A Patient-Centered Approach for the Treatment of Fungating Breast Wounds

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Authors' disclosures of conflicts of interest are found at the end of this article.

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https://doi.org/10.6004/jadpro.2020.11.5.6

Abstract

Nearly 2% to 5% of locally advanced breast cancers develop a fungating breast wound (FBW). Fungating breast wounds develop when malignant cells infiltrate the skin and cause breakdown, ulceration, and infection. Although systemic and locoregional control of locally advanced breast cancer is necessary, appropriate management of the wound is also crucial. With limited research and reference literature involving FBW, management of FBW is not well understood. The following article will highlight the comprehensive care approach needed to manage the patient with FBW, including medical management of the locally advanced breast cancer, addressing psychosocial complications, pain management, and wound care with appropriate dressing recommendations according to the specific wound characteristics. In addition, examples and brand names will be given, as the availability of products may be dictated by the facility, or price comparisons may need to be made for the patient who will have out-of-pocket costs.

CASE STUDY

LB is a 51-year-old postmenopausal female with no significant past medical history who presented to the emergency department with a fungating breast mass. She delayed seeking medical care, as she was the primary caregiver for her daughter with developmental delays. Staging CT scans of the chest, abdomen, and pelvis showed a 14.2 cm right breast mass with ulceration of the skin and 1.9 cm right axillary lymphadenopathy but no distant metastatic disease.

LB was admitted to the hospital for further workup. Ultrasound core needle biopsy of the right breast mass confirmed invasive ductal carcinoma with severe necrosis and lymphoplasmacytic infiltrate, Nottingham grade 3, Ki-67 97%, that was estrogen receptor negative (H score 0), progesterone receptor negative (H score 0), and HER2/*neu* negative (0+ on immunohistochemistry). Ultrasound core needle biopsy of the right axillary lymph node was also consistent with metastatic invasive ductal carcinoma that was estrogen, progesterone, and HER2/*neu* negative. Clinical staging was consistent with stage IIIB (T4, N1, M0). During her hospitalization, surgical oncology evaluated LB and determined that the breast mass

J Adv Pract Oncol 2020;11(5):503–510

was nonresectable due to the size of the breast mass and depth of extension into the chest wall. She was referred to medical oncology after discharge for medical management.

Treatment recommendations from her medical oncologist involved systemic chemotherapy with doxorubicin at 60 mg/m^2 and cyclophosphamide at 600 mg/m^2 given every 3 weeks for 4 cycles, followed by paclitaxel at 80 mg/m^2 given weekly for 12 cycles, with the intent to downsize the tumor to allow for surgery. LB uneventfully completed doxorubicin and cyclophosphamide for 4 cycles; however, after 3 cycles of paclitaxel, LB's breast mass became more tender and appeared exudative and fluctuant. At this time, restaging PET/CT scan revealed progression in the size of the breast mass with new metastatic disease to the lung, supraclavicular, mediastinal, retroperitoneal lymph nodes, and numerous bone metastases in the T3 to T9 vertebral bodies, L2 to L5 vertebral bodies, left femur, right proximal humerus, and sternum. LB was started on paclitaxel protein-bound particles for injectable suspension at 100 mg/m^2 given on days 1, 8, and 15 every 28 days for 3 cycles.

Repeat CT scans showed progression in the lung and right breast mass. Her breast mass became necrotic, moderately exudative, and malodorous. She was referred for palliative radiation and wound care. She received 50 Gy of palliative radiation to her FBW and 20 Gy to the supraclavicular and axillary lymph nodes. Her breast mass was then covered with hydrofiber foam held in place with nonadhesive tubular mesh. Therapy was changed to eribulin mesylate at 1.4 mg/m^2 given days 1 and 8 every 21 days for 3 cycles. Restaging scans showed systemic progression in lung, but improvement in right breast mass.

Clinically, LB reported improved pain, less odor, and the ability to wear sports bras and normal shirts. Due to systemic progress in the lung, treatment was changed to gemcitabine at 1,000 mg/m^2, given every 3 weeks for 3 cycles. Restaging CT scan was consistent with new metastases in the liver and lung, stable breast mass with improved appearance, and the physical exam revealed less odor, as well as a decrease in reported pain. Despite the systemic progression of LB's disease, the most distressing aspect of her disease was the management of her fungating breast mass due to the lack of a caregiver to assist with daily dressing changes, as well as access to and cost of dressing supplies.

