A Prospective, Descriptive Cohort Study of Malignant Wound Characteristics and Wound Care Strategies in Patients with Breast Cancer

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Abstract

Few studies have addressed the effects of dressings on malignant wounds. A 20-month (May 2010 to January 2011) descriptive, prospective cohort study was conducted by the Wound Care Unit of Institute Curie, Paris, France to evaluate the use of various local care procedures and characteristics of malignant wounds. Symptoms and wound management methods were observed over a period of 42 days in 32 patients (all women; mean age 60 years, range 30–96 years, most with infiltrating ductal carcinoma). After cleansing (with either sterile saline or water), a variety of wound treatments were used based on specific wound characteristics, including calcium alginate, hydrocellular, interface, and active charcoal and superabsorbent dressings. Wound size, color (red, pink, black, yellow), periwound condition, surface wound organisms (number of species and quantity), and signs of infection, along with wound-related pain (rated on a verbal rating scale), odor, bleeding (spontaneous or induced), and exudate (rated on a four-level scale as none, slight, moderate, intense) were assessed at baseline and on days 21 and 42 of treatment. The degree to which each symptom was managed was scored as controlled, partly controlled, or not controlled. Mean initial wound size did not change over the evaluation period; most (74%) wounds were characterized as being inflamed. No infectious episodes were observed during the duration of the evaluation. Exudate and bleeding were generally controlled with hemostatic dressings, calcium alginate dressings, or absorbent pads. Odor was not completely controlled with charcoal dressing and was noted to be significantly greater in patients with >10⁵/g bacterial counts and/or with one or more anaerobic bacteria (P = 0.05). At day 0, 13 out of 25 patients (50%) had uncontrolled pain; pain ratings did not change over the course of the study. Clinical research on specific clinical practice (eg, topical morphine for pain) and to assess the comparative efficacy of different care approaches on controlling the local symptoms of malignant wounds is warranted to improve the quality of care, which may affect patient quality of life.

Keywords: wound care, malignant wound, cancer, supportive care

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Malignant wounds are caused by malignant cells infiltrating the skin, the blood, and/or lymph vessels. They can be related to a local tumor that has reached an advanced stage or to a recurrence (cutaneous metastases).¹ These wounds can present as excoriated and/or externalized (fungating, fungus) and can be extensive superficial or deep and associated with a fistula. They can occur in the palliative care phase of the disease and cause a series of distressing symptoms for the patients, such as unpleasant odor, large quantities of discharge, induced or spontaneous bleeding, and pain.²,³ They also can expose patients to a risk of infection or hemorrhage that can require hospitalization and management in specialized units.
Malignant wounds are chronic (>6 weeks) and sometimes nonhealing, reflecting the progression of the cancerous process. Because these cancer wounds develop according to the patient’s response to anti-cancer treatment, they very quickly can become unbearable, although this seems to be to a certain extent mitigated by the implementation of local care procedures to manage them appropriately.

Many dressings developed over the past 40 years are designed to manage wound moisture and absorb or adsorb odors. However, no dressings are specifically indicated for use on malignant wounds; it is difficult to evaluate their effectiveness in the management of these wounds, which change as they develop and can be heterogeneous in terms of symptoms, aspects (ulcerating, fungating), and evolution. Controlling symptoms and pain related to chronic wounds in the palliative stage of cancer with a terminal diagnosis is a major challenge in terms of patient comfort and the comfort of those caring for and associating with these persons. Palliative care and malignant wound care begin at diagnosis and continue through treatment, follow-up care, and the end of life.

Thus, malignant wounds have been managed mainly by supplementary local care adapted on a case-by-case basis to treat the symptoms in addition to the patient’s medical treatment (ie, chemotherapy, radiotherapy). Many currently available dressings (eg, alginate, hydrocellular, and active charcoal dressings) have been used for this purpose, but none has been designed specifically for this type of wound. Only one solution based on miltefosine (Miltex®, Baxter, UK) is available for the treatment of cutaneous metastases of breast cancer. Its application is restricted to subcutaneous nodules and/or small sized ulcerations.

