

Full Length Research Paper

Microbiological profile of breast abscess in the Gynecology and Obstetrics Care Service of a Philanthropic Hospital in Vitória, ES, Brazil

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Mastitis is frequent and may lead to severe mutilations if initial treatment is not adequate. Community-acquired MRSA infections have been increasing in prevalence and incidence, including mastitis. We conducted a prospective observational study to evaluate the incidence of MRSA infections in community mastitis in Vitória, Espírito Santo. In the 24 months of study conducted at the gynecology and obstetrics emergency room of the Santa Casa de Misericórdia hospital, 52 patients with mastitis and indication of drainage had the etiological agent identified. The most important was *Staphylococcus aureus*, with 96% (50 / 52), of these 72% (36/50) were MRSA. Half of these patients were lactating. In the community mastitis treated in this service, there is a high incidence of MRSA, with potential failure in the initial treatments and risk of colonization and infection in newborns in the puerperal mastitis.

Keywords: Mastitis; MRSA infections; antibiotics.

INTRODUCTION

Infectious mastitis is defined as an infectious process of periareolar or peripheral breast tissues that may occur during breastfeeding (puerperal mastitis) or at other times (Beltrán et al., 2015; Lam et al., 2014). Puerperal mastitis occurs in 33% of cases and usually in the first 12

weeks after the birth of the baby or at the time of weaning (Beltrán et al., 2015; Berens et al., 2010). *Staphylococcus aureus* is an important etiologic agent because it penetrates through small lacerations in the skin (Berens et al., 2010). Non-puerperal infections occur less frequently (Beltrán et al., 2015).

The symptoms are non-specific and include unilateral or bilateral pain, erythema and edema, and may or may not be associated with systemic symptoms such as fever, chills and mialgia (Beltrán et al., 2015; WHO 2000). Treatment

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Table 1: Percentage of susceptibility of *Staphylococcus aureus* (MRSA) according to Kirby-Bauer antibiogram

<i>Staphylococcus aureus</i> (MRSA)	Percentage (%)
Ciprofloxacin	3,3
Clindamycin	83,3
Erythromycin	20
Gentamicin	100
Rifampicin	96,7
Tetracycline	100
Trimethoprim-sulfamethoxazole	100

usually requires correction of underlying causes and use of antimicrobials, always remembering that therapeutic options are limited in lactation period (Farahnik and Murase 2016).. In complications with abscess, surgical drainage with collection of material for cultures is essential (WHO 2000; Dener and Inan 2003).

METHODOLOGY

Patients with mastitis and indication of drainage seen at the gynecological care service of the Santa Casa de Misericórdia Hospital in Vitória-ES had the material collected and monitored prospectively in a 24-month period. After this period the cases with positive cultures were analyzed to identify the risk factors for community-associated methicillin-resistant *S aureus* (CA-MRSA). Those with healthcare-associated infection (HAI) criteria were discarded.

All drainages were performed in a sterile surgical center. After the incision, the material was collected by aspiration, placed in a sterile bottle, and sent to the microbiology laboratory.

The samples were submitted to direct examination by the Gram technique and the microbiological identification was performed by biochemical methods with an antimicrobial susceptibility test using the Kirby-Bauer technique according to CLSI interpretation guidelines.

The variables analyzed were: age, smoking, diabetes mellitus, previous MRSA infection, hospitalization within the last 30 days, previous antibiotic therapy, lactation and habits (tattooing, shaving). Data analysis and associations were obtained by percentage and frequency. The research was approved by the Research Ethics Committee through the CAAE: 72744916.3.0000.5065.

RESULTS

Fifty-two patients were included in the study, with a mean age of 29 years (age range, 14 to 79 years), 60% with non-puerperal abscesses. *S aureus* was the most prevalent agent, identified in 96% (50/52) of the positive cultures. Resistance to methicillin occurred in 36 of the 50 isolates of *S aureus*, totaling 72% of the strains. Susceptibility to tetracyclines and sulfamethoxazole-trimethoprim was identified in 100% of cases in MRSA with a slight reduction in susceptibility to tetracycline in methicillin-susceptible *S aureus* (MSSA) (table 1).

Table 2 summarizes the main risk factors found. Among them, trichotomy and previous use of antibiotics were the most important. In infants MRSA was identified in 50% of cultures.

DISCUSSION

S aureus was the main agent in mastitis with indication of surgical drainage, as described by Lam, Chan, and Wiseman in 2014 (Lam et al., 2014).

Noteworthy is the high prevalence of MRSA, with more than 70% of the isolated strains. Zimmerman et al. in 2009 and Paladino et al. in 2014^{7,8} demonstrated in studies where there is no separation of community and hospital strains that incidence ranges from 20% to 89.5%. In 2008 Stafford et al.⁹ identified a prevalence of 67% of CA-MRSA in mastitis requiring hospitalization. No national data on CA-MRSA mastitis were found but general data point to a prevalence of up to 32% depending on the isolated clone (Mejía et al., 2010).

