

Topical antimicrobials for infection management in chronic palliative care wounds

KEY WORDS

- ▶ Chronic wounds
- ▶ Infection management
- ▶ Palliative care
- ▶ Topical antimicrobials

This article reviews the literature available to help manage chronic wounds in palliative patients, with a focus on the use of topical antimicrobials. The aim is to provide suitable guidance for nurses in any clinical setting. Each section looks at the literature available and provides recommendations for practice for this specific issue. Main themes generated from the article include the use of antimicrobials in infection management, how different levels of colonisation require different treatment options, and the issues of antimicrobial resistance and the use of antiseptics.

The literature review for the article has been collected from a variety of sources. The electronic databases used to retrieve evidence included CINHAL, Medline, ScienceDirect, The Cochrane Library, Internurse, PsychINFO and Google Scholar. The rationale behind using these was that they were recommended in the MetaLib nursing database. Additionally, links were provided to nursing journals specifically within my chosen field, and all had relevant search results using the key words. The key search words used were 'Palliative', 'Chronic wound', 'End of life', 'Management', 'Topical antimicrobial', 'Resistance' and 'Antiseptic'. The results from the search produced over 100 specific articles, therefore inclusion and exclusion criteria were used to narrow the search results. Thus, only English-language articles have been used. International studies from Western and developed countries are used to gain an overview of other practices in worldwide healthcare systems. However, policy relating to the UK only has been used for application to practice. A mixed methods approach combining qualitative and quantitative data has also been included.

Poor management of the symptoms relating to infected chronic wounds can have a profound influence on patients' self-esteem. Research highlights how a shift from healing to symptom management may be instigated in palliative wounds as the body's systems begin to fail

(Delmore and Duran, 2009). All healthcare professionals must recognise the complexity of symptom control, and that appropriate management will improve overall outcomes for patients with advanced illness (Gist et al, 2009). Healthcare professionals play a vital role in managing chronic wounds in palliative care as management is a crucial element of treatment that can be integrated into everyday practice through interdisciplinary involvement (Ferris et al, 2007). With palliative treatment not only taking place in hospices, but also general hospitals, in the community and even prisons (Grocott and Gray, 2010), the rationale as to why healthcare professionals must recognise infected chronic wounds is evident.

INFECTION IN CHRONIC WOUNDS

Frank et al (2005) signify that infection risk in any wound is determined by the organisms present and host factors, such as immune response, nutrition and tissue perfusion. Sibbald et al (2003), however, assert that chronic wounds differ due to their delayed inflammatory response. Even though this aids protection, the persistent production of inflammatory mediators causes enzyme degeneration causing tissue hypoxia, thus triggering further bacterial proliferation. This suggests that chronic wounds may be more susceptible to infection.

CALLUM METCALFE
Registered Nurse, Acute
Medical Unit, Norfolk and
Norwich University Hospital
Foundation Trust

“Green (2012) maintains that signs of wound infection can be obscured and may go unnoticed, especially in palliative patients who may be unable to communicate their needs (McManus, 2007).”

Green (2012) maintains that signs of wound infection can be obscured. The author suggests this as wounds exist along a bacterial continuum and when critically colonised, no systemic reaction may occur, only local signs of warmth and pain. This demonstrates how infection may go unnoticed, especially in palliative patients who may be unable to communicate their needs (McManus, 2007). Dowsett and Newton (2005), however, identify how all wounds contain bacteria and that when bacterial burden increases, signs of pain, increased exudate and odour can occur. The European Wound Management Association’s (2005) Delphi approach also recommends that cellulitis and discharge be included as strong signs of clinical infection, which is how nurses can recognise infection even with no systemic response. Analysis of the literature therefore suggests that chronic wound infection is the outcome of dynamic bacterial interactions causing increased bacterial burden which can exacerbate symptoms (Green, 2012).

INCIDENCES AND RATES

By examining the incidences and rates of chronic wound infection in palliative care, it can be noted that there is limited information available (White, 2009). This immediately illustrates that more research is needed. As such, generalised wound literature will be used and applied to palliative patients where possible. The research suggests that up to 30% of all chronic wounds develop microbial isolates, usually associated with *Pseudomonas aeruginosa* (Frank et al, 2005). Merckoll et al (2009) links cross-contamination from healthcare professionals as the main source of this infection, thus high-quality hand hygiene is needed.