Epidemiology

Compared to other hard-to-heal or nonhealing wounds in the general population, malignant wounds do not occur frequently. A 2010 national prevalence survey in France showed that 1.7% of acute and chronic wounds in outpatients and 1.6% of wounds in hospitalized patients were malignant wounds. The prevalence of malignant wounds in patients treated for cancer, regardless of anatomical location, is not well documented. It is estimated in international studies to be between 5% and 10%. A survey of nurses conducted in Switzerland in three different geographical regions over a 6-month period found the prevalence of malignant wounds in patients with metastasized cancer was 6.6%.11

Cutaneous lesions are found most commonly in breast cancer; they occur in 2% to 5% of the cases, which is more frequently than in malignancies of the head and neck, genitals, or groin.4,5,12,13

The purpose of this descriptive study was to evaluate the use of various local care procedures and characteristics of malignant wounds.

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Key Points

- Because malignant wounds are relatively uncommon compared to other chronic wounds, knowledge about their natural progress and optimal care strategies is limited.
- The authors of this descriptive study documented the evolution and care of 32 patients with malignant wounds over a period of 42 days.
- Neither the size of the wounds nor patient pain changed significantly over time.
- A wide variety of advanced wound dressings were used and bleeding/exudate was generally well controlled.
- The presence of >10^9/g bacterial counts and/or one or more anaerobic bacteria was found to be associated with increased amounts of odor.
- Larger studies are needed to compare the effect of different treatment strategies.

Methods

Patients and study design. A 20-month (May 2010 until January 2011), prospective cohort study was conducted among patients with a malignant wound resulting from breast cancer for a period of 20 months by the Wound Care Unit of Institut Curie (Paris, France). During that time, 40 patients were expected to be enrolled based on the frequency of tumor wounds related to breast cancer in the general population, the frequency with which patients with these wounds receive care in the authors’ hospital, and the results of a pilot study carried out in 2007–2008 in the authors’ hospital department.

Inclusion criteria stipulated participants should be >18 years old and present with a breast cancer tumor-related wound measuring at least 10 cm². Exclusion criteria included an inability to participate in the medical follow-up of the study for geographical, social, or psychological reasons and/or the presence of end-stage disease.

Evaluations were fixed to a period of 42 days, with one evaluation every 21 days (day 0, day 21, and day 42) in order to prevent interference with chemotherapy cycles and to limit loss of follow-up.

The study was conducted in accordance with current ethical standards and regulations. The study protocol was accepted by the People’s Protection Committee (CPP Ile de France III) and by the Agence Nationale de Sécurité du Médicaments et des produits de santé (ANSM).

Evaluation criteria. Criteria evaluated at each consultation included clinical wound assessment variables and symptoms.

Wounds. At baseline and at each follow up visit, wounds were measured in cm at their widest and longest point perpendicularly. A four-color classification system adapted from
Keast et al as described in Falanga et al was used to assess the wound; the colors represent necrosis (black), fibrin (yellow), granulation tissue (red), and recently developed new epidermis on the wound (pink). A digital photograph was taken according to a standardized procedure: no flash, perpendicular to the wound, at a mean distance of 50 cm to 1 m.

_Infection._ Infectious episodes were documented by the presence of systemic, local, or regional signs of infection — ie, fever, increase of odor, pain, exudate, pus, unexplained change of the wound bed, sudden alteration, and inflammation.

_Pain._ Wound-related pain was evaluated using the Verbal Rating Scale (VRB), a sensitive, reproducible, reliable, validated self-evaluation scale, comprising five items (no pain, slight, moderate, bad, and unbearable pain).  

_Odor, bleeding, exudate._ Odor, bleeding, and exudate were graded by the assessor and by patients. Odor and exudate were assessed using a four-level scale: none, slight, moderate, and intense, regardless of the clinician’s formal findings/assessment. Bleeding was considered spontaneous when it occurred between two dressing changes with the dressing in place and no traumatic event; or induced when it occurred during the dressing change. The use of several superabsorbent dressings including Vliwasorb® (Lohmann et Rausher, Germany), DryMax® (Absorbest AB, Sweden), and Zetuvit® Plus (Hartmann, Germany) also was evaluated.

The degree to which each symptom was controlled also was scored (controlled, partly controlled, not controlled). The term _control of the symptoms_ does not mean the symptom was treated and eliminated but that the discomfort it caused was mitigated by the dressings, local care, or treatments.

