Case reports

Acta chir belg, 2003, **103**, 405-407

Maggot Therapy : Many Hands Make Light Work

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Key words. Maggot therapy; fly larvae; diabetes; foot ulcer; Lucilia Sericata.

Abstract. We report the case of a diabetic patient with severe ischaemic infected ulcer of the right foot, successfully treated with maggot therapy.

Introduction

Maggot therapy consists in the application of specific fly larvae on infected site that did not respond favourably to more previous conventional treatments. The authors report the case of a diabetic patient with severe ischaemic infected ulcer located on the right foot and successfully treated with maggots.

Case report

A 78-year old man was referred to our hospital for treatment of ischaemic non-healing ulceration of the right foot (Fig. 1a). The atherosclerotic risk factors were systemic hypertension, smoking and an insulin requiring diabetes mellitus with renal, ocular and peripheral polyneuropathy complications. His medical history included congestive heart failure and chronic intermittent claudication. The vascular examination revealed the presence of femoral pulses but the abolition of the bilateral peripheral pulses. The results of continuous-wave Doppler showed flattened curves in distal arteries. A contrast arteriogram confirmed the peripheral microangiopathy with occlusion of popliteal and crural arteries. Because there was a lack of adequate outflow vessels, the patient was considered with non reconstructible occlusive arterial disease. The ulceration culture revealed methycillin resistant staphylococcus aureus (MRSA). Despite lumbar sympathectomy, aggressive surgical debridement one to two times daily and antibiotic therapy, the wound continued to progress during the first three weeks of hospitalization. Then, we proposed an alternative treatment using maggots to attempt foot salvage. The patient signed informed consent form after expressing comprehension of the purpose, benefits, risks, and alternatives to maggot therapy. His infected ulcer healing substantially improved with maggot therapy (Fig. 1b).

Maggot application

Only sterile larvae of the species Lucilia Sericata were used in our patient. Maggot is one of the four stages of fly metamorphosis : egg, maggot, pupa and finally adult (1).

It is essential to avoid antimicrobial and disinfected topical therapy before the maggot application. The fundamental design was a two-layered dressing (3). Once Duoderm® applied to the intact skin surrounding the ulcer, approximately 200 fly larvae were inserted into the ulcerated cavity and were expected to ingest 10 to 15 gr of necrotic tissue daily (2). A sterilized piece of nylon was then placed over the ulcer. According to their life cycle, the application of larvae must be limited to 72 hours.

Discussion

In 1931, W. S. Baer was the first to successfully report the treatment of severe chronic osteomyelitis by using the maggots (2, 4-6). But already in the sixteenth century, Ambroise Pare (1509-1590) and baron D. J. Larrey, the famous military surgeon of Napoleon's armies (1766-1842) observed the beneficial effects of fly larvae on debridement and healing of suppurative wounds (6-7).

Several mechanisms are proposed to explain the beneficial effects of maggots on healing wounds. There could be categorized as secretory and mechanical activities.

Secretory activity

Firstly, maggots increase alkalinity of wounds (8) resulting from the secretion of various agents such as ammonia (7), allantoin (9) and calcium carbonate (6). Secondly, they secret natural antibiotic-like agents (8) against bacteria and proteolytic enzymes for liquefaction