Other strains of bacteria are also present within chronic wounds, and the rates of colonisation signify increased risk of infection (White, 2009). This is potentially problematic for the palliative patient, as certain comorbidities and steroids or immunosuppressants impair a wound’s ability to fight infection (Dowsett and Newton, 2005). One study focusing on the bacterial profile of general chronic wounds over 8 weeks found that 93.5% were infected with *Staphylococcus aureus* and that 39.1% were also infected with anaerobic bacteria (Gjødsbøl et al, 2006).

The impact of this not only on the patient, but also on the cost of treatment, is detrimental as Merckoll et al (2009) concluded that over £1 billion per year is spent on treating general wound infections. Lipsky and Hoey’s (2009) research supports these findings: over 60% of patients across Europe have received costly antimicrobial therapy in the previous 6–12 months for chronic wounds.

The research, though limited, therefore indicates that chronic wound infection is evident among the population. It also highlights how palliative patients may be more at risk than other patient groups. This indicates suitable management strategies need to be implemented for optimal symptom control once microbial isolation has occurred (Chrisman, 2010).

TOPICAL ANTIMICROBIAL USE

The use of antimicrobials has become common in practice. Siddiqui and Bernstein (2010) assert that antimicrobials are an umbrella term covering both antibiotics and antiseptics. Antibiotics are narrow-spectrum agents with intracellular targets; whereas antiseptics are chemical agents that are toxic to microbes (Butcher, 2013). However, there is disagreement over their use, especially antibiotics, due to the potential problems of resistance (Adkins, 2013). In my experience, nurses are aware of this issue; therefore the evidence needs to be examined to determine is best practice.

This article will focus on topical antibiotics only, as evidence shows that systemic antibiotics are only used in palliative patients with sepsis or deep tissue infection, not wounds with chronic aetiology unless systemic involvement occurs (Frank et al, 2005). Alvarez et al (2007) support these findings and recommend that topical routes be trialled first, and if these fail systemic routes be considered. However, it should be acknowledged that the role of the nurse is to evaluate the impact of antibiotics, not necessarily prescribe them (Nursing and Midwifery Council, 2015).

Chrisman (2010) identifies how controlling bacteria with topical antibiotics can decrease exudate, odour and pain, thus stabilising non-healing wounds. This immediately portrays how infection management can impact on other wound symptoms. The use of antibiotics, however, is limited to the treatment of serious critical

“Antiseptics, such as silver, iodine and honey, are now at the forefront of clinical practice due to their wound-stabilising abilities and limited antimicrobial resistance”

colonisation or compartment infection (Frank et al, 2005). Adkins (2013), however, explains the advantages of using antibiotics, as increased healing rates and longer dressing wear times are promoted. This will impact significantly on the patients' wellbeing and will reduce any pain, if present, by preventing wound manipulation (Adkins, 2013).

The most frequently used topical antibiotics are mupirocin, neomycin, gentamicin, bacitracin, polymyxin and gramicidin to combat Gram-positive, Gram-negative and anaerobic bacteria (Frank et al, 2005). The authors' category B evidence (National Institute for Health and Care Excellence, 2005) also indicates that a 2-week trial of Gram-positive, Gram-negative and anaerobic coverage should be used in any circumstances following cultures and clinical assessment. Lipsky and Hoey (2009) promote the use of neomycin, polymyxin and bacitracin individually and as a combined treatment. This is because their research found that both Gram-positive and Gram-negative strains of bacteria are affected while toxicity and dermatitis are prevented. This highlights the potential benefits of topical antibiotics, but levels of colonisation have not been considered. Thus, even though Adkins (2013) suggests that the combined treatment of all three antibiotics, called Polysporin Triple Antibiotic, can provide resistance and effective results, treatment of minor colonised wounds may increase resistance (Butcher, 2013).

COLONISATION

Initial analysis of the evidence provides contrasting theories about what level of colonisation requires topical antibiotics. However, Siddiqui and Bernstein (2010) contend that topical antibiotics should not be used for routine colonisation, only critical or severe. Lipsky and Hoey (2009) maintain that this will prevent hypersensitivity and bacterial resistance. The lack of research detailing the clinical benefits has been noted by Green (2012), who does not recommend their use in current practice. This is because of the lack of randomised controlled trials available that test the differences between low and severe colonisation.

Generalised research applied to the palliative setting does, however, provide guidance on what

level of colonisation requires topical antibiotics. One study showed that minor wound infections (lacerations and skin tears) were managed by topical antibiotics (O'Meara et al, 2001), while another study of major wounds with heavy bacterial burden found topical antibiotics to be of no clinical use in managing infection (Simons et al, 2001). Additionally, with studies showing that 14.5% of palliative patients present with over four major wounds (Maida et al, 2012), topical antibiotics may be ineffective in managing their symptoms.

