

Negative pressure wound therapy on a lactating breast: a case that demonstrates it can be achieved



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Negative pressure wound therapy (NPWT) is common after debridement of necrotic tissue post mastitis, when a gaping wound needs to be treated, but there is limited scientific evidence on the use of NPWT on the lactating breast. Patients are sent home with an open wound draining pus and milk, information on self care, and often a course of milk suppression drugs. However, NPWT treatment might decrease wound healing time considerably, giving women the opportunity to continue breastfeeding. Cost implications might be the only hurdle. The author describes a case of bilateral abscesses in lactating breasts. NPWT was used to treat one abscess, allowing a comparison between the NPWT-treated wound and the others. Healing was twice as fast in the NPWT-treated wound compared to the patient's other breast wounds. The patient also found the cleanliness of the NPWT to be more comfortable, compared to the open drainage of her other wounds.

Lactational breast abscesses are a complication from mastitis, and are a common cause of breastfeeding discontinuation (Luo et al, 2020). Mastitis is an inflammatory state of the breast tissue that may lead to local cellulitis and, in some severe cases, abscess formation. Common symptoms are cellulitis, oedema and pain, and the abscess will often spontaneously rupture. As a wound care provider, it can be complex to find a balance between continuing breastfeeding, which is ideal for the infant, and treating the wound can be complex.

There is very little guidance about lactation support during treatment of a breast abscess. Surgeons might suggest discontinuation of breastfeeding to decrease the risks of reactivation of mastitis, but the World Health Organization (WHO) is clear that breastfeeding should continue if the abscess does not interfere with latching of the baby (WHO, 2000). The benefits far outweigh the risks for mother and baby.

Microbiome and pathogens

As recently as 20 years ago, it was believed that breast milk is sterile, but study of its microbiota has shown that it is not. Breast milk provides the infant's gut with beneficial micro-organisms that play a key role in the colonisation of the baby's microbiome and digestion.

Hunt et al (2011) stated that there is a core breast milk bacteriome that includes *Staphylococcus*, *Streptococcus*, *Serratia*, *Pseudomonas*, *Corynebacterium*, *Ralstonia*, *Propionibacterium*, *Sphingomonas* and *Bradyrhizobium* species. Therefore, to find low levels of bacteria in breast milk is no cause for alarm, as colonisation is expected. However, a fine line between colonisation and infection exists, and when that line is crossed, mastitis will lead to infective mastitis and, if left untreated, breast abscesses will eventually form.

Infective mastitis

Nipple fissures and milk stasis are primary reasons for the formation of breast abscesses in lactating women. The structural damage to the nipple and areola complex gives access to bacteria to enter the ductal and glandular tissue of the breast and leads to infective mastitis.

Increased levels of bacteria ($>10^6$ leukocytes and $<10^3$ bacterial count) in static breast milk in breast tissue will lead to infective mastitis (Boakes et al, 2018). The lactating woman is then prone to abscess formation and will need medical and/or surgical intervention.

Because the mother and infant are usually colonised with the same organisms at the time mastitis develops, breastfeeding can continue

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Figure 1. Comfortable breastfeeding with no draining of liquids onto the infant during wound healing.



Figure 2. Negative pressure wound therapy device used in this case study (Vertice Medtech SA, suppliers of Medela NPWT systems in South Africa).

during an episode of mastitis without worry of the bacterial infection will be transmitted to the infant. The only exception to this approach is that vertical transmission of HIV from mother to infant is more likely in the presence of mastitis.

Fundamental treatment options of lactational breast abscess are widely studied but majority of studies show that the three key factors are:

- Draining of the abscess with wound care.
- Staining of the organisms to justify antibiotic use.
- Suppression or cessation of lactation if needed.

All evidence shows that it is still beneficial for mother and baby to continue breastfeeding.

Wound care after incision and drainage of an abscess

Literature reviews on guidelines on wound care, post incision and drainage, guide the clinician in the direction of conventional treatments. Conventional wound healing takes time, and the risk of infection is higher.

Kostaras et al (2014) examined surgeries on patients with a spectrum of complicated breast

pathologies and found that 150 of the 154 healed completely with negative pressure wound therapy (NPWT).

Traditional home wound care of a wound after incision and drainage of an abscess is often a messy affair. There might be a gaping wound, or a drain *in situ* and there may be high exudate levels and breast milk to complicate the healing process. The home care of breast abscess wounds are normally a messy affair, and the patient will see breast milk and pus freely draining from the breast. Constant leaking is a worry, and this increases during the let down reflex.