_Bacteriological criteria._ Semi-deep microbiological samples were taken using a curette at each evaluation to identify and quantify the aerobic and anaerobic bacteria and characterize the presence of biofilm under the fluorescence microscope after staining. _Colonization_ was defined as the presence of bacteria on the wound with no inflammatory response or sign of infection. _Infection_ was defined as the multiplication of bacteria in the wound with presence of local and/or general signs of infection. The presence of biofilm was determined by observing patterns of bacteria organized in colonies and the biofilm matrix composed of exopolymers using an epifluorescence microscope.
Table 1. Evolution of wounds aspect from day 0 (D0) to day 42 (D42)

<table>
<thead>
<tr>
<th></th>
<th>Excoriated</th>
<th>Superficial</th>
<th>Exteriorized</th>
</tr>
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<tbody>
<tr>
<td>D0</td>
<td>34%</td>
<td>50%</td>
<td>41%</td>
</tr>
<tr>
<td>D21</td>
<td>54%</td>
<td>46%</td>
<td>34%</td>
</tr>
<tr>
<td>D42</td>
<td>65%</td>
<td>35%</td>
<td>25%</td>
</tr>
</tbody>
</table>

Local wound care. Wound treatment protocols were adapted to each patient depending on wound characteristics, signs of infection, and symptoms following the decision tree presented in Figure 1 and in accordance with consensual recommendations.\textsuperscript{18-22} Protocols are associated with several different dressings (eg, primary dressing on the wound bed, secondary dressing to absorb and/or adsorb). New superabsorbent dressings (with polyacrylate) were tested (eg, Tegaderm superabsorber, 3M, US) instead of absorbent compresses (with cellulose).

Data collection. The information collected during the wound consultation, either as outpatient follow-up or in hospital, was introduced in a data file identified by the number of the study and included the type of wound and its histology, site, degree of evolution, and age; the aspect of the wound and the skin around the lesion, including a digital photograph; a description of the local care procedures and dressings applied; a description of systemic treatments; and an evaluation of the local symptoms, risks, and wound complications.

Statistical analysis. All variables were entered in MACRO V3.0 (Infermed, GB) and R version 2.13.2 (R Foundation for Statistical Computing, Vienna, Austria). Descriptive statistics were used to evaluate distributions and outcomes compared using chi-square, analysis of variance, or Pearson’s correlation coefficient. A nonparametric version of these tests was used whenever necessary, including Fisher, Kruskal-Wallis, and Spearman coefficient. The tests were carried out with a two-tailed, statistical significance level set at $P = 0.05$.

Results

Participants. Thirty-two patients (all women; mean age 60 years, range 30–96 years) were included in this study. All had breast cancer, mainly infiltrating ductal carcinoma; nine (28%) had neglected primary malignant wounds and 23 (72%) had cutaneous metastases. The mean duration of these wounds at the start of the evaluation was 13 months (range 1–64 months). Thirty-one (31, 96%) of the malignant lesions were located on the thorax; one was located in the axilla.

Thirty-one (31%) of the wounds were in palliative care, and 10 (31%) were receiving palliative care. Among the patients who discontinued the study, three died, one was transferred to a palliative care unit, and four did not come to one of their appointments for psychological or social reasons. Four wounds achieved partial epithelialization.

Wound description.

Size. The mean initial length of the wounds was 12 cm (range 2–35 cm) and the mean width was 8 cm (range 2–26 cm). Wound surface area remained globally stable during the study of the wound, with a mean length of 12 cm and a mean width of 9 cm on day 42, although wounds tended to become excoriated (see Table 1).

Color. Twenty-four (75%) of the wounds did not demonstrate any black necrotic tissue, 16 (50%) had ≥40% yellow and red tissue, and 30 (94%) had no pink. Budding malignant tissue (red) and fibrin or soft necrosis (yellow) dominated these wounds. The color classification remained stable for the duration of the study.

Periwound condition. In 58 (74%) of all the evaluations, the skin around the lesions was inflamed, which is usual for this type of wound because inflammation is related to the underlying tumor. This inflammation is not a sign of infection, even if it is sometimes difficult to differentiate the two phenomena. Contact eczema was observed in four (5%) of the cases and irritation in three (4%). In nine (12%) of the evaluations, the skin around the lesion was healthy.

Infection. No infectious episode (with fever or complications) was recorded during the evaluation period despite the vulnerability of the patients and the fact wounds were colonized by a relatively dense mixed flora. Fifty-four (54%) different bacteria were found on the wounds: 37 aerobic and facultative anaerobic bacteria and 17 obligate anaerobes. The four wounds that showed signs of healing had no anaerobic germs and one to three aerobic or facultative anaerobic bacteria.

