POSTOPERATIVE LARVAL DEBRIDEMENT THERAPY IN GYNAECOLOGY PRACTICE

JİNEKOLOJİ PRATİĞİNDE POSTOPERATİF LARVA DEBRİDMAN TEDAVİSİ

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Abstract

The aim of this study was to show the larval debridement therapy can be an initial therapy for chronically necrotic wounds with or without enfection. Steril larvae were put into wound directly or in a steril bag, and for wounds, each of which is 1 cm^2 on average, 6-7 larvae were applied on five patients. Therapy was applied once or twice a week depending on necrotic tissue amount, after 24-48 hours larvae were taken away from wound surface. This procedure continued sustainably until all necrotic tissues were removed from the wound. Larval debridement treatment (LDT) was applied to 5 patients. The average age of patients was calculated as 43.8/years old, average treatment time was found 15.2 days. The average wound size was found 9,66 centimeters. In two cases, Pseudomonas aeruginosa was isolated from tissue defects. Before the treatment we gave antibiotics to all patient and we performed debridement treatment mechanically on two patients. The cases were ceserian section, hysterectomy and salpingooferektomy and radical vulvectomy. In three cases the wounds were healed totally without any additional operation; but in two cases we performed secondary suture operation after larval debridement treatment because of large tissue defect. Larval debridement treatment has been used since ancient times. But nowadays it can be used as an initial treatment for wounds which are non-responsive or poorly responsive to the convential treatment. It may be more widely used in the future. Our cases describe this successful treatment completely.

Key words:nonhealing wounds, larval therapy, gynaecology.

Özet

Bu çalışmada amacımız Larvadebridmantedavisinin enfekte olmuş ya da olmamış kronik nekrotik yaralar için ilk tedavi olabileceğini göstermekti. Steril larvalar her biri bir santimetrekare yaraya sahip olan beş hastanın yaralarına ortalama 6-7 larva olmak suretiyle direkt ya da steril poşet içerisinde konulmuştur. Larvalar yara yüzeyinden alındıktan 24-48 saat sonra tedavi, nekrotik doku miktarına bağlı olarak haftada bir ya da iki kez uygulanmıştır. Bu prosedür tüm nekrotik dokular yaradan alınana kadar aralıksız bir şekilde sürdürülmüştür. Larvadebridmantedavisi (LDT) 5 hastaya uygulanmıştır. Ortalama hasta yaşı 43.8, ortalama tedavi süresi 15.2 gün şeklinde bulunmuştur. Ortalama yara büyüklüğü 9.66 cm'dir. İki vakada, pseudomonas aeruginosa doku defektinden izole edilmiştir. Tedaviden önce tüm hastalara antibiyotik verilmiş, iki hasta üzerinde debridman tedavisi mekanik olarak uygulanmıştır. Vakalar sezeryan, histerektomi, salpingooferektomi ve radikal vulvektomidir. Üç vakada ek bir tedaviye gerek kalmaksızın yaralar tamamen iyileşmiş; ancak iki vakada büyük doku defekti sebebiyle larvadebridmantedavisinin ardından ikinci bir sütür uygulanmıştır. Larvadebridmantedavisi antik dönemlerden beri kullanılmaktadır. Fakat son zamanlarda, klasik tedaviye cevap vermeyen ya da zayıf cevap veren yaralar için ilk tedavi olarak kullanılabilmektedir. Gelecekte daha yaygın bir şekilde kullanılabilir. Vakalarımız bu başarılı tedaviyi tamamen anlatmaktadır.

Anahtar Kelimeler:İyileşmeyen yara, larva tedavisi, jinekoloji.