From reviewing the evidence, it could therefore be argued that topical antibiotics should not be considered in the routine management of chronically infected wounds in palliative patients. However, should culture and clinical assessment results find critical colonisation has occurred, then topical antibiotics such as neomycin, polymyxin or bacitracin should be considered depending on wound severity. Should this fail, systemic administration may be required.

ISSUES: RESISTANCE AND ANTISEPTICS

Antimicrobial resistance is a major clinical concern that is affecting contemporary practice. Due to the increase in cases, other methods of dealing with wound-related infections are needed. The issue is of such importance that it has led the Department of Health (2013) to publish a 5-year plan on aiming to reduce antimicrobial resistance. Research has even detailed how such overuse of antimicrobials may result in a post-antibiotic era in which infections in chronic wounds may be untreatable (Edward-Jones et al, 2015).

Antiseptics such as silver, iodine and honey are therefore now at the forefront of clinical practice due to their wound-stabilising abilities and limited antimicrobial resistance (Lipsky and Hoey, 2009). *In vitro* studies have claimed that these antiseptics inhibit bacterial growth and disrupt the protective bacterial film layer called the biofilm (Cooper, 2004). These studies have not been applied to clinical practice, but with the literature supporting their use in not only managing infection, but pain, exudate and odour (Lipsky and Hoey, 2009), antiseptics may be highly beneficial for the palliative patient.

Silver has widely been used over the years, as it

“A small therapeutic dose of iodine will only be beneficial in managing superficial infection.”

binds to bacterial walls, causing disruption and eventual death of the bacteria (Storm-Versloot et al, 2010). In addition to this, silver inhibits enzyme function (Butcher, 2013). Silver has also been noted to be effective in combating yeast, fungi and viruses (Tomaselli, 2006) which can cause odour, portraying how this antiseptic may possess overall symptom control qualities. Additionally, Adkins (2013) contends that the ease to which silver can be added to alginates, foams, hydrocolloids and hydrogels is another advantage when considering the palliative patient. Iheanado's (2010) paper supports this theme, and recognises that silver dressings represent one in seven dressing prescriptions in the UK.

However, research has shown there is still speculation over the use of silver dressings in practice (Leaper, 2006). This is because majority of the research does not provide qualitative microbial counting once silver dressings have been used and *in vitro* findings have not always been applied to clinical use. Leaper (2006) also argues that research results provide no specific concentration of silver ions at which bacteria are affected. Initial interpretation therefore highlights how more research will be needed.

The literature, however, does recognise that the use of silver in palliative wounds may be more effective. One study looking at Aquacel Ag found that over a 4-week period, over 30 patients noted a reduction in ulcer size, exudate and pain (Coutts and Sibbald, 2005). This study reviewed a mixture of chronic palliative wounds, such as diabetic ulcers, highlighting how treatment can be applied to the palliative population. A study on activated charcoal silver dressings used for chronic wounds also found a reduction in bacterial load over 2 weeks (Verdú Soriano et al, 2004). Another comparative study with large sample size reviewing chronic ulcers found that the silver dressing group had fewer clinical infections and required no antibiotics over a 14-day period when compared to a placebo (Meame et al, 2005).

A critique of the evidence therefore demonstrates that silver may be beneficial for palliative patients as it not only manages chronic infection, but also exudate and odour. More research, however, is needed to test its clinical effectiveness.

Iodine is another antiseptic commonly used in practice. In my own experience, this is usually the first dressing of choice for chronic wounds. Butcher (2013) identifies that iodine causes bacterial cell wall degeneration, resulting in rapid death through the leakage of cellular materials. The amount of research on iodine is limited (Hess, 2008), however, meaning nurses must review the evidence base before using this antiseptic.

Frank et al's (2005) research suggests that a small therapeutic dose of iodine will be only beneficial in managing superficial infection. Presterl et al's (2007) findings agree with this, as a concentrated povidine iodine dose was found not to be effective in reducing bacterial burden in *Staphylococcus epidermis* wound cultures. Haynes (2008) has also recognised that iodine has been used for over 150 years without bacterial resistance, highlighting an option to managing resistant infection in the future (Butcher, 2013).

Having reviewed the limited literature on iodine it suggests that more research is needed. It may be beneficial for palliative patients prone to chronic wound infection due to underlying pathology as there is a low risk of bacterial resistance. More *in vivo* tests will be needed to provide reliable evidence to support its use within palliative wound care (Haynes, 2008).

