant to cephalosporins, but were fully susceptible to Imipenem-Cilastatin and Piperacillin-Tazobactam combinations. Metronidazole, Piperacillin-Tazobactam and Clindamycin were the most active antimicrobial agents against these anaerobes. This finding accords with data obtained by Moazzez et al.[9]

CONCLUSION

Hence, to conclude breast abscess is a fairly common surgical problem among both lactational and non-lactational female. Staphylococcus aureus and Pseudomonas aeruginosa were the most common Gram positive and Gram negative isolates found in both lactational and non-lactational breast abscess. Non-lactating breast abscesses besides aerobes also showed presence of anaerobic bacteria. Bacteroides sps were the anaerobic isolates found. Antibiotics were given to the subjects according to their sensitivity pattern. With minimally invasive management of breast abscesses such as ultrasound-guided drainage plus systemic antibiotic drug therapy, understanding the current bacteriological features of these abscesses is essential to determining the correct choice of empirical antibiotic therapy.

Hence, this study shows that bacteria, aerobic as well as anaerobic play an important role in pathogenesis of this condition. So, antibiotic therapy should be recommended to all the patients undergoing drainage of these abscesses irrespective of the lactational status. Regular monitoring in order to make reliable information available for optimal empirical therapy for patients with breast abscesses.

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