

ABM Clinical Protocol #4: Mastitis, Revised March 2014

Lisa H. Amir^{1,2} and The Academy of Breastfeeding Medicine Protocol Committee

A central goal of The Academy of Breastfeeding Medicine is the development of clinical protocols for managing common medical problems that may impact breastfeeding success. These protocols serve only as guidelines for the care of breastfeeding mothers and infants and do not delineate an exclusive course of treatment or serve as standards of medical care. Variations in treatment may be appropriate according to the needs of an individual patient.

Introduction

MASTITIS IS A COMMON CONDITION in lactating women; estimates from prospective studies range from 3% to 20%, depending on the definition and length of postpartum follow-up.^{1–3} The majority of cases occur in the first 6 weeks, but mastitis can occur at any time during lactation. There have been few research trials in this area.

Quality of evidence (levels of evidence I, II-1, II-2, II-3, and III) for each recommendation as defined in the U.S. Preventive Services Task Force Appendix A Task Force Ratings⁴ is noted in parentheses in this document.

Definition and Diagnosis

The usual clinical definition of mastitis is a tender, hot, swollen, wedge-shaped area of breast associated with temperature of 38.5°C (101.3°F) or greater, chills, flu-like aching, and systemic illness.⁵ However, mastitis literally means, and is defined herein, as an inflammation of the breast; this inflammation may or may not involve a bacterial infection.^{6,7} Redness, pain, and heat may all be present when an area of the breast is engorged or “blocked”/“plugged,” but an infection is not necessarily present. There appears to be a continuum from engorgement to noninfective mastitis to infective mastitis to breast abscess.⁷ (II-2)

Predisposing Factors

The following factors may predispose a lactating woman to the development of mastitis.^{7,8} Other than the fact that these are factors that result in milk stasis, the evidence for these associations is generally inconclusive (II-2):

- Damaged nipple, especially if colonized with *Staphylococcus aureus*

- Infrequent feedings or scheduled frequency or duration of feedings
- Missed feedings
- Poor attachment or weak or uncoordinated suckling leading to inefficient removal of milk
- Illness in mother or baby
- Oversupply of milk
- Rapid weaning
- Pressure on the breast (e.g., tight bra, car seatbelt)
- White spot on the nipple or a blocked nipple pore or duct: milk blister or “bleb” (a localized inflammatory response)⁹
- Maternal stress and fatigue

Investigations

Laboratory investigations and other diagnostic procedures are not routinely needed or performed for mastitis. The World Health Organization publication on mastitis suggests that breastmilk culture and sensitivity testing “should be undertaken if

- there is no response to antibiotics within 2 days
- the mastitis recurs
- it is hospital-acquired mastitis
- the patient is allergic to usual therapeutic antibiotics or
- in severe or unusual cases.”⁷ (II-2)

Breastmilk culture may be obtained by collecting a hand-expressed midstream clean-catch sample into a sterile urine container (i.e., a small quantity of the initially expressed milk is discarded to avoid contamination of the sample with skin flora, and subsequent milk is expressed into the sterile container, taking care not to touch the inside of the container). Cleansing the nipple prior to collection may further reduce

¹Judith Lumley Centre (formerly Mother & Child Health Research), La Trobe University, Melbourne, Australia.

²Royal Women’s Hospital, Melbourne, Australia.

skin contamination and minimize false-positive culture results. Greater symptomatology has been associated with higher bacterial counts and/or pathogenic bacteria.¹⁰ (III)

Management

Effective milk removal

Because milk stasis is often the initiating factor in mastitis, the most important management step is frequent and effective milk removal:

- Mothers should be encouraged to breastfeed more frequently, starting on the affected breast.
- If pain interferes with the let-down, feeding may begin on the unaffected breast, switching to the affected breast as soon as let-down is achieved.
- Positioning the infant at the breast with the chin or nose pointing to the blockage will help drain the affected area.
- Massaging the breast during the feed with an edible oil or nontoxic lubricant on the fingers may also be helpful to facilitate milk removal. Massage, by the mother or a helper, should be directed from the blocked area moving toward the nipple.
- After the feeding, expressing milk by hand or pump may augment milk drainage and hasten resolution of the problem.¹¹ (III)

An alternate approach for a swollen breast is fluid mobilization, which aims to promote fluid drainage toward the axillary lymph nodes.¹² The mother reclines, and gentle hand motions start stroking the skin surface from the areola to the axilla.¹² (III)

There is no evidence of risk to the healthy, term infant of continuing breastfeeding from a mother with mastitis.⁷ Women who are unable to continue breastfeeding should express the milk from breast by hand or pump, as sudden cessation of breastfeeding leads to a greater risk of abscess development than continuing to feed.¹¹ (III)

Supportive measures

Rest, adequate fluids, and nutrition are important measures. Practical help at home may be necessary for the mother to obtain adequate rest. Application of heat—for example, a shower or a hot pack—to the breast just prior to feeding may help with the let-down and milk flow. After a feeding or after milk is expressed from the breasts, cold packs can be applied to the breast in order to reduce pain and edema.