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Introduction

A wound is a breach in the skin, which can allow infection through the entry of microorganisms. An acute wound is closed almost uneventfully. But chronic wounds have been defined as those which do not follow the orderly manner of healing and thus do not achieve closure (1). We treat such wounds with difficulty and management of chronic wounds is not possible with a single agent and most of them can't achieve satisfactory results in a sufficiently short period. Besides, the results can't satisfy the patients. Chronic wounds progress and turn into the form of nonhealing ulcers, with fibrotic and dead necrotic tissue, a source of infection. Necrotic tissues in these nonhealing wounds promote bacterial growth, inhibit the penetration of antibiotics, prevent the formation of granulation tissue and subsequent re-epithelialization and interfere with wound contraction. The presence of compromised, necrotic tissues provide a warm, moist, and nutritive environment for bacteria to proliferate and even allow the normal commensals to turn virulent. Necrotic tissue serves as a medium for bacterial growth, resulting in delayed healing and an increased risk of wound or systemic infection (2). In order for healing to commence the necrotic tissues within these wounds must be removed. We can perform surgical debridement or we can use topical agents. Debridement is an essential component of treatment. It is essential especially for wound bed preparation (3). In larval debridement treatment or biosurgery, sterile larvae of *Lucilia sericata* Meigen (Diptera: Calliphoridae) are applied to open wounds and ulcers with or without infection, where they exertantibacterial effects (4). They remove devitalized tissue, decrease the risk of infection and improve wound healing. Especially debridement and removal of pathogenic bacteria have two important effects. Nowadays they become a more acceptable system of wound management. The treatment was investigated by Church, Sherman and other biotherapy advocates. It is often used as a last treatment, but sometimes it can be used as an initial treatment in selected cases. Adverse effects can be rarely seen, but we have to be careful and it shouldn't contact with healthy skin. LDT and their use for the wound speciality will be discussed. In our cases, LDT was

suggested as an initial treatment because other forms of treatment were not possible.

Material and methods

In this study, steril larvae of Lucilia sericata, which is a kind of fly that was produced in İstanbul Universty Cerrahpasa Medical Faculty Scientific and Technological Research Instution of Turkey Biotherapy Research and Improvment Laboratuary, are used. We applied these larvae on 5 patients who were operated at Cerrahpaşa Medical Faculty, Obstetric and Gynecology Department for different causes. At first stage, 6-7 steril larvae were put into wound directly or in steril bag for each wound, 1 cm^2 on average. Larval debridement therapy was applied once or twice a week depending on necrotic tissue amount, after 48-72 hours larvae were taken away from wound surface. This procedure continued sustainably until all necrotic tissues were removed from the wound. After that in accordance with the healing of the wound, the patient was controlled a monthly or weekly or larval debridement therapy was applied again.

Results

LDT was applied to 5 patients in our clinics. In two patients, a median insicion was performed for total abdominal hysterectomy. In the other two patients pfannelstiel insicion was performed for ceserian /section (before and after larval debridement therapy (as shown in figure1 and figure 2). In one patient, radical vulvectomy was performed. The average age of cases was calculated as 43.8/years old, the average treatment time was found 15.2 days. The average wound size was found 9,66 centimeters. One patient had diabetes mellitus type 1 and one patient had also hypertension furthermore. One patient had systematic lupus eritamatosus with nephrotic involvement. Before the larval debridement treatment, antibiotic treatment was given and the wounds were covered with water in all cases. Additionally, we performed debridement treatment mechanically on two cases. In three cases the wounds were healed totally without any additional operation but in two cases we performed secondary suture operation after LDT because of large tissue defect. These two patients had such underlying systematic diseases as systematic lupus eritamatosus and diabetes mellitus type 1. Although there was an improvement in wound healing, patient who had vulvar carcinoma died on the 8^{th} day of the treatment because of the systematic health problems (Table 1).

Figure 1: Before larval depridement therapy

Figure 2: After larval debridement therapy

Tablo 1: Features of cases (n:5)

N:5	1	2	3	4	5
Age	35	72	53	28	67
Systematic illness	Hypertension,Diabetes Mellitus type 1		Diabetes mellitus type1	Systematic lupus eritamatosus	
The reason for operation	Pregnancy	Myoma uteri	Vulva cancer	Pregnancy	Myoma uteri
Operation	Cesarean section	TAH+BSO	Radical vulvectomy	Cesarean section	TAH+BSO
Wound diameter			7	7	15
Antibiotic treatment before debridement	Yes(ciprofloxacine+metronidazole)	Yes (ciprofloxacine)	Yes (ciprofloxacine)	Yes (ciprofloxacine)	Yes (ciprofloxacine)
Bacteria involvement	Pseudomonas aeurigonasa		Pseudomonas aeruginosa		Pseudomonas aeurigonasaa
Larvae treatment time(day)	4	20	3	25	24
Number of application	2	9	5	20	11
Side effect	Pruritus	No	No	No	No
Secondary suture	No	No	No	Yes	Yes
Exitus	No	No	Yes	No	No