Globally, there are over one million cases of breast cancer diagnosed each year (Global Cancer Obsevatory, 2019). Locally advanced breast cancer accounts for 10% to 30% of new breast cancer diagnoses (Gao, Edlund, & Yuan, 2017). Approximately 2% to 5% of locally advanced breast cancers develop a fungating breast wound (FBW; Lund-Nielsen, Müller, & Adamsen, 2005). An FBW is due to an infiltration of malignant cells in the skin that causes breakdown, inflammation, and infection (Gozzo, Tahan, Andrade, Nascimento, & Prado, 2014). Clinically, FBW can present as a firm, painful, vascular, ulcerated, exudative, inflamed, malodorous lesion. Due to the nature of FBW and the limited life expectancy of 6 months to 1 year, it is imperative that regional control be maximized to help alleviate pain and bleeding, and improve quality of life (Gozzo et al., 2014). Despite advancements made in the treatment of locally advanced breast cancer, management of FBW remains challenging. Fungating breast wounds are a poorly understood and understudied subset of locally advanced breast cancer. As a result, there are limited resources to highlight the optimal management of patients with FBW. Comprehensive care of FBW involves a multidisciplinary approach to treat the malignancy, provide pain control, care for the wound, and provide social and psychological support.

MANAGEMENT

Systemic and Locoregional Control

Patients with locally advanced breast cancer are treated with a multimodality approach via systemic and locoregional control. Systemic treatment includes neoadjuvant chemotherapy to inhibit tumor proliferation. If a patient has human epidermal growth factor receptor 2 (HER2)-positive dis-

ease, HER2-directed therapy such as trastuzumab (Herceptin) and pertuzumab (Perjeta) should be included in the treatment regimen. Additional systemic control includes antiestrogen therapy for hormone-positive breast cancer, as well as continuation of HER2-directed therapy after surgery for HER2-positive patients.

Locoregional therapy involves surgery, usually with a modified radical mastectomy with axillary lymph node evaluation, followed by chest wall and regional lymph node radiation. Unfortunately, there are some patients who are deemed inoperable. Many times, women with FBW are not surgical candidates, as there is extensive involvement in the dermis and chest wall. Therefore, radiation is a useful modality to provide not only symptomatic relief but also improved regional control of the disease. According to Gao and colleagues (2017), palliative radiation improves patients' symptoms, including reducing the size of the breast mass, decreasing bleeding, and reducing pain. Unfortunately, there is no consensus on when women with FBW should have a radiotherapy intervention, or on the optimal radiation dosing. In previously published data, it was found that a dose of 30 Gy to 50 Gy may be needed to sustain a durable response with minimal toxicity (Gao et al., 2017).

Wound Care

Wound care is a crucial element of the management of FBW. Data regarding wound care is limited, and the literature repeatedly points to a lack of consistency in practice (da Costa Santos, de Mattos Pimenta, & Nobre, 2010; Gozzo et al., 2014). Much of the literature available is old, and the studies are on a small scale. Repeatedly noted is a lack of consistency in practice and of guidelines and knowledge.

Dressing selection is made based on the properties of the wound and the dressing. Various materials and treatments are available, and most of these are manufactured by readily accessible manufacturers. Popular online retailers provide dressing supplies that can be easily purchased by patients without prescriptions. The frequency of dressing changes varies based on the amount of exudate (European Oncology Nursing Society, 2015).

Recommendations in the literature include consultation and collaboration with wound care nurses (European Oncology Nursing Society, 2015; Tilley, Lipson, & Ramos, 2016; Winnipeg Regional Health Authority, 2006). Lack of access to certified wound care nurses and lack of knowledge about how to access these resources often lead to an oncologist or oncology advanced practitioner directing the care of an FBW. Controlling odor, bleeding, and exudate can be done with appropriate care (see Table 1).