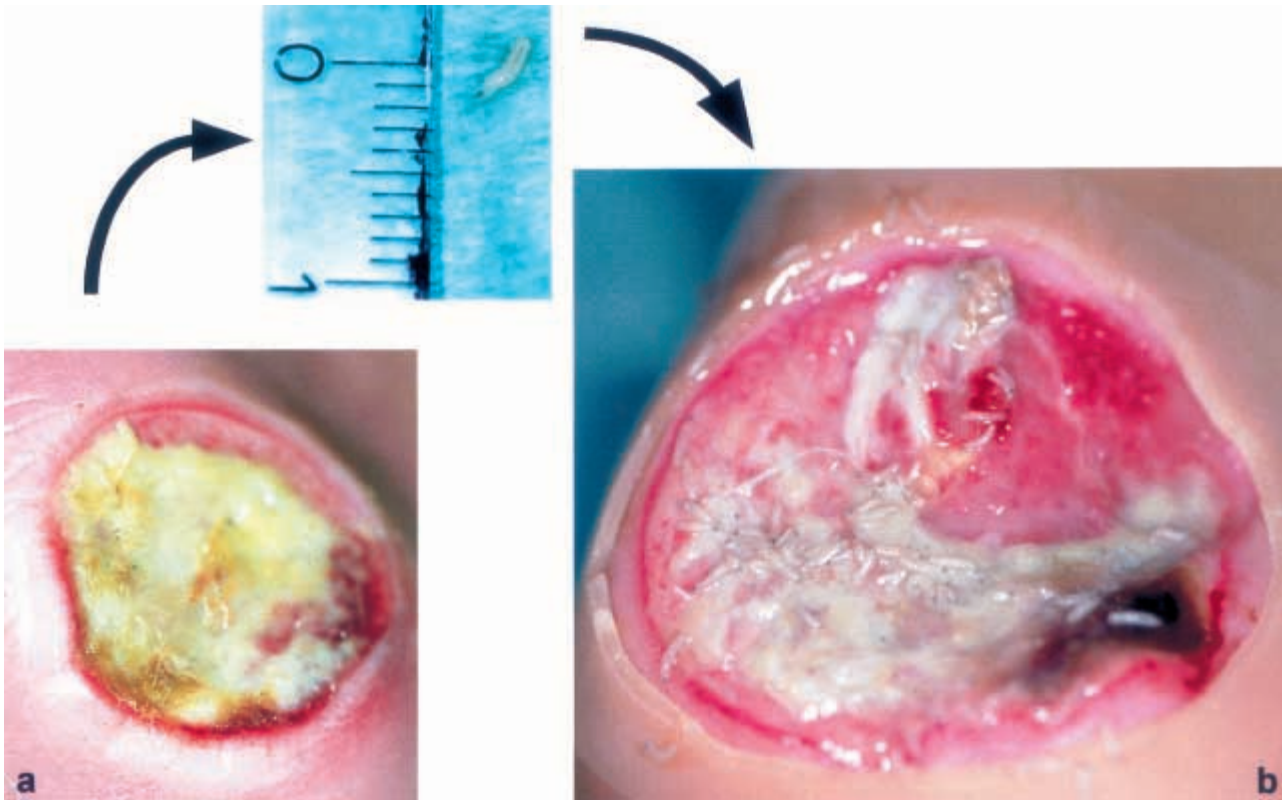

Fig. 1
a. Clinical examination revealed a nonhealing ischaemic ulcer located laterally on the right foot.
b. The ulcer after 2 weeks of maggot therapy.

of necrotic tissue (6-7, 9). Finally, growth promoting agents were also detected in maggot extracts (9).

Mechanical activity

Firstly, the continuous movement of maggots stimulate the formation of granulation tissue (9). Secondly, there is a mechanical wash out of bacteria by the serous exudates as a result of the irritating effect of crawling larvae (6, 9).

In addition, bacteria and necrotic tissues would be directly ingested by maggots.

The potential clinical indications for maggot therapy include all types of necrotic or infected wounds, particularly with antibiotic resistant bacteria (7-8). Small clinical experiences suggested that maggots offered also an ideal solution against Staphylococcus aureus, in particular MRSA, Pseudomonas and group A and B Streptococci (5, 7-8). Spectacular results with larvae were observed in the treatment of diabetic foot (10).

Maggot therapy has a number of advantages, previously described, as well as disadvantages. It is essential to sufficiently provide oxygen to the larvae while preventing their escape from the wound. In addition, the continuous crawling of larvae can induce pruritus and discomfort easily controlled with oral medication. However, the most important annoyance is probably the psychological apprehensions of the patient as much as the nursing staff with the maggot application.

Conclusion

Maggot therapy represents an effective and valuable alternative therapy, especially for diabetic patient with infected wound that did not respond to previous surgical debridement and conventional treatment.

Acknowledgements

We gratefully acknowledge the contributions of Dominique Frippiat and all the nursing staff of the Department of cardiovascular and thoracic surgery (4D) in the management of our patient.

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