

Fungating Malignancies: Management of a Distinct Wound Entity

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GENERAL PURPOSE: To provide information on the surgical management of fungating malignancies as a distinct wound entity.

TARGET AUDIENCE: This continuing education activity is intended for physicians, physician assistants, nurse practitioners, and nurses with an interest in skin and wound care.

LEARNING OBJECTIVES/OUTCOMES: After participating in this educational activity, the participant will:

1. Identify characteristics of patients in a study examining the treatment of fungating malignancies.
2. Select common symptoms experienced by patients with fungating malignancies.
3. Explain issues related to the surgical treatment of fungating malignancies.
4. Identify a reason why patients with fungating breast masses may avoid medical care.

ABSTRACT

OBJECTIVE: To address the literature gap on malignant fungating wound treatment by reporting two institutions' experiences with this disease process and proposing practices to improve care.

METHODS: A multi-institutional retrospective review was conducted of 44 patients with 45 malignant fungating wounds over an 11-year period. Patient characteristics, treatment history, and outcomes were analyzed.

RESULTS: Of the 44 patients who met the inclusion criteria, 31 (70.5%) were women and 13 (29.5%) were men. The average age at presentation was 63.0 (SD, 16.1) years. The most common malignancy was breast cancer, accounting for more than half of cases (54.5%). The average surface area of the tumors at presentation was 110.3 (SD, 215.0; range, 2.2–1,140) cm², whereas the average surface area at time of discharge/death was 104.6 (SD, 310.7; range, 0–1,800) cm².

Neither surface area at presentation ($P = .504$) nor surface area at time of final follow-up ($P = .472$) were significantly associated with death during the study time frame.

CONCLUSION: In the era of advancing technologies and medical innovation, the benefits of palliative surgery, which helps mitigate an open wound, should not be overlooked. Improving end-of-life care is beneficial to the patient and families alike. As surgeons, we strive for a tangible cure, but providing palliative resection to enable death with dignity might be the most humane service of all.

KEYWORDS: cancer, fungating wound, malignancy, palliative resection, plastic surgery, wound care

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INTRODUCTION

Solid tumors have a variety of presentations, ranging from small indolent lesions to rapidly progressive masses. Despite advances in screening modalities and treatment regimens, patients may present in late-stage disease with malignant fungating wounds. These lesions are the result of erosive enlarging malignancies emanating from a deeper tissue plane causing overlying skin necrosis and bleeding.^{1,2} Necrotic material, blood, and copious exudate accumulate in deep crypts between friable tumor fronds, conferring risk for superimposed infection.^{1,3,4} Patients may delay presentation until home wound care becomes unmanageable, and they seek additional resources;⁴ moreover, some patients present in a delayed fashion after initially seeking holistic treatments for their malignancy.⁵

Malignant fungating wounds are a poor prognostic sign, and many tumors may be unresectable given extensive disease. Although rare, malignant fungating wounds occur with a frequency of 5% to 14.5% in the terminal phase of advanced cancers.^{1,2,5–10} Symptoms of these wounds include malodor, local pain, mass effects, excessive exudate, intermittent bleeding, moisture-associated skin damage, local skin necrosis, and infection.^{1,6,7} Patients with fungating masses may resort to social isolation given these distressing symptoms.^{1,4,8} Further, complicated treatment protocols, including frequent dressing changes, can be time-consuming and strain relationships between patients and family members/caregivers.^{1,3,5,8,11,12} These resultant psychosocial and physically challenging stressors negatively impact patients' quality of life, further increasing suffering in the terminal phase of cancer.

The treatment of fungating tumors deviates from that of chronic wounds with nonmalignant etiologies. Although ample literature discusses care of chronic wounds, there is a paucity of reports focused on malignant fungating wounds, for which care is generally palliative.^{2–4,7,8,13–15} Here, the authors address this gap by reporting on their experiences managing malignant fungating wounds and delineate these wounds as distinct entities in the spectrum of chronic wounds. Ultimately, the authors advocate for palliative surgical intervention of malignant fungating wounds if it will improve patients' quality of life in end-stage disease.

METHODS

Researchers performed a multi-institutional, institutional review board-approved retrospective review on patients diagnosed with malignant fungating wounds managed by plastic and reconstructive surgery between 2010 and 2021 (approval ICMS-2020-002). All study procedures were conducted in accordance with the Declaration of Helsinki, and patients or their guardians gave permission for their images to be published.

