

RECENT DEVELOPMENTS IN THE MANAGEMENT AND THERAPY OF WOUNDS EXHIBITING COMPLEX PRESENTATIONS

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Abstract: Wound problem is a medical problem faced by surgeons, and the treatment of problematic wounds is a complex medical practice. With the development of medical technology, various methods are also used in clinical practice to prevent the occurrence of problem wounds and promote the healing of problem wounds. Through literature review, this article summarizes the current status and progress of the definition of problem wounds and their prevention and treatment, so as to improve the understanding and treatment of problem wounds.

Keywords: Problem wounds; Wound healing; Treatment

1 INTRODUCTION

Problem wounds are a type of wound that are often encountered in clinical practice. Whether it is a wound, a wound after debridement and suturing, or an incision after surgery, wound problems may occur during the healing process and become a problem wound, affecting the process of wound healing. The factors that affect wound healing are often systemic lesions caused by the mixture and superposition of multiple factors, which can be summarized into two aspects: local factors and systemic factors. The humidity of the wound surface is also a local factor that affects wound healing [1-2].

Problem wounds are common but there is no precise definition. It is generally believed that problem wounds, namely chronic wounds, refer to wounds that do not heal within a reasonable period of time using traditional medical or surgical methods. Lin et al. [3] believe that problem wounds are soft tissue injuries that have not healed after 1 month and are scored less than 8 points by the Strauss Wound Classification Scoring System (Table 1).

Table 1 Strauss wound classification scoring system scores

standard	score*		
Exterior	2 minutes red base	1 point The base is yellow or white	0 marks base black
size	Smaller than the tip of the thumb	Between the tip of your thumb and your fist	bigger than fist
depth	epidermis or subcutaneous	muscle or tendon	bone or joint
Infect	No or only surface contamination	cellulitis	sepsis+
perfusion	warm, pink Rapid capillary perfusion Have a clear pulse	cool, pale Slow capillary perfusion and/or Doppler detectable pulse	cold, purple No capillary perfusion and/or no pulse

Note: * Apply 1/2 points when the wound condition falls between the two descriptions (the wound appears partially vascularized and partially covered by fibrinous exudate); + Findings associated with sepsis include fever, chills, leukocytosis, and/or uncontrolled blood sugar levels

In addition to infected wounds that are already problematic wounds in themselves, various other types of wounds may also become problematic wounds during the healing process. Therefore, the definition of problem wounds should also focus on the observation of the healing process. Based on the current understanding of problem wounds, it is believed that problem wounds are: (1) Infected wounds or a type of wound with secondary infection; (2) A type of wound that does not heal as expected, and its healing time is longer than that of a normally healed wound. ; (3) Others, such as wounds scored <8 points by the Strauss Wound Classification Scoring System.

2 WAYS TO PREVENT PROBLEM WOUNDS

Problematic wounds not only bring heavy financial and psychological burdens to patients, but also bring difficulties to medical staff. Therefore, how to prevent the occurrence of problem wounds should be placed at the top of the list. Some potential factors that affect wound healing can be avoided through preventive measures. A detailed medical history should be obtained, the patient's general condition and wound condition should be carefully assessed, and treated accordingly.

2.1 Take Measures to Address Systemic Factors that Affect Wound Healing

Nutritional support for patients, timely supplementation of protein, vitamins, etc. If there are underlying diseases, they should be promptly and actively treated and controlled. For example, patients with diabetes should pay attention to blood sugar control. In addition, the prophylactic use of antibiotics when indicated is also an important measure to prevent problem wounds.

2.2 Carry out Local Treatment and Care for Contaminated and Potentially Contaminated Wounds

The basic methods are debridement and dressing change. Remaining foreign matter is the main reason for non-healing wounds. Thorough removal of foreign matter and necrotic tissue in the wound and timely closure of the wound are important prerequisites for preventing the formation of problematic wounds. At the same time, attention should be paid to local care of the wound. The main method is to change the dressing.