Providing wound care can improve the quality of life and decrease symptoms. Lund-Nielsen and colleagues (2005) report a prospective exploratory study of 12 women with malignant fungating masses. The women were assessed, treated, and educated. Overall, the wounds were smaller at the end of the intervention. With intervention, 75% of the wounds had improved when measuring the level of malodor, amount of bleeding, and amount of seepage. One wound completely healed. Three wounds progressed, and it should be noted that those women were also off systemic therapy. Social isolation and anxiety decreased. The frequency with which dressings were changed decreased (Lund-Nielsen et al., 2005).

Wound care can be provided in the clinic as part of the assessment of the wound. It is important to note the size, color, amount of exudate, appearance of exudate, and pain. The Malignant Wound Assessment Tool (MWAT) has been validated, although is not commonly used (Savage, Murphy-Kane, Lee, Suet-Lam Chung, Howell, 2019). Particularly useful in this tool is the question "What bothers you most about having the wound?" This allows the provider to gather important information to guide care. Photographs can be helpful and used according to institutional policy. Patients with home care can also receive assistance from their home care services.

Exudate

Malignant wounds cause tissue to become necrotic in a manner that presents as moist, yellow slough instead of the dry, black eschar of other necrotic tissues. Exudate is partially from autolysis of necrotic tissue. Irregular cellular perfusion contributes to exudate. Exudate can also be caused by colonized bacteria activating proteases that break down necrotic tissue, causing it to liquefy (da Costa Santos et al., 2010). Additionally, tumor vasculature has in-

Table 1. Management of Fungating Breast Wounds

Wound characteristic	Dressing type	Manufacturer	Brand name	Price range
Highly exudative	Alginate	3M	Tegaderm High Integrity	$2–$7 each
			Tegaderm High Gelling Alginate Dressings	$2–$7 each
		Integra LifeSciences Corp	Algicell	$2–$7 each
		Smith & Nephew	Algisite M Calcium Alginate Dressing	$2–$7 each
Highly exudative with infection	Alginate with silver	KCI	Silvercel	$3–$10 each
		McKesson	Calcium Alginate with Antimicrobial Silver Sheet Dressing	$1–$4 each
		Hollister	Restore	$10 each
Moderately exudative	Hydrofiber foam	Ferris Mfg Corp	PolyMem NonAdhesive	$2–$5 each
		Smith & Nephew	Allevyn Gentle	$2–$5 each
			Allevyn Non-Adhesive	$2–$5 each
		DermaRite Industries LLC	ComfortFoam	$2–$5 each
		Covalon Technologies Ltd	Covawound Foam	$10 each
		Kendall	Foam Dressing With Topsheet	$1–$2 each
			Foam Wound Dressing	
		McKesson	Hydrophilic Foam Dressing Non-Adhesive	$2–$5 each
	Activated charcoal	KCI	Actisorb	$2–$5 each
	Silver-impregnated activated charcoal	KCI	Actisorb Silver	$3–$7 each
Low exudate	Cleansing	MoInlycke	Mesalt	$1–$2 each
Peri-wound protection for exudative wounds	Liquid polymer acrylate	Cavilon	No-Sting Skin Prep	< $1 each
	Dimethicone	Medline	Remedy Methicone Moisture Barrier	$1 per fl oz
	Ostomy barriers	Hollister	HolliHesive Skin Barrier	$5 each
		ConvaTec	Eakin Cohesive Seals	$2–$4 each

creased capillary permeability (Gozzo et al., 2014). Infection risk is increased in the setting of exudate.

This moist environment requires a dressing that can accommodate moisture and help debride the wound (Seaman, 2006). Exudate also compromises skin around the wound, leading to breakdown and maceration of the surrounding skin or enlargement of the wound itself. Therefore, the surrounding skin must be protected as well. Alginate and hydrofiber foam dressings are absorbent, and therefore appropriate choices in malignant wounds with exudate. Both also boast properties of easy removal, thereby decreasing pain.

Alginate dressings are nonadhesive pads (or ribbons) made of polysaccharide fibers or xerogel derived from seaweed. They need a moist environment to become activated by an ion exchange that transforms it to a gel that can absorb up to 20 times its weight in exudate (Wound management and prevention, 2020; Wound source, 2020). It requires a second dressing to hold it in place but is a good choice for highly exudative wounds. Some alginate dressings are also impregnated with silver for antimicrobial properties.