Inclusion criteria specified patients with fungating wounds with a malignant etiology. Patients with clinically similar chronic wounds without proven malignancy were excluded. The results yielded 45 wounds across 44 patients. Patient medical history, demographics, photographs, pathology, referral basis, surgical history, wound care treatment regimens, follow-up, and outcomes were reviewed.

Significant associations between variables were calculated with independent Student *t* tests and χ^2 tests; statistically significant *P* values reflect an $\alpha < .05$. Descriptive statistics and significance testing were performed using SPSS Statistics 28.0 (IBM Corp).

RESULTS

Of the 44 patients who met the inclusion criteria, 31 (70.5%) were women. At the time of the study's completion, 15 patients (34%) were alive, 21 patients (48%) were deceased, and 8 patients (18%) were lost to follow-up. The average age at initial cancer diagnosis was 58.7 (SD, 16.0) years, and the average age at presentation to plastic surgery was 63.0 (SD, 16.1) years (Table 1). Most patients presented after online searches for providers (*n* = 16 [36.4%]), followed by oncologist referral (*n* = 13 [29.5%]), other physician referral (*n* = 10 [22.7%]), family/friends referral (*n* = 2 [4.5%]), self-referral (*n* = 1 [2.3%]), and dental referral (*n* = 1 [2.3%]); two referral sources were unknown (4.5%). One patient presented with two fungating wounds, each with a distinct etiology, resulting in a total cohort of 45 wounds (Supplemental Table, <http://links.lww.com/NSW/A123>). The most common malignancy was breast cancer, accounting for more than half of cases (*n* = 24 [54.5%]; Figures 1 and 2), followed by squamous cell carcinoma (SCC; *n* = 11 [25.0%]); of note, 34.1% of patients (*n* = 15) suffered from skin cancers (melanoma, SCC, and basal cell carcinoma).

Regarding treatment history, 18 patients (40.9%) delayed seeking medical treatment, and 13 (29.5%) attempted alternative therapies prior to consultation with plastic surgery. Average cancer stage at presentation was stage 3. Of the 44 patients, 18 (40.9%) received radiation therapy, and 20 (45.5%) received chemotherapy (Table 2). The average time between diagnosis and surgical resection was 4.1 (SD, 5.8) years, and the average time between tumor ulceration and surgical resection was 3.6 (SD, 5.1) years. The χ^2 analysis demonstrated that radiation therapy trended toward being significantly associated with a final outcome of death (*P* = .055), whereas no significant correlation with death was identified in those who received chemotherapy (*P* = .152); however, these metrics may reflect overall disease stage and treatment paradigm for each pathology.

Presenting symptoms and reasons for seeking care included pain, excessive exudate, mass effects, malodor,

Table 1. PATIENT CHARACTERISTICS AT INITIAL PLASTIC SURGERY VISIT

Characteristics	n (%)	Mean (SD)
Sex		
Male	13 (29.5)	
Female	31 (70.5)	
Age at initial visit, y		63.0 (16.1)
Race		
White	33 (75.0)	
Black	4 (9.1)	
Asian	4 (9.1)	
Hispanic	3 (6.8)	
Type of malignancy		
Breast cancer	24 (54.5)	
Squamous cell carcinoma	11 (25.0)	
Sarcoma	4 (9.1)	
Melanoma	3 (6.8)	
Basal cell carcinoma	1 (2.3)	
Colorectal	1 (2.3)	
Wound location		
Breast/chest	27 (50.9)	
Head/neck	9 (17.1)	
Upper/lower extremities	7 (13.2)	
Scalp	5 (9.4)	
Back	4 (7.5)	
Abdomen	1 (1.9)	

moisture-associated skin damage, intermittent bleeding, local tissue necrosis, infection, and patient-reported poor quality of life (Table 3). All patients experienced at least one symptom, with an average of five symptoms reported per patient. A typical constellation of symptoms included excessive exudate ($n = 39$ [88.6%]), pain ($n = 36$ [81.8%]), intermittent bleeding ($n = 32$ [72.7%]), malodor ($n = 31$ [70.5%]), and necrosis ($n = 30$ [68.2%]).

The average surface area of the tumors at presentation was 110.3 (SD, 215.0; range, 2.2–1,140) cm², whereas the average surface area at time of discharge/death was 104.6 (SD, 310.7; range, 0–1,800) cm². The results of a Student *t* test indicate that neither surface area at presentation ($P = .504$) nor surface area at time of final follow-up ($P = .472$) was significantly associated with death during the study time frame. Surface area at presentation was not significantly correlated with length of time between initial visit and death ($P = .564$).