Discussion

When modern medicine fails, it is often useful to draw ideas from ancient treatments (6). Larval therapy was introduced in Western medicine following World War I by Bear (7) and has been practised for the treatment of chronic wounds since the 1930s. (8). Larvae took an important place in wound healing after the investigations of Sherman. The therapeutic use of fly larvae for debride necrotic tissue, also known as larval therapy or biosurgery, dates back to the beginnings of civilisation (9). Larval therapy is an iatrogenically induced myiasis (1). Larval therapy has been used

to help wound healing since ancient times. Wollina et al.(10) defines biosurgery as the use of living larvae on wounds to remove devitalized tissues, decrease the risk of infection, and improve wound healing. In January 2004, the FDA gave clearance to produce and market medical maggots for 'debriding nonhealing necrotic skin and soft tissue wounds, including pressure ulcers,venous stasis ulcers,neuropathic foot ulcers and nonhealing traumatic or post surgical wounds (11). The flies most often used in larval therapy are facultative calliphorids. They are not the same as that of the house fly. Most flies that facilitate myiasis belong to one of three major families: Oestridae, Sarcophagidae or Calliphoridae. Only a minority of the approximately 80 000 species have properties that enable medical use. Larvae of the greenbottle fly, L sericata, are currently used routinely (12). It feeds on necrotic tissue. Some factors like patient intolerance hampers its acceptance and a number of limitations decrease its efficiency. However larval therapy is so popular due to its safety, simplicity, efficacy and cost-effectivity nowadays. Clinical applications of larval therapy are non-acute external wound that have failed one or more alternative treatments, any superficial wound excluding those with organs or blood vessels exposed, aggressive superficial infection in conjuction with surgical debridement and antibiotics, some types of fungating cancers ,wounds with multidrug –resistant infections. Current evidence supports its use for traumatic wounds that fail to heal, pressure ulcers, diabetic ulcers, decubital ulcers, neurovascular and vascular ulcers (13), osteomyelitis of the mandible and other bones (14), florid necrotizing fasciitis (15), postsurgical wound infections, methicillin-resistant *Staphylococcus aureus* (MRSA)-infected wounds debridement of infected surgical wounds, and burns (16). It is not prefered for wounds that need urgent debridement like absce. Larvae can be applied either directly to the wound or in commercially available biobags. Larval therapy has different mechanisms for wound healing. First of all, they debrides necrotic tissue with a mixture of proteolytic enzymes including colleganese and removes necrotic tissue through digestive enzyme activity. Then they produce natural antibiotic-like agents, alkalinizes the wounds with secreted ammonia, inhibits bacterial growth, and disinfects the wounds through the ingestion of microbes.

Finally they produces substances which stimulate wound healing by inducing fibroblast migration into the wound space. They have also antibacterial properties. Huberman and associates found that the

larvae of the *Lucilia sericata* species have antibacterial activity against gram-positive bacterial strains, including methicillin sensitive *Staphylococcus aureus* and methicillin-resistant *Staphylococcus aureus*, and gram-negative bacteria, such as *Pseudomonas aeruginosa*, *Serratia marcescens*, *Escherichiacoli*, and *Klebsiella pneumoniae*. They also reported higher levels of antibacterial substances when the maggots were in the presence of bacteria (17).

The adverse effects of this treatment are fever, pain and sometimes bleeding. Courtenay and Church said that larva use is associated with episodes of fever; patients may have increased pain and occasinally bleeding (1). They don't have so many adverse effects, but we have to be careful. They shouldn't contact with healthy skin. They don't damage healthy dermis and subcutaneous tissue, but they can damage to healthy epithelium; therefore, epithelium protection must be performed. Treatment must be continued until healthy granulation tissue formation takes place. Frequent change of larva is essential every 2-3 days, as following this period, the larvae turn into pupa and are unsuitable for debridement therapy (18). Larval therapy is cost-effective. Thomas has calculated that routine use of larvae can cause NHS to save 160 million pounds annually (19).

Larval therapy has been used since ancient times. In many studies, it has been compared with other wound management techniques and found to be more acceptable. It is becoming a more and more popular form of treatment form in wound management day by day. It can be used for any wound especially infectious form as a last treatmet. But nowadays it can be used as an initial treatment for wounds which are non-responsive or poorly responsive to the convential treatment. It may be more widely used in the future. Our cases describe this successful treatment completely.

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