Ordinary dressing changes generally use sterile dressings to cover the wound after disinfection. For the prevention of problematic wounds, ordinary dressing changes sometimes cannot achieve the expected preventive effect. Some special methods have emerged in clinical practice. For example, there are reports in the literature that the use of 75% ethanol gauze for external application can improve or reduce the degree of tension blisters to a certain extent, and is beneficial to tissue repair and reduce limb pain and tissue exudation [4]; there are also Use sodium thiosulfate alcohol gauze to cover surgical incisions to prevent the occurrence of problematic wounds [5]; Negative pressure wound therapy (NPWT) is an advanced trauma treatment method developed in recent years, and has highlighted its advantages in the treatment of high-risk wounds. NPWT is different from traditional wound care and negative pressure drainage technology. Negative pressure wound therapy mainly uses lower negative pressure and intermittent working methods to treat wounds. Studies have shown that compared with conventional treatment, NPWT can significantly reduce the formation of exudates and shorten the length of hospitalization [6].

3 WAYS TO TREAT PROBLEM WOUNDS

For problem wounds, attention should be paid to reasonable treatment methods, with the goal of closing the wound and allowing it to heal in the shortest possible time.

3.1 Measures to Deal with Delayed Healing or Secondary Suture Wounds

These wounds also include those that require skin grafting or flap repair. The main reasons for delayed wound healing include patients' lack of medical knowledge, poor compliance, special wound locations, and underlying diseases. While debriding, anti-infection, removing foreign bodies, and strengthening dressing changes are performed according to the patient's wound condition, health is also enhanced. Education, enhancing wound protection knowledge, improving dressing change compliance, strengthening psychological care, improving patients' nutritional status, and actively treating underlying diseases can prevent the occurrence of delayed wound healing or promote the healing of wounds that are already delayed [7].

For wounds that require secondary sutures, relying solely on granulation tissue proliferation and filling will take a long time to heal, increasing the patient's pain and easily forming scars. Through corresponding treatment, patients should correct malnutrition, anemia, electrolyte imbalance, control blood sugar and resume eating in a timely manner, avoid chemotherapy, radiotherapy and hormone application during the perioperative period, and strengthen dressing changes to keep the wound surface clean and the granulation tissue to grow well. Timely suturing can shorten the healing time and reduce scar formation. The dead space can be eliminated by using full-thickness bottom suturing. Incisions with high tension can be closed by increasing the suture spacing and margin [8]. For wounds with granulation tissue edema, hypertonic saline wet compress can be used to reduce edema.

3.2 Treatment of Infected Wounds

The methods of clinical application are different. Some methods are currently widely used in clinical practice, while some methods have not been widely used and are still in the research stage. There are also some methods that are still controversial or even abandoned. Below, combined with relevant literature, several methods for treating infected wounds are introduced.

3.2.1 Apply different dressings to treat problem wounds

For example, iodophor has a good anti-inflammatory and bactericidal effect, so there are reports in the literature that the use of iodophor gauze strips is used to treat infectious wounds [9]. Compared with ordinary dressing changes, the wound healing effect is significant; the use of silver-containing dressings [10] and through Using hypertonic glucose and insulin combined to wet wounds [11] can improve cell function and reduce exudate formation for the treatment of chronic wounds; and some scholars have studied the use of white sterilized gauze to treat burn infected wounds, which is more effective than ordinary Vaseline gauze. The drug is significant[12]. There are also studies showing that the use of alginate dressings in problem wounds, such as the treatment of diabetic foot ulcers [13], the treatment of chronic skin wounds [14] and the treatment of diabetes combined with pressure ulcers [15], are more effective than conventional dressing therapy and have good efficacy. clinical application prospects.

3.2.2 Cavity compression method to treat chronic wounds

By treating the wound, when the granulation tissue in the wound bed reaches more than 80% and the amount of exudate is significantly reduced, Zhang Bingyan et al. [16] used pressure tools such as gauze, bandages, abdominal belts, 3M seam-free tape and various homemade pressure-sensitive adhesives. Pressure tapes, etc. exert appropriate pressure on the human body surface to promote the rapid healing of wounds, sinus tracts and postoperative dehiscence wounds.

3.2.3 Application of negative pressure wound treatment technology

Basic research has confirmed the mechanism and advantages of vacuum-assisted closure (VAC) technology for wound treatment [17]. The use of VAC technology can keep the wound in a moist wound environment, absorb excess wound exudate, keep the surrounding skin dry, eliminate the need for frequent dressing changes, reduce the chance of infection by sealing the wound, and is comfortable and acceptable to the patient. Yes, but the price is relatively high. Li Yongzhong et al [18] believe that the combination of negative pressure closed drainage technology and local oxygen therapy can promote wound healing and is a new way to treat wounds.