Honey dressings are now being used more within palliative wound care, due to their stabilising abilities (Alvarez et al, 2007). Butcher (2013) highlights that the high osmolarity created by honey inhibits microbial growth and enzyme function. Chang and Cueller (2009) contend that the properties of odour control, autolysis of non-viable tissue and inflammation control make honey a suitable option for managing chronic wounds in palliative patients. The overall properties of honey demonstrate clearly the clinical effectiveness of its use in practice, and the majority of the literature supports this view.

Visavadia et al's (2008) case-study review found that manuka honey healed infected wounds within 2–5 weeks compared to topical antibiotics over 10+ weeks due to the limited bacterial resistance. Even though the sample size was small, the study shows that honey provides a moist environment while debriding necrotic tissue, which is evident in

the majority of palliative wounds (Chrisman, 2010). Merckoll et al (2009) assert this view, as their study comparing Medihoney and Norwegian honey found they both destroyed bacteria from concentrations as low as 0.8%. This coincides with McDonald and Lesage's (2006) study that found the small percentage of hydrogen peroxide released from honey inhibited overall cell growth in palliative wounds.

The analysis of the literature therefore suggests that honey may be beneficial for managing chronic infection in palliative wounds. Its ability to not only control infection, but odour and exudate will be crucial in improving patients' overall wellbeing.

CONCLUSION

By reviewing the evidence, it can be argued that there is no clear guidance on the preference of

antibiotics or antiseptics being used in practice. The assessment and severity of infection has been shown to be primarily a clinical skill and nurses must be aware of this complex nursing factor when selecting the correct treatment. If microbial isolation shows that critical colonisation has occurred, however, a broad-spectrum agent, i.e. Polysporin Triple Antibiotic, should be considered.

Recommendations should be made to use an antiseptic where possible to prevent bacterial resistance. Silver and honey are universal agents that can combat odour and exudate as well as infection. These should therefore be promoted for the palliative patient for overall infection management. Research shows this is cost-effective if used in the correct manner.



REFERENCES

Adkins C (2013) Wound care dressings and choices for care of wounds in the home. *Home Healthcare Nurse* 31(5): 259–67

Alvarez O, Kalinski C, Nusbaum J et al (2007) Incorporating wound healing strategies to improve palliation (symptom management) in patients with chronic wounds. *J Palliat Med* 10(5): 1161–89

Butcher M (2013) Assessment, management and prevention of infected wounds. *J Comm Nurs* 27(4): 26–34

Chang J, Cueller NG (2009) The use of honey for wound care management: A traditional remedy revisited. *Home Healthcare Nurse* 27(5): 309–16

Chrisman C (2010) Care of Chronic Wounds in palliative care and end of life patients. *Int Wound J* 7(4): 214–35

Cooper R (2004) A review of the evidence for the use of topical antimicrobial agents in wound care. *World Wide Wounds*. <http://www.worldwidewounds.com/2004/february/Cooper/Topical-Antimicrobial-Agents.html> (accessed 04.04.2016)

Coutts P, Sibbald RG (2005) The effect of a silver-containing Hydrofiber dressing on superficial wound bed and bacterial balance of chronic wounds. *Int Wound J* 2(4): 348–56

Delamore B, Duran D (2009) Wound care at the end of life. *Clin J Oncol Nurs* 13(4): 381–3

Department of Health (2013) *UK Five Year Antimicrobial Resistance Strategy 2013 to 2018*. Department of Health, London. www.gov.uk/government/uploads/system/uploads/attachment_data/file/244058/20130902_UK_5_year_AMR_strategy.pdf (accessed 04.04.2016).

Dowsett C, Newton H (2005) Wound bed preparation: TIME in practice. *Wounds UK* 1(3): 58–9

Edward-Jones V, Flanagan M, Wolcott R (2015) Technological advancements in the fight against antimicrobial resistance. *Wounds International* 6(2): 47–51

European Wound Management Association (2005) *Position Document: Identifying Criteria for Wound Infection*. MEP Ltd, London. EWMA. http://ewma.org/fileadmin/user_upload/EWMA/pdf/Position_Documents/2005_Wound_Infection_English_pos_doc_final.pdf (accessed 04.04.2016)

Ferris F, Al Khateib AA, Fromantin I et al (2007) Palliative wound care: managing chronic wounds across life's continuum: a Consensus statement from the international palliative wound care initiative. *J Palliat Med* 10(1): 37–9

