

PALLIATIVE PEARLS

BY ENCLARA PHARMACIA

Wound Odor Management July 2017

Patient Case

AZ is a 96 year-old male with a primary diagnosis of ALS. Comorbidities include GERD, HTN, and wounds on the coccyx and plantar region. He has no known drug allergies. AZ has been receiving hospice care for 3 weeks. He resides at home. His daughter lives nearby and visits daily.

AZ's wounds present with eschar on both his coccyx and heels. Wound care currently includes dressing changes 3 times a week with medicinal honey during hospice visits. Recently, AZ developed slough, green drainage, and foul smelling odor from his wounds. A 7-day course of cephalexin was ineffective in reducing the drainage or odor. The nurse suspects that the wounds are infected with *Pseudomonas* and a 14-day course of oral ciprofloxacin is initiated. AZ's daughter is finding it difficult to care for her father due to the strong wound odor. The hospice care team is questioning the benefit of topical metronidazole as adjunctive treatment to control wound odor.

HOW DOES WOUND ODOR AFFECT PATIENT CARE? 1-3

Wound odor is very distressful for patients, caregivers, and healthcare professionals. For patients, it can trigger feelings of shame, embarrassment, and depression and may contribute to nausea and loss of appetite. Offensive odors can spread to clothing, bedding, furniture, and living areas. Wound odors may eventually lead to social isolation for patients and feelings of guilt for caregivers during a critical time when both physical and emotional support are essential. Healthcare professionals face the challenge of controlling odor and providing supportive education for suitable wound care to help improve the patient's quality of life.

WHAT ARE THE CAUSES OF WOUND ODOR? 4,5

Wound odors that persist after normal dressing changes are typically caused by necrotic tissue and bacterial overgrowth. Anaerobic and/or aerobic bacteria are found in necrotic tissue. Malodor is caused by volatile fatty acids that are released during lipid catabolism by anaerobic bacteria. Anaerobes, such as *Bacteroides fragilis*, *Bacteroides prevotella*, *Fusobacterium nucleatum*, *Clostridium perfringens*, and anaerobic cocci produce strong odors. Some aerobic bacteria, such as *Proteus*, *Pseudomonas*, and *Klebsiella* also contribute to malodor.

HOW IS WOUND ODOR MANAGED?

Wound odor is managed with a combination of wound cleansing, debridement of necrotic tissue, control of infection locally, specialized dressings, and/or use of odor absorbents and concealers.^{2,5}

Wound Cleansing³

Wound cleansing helps to remove necrotic tissue, exudate, slough, and bacterial contaminants. There are a number of commercially available wound cleansers; however, preservative-free, room temperature normal saline is equally effective and a safe and non-irritating agent. Using appropriate pressure is important in cleansing the wound without harming tissue. To irrigate a wound with normal

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saline, a technique using an 18-20 gauge angiocath attached to a 30-60 ml syringe creates an appropriate pressure of 8-15 psi.

Debridement²

Debridement helps to address the cause of wound odor by removing necrotic tissue, exudate, bacteria, and metabolic waste. There are five methods of debridement:

- Biological: Use of maggots to consume bacteria and dead tissue while preserving healthy tissue
- Enzymatic: Use of chemical enzymes, such as Santyl® or trypsin-based products, to break down necrotic tissue
- Autolytic: Use of endogenous proteolytic enzymes and phagocytic cells in the wound to break down dead tissue commonly achieved through the use of hydrocolloid or hydrogel dressings.
- Mechanical: Use of force to remove necrotic tissue, such as forceful irrigation and wet-to-dry dressing
- Sharp or Surgical: Use of scissors, scalpels, curettes, or sharp blades in a sterile environment. This method may be painful and can increase the risk of bleed.

Each method of debridement has its own contraindications, as well as advantages and disadvantages regarding time, skill required, cost, level of discomfort and invasiveness. Autolytic debridement is used frequently in home and long term care settings because it is easy, inexpensive, noninvasive, and painless. This method may take several weeks to achieve desired outcomes and must be avoided in infected wounds.