Local wound care procedures. Sixty-two wounds (79%) were cleansed with saline solution and 16 (21%) with water. Although cleansing with saline does not exclude prior cleansing with water, a shower with no dressing was advised before the local care was administered.

Dressings. A variety of primary dressings — ie, those in direct contact with the wound bed — were used. On average, alginate dressings were used in 31 (40%) of all dressing changes (day 1: 11 [34%]; day 21: 13 [50%]; day 42: seven [35%], including Kendall alginate® [Kendall, US, and Algosterr® Brotherie, France]). Hydrofiber dressings (Aquacel®, ConvaTec, US) were the second most commonly used (day 1: 13 [41%]; day 21: seven [27%]; day 42: 10 [50%]), followed by hydrocellular dressings (Mepilex® nonadhesive dressings, Mölnlycke, Sweden) in nine (11%) dressing changes (day 1: four [12%]; day 21: four [15%]; day 42: one [5%]). Interface dressings (eg, Urgotul®, Urgo, France) were used in five cases (6% of the time), and a variety of other dressings in three cases (4% of the time). Eighteen (56%) of the patients cooperated in all three successive evaluations, 10 (31%) completed two evaluations, and four (13%) were evaluated once. Among the patients who discontinued the study, three died, one was transferred to a palliative care unit, and four did not come to one of their appointments for psychological or social reasons. Four wounds achieved partial epithelialization.

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In 12 (16%) of the cases, several layers of primary dressing were placed on the wound to facilitate exudate management. Secondary cover dressings included a combination of absorbent compresses (33 [42%]) (ie, Zetuvit®, Hartmann, Germany) and active charcoal dressings for odor control (ie, Actisorb®, Systagenix, US). Occasionally, superabsorbent dressings were applied and removed quickly because of exudate leakage and discomfort. In 15 dressing changes (19%), a hydrocellular dressing (ie, Mepilex®, Mölnlycke, Sweden) was used over the primary dressing, and in 12 (15%) a combination of alginate, active charcoal, and absorbent compresses were applied. In nine cases (12%), a variety of compresses and in six (8%) only absorbent compresses were used. In a small percentage of cases (three, 4%), an alginate dressing and an absorbent compress were used together.

Antimicrobials. These products were prescribed for periods of 8 to 12 days at the first signs of clinically observed localized infection (ie, increase in odor or discharge, unexplained change in the wound bed) or in cases of suspected biofilm. The antimicrobials or a cleansing solution (Prontosan®, BBraun, Germany) were combined with the treatment to achieve a regular, superficial debridement of the wound bed, thereby optimizing the antibiofilm efficacy of the local care administered.

Antimicrobials (impregnated dressings, cleansing solutions) were applied in 19% of the cases, including silver ion-impregnated alginate dressings (Release® non-adherent Ag, Systagenix, US) (8% of the time), silver ion-impregnated hydrocellular dressings (3%), silver nanocrystal dressings (Acticoat®, Smith & Nephew, UK) (1%), and other miscellaneous topical antibacterials (7% of the time).

Antimicrobial solutions (or cleansing solutions) were used in combination with dressings that did not contain antimicrobials; antimicrobial-impregnated dressings were applied as primary dressings.

Impact of local care and dressings on symptoms.

Exudate. The exudate was generally moderate and could be controlled using absorbent alginate, hydrofiber, or hydrocellular dressings or extra-absorbent compresses (see Figures 2 and 3). These products were sometimes applied in several thicknesses. Exudate increased significantly when the number of different bacteria was more than four ($P = 0.007$) and when at least one obligate anaerobe was present in the samples ($P = 0.05$) (see Table 2).

Odor. On day 1, no odor was recorded as intense (see Figure 4). However, in 17 out of 57 evaluations (30%) (those without a missing date), local care (ie, active charcoal dressings) did not completely control odor; even a moderately malodorous or minor smell could be difficult to treat (see Figure 5). On day 21, intense odors were treated with systemic antibiotics (metronidazole).