Patients were treated for an average of 24.1 (SD, 46.5) visits, with the duration of treatment ranging from one office visit to 5 years of care. Nine patients (20.5%) were seen five times or less; of these, two patients (4.5%) were seen for only one consultation. These nine patients were

initially lost to follow-up, but one patient later presented to another facility before dying 1 year later. The average time from initial plastic surgery visit to death was 1.3 years, ranging from 2 months to 5 years.

Debridement and/or debulking procedures were performed on 42 patients (95.5%); debridement was performed both in the clinic and in the OR. Prior to operative intervention, patients underwent preoperative clearance based on age and comorbidities to ensure they were metabolically fit for surgery. High-risk patients who were not cleared for surgery received debridement in the clinic setting with local anesthetic. Active infections that could be quelled with antibiotics were treated accordingly prior to resection. Biologics, such as an antimicrobial collagen wound matrix or an animal-derived extracellular matrix, were used on 17 patients (38.6%). Patients tolerated the procedures well with no significant bleeding complications or adverse events reported postoperatively.

DISCUSSION

Although operations for patients with malignant fungating wounds may not augment survival, surgical interventions such as mass excision, debridement, and possible reconstruction may improve quality of life by mitigating the effects of an open wound during the terminal phases of cancer. Palliative resection may not only ameliorate wound care but also help patients die with dignity and ease suffering by mitigating foul-smelling, weeping wounds. This is of particular importance in the pediatric population with malodorous, ulcerating, and disfiguring wounds (Figure 3). Operative goals are to provide palliative resection and/or reconstruction with short operative time, acceptable risk, and low donor site morbidity while enabling uncomplicated recovery. Accordingly, the majority of patients received debridement or resection with/without local tissue rearrangement. Few patients received local/rotational flap coverage based on wound location and defect size; complex free-flap operations requiring microvascular anastomosis were not offered.

In this cohort of 45 malignant wounds, the most common underlying etiologies were breast cancer, sarcomas, and skin cancer. Notably, more than half of the patients were women with a fungating breast malignancy. This anatomic distribution is akin to other published reports.^{1,4,7–9} The mean survival of 1.3 years after presentation is also comparable to other reports.^{4,10,16} Of interest, four outlier cases (9.3%) demonstrated long-term survival following complete resection: a locally advanced invasive ductal carcinoma of the breast, an ulcerated melanoma of the cheek, a fungating liposarcoma of the thigh, and an invasive SCC of the fingertip. All four patients are still alive without evidence of disease recurrence at the resection site over 1 year postoperatively.

Figure 1. MALIGNANT FUNGATING BREAST CANCER

Patient 003 was diagnosed with breast cancer 7 years prior to initial consultation with plastic surgery. She initially refused surgery and chemotherapy and opted for homeopathic and alternative care before presenting with a fungating lesion. The patient consented to palliative resection alone: (A) prior to resection and (B) 1 month following resection.



Of further interest, three of these patients presented to clinicians in a delayed fashion after months to years of self-treatment/homeopathic remedies. Although a small percentage of this cohort, these cases underscore that malignant fungating wounds deserve evaluation for resectability before a palliative path is charted. In addition, this highlights the importance of multidisciplinary cancer care from surgeons to oncologists to radiologists and beyond to provide adjuvant therapy to help prevent recurrence/metastasis.

Pertinent to this study population, 40.9% of patients ($n = 18$) received radiation therapy prior to consultation with the authors. It is well documented that radiotherapy negatively affects tissue quality, resulting in nonhealing wounds, fibrosis, and ulceration. Radiation causes vessel wall edema, stasis, and occlusion, thereby preventing the influx of oncogenic factors while also impeding recruitment of fibroblasts and cytokines in the wound bed for healing; radiotherapy also weakens collagen—a scaffold imperative to wound healing.¹⁷ As such, careful consideration is required when operating in an irradiated field. Surgical tactics such as minimal undermining to maintain blood supply and avoiding excess tension may help achieve desired results. The potential for re-

surgence of devitalized tissue and nonhealing wounds should be thoroughly discussed with patients as part of informed consent; however, in the case of palliative surgery, most of the patients were amenable to the proposed operations in the hope of improved quality of life.

Similar consideration is required for bleeding, which is inherent to friable and highly vascularized malignant tissue. Many patients are on anticoagulation or antiplatelet agents for malignancy or other comorbidities. Interdisciplinary planning among surgeons, oncologists, and anesthesiologists is a critical and complementary step to informed consent when discussing surgical planning, alternate interventions, and perioperative medication management. Perioperative tactics, including medication cessation or coordination with vascular surgeons or interventional radiologists for embolization, should be discussed with the patient's care team. No significant perioperative bleeding complications were reported in this cohort.