Frank C, Bayoumi I, Westendorp C (2005) Approach to infected skin ulcers. *Can Fam Physician* 51(10): 1352–9

Gjødtsbøl K, Christense JJ, Karlsmark T et al (2006) Multiple bacteria species reside in chronic wounds: a longitudinal study. *Int Wound J* 3(3): 225–31

Green B (2012) Understanding infection in wound care. *Wound Healing Southern Africa* 5(2): 102–7

Grocott P, Gray D (2010) The argument for palliative wound care. *Wounds UK* 6(1): 167–9

Gist S, Tio-Matos I, Falzgraf S, Cameron S, Beebe M (2009) Wound care in the geriatric client. *Clin Interv Aging* 4: 269–87

Haynes J (2008) An overview of caring for those with palliative wounds. *Br J Community Nurs*. 13(12): S24, S26, S28 passim

Hess CT (2008) *Clinical Guide to Skin and Wound Care*. 6th edn. Lippincott Williams & Wilkins, Ambler

Iheanado I (2010) Silver dressings – do they work? *Drug Therap Bull* 48(4): 38–42

Leaper DJ (2006) Silver dressings: their role in wound management. *Int Wound J* 3(4): 282–94

Lipsky BA, Hoey C (2009) Topical antimicrobial therapy for treating chronic wounds. *Clin Infect Dis* 49(10): 1541–9

Maida V, Ennis M, Corban J (2012) Wound outcomes in patients with advanced illness. *Int Wound J* 9(6): 683–92

McManus J (2007) Principles of skin and wound care: the palliative approach. *End of Life Care* 1(1): 8–18

Meame S, Vallet D, Morere MN, Téot L (2005) Evaluation of silver-releasing hydroalginate dressing in chronic wounds with signs of clinical infection. *J Wound Care* 14(9): 411–9

Merckoll P, Jonassen TØ, Vad ME, Jeansson SL, Melby KK. (2009) Bacteria, biofilm and honey: A study of the effects of honey on 'planktonic' and biofilm-embedded chronic wound bacteria. *Scand J Infect Dis* 41(5): 341–47

National Institute for Health and Clinical Excellence (2005) *Grading Evidence and Recommendations for Public Health Interventions: Developing and Piloting a Framework*. Available at: http://www.nice.org.uk/nicemedia/docs/grading_evidence.pdf (accessed: 24.02.2016)

Nursing and Midwifery Council (2015) *Professional Standards of Practice and Behavior for Nurses and Midwives*. Available at: <http://www.nmc-uk.org/Documents/NMC-Publications/revised-new-NMC-Code.pdf> (accessed: 24.02.2016)

O'Meara SM, Cullum NA, Majid M, Sheldon TA (2001) Systematic review of antimicrobial agents used for chronic wounds. *Br J Surg* 88(1): 4–21

Presterl E, Suchomel E, Eder M et al (2007) Effects of alcohols, povidone-iodine and hydrogen peroxide on biofilms of *Staphylococcus epidermidis*. *J Antimicrob Chemother* 60(2): 417–20

Sibbald RG, Orsted HL, Schultz G, Coutts RN, Keast MD; International Wound Bed Preparation Advisory Board; Canadian Chronic Wound Advisory Board (2003) Preparing the wound bed 2003: focus on infection and inflammation. *Ostomy Wound Manage* 49(11): 24–51

Siddiqui A, Bernstein J (2010) Chronic wound infection: facts and controversies. *Clin Dermatol* 28(5): 519–26

Simons J, Johnson J, Yu L et al (2001) The role of topical antibiotic prophylaxis in patients undergoing contaminated head and neck surgery with flap reconstruction. *Laryngoscope* 111(2): 329–35

Storm-Versloot MN, Vos CG, Ubbink DT, Vermeulen H (2010) Topical silver for preventing wound infection. *Cochrane Database Syst Rev* 3: CD006478

Tomaselli N (2006) The role of topical silver preparations in wound healing. *J Wound Ostomy Continence Nurs* 33(4): 367–78; quiz 379–80

Verdú Soriano J, Rueda López J, Martínez Cuerto F, Soldevilla Agreda J (2004) Effects of activated charcoal silver dressing on chronic wounds with no clinical signs of infection. *J Wound Care* 13(10): 419, 421–3

Visavadia BG, Honeysett J, Danford MH (2008) Manuka honey: an effective treatment for chronic wound infection. *Br J Oral Maxillofac Surg* 46(1): 55–7

White RJ (2009) Wound infection-associated pain. *J Wound Care* 18(6): 245–9