Although most women with mastitis can be managed as outpatients, hospital admission should be considered for women who are ill, require intravenous antibiotics, and/or do not have supportive care at home. Rooming-in of the infant with the mother is mandatory so that breastfeeding can continue. In some hospitals, rooming-in may require hospital admission of the infant.

Pharmacologic management

Although lactating women are often reluctant to take medications, women with mastitis should be encouraged to take appropriate medications as indicated.

Analgesia. Analgesia may help with the let-down reflex and should be encouraged. An anti-inflammatory agent such as ibuprofen may be more effective in reducing the inflammatory symptoms than a simple analgesic like paracetamol/acetaminophen. Ibuprofen is not detected in breastmilk following doses up to 1.6 g/day and is regarded as compatible with breastfeeding.¹³ (III)

Antibiotics. If symptoms of mastitis are mild and have been present for less than 24 hours, conservative management (effective milk removal and supportive measures) may be sufficient. If symptoms are not improving within 12–24 hours or if the woman is acutely ill, antibiotics should be started.⁷ Worldwide, the most common pathogen in infective mastitis is penicillin-resistant *S. aureus*.^{14,15} Less commonly, the organism is a *Streptococcus* or *Escherichia coli*.¹¹ The preferred antibiotics are usually penicillinase-resistant penicillins,⁵ such as dicloxacillin or flucloxacillin 500 mg by mouth four times per day,¹⁶ or as recommended by local antibiotic sensitivities. (III) First-generation cephalosporins are also generally acceptable as first-line treatment, but may be less preferred because of their broader spectrum of coverage. (III)

Cephalexin is usually safe in women with suspected penicillin allergy, but clindamycin is suggested for cases of severe penicillin hypersensitivity.¹⁶ (III) Dicloxacillin appears to have a lower rate of adverse hepatic events than flucloxacillin.¹⁷ Many authorities recommend a 10–14-day course of antibiotics^{18,19}; however this recommendation has not been subjected to controlled trials. (III)

S. aureus resistant to penicillinase-resistant penicillins (methicillin-resistant *S. aureus* [MRSA], also referred to as oxacillin-resistant *S. aureus*) has been increasingly isolated in cases of mastitis and breast abscesses.^{20–22} (II-2) Clinicians should be aware of the likelihood of this occurring in their community and should order a breastmilk culture and assay of antibiotic sensitivities when mastitis is not improving 48 hours after starting first-line treatment. Local resistance patterns for MRSA should be considered when choosing an antibiotic for such unresponsive cases while culture results are pending. MRSA may be a community-acquired organism and has been reported to be a frequent pathogen in cases of breast abscess in some communities, particularly in the United States and Taiwan.^{21,23,24} (I, II-2) At this time, MRSA occurrence is low in other countries, such as the United Kingdom.²⁵ (I) Most strains of methicillin-resistant staphylococci are susceptible to vancomycin or trimethoprim/sulfamethoxazole but may not be susceptible to rifampin.²⁶ Of note is that MRSA should be presumed to be resistant to treatment with macrolides and quinolones, regardless of susceptibility testing results.²⁷ (III)

As with other uses of antibiotics, repeated courses place women at increased risk for breast and vaginal *Candida* infections.^{28,29}

Follow-Up

Clinical response to the above management is typically rapid and dramatic. If the symptoms of mastitis fail to resolve within several days of appropriate management, including antibiotics, a wider differential diagnosis should be considered. Further investigations may be required to confirm

resistant bacteria, abscess formation, an underlying mass, or inflammatory or ductal carcinoma. More than two or three recurrences in the same location also warrant evaluation to rule out an underlying mass or other abnormality.

Complications

Early cessation of breastfeeding

Mastitis may produce overwhelming acute symptoms that prompt women to consider cessation of breastfeeding. Effective milk removal, however, is the most important part of treatment.⁷ Acute cessation of breastfeeding may actually exacerbate the mastitis and increase the risk of abscess formation; therefore, effective treatment and support from healthcare providers and family are important at this time. Mothers may need reassurance that the antibiotics they are taking are safe to use during breastfeeding.