Hydrofiber foam dressings are sheets of foamed polymer solutions (often polyurethane)

with open cells that hold fluid (Wound source, 2020). They can be impregnated with other materials, such as silver. The dressings vary in absorption capacity based on the size and material. Hydrofiber foam dressings are available with an adhesive border, but malignant wounds often do not conform to the size restrictions of the border, so ones without borders are more appropriate.

Mesalt dressings by Mölnlycke are absorbent material, viscose or polyester, impregnated with sodium chloride, which is released when it comes in contact with moisture. Sodium chloride promotes wound healing and stimulates cleansing. It should not be used in wounds with low exudate (da Costa Santos et al., 2010).

Moisture-Associated Skin Damage

Prevention and management of moisture-associated skin damage (MASD) is important in helping to prevent growth of the wound. Macerated skin can appear pale, wrinkled, grey, or white. It also can present as erythematous skin with swelling, pain, or pruritis (Tilley et al., 2016). Liquid polymer acrylates are applied to the skin prior to application of the dressing. They do not interfere with the dressing and can protect the skin from maceration and injury. Zinc oxide–based ointments and petrolatum-based ointments are messy, difficult to remove, and interfere with adhesives. They are less appropriate for a breast wound and more appropriate for malignant wounds that are frequently exposed to urine or feces. If the surrounding skin is sensitive to adhesives, an ostomy skin barrier can be applied, which acts as a second skin, and the dressing can then be taped to that. The ostomy barrier only needs to be changed every 5 to 7 days, while the dressing on top can be changed multiple times without further damage to the surrounding skin.

Odor

Care of the patient with malignant wounds includes odor management to improve quality of life (QOL). Most of the odor is caused by anaerobic microorganisms breaking down necrotic tissue (da Costa Santos et al., 2010). Approaches include treating infection and masking odor, often in combination. Patient and caregivers report that malodor is the worst aspect of a fungating wound and impacts QOL of all parties (Alexander, 2010).

Topical metronidazole comes in several forms and is inexpensive. It comes as a topical gel, lotion, or solution. It can be prepared by crushing tablets and mixing in sterile water, 5 mg/mL or 10 mg/mL (Seaman, 2006). After 2 to 3 days of application, odor has been shown to be reduced (Gozzo et al., 2014). Topical metronidazole is a grade B recommendation.

Less studied and less commonly used options may also be helpful. Activated charcoal dressings filter odor, but can be expensive. If these are used, the wound must be thoroughly cleaned to ensure that it is all removed from the surface of the wound during dressing changes (Gozzo et al., 2014). Medical-grade honey can provide autolytic debridement and antibacterial effects (European Oncology Nursing Society, 2015).

Topical antimicrobial Iodosorb gel is iodine in a starch copolymer in a slow-release formulation. Applied in a 1/8-inch layer, each gram absorbs 3 mL of fluid and decreases bacterial counts (Seaman, 2006). Application may be uncomfortable or produce a burning sensation.

Curcumin and carbon are grade B recommendations for odor reduction. Curcumin ointment is a compound of turmeric. Activated carbon promotes absorption of bacterial spores that are responsible for odor. Grade C recommendations include arsenic trioxide, essential oils, and green tea extract (da Costa Santos et al., 2010).

Bleeding

Bleeding in malignant wounds is a result of hemostasis imbalance (Gozzo et al., 2014), caused by disruption of the clotting cascade by the tumor. Gozzo and colleagues (2014) report that it is the most common symptom. Prevention is the primary treatment: proper dressing selection, wound cleansing, nonadherent dressings, and gentle dressing changes (Gozzo et al., 2014). Trauma and dressing changes can worsen bleeding. Treatment is directed by the severity of bleeding.

