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Adjuvant Maggot Debridement Therapy for Deep Wound Infection due to Methicillin-resistant *Staphylococcus aureus*

Sir,

Community-acquired methicillin-resistant *Staphylococcus aureus* (MRSA) is the leading cause of skin and soft-tissue infections in the United States.^[1] The management of chronic wounds poses a challenge for clinicians despite

technological advances of modern medicine. The use of maggots to heal wounds existed from antiquity.^[2] There is growing evidence recognizing maggot therapy as a safe and effective treatment of wounds, with increased understanding of its mechanism of action for debridement, disinfection, and wound healing.^[3] Maggot debridement therapy (MDT)



Figure 1: (a) The patient at presentation, large draining abscess medial to the left scapula. (b) The wound 10 days after initial debridement filled with fibrinous material. (c) Placement of BioBag[®] maggot debridement therapy. (d and e) Debridement of fibrinous material by maggot debridement therapy after 1st and 2nd application, respectively

is essentially debridement of necrotic tissue by biochemical and mechanical means.^[3]

An 82-year-old Caucasian male with diabetes presented to our hospital with 4 days of febrile illness and upper back discomfort after sustaining a mechanical fall. On physical examination, temperature was 101.9°F and blood pressure was 87/50. There was no audible murmur. A 5 cm × 4 cm abscess with surrounding cellulitis was noted medial to the left scapula [Figure 1a]. During surgical debridement, a copious amount of pus was removed. Laboratory studies revealed the following: white blood cell count, 17,600/mm³ with 89% neutrophils and 2% bands; hemoglobin A1c 6.9%. A wound culture and four sets of blood cultures in 2 consecutive days revealed MRSA. Dual-antibiotic treatment was started: ceftaroline (renally adjusted due to serum creatinine of 4.4 mg/dL) intensified with daptomycin at 4 mg/Kg. Fever and leukocytosis resolved 72 h after initiation of antibiotics. A transthoracic echocardiogram did not show vegetations on any cardiac valve. Ten days after the initial debridement, the wound measured 7 cm × 4 cm, filled mostly with fibrinous material [Figure 1b]. It was decided to use maggots for the debridement. Figure 1c shows placement of the maggots, live larvae product BioBag[®] (BioMonde[®], Gainesville, Florida, USA), which contains green bottle larvae from the fly *Lucilia sericata*. A heat-sealed porous polyester bag, containing the larvae, was applied on the wound. Video 1 shows the bagged larvae being removed from the wound after 3 days of continuous application. After two consecutive treatments with MDT, each one for 72 h of application [Figure 1d after one application and Figure 1e after second application], the wound had no fibrinous material and a pink-colored granulation tissue was present at wound edges. After 7 days of the combination antibiotic treatment, the patient completed an additional 4-week course with daptomycin, with continued improvement in wound healing.

This case report offers supporting evidence that MDT will hasten wound healing of deep and complex MRSA-infected cutaneous abscesses. A recent meta-analysis demonstrated that MDT shortened the healing time and improved healing rate of chronic ulcerations.^[4] Bowling *et al.* were the first to demonstrate elimination of MRSA colonization in chronic

diabetic foot ulcers using MDT with an efficacy of 92%.^[5] Nishijima *et al.* reported successful use of MDT to achieve limb salvage of MRSA-infected wound with critical ischemia.^[6]

Initially, we chose to combine daptomycin and ceftaroline to treat the patient's MRSA bacteremia and sepsis. Prior evidence showed that this combination can be used as salvage therapy for persistent bacteremia due to MRSA.^[7] More recent data demonstrated that the same combination achieved shorter duration of MRSA bacteremia compared to the standard of care (monotherapy with vancomycin) and can possibly be associated with improved mortality.^[8] The Patient's bacteremia cleared quickly, and after of the ceftaroline–daptomycin combination, an additional 4-week course with daptomycin was given in accordance to treatment guidelines for complex MRSA infections.^[9]

We believe that MDT hastened improvement of our patient's wound through the removal of fibrinous debris without harming healthy tissue. The interdisciplinary collaboration of infectious diseases and surgical and wound care specialists led to an evidence-based approach to resolve a complex and large wound.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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