Abscess

If a well-defined area of the breast remains hard, red, and tender despite appropriate management, then an abscess should be suspected. This occurs in about 3% of women with mastitis.³⁰ (II-2) The initial systemic symptoms and fever may have resolved. A diagnostic breast ultrasound will identify a collection of fluid. The collection can often be drained by needle aspiration, which itself can be diagnostic as well as therapeutic. Serial needle aspirations may be required.^{31–33} (III) Ultrasound guidance for needle aspiration may be necessary in some cases. Fluid or pus aspirated should be sent for culture. Consideration of resistant organisms should also be given depending on the incidence of resistant organisms in that particular environment. Surgical drainage may be necessary if the abscess is very large or if there are multiple abscesses. After surgical drainage, breastfeeding on the affected breast should continue, even if a drain is present, with the proviso that the infant's mouth does not come into direct contact with purulent drainage or infected tissue. A course of antibiotics should follow drainage of the abscess. (III)

Photographs of breast abscesses and percutaneous aspiration can be found in a 2013 review by Kataria et al.³⁴

Candida infection

Candida infection has been associated with burning nipple pain or radiating breast pain symptoms.¹⁸ Diagnosis is difficult, as the nipples and breasts may look normal on examination, and milk culture may not be reliable. Careful evaluation for other etiologies of breast pain should be undertaken with particular attention to proper latch and ruling out Raynaud's/vasospasm and local nipple trauma. When wound cultures are obtained from nipple fissures, they most commonly grow *S. aureus*.^{35–37} (I)

A recent investigation of women with these typical symptoms, using breastmilk cultures after cleansing the nipples, found that none of the 35 cultures from the control group of women grew *Candida*, whereas only one of 29 in the symptomatic group grew the organism.³⁸ (I) There was also no significant difference in the measurement of a by-product of *Candida* growth [(1,3)- β -D-glucan] between groups.³⁸ Yet, evidence is conflicting as another recent study on milk culture found that 30% of symptomatic mothers were positive for

Candida, whereas 8% of women in the asymptomatic group grew the organism.³⁹ (I)

Women with burning nipple and breast pain may also be more likely to test positive for *Candida* on nipple swab by polymerase chain reaction.⁴⁰ Using molecular techniques as well as standard culture, a large cohort study of women followed up for 8 weeks postpartum found that burning nipple pain with breast pain was associated with *Candida* species, but not with *S. aureus*.⁴¹ (II-2)

Further research in this area is required. Until then, a trial of antifungal medications, either with or without culture, is the current expert consensus recommendation. (III)

Prevention (III)⁸

Effective management of breast fullness and engorgement

- Mothers should be helped to improve infants' attachment to the breast.
- Feeds should not be restricted.
- Mothers should be taught to hand-express when the breasts are too full for the infant to attach or the infant does not relieve breast fullness. A breast pump may also be used, if available, for these purposes, but all mothers should be able to manually express as the need for its use may arise unexpectedly.

Prompt attention to any signs of milk stasis

- Mothers should be taught to check their breasts for lumps, pain, or redness.
- If the mother notices any signs of milk stasis, she needs to rest, increase the frequency of breastfeeding, apply heat to the breast prior to feedings, and massage any lumpy areas as described in the section Effective milk removal.
- Mothers should contact their healthcare provider if symptoms are not improving within 24 hours.

Prompt attention to other difficulties with breastfeeding

Skilled help is needed for mothers with damaged nipples or an unsettled discontent infant or those who believe that they have an insufficient milk supply.

Rest

As fatigue is often a precursor to mastitis, healthcare providers should encourage breastfeeding mothers to obtain adequate rest. It may also be helpful for healthcare providers to remind family members that breastfeeding mothers may need more help and encourage mothers to ask for help as necessary.

Good hygiene

Because *S. aureus* is a common commensal organism often present in hospitals and communities, the importance of good hand hygiene should not be overlooked.^{14,42} It is important for hospital staff, new mothers, and their families to practice good hand hygiene. Breast pump equipment may also be a source of contamination and should be washed thoroughly with soap and hot water after use.

Recommendations for Future Research

There are several aspects of prevention, diagnosis, and treatment of mastitis that require research. First, a consensus on a definition of mastitis is vital.⁴³ We need to know when antibiotics are needed, which are the most appropriate antibiotics, and the optimal duration of treatment. The role of probiotics in prevention and treatment needs to be determined. Finally, the role of massage to prevent and treat breast engorgement and infection needs to be clarified.