Minor bleeding, which can be controlled at the bedside, can be topically managed with direct pressure. Pressure can be applied with gauze saturated with epinephrine (1 mg epinephrine: 1 mL NS) for 10 minutes (Tilley et al., 2016). Silver

nitrate sticks can control bleeding, but they can also be painful and must be applied with each dressing change (Tilley et al., 2016). Calcium alginate can control bleeding but runs the risk of remaining embedded in the wound with dressing changes (Tilley et al., 2016). Absorbable gelatin and collagen dressings can control bleeding (Seaman, 2006). If the wound constantly oozes a small amount of blood, sucralfate paste (Carafate) can be compounded by dissolving a 1-g tablet in 5 mL of a water-soluble gel and applied (Seaman, 2006).

Major bleeding requires more aggressive interventions. At this point, vascular surgery or interventional radiology consults are appropriate. If this worsens to hemorrhage, it may result in death. Comfort measures include towels to absorb the bleeding, as well as blankets to offset the cold sensation of blood loss. Benzodiazepines and opioids are also appropriate in this phase (Tilley et al., 2016).

If one searches the internet for methods to control bleeding, they may come across some dangerous recommendations, particularly that of Mohs' paste, which is zinc chloride. It is sold under the title of "black salve," or Cansema. There are Japanese case studies that report using Mohs' paste (Kakimoto, Hiromi, Okamura, & Yoshino, 2010; Yanazume, Douzono, Yanazume, Iio, & Douchi, 2013) to control bleeding from malignant wounds; however, there are no data from controlled trials, and case reports of harm exist in the literature (Eastman, McFarland, & Raugi, 2013). In particular, the brand Cansema is marketed and prevalent on the internet. Many of these black salves contain bloodroot, which has been shown to have many toxicities. The U.S. Food & Drug Administration has taken action against companies selling bloodroot products. It is important for health-care providers to be aware of the prevalence and accessibility of these potentially harmful products, so that patients can be educated on avoiding them.

Pain

Malignant wounds are a significant source of pain. Pain can be related to the tumor itself as it presses against other structures. It can be secondary to edema or to infection. Nerve endings can be exposed leading to pain. Dressing changes themselves are a source of pain, as are debriding agents. Pain from FBW often causes sleep disturbances because it becomes difficult to sleep in a comfortable position, thus resulting in muscular discomfort and routine sleep deprivation.

In addition to opioids for pain management, changing the dressing regimen can decrease pain. Using moisture-retentive dressings decreases the number of dressing changes needed. Soaking the dressing prior to removal with either sterile normal saline or tap water loosens the dressing and prevents retention in the wound bed or tearing of the tissue (Seaman, 2006; Tilley et al., 2016). Nonadherent dressings also prevent tearing of the tissue on removal. Antimicrobial agents can reduce pain secondary to infection. Securing dressings with nonadhesive alternatives such as burn netting, elastane (Lycra), or surgical bras can reduce pain to periwound skin. Ostomy skin barriers can reduce the need for adhesive changes and protect the periwound skin from repeated trauma from adhesive use (Seaman, 2006; Tilley et al., 2016).

Topical pain control can also be helpful. Topical anesthetics (2% lidocaine jelly) can be applied 3 to 5 minutes before wound care. Topical opioids such as 10 mg morphine in 8 g hydrogel can be mixed by compounding pharmacies (Seaman, 2006).

Itching of skin lesions and periwound areas contributes to pain. This can be treated orally with an antihistamine like hydroxyzine. Topical steroids can be used if they are found to be helpful, as well as topical antihistamines or calamine preparations (Winnipeg Regional Health Authority, 2014).

Nutritional Management

Malignant wounds are no different from other wounds in that they have a high metabolic demand. The patient's protein intake should be 1.5 to 2.5 g/kg body weight per day to promote healing (Winnipeg Regional Health Authority, 2006). The micronutrients zinc, vitamin A, vitamin E, and vitamin C promote wound healing.

Practical Approach to Wound Care

Lund-Nielsen and colleagues (2005) lay out the steps to dressing changes in the home or office. The first step is to rinse the wound with tap water. If there is exposed bone, sterile water should be used. Next, the area should be washed with liquid medicinal soap with a pH between 4 to 6, which is close to that of the skin. Chlorhexidine gluconate

4% is one option. After cleansing, assessment of the wound can be performed. If it is a wound with high exudate, the wound edges should be protected with barrier cream. If using metronidazole topically, it can be applied at this time, prior to dressing application. Dressings that are treated with an agent are applied directly to the wound, then the absorbent dressings applied over that. For example, if using a charcoal dressing, it is applied directly to the wound. If using hydrogel for dry necrosis, it is applied directly to the wound. The absorbent dressing is applied on top of that, followed by securing material or adhesive (Lund-Nielsen et al., 2005).