The use of biologics to enhance collagen formation and re-epithelialization is an invaluable tool in wound care.¹⁸ Despite these benefits, the long-term effects of materials with inductive and regenerative properties should be considered in the setting of an active cancer. However, the short-term benefits of biologics likely

Figure 2. CUTANEOUS INFILTRATION OF MALIGNANT FUNGATING BREAST CANCER AFFECTING THE CHEST, ABDOMEN, RIGHT UPPER EXTREMITY, AND BACK

A, Ventral view; B, dorsal view. Following diagnosis, patient 001 underwent a right mastectomy with adjuvant chemoradiation. Seven years following initial diagnosis, she developed skin ulcerations, which she managed independently until seeking wound care 11 years later. The patient was treated with a combination of local debridement, skin substitute applications, and frequent dressing changes.



outweigh the potential for malignant propagation in patients with terminal illness.

Given the authors’ experience with malignant fungating wounds, they advocate for their treatment as a distinct entity from chronic wounds. Malignant fungating wounds

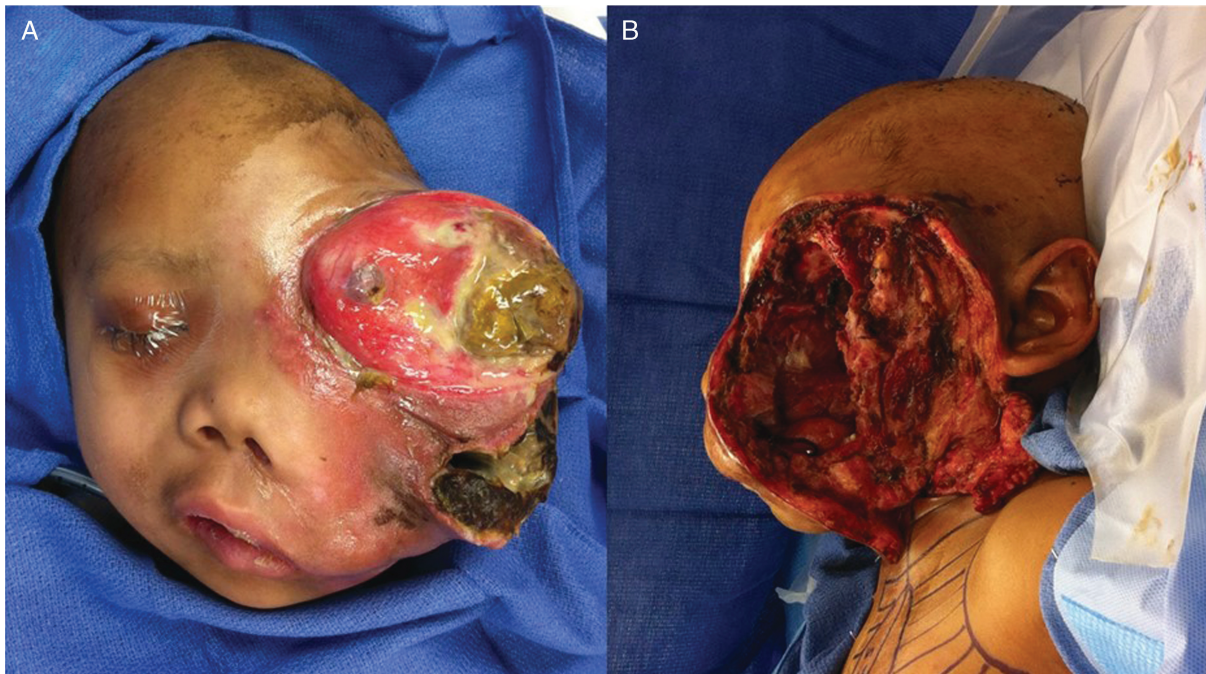
present most commonly in the breast, head, and neck as rapidly growing malignant cells invading normal dermal architecture.^{1,4,7-9} Local lymphedema, mass effects, tumor necrosis, and bacterial overgrowth in deep tumor crypts are processes not observed in wounds of benign etiology. Malignant fungating wounds are often large at presentation to plastic surgery or wound care, as reflected in this cohort with an average size of 110 cm² at consultation. These large lesions also incur mass effects, such as compression on adjacent structures resulting in neurovascular occlusion and pain. All patients presented with one or more wound-related symptoms, typically copious exudate and local pain, consistent with prior publications;^{1,6,7} 44% of patients