Acknowledgments

This work was supported in part by a grant from the Maternal and Child Health Bureau, U.S. Department of Health and Human Services.

References

1. Waldenström U, Aarts C. Duration of breastfeeding and breastfeeding problems in relation to length of postpartum stay: A longitudinal cohort study of a national Swedish sample. *Acta Paediatr* 2004;93:669–676.
2. Foxman B, D'Arcy H, Gillespie B, et al. Lactation mastitis: Occurrence and medical management among 946 breastfeeding women in the United States. *Am J Epidemiol* 2002; 155:103–114.
3. Amir LH, Forster DA, Lumley J, et al. A descriptive study of mastitis in Australian breastfeeding women: Incidence and determinants. *BMC Public Health* 2007; 7:62.
4. Appendix A Task Force Ratings. Guide to Clinical Preventive Services: Report of the U.S. Preventive Services Task Force, 2nd edition. www.ncbi.nlm.nih.gov/books/NBK15430 (accessed May 7, 2014).
5. Lawrence RA. The puerperium, breastfeeding, and breast milk. *Curr Opin Obstet Gynecol* 1990;2:23–30.
6. Inch S, Renfrew MJ. Common breastfeeding problems. In: Chalmers I, Enkin M, Keirse M, eds. *Effective Care in Pregnancy and Childbirth*. Oxford University Press, Oxford, United Kingdom, 1989:1375–1389.
7. World Health Organization. *Mastitis: Causes and Management*. Publication number WHO/FCH/CAH/00.13. World Health Organization, Geneva, 2000.
8. Walker M. Mastitis in lactating women. *Lactation Consultant Series Two*. Schaumburg, IL: La Leche League International, 2004.
9. O'Hara M-A. Bleb histology reveals inflammatory infiltrate that regresses with topical steroids; a case series [platform abstract]. *Breastfeed Med* 2012;7(Suppl 1):S-2.
10. Matheson I, Aursnes I, Horgen M, et al. Bacteriological findings and clinical symptoms in relation to clinical outcome in puerperal mastitis. *Acta Obstet Gynecol Scand* 1988;67:723–726.
11. Thomsen AC, Espersen T, Maigaard S. Course and treatment of milk stasis, noninfectious inflammation of the breast, and infectious mastitis in nursing women. *Am J Obstet Gynecol* 1984;149:492–495.
12. Bolman M, Saju L, Oganessian K, et al. Recapturing the art of therapeutic breast massage during breastfeeding. *J Hum Lact* 2013;29:328–331.
13. Sachs HC; Committee on Drugs. The transfer of drugs and therapeutics into human breast milk: An update on selected topics. *Pediatrics* 2013;132:e796–e809.
14. Amir LH, Garland SM, Lumley J. A case-control study of mastitis: Nasal carriage of *Staphylococcus aureus*. *BMC Fam Pract* 2006;7:57.
15. Kvist LJ, Larsson BW, Hall-Lord ML, et al. The role of bacteria in lactational mastitis and some considerations of the use of antibiotic treatment. *Int Breastfeed J* 2008;3:6.
16. Antibiotic Expert Group. *Therapeutic Guidelines: Antibiotic*. Therapeutic Guidelines Ltd., Melbourne, 2010.
17. Olsson R, Wiholm BE, Sand C, et al. Liver damage from flucloxacillin, cloxacillin and dicloxacillin. *J Hepatol* 1992; 15:154–161.
18. Lawrence RA, Lawrence RM. *Breastfeeding: A Guide for the Medical Profession*, 7th edition. Mosby, St. Louis, 2011.
19. Neifert MR. Clinical aspects of lactation: Promoting breastfeeding success. *Clin Perinatol* 1999;26:281–306.
20. Perez A, Orta L, Padilla E, et al. CA-MRSA puerperal mastitis and breast abscess: A potential problem emerging in Europe with many unanswered questions. *J Matern Fetal Neonatal Med* 2013;26:949–951.
21. Branch-Elliman W, Golen TH, Gold HS, et al. Risk factors for *Staphylococcus aureus* postpartum breast abscess. *Clin Infect Dis* 2012;54:71–77.
22. Stafford I, Hernandez J, Laibl V, et al. Community-acquired methicillin-resistant *Staphylococcus aureus* among patients with puerperal mastitis requiring hospitalization. *Obstet Gynecol* 2008;112:533–537.
23. Berens P, Swaim L, Peterson B. Incidence of methicillin-resistant *Staphylococcus aureus* in postpartum breast abscesses. *Breastfeed Med* 2010;5:113–115.
24. Chen CY, Anderson BO, Lo SS, et al. Methicillin-resistant *Staphylococcus aureus* infections may not impede the success of ultrasound-guided drainage of puerperal breast abscesses. *J Am Coll Surg* 2010;210:148–154.
25. Dabbas N, Chand M, Pallett A, et al. Have the organisms that cause breast abscess changed with time?—Implications for appropriate antibiotic usage in primary and secondary care. *Breast J* 2010;16:412–415.
26. Johnson MD, Decker CF. Antimicrobial agents in treatment of MRSA infections. *Dis Mon* 2008;54:793–800.
27. Rodvold KA, McConeghy KW. Methicillin-resistant *Staphylococcus aureus* therapy: Past, present, and future. *Clin Infect Dis* 2014;58(Suppl 1):S20–S27.
28. Dinsmoor MJ, Vilorio R, Lief L, et al. Use of intrapartum antibiotics and the incidence of postnatal maternal and neonatal yeast infections. *Obstet Gynecol* 2005; 106:19–22.
29. Pirotta MV, Gunn JM, Chondros P. “Not thrush again!” Women’s experience of post-antibiotic vulvovaginitis. *Med J Aust* 2003;179:43–46.
30. Amir LH, Forster D, McLachlan H, et al. Incidence of breast abscess in lactating women: Report from an Australian cohort. *BJOG* 2004;111:1378–1381.
31. Dixon JM. Repeated aspiration of breast abscesses in lactating women. *BMJ* 1988;297:1517–1518.
32. Ullitzsch D, Nyman MKG, Carlson RA. Breast abscess in lactating women: US-guided treatment. *Radiology* 2004; 232:904–909.
33. Christensen AF, Al-Suliman N, Nielson KR, et al. Ultrasound-guided drainage of breast abscesses: Results in 151 patients. *Br J Radiol* 2005;78:186–188.
34. Kataria K, Srivastava A, Dhar A. Management of lactational mastitis and breast abscesses: review of current knowledge and practice. *Indian J Surg* 2013;75:430–435.