Control of Infection Locally

Topical antimicrobials can provide antimicrobial activity directly to a site of infection with limited systemic absorption and toxicity and may be preferable when systemic therapies are unable to penetrate dead tissue.⁶

Metronidazole^{1-3, 7-11}

Metronidazole is a synthetic antimicrobial effective against anaerobic bacteria and protozoa. It is commercially available in topical, intravenous and oral formulations. Topical formulations are specifically indicated for the treatment of rosacea and bacterial vaginosis and vaginitis. The off-label use of topical metronidazole in reducing or eradicating wound odor has been reported effective primarily in case reports, series and longitudinal studies through the use of 0.75-0.8% gel or compounded 1% solution.⁸ The off-label use of crushed metronidazole tablets applied topically has been cited in topic reviews and meta-analyses as an effective and cheaper alternative to commercially available preparations although there are no known studies supporting its effectiveness. Metronidazole can be compounded into a 5% topical powder or a 0.5% and 1% topical spray.

Metronidazole use found in clinical practice follows:

- Metronidazole gel is commercially available as a 0.75% and 1% topical gel. The gel is applied to the wound once or twice a day or with dressing changes.¹⁰ This preparation is appropriate for dry wounds.⁹

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- Regular-release metronidazole tablets are available in 250mg and 500mg strengths. Tablets can be crushed and sprinkled onto the wound bed once or twice a day or with dressing changes. This application is appropriate for wounds with heavy exudate.⁹ For ease of administration, the metronidazole 5% powder is an alternative to crushed tablets.
- Metronidazole solution for injection can be used to soak gauze. The gauze is then applied topically to the wound to serve as a compress with dressing changes.¹¹ The metronidazole 0.5% and 1% spray can also be applied in this manner or sprayed directly onto the wound bed.
- Oral or IV administration of metronidazole can be used for deep tissue or systemic infections. Systemic administration may be associated with adverse effects, such as nausea, headache, neuropathy and alcohol intolerance.²

Specialized Dressings

Silver

Silver, in its positively charged ion state, has antimicrobial activity against a broad range of bacteria, fungi and viruses.¹² Silver is incorporated in a wide variety of dressing types, such as alginates, hydrocolloids, hydrogels, hydrofibers, foams, contact layers and gauze. The type of silver dressing selected is dependent on the amount of exudate in the wound.¹³

Cadexomer Iodine¹⁴⁻¹⁵

Cadexomer iodine can help wound odor through control of infection. It is commercially available in the form of a pad or gel that slowly releases elemental iodine as it absorbs wound exudate. The product's sustained-release mechanism controls the amount of iodine exposed to the wound providing antimicrobial activity without cytotoxicity. This type of product should be avoided in children and in those with iodine sensitivity, impaired renal function, thyroid disorders or those taking lithium.

Medicinal Honey^{4,16}

There is increasing interest in the use of medical grade honey due to the emergence of antibiotic-resistant bacteria. Honey's acidity and high osmolality creates an unfavorable environment for bacterial growth and promotes autolytic debridement. Honey's high glucose content provides an alternative source of energy for bacteria resulting in the production of lactic acid as a bacterial waste product rather than malodorous compounds. Its high viscosity also serves as a protective barrier to prevent infection. Note that only medical grade honey sterilized with gamma irradiation should be used in wound care to prevent contamination from *Clostridium* spores. Medicinal honey gel, paste, and impregnated dressings are commercially available.

Odor Absorbents and Concealers

Charcoal works by absorbing or trapping odor molecules. Charcoal is available in several types of dressings and must cover the wound to serve as a sealed unit for optimal effectiveness.⁹ Charcoal dressings may be used as primary or secondary dressings.¹⁷

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Pans of charcoal, baking soda or cat litter can be discreetly placed in close proximity to the patient or under the patient's bed to absorb odors. Containers containing coffee beans, vanilla beans or cider vinegar may also help to conceal odors.² One to two drops of peppermint oil, or other essential oils of lavender, lemon, citrus or tea also can be applied to the outside of the wound dressing to mask odors.^{5,17} Immediate and proper disposal of saturated dressings will also aid in odor control.

Pharmacist Assessment

Recognizing that wound odor is commonly associated with anaerobic bacteria, topical metronidazole would be considered a suitable adjunct to existing therapy. Metronidazole 5% topical powder is an easy and cost-effective preparation.

Recommendations

- Continue use of medicinal honey gel to reduce bacterial load, slough and eschar.
- Gently cleanse wounds with room temperature normal saline for irrigation, sprinkle metronidazole 5% powder over wounds, and follow with an application of medicinal honey gel. Cover wounds with foam dressings. Repeat minimally every 3 days, disposing used wound dressings immediately.
- Monitor wound progression and odor during visits and re-evaluate wound care regimen in 2 weeks.
- Place a pan of cat litter under the bed to help absorb odors.

For additional information on this topic, please review these references:

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