Knowing charcoal dressings are indicated to treat malodorous wounds, the authors assessed their efficacy in this indication to determine if inability to control odor was connected to any particular type of bacterial colonization (type of bacteria, quantity of germs). Microbiological results of the group of wounds for which odor was controlled by local care (charcoal dressings) were compared with the group that was only partly controlled by the same procedure (see Table 3). Odor was present in a significantly

<table>
<thead>
<tr>
<th>Absence of anaerobic bactéria</th>
<th>Présence de bactéria anaérobie</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Odor: none</td>
<td>10 (55.6%)</td>
<td>9 (21.4%)</td>
</tr>
<tr>
<td>Odor: slight, moderate, intense</td>
<td>8 (44.4%)</td>
<td>33 (78.6%)</td>
</tr>
<tr>
<td>Exudate: none, slight</td>
<td>8 (44.4%)</td>
<td>7 (16.7%)</td>
</tr>
<tr>
<td>Exudate: moderate, intense</td>
<td>10 (55.6%)</td>
<td>35 (83.3%)</td>
</tr>
</tbody>
</table>

$P = 0.009$ $P = 0.050$

Total 18 42 60

NB : missing data, total = 60
higher proportion of wounds with $>10^5/g$ bacteria than in those with lower bacterial counts ($P = 0.04$) and in wounds with odor that contained one or more anaerobic bacteria ($P = 0.05$) (see Table 4). No significant differences in odor control were found for the presence of obligate anaerobes.

**Bleeding** (see Figure 6). Spontaneous bleeding is specific to fungating wounds because of the increase in angiogenesis related to the malignant process and, in some cases, blood vessels damaged by the underlying tumor. The local care rationales (alginites, hemostatic dressings, local adrenaline) generally controlled spontaneous bleeding when it occurred (see Figure 7). Bleeding at dressing changes was related to delicate, easily ruptured budding cells that form on this type of wound (see Figure 8). These bleeding episodes were globally controlled by applying a nonadherent, interface-type primary dressing or silicone-impregnated dressing (see Figure 9).

**Pain.** Most patients already were taking systemic analgesics for grade 1 pain (nonopioids), grade 2 pain (light opioids), or grade 3 pain (opioids) (see Figure 10). If pain was anticipated at dressing changes, the patient was apprised and offered either Entonox® (50% nitrous oxide and 50% oxygen; BOC Healthcare, UK; required five times among all evaluations), premedication (required five times), a topical anesthetic EMLA® (AstraZeneca, UK; three times), or Xylocaine® (AstraZeneca, UK; five times). Other treatments such as local morphine or dressing the wound under general anesthetic also were offered in three cases (4%) (see Figures 11 and 12).

Unlike other symptoms, pain symptoms did not change much during the course of the study (see Figures 13 and 14).

**Antimicrobials.** Antimicrobials were combined as a single group because not many were prescribed. A reduction of the intensity of one of the three infection-related symptoms (odor, exudate, pain) was considered a positive effect of the dressing. However, in all of the evaluations, the comparison results were nonsignificant.

**Discussion**

No episode of infection was observed during the evaluation period. Exudate, moderate and generally controlled by the different absorbent dressings, increased in the presence of more than four different bacteria or the presence of anaerobic bacteria. Odors were rated moderate but were not controlled in 30% of the situations despite the use of charcoal dressings, especially when bacteria were present in quantities $>10^5/g$. Bleeding was generally controlled by local wound care. Pain levels did not change much in the course of the study.
This study is the first to document the evolution of tumor wounds and the types of dressings used. However, tumor wound presentation varies greatly and changes over time. The study was kept brief in order to avoid early withdrawal of patients; 27 of the patients included died within 8 months of the end of the study.

In most cases, malignant wounds develop when the patient is not responding to anti-cancer treatment; despite appropriate local care, wound symptoms worsened. Wound management protocols must be regularly readjusted, and the care provided must be part of a holistic management program that takes into account the patients’ general state of health, systemic treatments, and the cancer's impact locally (eg, aplasia, hospitalization, fatigue, anxiety).

In this study, treating these wounds with modern dressings (eg, alginate, hydrocellular, interface, active charcoal dressings) provided some symptom control, but changes in odor control and pain reported during the time of the study were limited. Odor and pain remain challenging to manage and, as such, justify the development of new solutions targeting the problems specifically related to these wounds or the difficulty in managing an increase in local pain when it is compounded by diffuse pain.