35. Livingstone V, Stringer LJ. The treatment of *Staphylococcus aureus* infected sore nipples: A randomized comparative study. *J Hum Lact* 1999;15:241–246.
36. Amir LH, Garland SM, Dennerstein L, et al. *Candida albicans*: Is it associated with nipple pain in lactating women? *Gynecol Obstet Invest* 1996;41:30–34.
37. Saenz RB. Bacterial pathogens isolated from nipple wounds: A four-year prospective study. *Breastfeed Med* 2007;2:190.
38. Hale TW, Bateman TL, Finkelman MA, et al. The absence of *Candida albicans* in milk samples of women with clinical symptoms of ductal candidiasis. *Breastfeed Med* 2009;4: 57–61.
39. Andrews JI, Fleener DK, Messer SA, et al. The yeast connection: Is *Candida* linked to breastfeeding associated pain? *Am J Obstet Gynecol* 2007;197:424.e1–e4.
40. Panjaitan M, Amir LH, Costa A-M, et al. Polymerase chain reaction in detection of *Candida albicans* for confirmation of clinical diagnosis of nipple thrush. *Breastfeed Med* 2008;3:185–187.
41. Amir LH, Donath SM, Garland SM, et al. Does *Candida* and/or *Staphylococcus* play a role in nipple and breast pain in lactation? A cohort study in Melbourne, Australia. *BMJ Open* 2013;3:e002351.
42. Collignon PJ, Grayson ML, Johnson PDR. Methicillin-resistant *Staphylococcus aureus* in hospitals: Time for a culture change. *Med J Aust* 2007;187:4–5.
43. Kvist LJ. Toward a clarification of the concept mastitis as used in empirical studies of breast inflammation during lactation. *J Hum Lact* 2010;26:53–59.

ABM protocols expire 5 years from the date of publication. Evidence-based revisions are made within 5 years or sooner if there are significant changes in the evidence.

The Academy of Breastfeeding Medicine Protocol Committee
Kathleen A. Marinelli, MD, FABM, Chairperson
Maya Bunik, MD, MSPH, FABM, Co-Chairperson
Larry Noble, MD, FABM, Translations Chairperson
Nancy Brent, MD
Amy E. Grawey, MD
Alison V. Holmes, MD, MPH, FABM
Ruth A. Lawrence, MD, FABM
Tomoko Seo, MD, FABM

For correspondence: abm@bfmed.org