Table 2. HISTORY AND TREATMENT COURSE		
Variables	n (%)	Mean (SD)
Patient history		
Delay in seeking medical treatment	18 (40.9)	
Alternative therapy	13 (29.5)	
Radiation	18 (40.9)	
Chemotherapy	20 (45.5)	
Neither chemotherapy nor radiation	19 (43.2)	
Size of resected tumor, cm ³		439.0 (909.6)
Under care of a board-certified oncologist	13 (28.9)	
Treatment course		
Duration, mean (SD), mo	6.0 (11.8)	
No. of clinic visits, mean (SD)	24.1 (46.5)	
No. of patients with fewer than five visits	9 (20.5)	
No. of patients with one visit	2 (4.5)	
Treatment characteristics		
Local debridement/debulking	42 (95.5)	
Biologics	16 (36.4)	

Table 3. PRESENTING SYMPTOMS	
Symptom	n (%)
Exudate	39 (88.6)
Pain	36 (81.8)
Bleeding	32 (72.7)
Odor	31 (70.5)
Necrosis	30 (68.2)
Poor quality of life	20 (45.5)
Mass effect	18 (40.9)
Moisture-associated skin damage	16 (36.4)
Infection	9 (20.5)

Figure 3. HIGH-GRADE MAXILLARY OSTEOGENIC SARCOMA (CONVENTIONAL TYPE) OF THE RIGHT ANTERIOR AND POSTERIOR MAXILLA

A, Protuberant, erosive, necrotic tumor displacing periorbital structures and causing skin breakdown in patient 044. B, Following palliative partial resection with maxillary and palate reconstruction and pedicled pectoralis flap.



presented with all four of the most common symptoms: exudate, bleeding, pain, and malodor. Malodor is often the most distressing symptom as it can inhibit social interaction with family, friends, and even professional caregivers.^{1,3,5,8,11,12} The patients were proponents of intervention as a means to curb their distressing symptoms. Given the aim of symptom improvement over cure, patients opted for treatment despite the potential for re-emergence of nonviable tissue, nonhealing wounds in irradiated fields, and bleeding. No postprocedural adverse events were reported, indicating good outcomes.

The psychosocial characteristics of patients with malignant fungating wounds are also distinct. Patients may exhibit a remarkable level of denial and dissociation from their disease. In addition, the incidence of malignant fungating wounds is linked to the onset of anxiety, depression, and personality disorders.^{5,19} Coping mechanisms often divert the patient from mainstream medical care to pursue alternative remedies with resultant deterioration of the wound and progressive social isolation. Nearly half of these patients delayed seeking traditional medical treatment. Women with fungating breast masses have reported avoiding medical care due to shame, embarrassment, fear of cancer diagnosis, loneliness, and limited resources.^{1,2,5,8,11,15,20}

The treatment algorithm for malignant wounds should be tailored to the individual patient's needs, with the main

focus of improving quality of life and reducing both psychological and physical distress. The literature supports palliative resection in patients with malodorous masses to decrease suffering and increase social and family support.²¹ Coordination with certified wound nurses, at-home wound care, and patient education can also assist with alleviating symptoms, providing education, and easing the wound burden. Ideally, early referral to plastic surgery for palliative resection may help decrease ongoing suffering from painful malignant wounds.

The biggest limitation to this study is the lack of quantifiable data on quality of life following intervention. Anecdotally, patients reported improvement in their presenting symptoms. Future work with this population should strive to obtain quantifiable metrics on satisfaction, symptom improvement, and quality of life through perioperative surveys in the hopes of providing resources to other patients in late-stage disease looking for assistance with their malignant fungating wounds. In addition, the authors recommend comparing usage of wound care services preoperatively and postoperatively to evaluate potential changes in resource utilization.

CONCLUSIONS

In the era of advancing technologies and medical innovation, the benefits of palliative surgery for malignant

fungating wounds should not be overlooked. Improving end-of-life care is beneficial to the patient and families alike. As surgeons, we strive for a tangible cure, but providing palliative resection to mitigate the sequelae of fungating wounds and allow for death with dignity might be the most humane service of all. ●

PRACTICE PEARLS

- Malignant fungating wounds typically have a poor prognosis and may be unresectable.
- Patients with fungating malignant wounds may present in a delayed manner once home wound care becomes unmanageable.
- Wounds may impart psychosocial and physically challenging stressors on patients and caregivers alike.
- The treatment of fungating tumors deviates from that of chronic wounds with nonmalignant etiologies, and may encompass palliative surgery to improve quality of life.

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