Potential drainage of wound fluid, pus and breast milk, make the choice of wound care products a challenge. Effective exudate management, stimulation of granulation, minimising bacterial growth and comfort are the aim when choosing wound care products to manage this situation.

The suggested cost-sensitive treatment plan for wound care, post incision and drainage of a breast abscess without a drain is currently:

- Cleaning the wound by irrigating the cavity
- Plugging the present cavity with a lint product (e.g. Sorbata ribbon)
- Protecting the surrounding skin from moisture damage
- The correct antibiotic treatment.

Negative pressure therapy device

Baranoski and Ayello (2016) explained NPWT as a method to increased wound healing and explains further that by generating negative pressure in the wound will causes macro-and microstrain in the cells. These strains will cause growth factors and cytokines to upregulate the fibroblastic activity and so increasing production of the extracellular matrix causing cells to proliferate quicker and so forming new granulation tissue.

NPWT therapy is a very costly treatment in South Africa and local medical aid funding has strict guidelines on commencing treatment. Financial implications make NPWT a luxury, but as shown in the following case, there are definite benefits. The motivation for applying NPWT for the patient described in this paper was to increase wound healing speed and comfort so that the mother could move towards her breastfeeding goals.

Case presentation

Mrs R is a healthy 31-year-old, taking no medication and with no underlying diseases. She had delivered a healthy infant, Miss H, by emergency caesarean section at 39+ weeks after an uneventful pregnancy. Complications in her breastfeeding led to bilateral

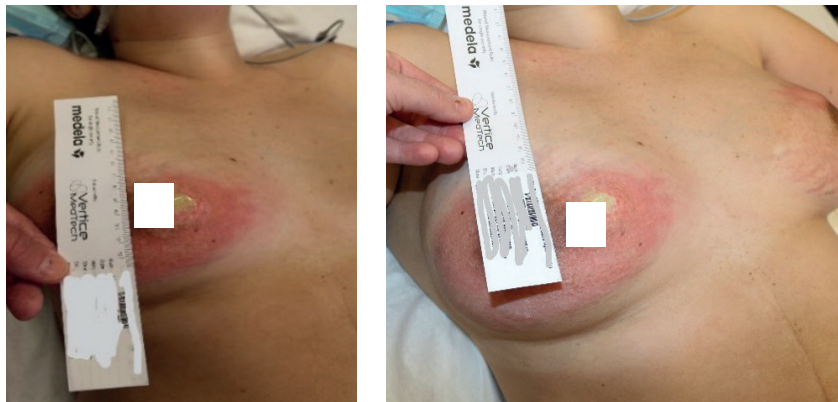


Figure 3. First incision and drainage of breast abscesses.

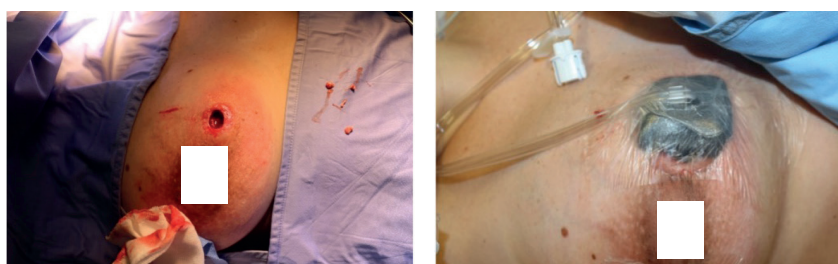


Figure 4. (a) Post drainage and (b) drainage with placement of NPWT.



Figure 5. Healthy granulating tissue seen with NPWT on second visit.



Figure 6. Rapid healing with no breast milk draining out of the wound.

breast abscesses developing.

Ill-fitting nipple shields and undiagnosed tongue tie in Miss H might have been the cause of Mrs R's severe nipple damage. She was diagnosed with bilateral mastitis by her general practitioner and was prescribed oral antibiotics on day 20 post partum.

The mastitis escalated into a breast abscess. This led to an ER visit for fine needle aspiration and a swab to determine the organism causing the infection, which was *S aureus*. Antibiotic treatment was extended, but it had little effect. Needle aspiration was unsuccessful and bilateral breast abscesses were

diagnosed 2 days later.