Table 2: Percentage of risk factors identified in all patients evaluated and in patients with MSRA infections

Risk Factors identified	Percentage (%)	Total Percentage (%) in MSRA infections
Trichotomy	84	86,7
Previous antibiotic therapy	86	83,3
Hospitalization within the last 30 days	38	46,7
Lactation	40	50
Cigarette Smoking	12	13,3
Diabetes Mellitus	12	6,7
Previous infection by MSRA	2	3,33
Previous surgery	18	26,7

Among the possible risk factors evaluated, trichotomy was the most important, identified in 84% of the total women evaluated, 86.7% of whom had MRSA infection. Although this is not an exclusive risk factor for MRSA, it is an important factor for skin and soft tissue infections, many of which requiring antimicrobial treatment (Williamson 2015). Other risk factors such as previous MRSA infection and diabetes mellitus were not important in this study.

In relation to the previous antibiotics, it was found that they had been prescribed for the current infection (mastitis) in a health care unit, pharmacy or emergency care.

Previous hospitalization was another important fact related to puerperal mastitis, accounting for about 46% of MRSA mastitis. Lactation is a process that often occurs with lesions in the breast tissues and consequently with ports of entry. Half of the patients were in the lactation period, a relatively higher number than that found in the literature, which indicates that this association varies between 2.5 and 33% of cases (Dener and Inan 2003). An important consideration to make, due to the significant number of mastitis among breastfeeding mothers, may be the fact that the Santa Casa de Misericórdia Hospital in Vitória (SCMV) is the gynecological referral service for its puerperal mothers and, therefore, a relatively higher incidence. An important point in relation to breastfeeding and puerperal mothers is the infection/colonization by MRSA and the risk of transmission to the neonate who, in the context of a neonatal infection, is also at risk of MRSA infection (Fortunov et al., 2006; Kriebs 2016).

CONCLUSION

In the population of this study, CA-MRSA was shown to be an extremely prevalent pathogen in mastitis related or not to puerperium, which requires attention in relation to

empirical antimicrobial treatments, especially in the most severe cases.

REFERENCE

- Beltrán Vaquero DA, Crespo Garzón AE, Rodríguez Bravo TC, Iglesias ÁG (2015). Mastitis infecciosa: Nueva solución para un viejo problema. *Nutr Hosp.* 2015;31:89–95 Doi: 10.3305/nh.2015.31.sup1.8714.
- Berens P, Swaim L, Peterson B (2010). Incidence of Methicillin-Resistant *Staphylococcus aureus*. 2010;5(3).
- Dener C, Inan A (2003). Breast abscesses in lactating women. *World J Surg.* 2003;27(2): 130–3. Doi: 10.1007/s00268-002-6563-6.
- Farahnik B, Murase JE (2016). Antibiotic safety considerations in methicillin-resistant *Staphylococcus aureus* postpartum mastitis. *J Am Acad Dermatol.* 2016;75(4):e149. Doi: 10.1016/j.jaad.2016.04.042.
- Fortunov RM, Hulten KG, Hammerman WA, Mason EO, Kaplan SL (2006). Community-acquired *Staphylococcus aureus* infections in term and near-term previously healthy neonates. *Pediatrics.* 2006;118(3):874–81. Doi: 10.1542/peds.2006-0884.
- Kriebs JM (2016). *Staphylococcus* Infections in Pregnancy. *J Perinat Neonatal Nurs.* 2016;30(2):115–23. Doi: 10.1097/JPN.0000000000000165.
- Lam E, Chan T, Wiseman SM (2014). Breast abscess: Evidence based management recommendations. *Expert Rev Anti Infect Ther.* 2014;12(7):753–62. Doi:10.1586/14787210.2014.913982.
- Mejía C, Zurita J, Guzmán-Blanco M (2010). Epidemiology and surveillance of methicillin-resistant *Staphylococcus aureus* in Latin America. *Brazilian J Infect Dis.* 2010;14:79– 86. Doi: 10.1590/S1413-86702010000800003.
- Paladino S, Conti R, Lanzillota A, Herrera R, Amarante D (2014). PRACTICO 3. Mastitis por SAMR. 2014:210–5.
- Stafford I, Hernandez J, Laibl V, Roberts S, Jr GW, Sheffield J (2008). *Staphylococcus aureus* Among Patients With. *Obstet Gynecol.* 2008;112(3):533–7.
- Williamson H (2015). Social pressures and health consequences associated with body hair removal. *J Aesthetic Nurs.* 2015;4(3):131–3. Doi: 10.12968/joan.2015.4.3.131.
- World Health Organization (WHO) (2000). Mastitis - Causes and Management. *World Heal Organ.* 2000:1–44.
- Zimmerman LH, Tyburski JG, Stoffan A (2009). Twelve hundred abscesses operatively drained: An antibiotic conundrum? *Surgery.* 2009;146(4):794–800. Doi: 10.1016/j.surg.2009.06.020.