Others treatments (products, biotechnologies) are proposed in the literature to control symptoms (ie, odor, exudate). They were tested or envisaged within the scope of this research but not included in the protocol and did not offer a satisfactory response for any of the symptoms.

![Figure 3. Control of exudates (controlled, partly controlled, noncontrolled) by local care on day 0 (D0) to day 42.](image)

<table>
<thead>
<tr>
<th></th>
<th>Charcoal dressing NO</th>
<th>Charcoal dressing YES</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Odor non/partly controlled</td>
<td>2 (14.3%)</td>
<td>14 (50%)</td>
<td>16</td>
</tr>
<tr>
<td>Odor controlled</td>
<td>12 (85.7%)</td>
<td>14 (50%)</td>
<td>26</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>14</td>
<td>28</td>
<td>42</td>
</tr>
</tbody>
</table>

**Figure 4. Intensity of odor (none, slight, moderate, intense) on day 0 (D0) to day 42 (D42).**

<table>
<thead>
<tr>
<th>Groups of bacteria</th>
<th>Odor non/partly controlled</th>
<th>Odor controlled</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Anaerobe obligates</strong></td>
<td>49 (42.6%)</td>
<td>35 (25.9%)</td>
<td>84 (33.6%)</td>
</tr>
<tr>
<td><strong>Enterobacteria</strong></td>
<td>18 (15.7%)</td>
<td>23 (17%)</td>
<td>41 (16.4%)</td>
</tr>
<tr>
<td><strong>Pseudomonas</strong></td>
<td>13 (11.3%)</td>
<td>15 (11.1%)</td>
<td>28 (11.2%)</td>
</tr>
<tr>
<td><strong>Staphylococci</strong></td>
<td>11 (9.6%)</td>
<td>23 (17%)</td>
<td>34 (13.6%)</td>
</tr>
<tr>
<td><strong>Streptococcus</strong></td>
<td>13 (11.3%)</td>
<td>18 (13.3%)</td>
<td>31 (12.4%)</td>
</tr>
<tr>
<td>Various Gram-positive bacteria in quantities ≤ or &gt; to 10^5</td>
<td>11 (9.6%)</td>
<td>21 (15.6%)</td>
<td>32 (12.8%)</td>
</tr>
<tr>
<td>Bacteria ≤10^5</td>
<td>96 (83.5%)</td>
<td>124 (91.4%)</td>
<td>220 (88%)</td>
</tr>
<tr>
<td>Bacteria &gt;10^5</td>
<td>19 (16.5%)</td>
<td>11 (8.1%)</td>
<td>30 (12%)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>115</td>
<td>135</td>
<td>250</td>
</tr>
</tbody>
</table>

Calculations were made for the 250 different bacteria recorded in the samples of the 20 subjects with odor (>0)
The new superabsorbent dressings have been shown in a clinical case series to be effective in absorbing the thinner fluid discharge from venous ulcers, but they were not effective in this study in absorbing the thicker discharge of malignant wounds, alone or combined with the debris from tumoral necrosis.

In addition to active charcoal dressings, several other options to address odor are proposed in the literature, such as aromatherapy, chlorophyll, or curcumin. However, there is very little proof of their effectiveness. Other approaches, such as the application of yogurt — used because *Lactobacillus* (a Gram-positive facultative anaerobic bacterium) present in dairy products restricts the growth of anaerobic bacteria by competition (at high doses) and thus would purportedly have an impact on odor — are highly debatable. The true benefit of this type of practice is questionable in terms of quality of life when considering the applications have to be repeated several times a day, and nothing proves a probiotic treatment would be inoffensive in patients with compromised immune systems.

Metronidazole (Flagyl®; Sanofi Aventis, France; Rosex® cream, Galderma, France) is the antibiotic most widely used (and most widely documented) to treat malodorous wounds due to the presence of anaerobic bacteria. Other broad-spectrum antibiotics could be prescribed, but it would seem more reasonable to reserve them for treating infection because of the risk of selection pressure and side effects. However, the frequent prescription of metronidazole for malodorous wounds remains empirical, and its long-term use has been queried. Therefore, it would seem wise to prescribe it for shorter periods (7 to 10 days) and only if the odor persists despite appropriate care.

The efficacy of topical antimicrobials seems to be limited or varies from one wound to another with respect to control of the symptoms and local infection. This clinical reality can

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**Figure 5.** Odor control (controlled, partly controlled, noncontrolled) by local care or treatment day 0 (D0) to day 42 (D42).