Mrs R was then hospitalised for incision and drainage of the abscesses, with three wounds which needed advanced wound care. She was adamant about her wish to carry on breastfeeding after her treatment.

Very little information could be found in the literature on lactation management and wound care of a breast abscess in a lactating breast.

The care plan had two main goals:

- Effective wound management and optimal wound healing
- Protecting lactation and supporting the mother.

Treatment

Mrs R was exclusively breastfeeding on day 1 of her hospital admission. She was using a better-fitting breast shield, which had improved breast drainage and minimised the risk of milk stasis.

NPWT was started in theatre on the deeper debrided wound on the right breast. The other wounds were covered with a silicone-based foam dressing in theatre by the surgeon. The surgeon preferred to not plug the wounds to allow free drainage of exudate. The main wound measured 3 cm × 3 cm × 5 cm. All the necrotic tissue was removed in theatre, exposing a healthy wound bed.

She had been on oral antibiotics and was prescribed IV antibiotics while in hospital. She had IV paracetamol and additional oral analgesia for pain relief.

On day 4, Mrs R was breastfeeding on the demand from both breasts and was able to keep up with her baby's demands. There was minimal (5 ml) breast milk drainage into the canister of the NPWT system. However, large amounts of breast milk were draining from the smaller incision sites, making it difficult for Mrs R to keep her skin dry. The Alleyn classics dressings needed to be changed 6 hourly and more cost-conscious wound cover needed to be considered.

The first dressing change was very painful for the patient and a silicone contact layer was placed on the wound bed for comfort during subsequent dressings changes. The wound diameter had decreased by 50% in 3 days.

On day 10, Mrs R was still on oral antibiotics and anti-inflammatory medication to manage local inflammation and pain. The NPWT wound was the only wound not draining breast milk. Mrs R had high levels of breast milk production.

Healthy granulation tissue was noted in all wounds. NPWT was stopped at Mrs R's request because she found that movement constraints made it difficult to care for Miss H due to the size of the unit. Continuation of NPWT would have been beneficial for wound healing.



Figure 7. Conventional wound care was undertaken with good results.



Figure 8. On day 22, active epithelisation was visible. Right: Only scar tissue remained on day 42.

At this stage the left breast was starting to feel lumpy, and 40ml of breast milk was still draining out of the incision site. The risk of milk fistula formation was considered and after consultation with Mrs R, it was decided to suppress lactation with cabergoline. Once healed, she has the option of resuming lactation.

The right breast wounds were all healing well on day 16. Home wound care was done with saline and iodine and the wound was left undisturbed for 5 days when possible.

Mrs. R had another incision and drainage on her left breast. The surgeon prescribed more antibiotics after a swab revealed a persistent methicillin-sensitive *S aureus* infection.

The second surgeon performing the incision and drainage plugged the cavity (1 cm × 1 cm × 4cm) with ribbon for 48 hours. After removal of the plug, the abscess was left with open drainage of exudate. Total healing time was 35 days.

Mrs R said: "The overall experience of the [NPWT] was incredibly positive. Apart from the fact that it kept the wound sealed, which made breastfeeding much more of a possibility, it also healed the wound much faster than the other abscess wounds healed on their own."

Conclusion

In this unique situation, we were able to compare healing rate between wounds. All the wounds were cleaned with normal saline and no other antibacterial products were used while NPWT was in progress. NPWT was able to fill the wound cavity twice as fast as the normal incision and drainage wounds and this wound also stopped draining breast milk sooner.

Wound healing to the epithelial stage was simultaneous, which decreased the time of wound care tremendously. The biggest wound was the most comfortable for the mother because it was not leaking any exudate or breast milk while breastfeeding her infant. A smaller device would have been beneficial and could have made NPWT more comfortable for her while still taking care of an infant.

Research done by Witkowska-Zimny et al (2019) identified multiple uses of breast milk ranging from eye treatment to eczema care and it appears that breast milk in the wound does not seem to cause any negative effects. It could be suggested that it might even be beneficial for wound healing because of the antibacterial and regenerative properties of fresh breast milk.

With multiple abscess a bridging technique could have been considered but the position of incision sites made it difficult to keep access to the nipple for breastfeeding.

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Conflict of interest

The negative pressure wound therapy machine and wound packs were donated for use by Vertice Medtech SA, suppliers of Medela NPWT systems in South Africa, with no cost to the patient. The author received no financial benefit by completing this study.

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