ECONOMIC BURDEN

Appropriate wound care of FBW requires specific topical ointments and dressings, thus leading to issues with accessibility and cost (Ivetiç & Lyne, 1990). Frequent dressing changes increase the financial burden of dressing supplies. Frequency of dressing changes can be decreased by appropriate dressing selection, but these products can be expensive, particularly if a patient has limited financial resources. Additionally, patients often require daily help with dressing changes, thus relying heavily on caregivers for assistance. The financial burden of wound care is only one aspect of the psychosocial complications that patients with FBW experience.

PSYCHOSOCIAL COMPLICATIONS

Although medical management of FBW is difficult, there are numerous social and psychological issues that are equally challenging. Fungating wounds lead to patients experiencing poor self-image. Many patients report embarrassment, shame, anger, anxiety, and guilt as a result of a fungating wound (Ivetiç & Lyne, 1990). In a study by Probst and colleagues (2013), FBW patients reported that they felt they were losing control over their bodies due to the visible manifestation of their cancer. Forty-two percent of women reported that their wound has a negative influence on their femininity (Lund-Nielsen et al., 2005). The negative influence on their femininity included body image disturbances, restriction of clothing options, and lack of a sex life. During sexual activity, partners of FBW patients reported fear of causing pain or discomfort, thus resulting in reduced episodes of intimacy (Young, 2017).

Additionally, poor self-image is exacerbated by the anxiety that is associated with participating in social events, thus ultimately leading to social isolation. Women with FBW become anxious in social settings due to their malodorous, bulky, bleeding lesions and thus have limited interactions with other individuals. Similarly, FBW also limits clothing options for women to participate in social events.

Since clinical depression is common among women with FBW, comprehensive treatment should include medication and counseling services. Individual counseling with cognitive behavioral therapy has shown some benefit to patients (Maida, Alexander, Case, & Fakhraei, 2016). However, dedicated FBW support groups are rare. Because of the many physical and psychosocial complications of FBW, it is imperative that medical providers use a comprehensive approach to care for individuals with FBW.

Similarly, caregivers are affected by FBW. Caregivers of fungating wounds were found to have higher levels of burnout (Alexander, 2010). A study showed that caregivers experience significant distress during dressing changes due to the labor-intensive process, close encounter with a malodorous wound, and emotional trauma associated with repeat visible exposure to the cancerous lesion (Alexander, 2010).

DISCUSSION

Although there is a relatively small subset of women with FBW, it is crucial that medical providers understand the importance of providing quality, comprehensive, patient-centered care due to the complexity of FBW and its associated complications. By utilizing the PALCARE approach as described by Tilley and colleagues (2016), providers have a systematic approach to the needs of women with FBW. PALCARE includes prognosis, advance care planning, living situation, comprehensive history, assessment, recommendations, and education (Tilley et al., 2016). The PALCARE model helps providers address both the physical and psychosocial needs of patients with a fungating wound.

Although use of the PALCARE model is beneficial, medical clinics must also adapt to structurally accommodate the multidisciplinary approach to management of FBW. Patients with FBW should

be offered a same-day multidisciplinary clinic appointment with medical oncology, radiation oncology, surgical oncology, wound clinic, social work, and psychology to maximize care. This requires a large institution or facility with all disciplines available. Similarly, rooms where wound care nurses can provide a private area to photograph and dress the wound will provide improved care.

Despite the advancements made in the treatment of locally advanced breast cancer, women with FBW have worse outcomes, as well as numerous physical and psychosocial side effects. With the need to expand the knowledge of treatment and management of FBW, it is crucial that more research is conducted to maximize therapeutic interventions, as well as enhance providers' knowledge of appropriate wound care management.

Disclosure

The authors have no conflicts of interest to disclose.

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