

Larval therapy for debridement of chronic wounds

17 October 2009

Author

Wound Healing and Management Node Group

Question

What is the best available evidence regarding the use of larvae (maggots/biosurgery) for debridement of chronic wounds?

Clinical bottom line

Debridement is defined as “removal of foreign debris and devitalised or contaminated tissue from a wound bed so that surrounding, healthy tissue is exposed”⁵ (Level IV). A common practice in the management of chronic wounds is to debride the wound surface and the wound bed of devitalised/necrotic tissue which is believed to create a barrier that inhibits the migration of epithelial cells, thereby stalling the healing process¹ (Level IV). Debridement is considered necessary when other therapeutic options have failed to advance healing in the wound that contains yellow slough or black eschar⁵ (Level IV).

Larval (or maggot) debridement therapy involves applying medical-grade sterile (non-breeding) maggots to the wound bed. Selecting the appropriate species of larvae is essential. The green bottle fly (*Lucilia sericata*) is the most commonly used species due to its exclusive diet of necrotic tissue²⁻⁴ (Level III & IV).

A systematic review that compared larval debridement therapy with other forms of conventional therapy reported that wounds that were managed by larval debridement therapy achieved the following outcomes⁵ (Level I):

- More rapid debridement than those managed by conventional interventions alone.
- A mean reduction of 50% of necrotic tissue after nine treatment days versus a mean reduction of 50% of necrotic tissue after 29 treatment days using conventional therapy alone ($p < .001$).
- Complete debridement following four weeks of treatment, compared with an averaged 33% coverage with necrotic tissue after five weeks of treatment in wounds treated by conventional therapy ($p < .001$).
- An average of 56% granulation tissue coverage in their wounds versus a mean coverage of 15% in the conventional treatment group.

- A significantly smaller mean surface area than those managed with conventional therapy, indicating greater progress toward healing.

A study that evaluated healing outcomes in 92 pressure ulcers of which 43 wounds were debrided using maggot therapy and 49 wounds debrided using conventional therapy (i.e. patients' usual care by GP that did not include maggot therapy), reported the following outcomes⁸ (Level III):

- Complete debridement was achieved in 80% of maggot-treated wounds compared with 48% of wounds debrided with conventional therapy alone ($p < 0.021$).
- Within three weeks of treatment, necrotic tissue was significantly reduced ($p < 0.05$) and granulation tissue significantly increased ($p < 0.001$) in wounds that were debrided using maggot therapy as compared with conventionally treated wounds.

There is consistent evidence that the application of larvae as a debriding agent is associated with reduced odour and reduced exudate³ (Level III).

The application of larvae as a debriding agent may be unacceptable to the patient and other choices should be made available⁹ (Level IV).

Risk factors

- Mild bleeding can occur with larval debridement therapy; however, it can be significant in patients who take antiplatelet medication and, therefore, must be closely monitored⁵ (Level I).
- Larval debridement therapy should not be performed next to a major vessel⁵ (Level I).
- Pain associated with larval debriding therapy varies with individuals. Pain can be present before, during or after debridement therapy and can range from mild to severe. It is recommended that mild pain is treated with nonopioid analgesics; topical agents; or a non-steroidal anti-inflammatory drug¹⁻⁵ (Level II).

Other factors for consideration

- Negative experiences/associations with larval treatment appear to be outweighed by the benefits perceived by

the patient; these benefits include reduced odour and exudate^{3,8} (Level IV).

- One small qualitative study (n=35) found that older women (≥70 years) were more likely to refuse larval therapy due to the visual imagery that it elicited³ (Level III).
- Acceptance of larval therapy appears to be associated with the following factors³ (Level III):
 - ulcer recurrence and duration rates
 - the patient's experience with other treatments
 - social comparison with the experiences of others.
- Larvae are available in two formulations: bagged and loose. No differences in effectiveness have been reported based on formulation² (Level III).
- Findings from a case series of 101 patients suggest that larval therapy results in poor treatment outcomes for patients with the following characteristics⁴ (Level III):
 - chronic limb ischaemia
 - older patients
 - patients with septic arthritis.
- The form of debridement should be selected with the following in mind⁶ (Level IV)
 - wound location
 - extent of necrotic tissue
 - presence of infection
 - patient pain
 - availability and safety of pain medication
 - haemostasis availability and acceptability
 - exudate volume and viscosity
 - patient compliance with therapy
 - patient choice where appropriate
 - wound treatment aims
 - patient prognosis and outcome goal
 - clinical skill and knowledge.

Characteristics of the evidence

This evidence summary is based on a structured search of the literature and selected evidence-based health care databases. The evidence in this summary is from:

- A systematic review of the literature reported that the evidence for larval debridement therapy is insufficient to

conclude that its effectiveness is the same or greater than other conventional therapies⁵:

- The same review maintains that clinical experience provides strong evidence for the efficacy and safety of larval debridement in selected patients⁵.
- A literature review summarising the effectiveness of a number of debriding techniques¹.
- A case series of 101 patients that assessed the influence of patient and wound (n=117) characteristics on healing outcomes of ulcers of mixed aetiology using larval therapy⁴.
- A randomised controlled trial assessing the effectiveness of larval debridement therapy on 267 patients with ulcer of mixed aetiology and 25% slough/necrotic tissue coverage².
- A small randomised trial assessing the effectiveness of two larval formulations (bagged and loose) and patients (n=35) perceptions of each³.
- A systematic review that concluded that there is insufficient high-quality evidence that demonstrates the effectiveness of one debridement method over another, or that healing efficacy is increased by using debridement⁷.
- A study that evaluated healing outcomes in 92 pressure ulcers of which 43 wounds were debrided using maggot therapy and 49 wounds debrided using conventional therapy (i.e. patients' usual care by GP that did not include maggot therapy)⁸.
- A wound care manual⁹.

Best practice recommendations

- To avoid contaminating the wound, only medical-grade or sterilised larvae from a known insectarium should be used for larval debridement therapy (Grade A).
- Care should be taken to follow supplier's instructions and ensure that larvae do not come into contact with surrounding healthy tissue (Grade A).
- A commonly reported practice to protect the periwound skin is to cover the skin with a hydrocolloid dressing with its centre cut away in order to allow direct contact between larvae and wound bed (Grade A).
- Professional guidance is necessary for patients who are asked to consider larval therapy (Grade B).
- The choice of words used by the clinician to describe the debridement activity of larvae influences the patient's perception and acceptability of the procedure. Using terms such as larvae "remove" or "clean" (dead) tissue, is preferable to using terms such as larvae "eat" (dead) tissue (Grade B).

- Pain experienced at dressings or with fresh application of larvae can be managed with topical analgesic or a non-steroidal, anti-inflammatory drug (Grade B).
- A careful assessment must be made of the patient's suitability to the method of debridement (Grade B).

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