**Figure 6.** Intensity of spontaneous bleeding (none, slight, moderate, intense) on treatment day 0 (D0) to day 42 (D42).

**Figure 7.** Control of spontaneous bleeding (controlled, partly controlled, noncontrolled) by local care on treatment day 0 (D0) to day 42 (D42).

**Figure 8.** Intensity of induced bleeding (none, slight, moderate, intense) treatment day 0 (D0) to day 42 (D42).
be explained by the fact that antimicrobials are effective only on surface germs, and although malignant wounds are ulcerated on skin level, the underlying tumor mass can exceed several cm and sometimes includes abscesses or is covered in damp necrotic tissue that cannot always be debrided.33
Although they are only partly effective, active charcoal dressings offer the advantage of being an antibiotic-free solution — ie, they do not impact the microflora of the wound, acting only by adsorbing the volatile components that create the odor. The management of odor remains a complex issue, and little is known about the effectiveness of commonly used treatment approaches. Research and development might address increasing the specific adsorption surface of active charcoal dressings or develop products that target the volatile odor components emitted by bacteria (ie, sulphurous components).

Induced bleeding can be fairly easily handled using interfaces and padding and an informed approach to dressing removal (eg, wetting the previous dressing before removal, proceeding with care). Nonpetrolatum interfaces such as mylar film (eg, Telfa Clear, Kendall, US) also can be utilized in this indication. Such products were not used in this study because they are not reimbursed in France. If spontaneous bleeding remains frequent and abundant despite the local solutions available (hemostatic, adrenaline), the indication for hemostatic radiotherapy can be discussed with the radiotherapist.

Pain management is complex because it involves not only the pain itself (nociceptive or neurogenic pain), but also anxiety, distress, and apprehension related to the care procedures. The efficacy of local anesthetics seems variable and restricted by the size of the wound (eg, when using EMLA®) and whether it is possible to implement the procedure given these anesthetics must be applied 10 to 45 minutes before the dressings are changed on wounds that suppurate and sometimes bleed. The local application of morphine mixed with hydrogels (eg, Intrasite® gel, Smith & Nephew, UK) is used in clinical practice and seems beneficial, although its efficacy has not been proven. Clinical research is currently under way in France (Institut Curie).

In many cases, pain must be addressed systemically using medication (eg, Entonox®, BOC Healthcare, UK; premedication) or combined with nonmedical technologies such as hypnotic analgesia. In extreme cases, the patient is in so much pain, general anesthesia could be offered, at least as an immediate solution. Techniques such as loco-regional anesthesia (ie, paravertebral blocks) also could provide optimization of pain relief.

The development of drug-eluting dressings offering local controlled delivery of analgesics could be a way of improving the management of some symptoms to complement the constant attention the caregiver must pay to the patient’s pain through his/her procedures and attitudes.

Limitations

The number of patients included in the study is too small to draw any robust conclusions on care guidelines. Because the incidence of malignant wounds is quite low compared to other types of wounds, large, multicenter, prospective studies should be conducted to evaluate the effectiveness of various approaches to care. In this study, the period for evaluations was fixed to 42 days, which is relatively short for evaluating the evolution of a chronic wound. Results for symptom evolution and control and for infectious episodes may have been different if observed for a longer period of time.

Conclusion

Dressings used to manage malignant wounds in this study are mainly designed to absorb exudate. When associated with careful cleaning of the wound, they may contribute to wound cleanliness and can control exudate and bleeding when removed. They may limit the complications and symptoms related to malignant wounds through their absorptive and hemostatic properties, nonadherence to the wound, and ability to keep the wound moist.
The number of bacterial species, a high number of bacteria, or the presence of anaerobic seems to destabilize the clinical situation and increase symptoms, even in the absence of a confirmed infection. Experimental research about volatile compounds produced by malignant wounds (bacteria, necrosis) and study of olfactory perception could increase understanding of complex odor and its consequences and foster study of new technologies, research, and approaches. Clinical research on specific clinical practice (eg, the use of topical morphine) seems necessary to quantify efficacy, comparatively, to other techniques. Research into and development of topical preparations specially designed to help manage the specificities and symptoms of malignant wounds may help improve the quality of care and, above all, the comfort of patients and their families.

References