3.2.4 Recombinant human epidermal growth factor in the treatment of diabetic foot ulcers

Li Xiangchuan [19] proposed that when using debridement, controlling inflammation and maintaining moisture balance treatment methods, recombinant human epidermal growth factor can be externally sprayed and dressing changed to maintain the moist environment of the wound, accelerate the growth rate of granulation tissue, and improve the healing rate.

3.2.5 Mesenchymal stem cell transplantation to treat chronic wounds

In recent years, research on stem cell transplantation to treat diabetic wounds has made breakthrough progress, and is expected to become a new treatment method and be used in clinical applications [20-21]. Current research has preliminarily elucidated the mechanism of stem cell proliferation and differentiation, and illustrated the plasticity of different stem cells in vivo and in vitro [22] as well as future clinical applications. I believe this will be a promising therapeutic strategy.

3.2.6 Hyperbaric Oxygen Used to Treat Problem Wounds

The application of hyperbaric oxygen to some special wounds in clinical practice is a new method of promoting wound healing that has been proposed in recent years. Chen Wenhui [23] recommended early treatment for patients with fractures and brain injuries and patients with peripheral blood circulation disorders due to foot trauma [24] Combined application of hyperbaric oxygen auxiliary therapy can effectively promote wound healing.

3.2.7 Development and application of traditional Chinese medicine

At present, research on the role of traditional Chinese medicine in promoting wound healing mainly focuses on the mechanism of "simmering pus and growing flesh" [25]. The more researched Yuchuang prescriptions include ancient prescriptions such as "Shengji Yuhong Cream", and there are also traditional prescriptions such as "Qu putrefaction and Shengji Cream". The healing effect of these prescriptions is mainly accomplished by promoting blood circulation, fibroblast growth, activation, and chemotactic macrophages, enhancing the oxidative metabolic function of immune-active cells in the wound, increasing the amount of fibronectin in the wound, and promoting the proliferation of shrinkage substances in the wound. . Fei Ji et al. [26] used the traditional Chinese medicine Shixiang ointment for external application to promote the repair of chronic refractory wounds. The efficacy in terms of wound healing rate, pain score, healing time and clinical comprehensive efficacy evaluation was better than that of Huaxin.

3.2.8 Improving chronic wound healing through telemedicine

Prospective, cluster-controlled study of chronic wound patients who met study criteria for home care, excluding pressure ulcers, surgical wounds, and cancer, by grouping patients with chronic wounds who met study criteria into a telemedicine group or a best conventional conventional practice group. Through follow-up studies, it was concluded that the use of telemedicine combined with home care has a significant positive effect on improving the management of chronic wounds and promoting wound healing [27].

3.2.9 Other methods

Vaseline gauze is used for fresher granulation wounds with less secretion or small newly cut purulent wounds; gauze soaked in 20% sodium chloride is used for wounds with local infection, necrosis and large exudation; cod liver oil gauze is used For slow-healing wounds, it has the function of nourishing and promoting the growth of granulation and epithelium; use 3% hydrogen peroxide solution to flush the wound, which has a mechanical flushing effect, especially for wounds suspected of anaerobic infection; use 1:5000 nitrofurazone solution Washing or wet compressing wounds has a certain antibacterial effect; using antibiotic solutions, commonly used to wet compress neomycin, chloramphenicol, gentamicin, etc., for general exudative wounds has antibacterial and inhibiting the excessive growth of wound granulation. Function; 10% silver nitrate is used to cauterize excessive hyperplasia of granulation wounds; in recent years, some people have also proposed using honey dressings to treat chronic diabetic wounds [28-29]; there are also reports in the literature using homemade spider badger ointment to promote stage III and above bedsore healing [30]; using sugar to promote wound healing [31] and maggot debridement therapy for refractory infected wounds [32], etc.

It can be seen among the many methods of local prevention and treatment of problematic wounds. In addition to surgical dressing changes and striving for secondary suturing or flap repair to promote wound healing and shorten the healing time as much as possible, there are also reports on a variety of local treatment methods, such as Hyperbaric oxygen, pressurization, negative pressure within the wound, the application of different dressings and even the direct application of medicine to the wound. Topical use of antibiotics [33] is used to treat problematic wounds. Some antibiotics such as chloramphenicol are no longer used or should be avoided. At the same time, because the concentration of local antibiotics is difficult to control and may easily lead to drug resistance, it is currently not

recommended in most cases. Use topically. It can be seen from reading the literature that when faced with wound problems, wound analysis is the first step to understand the wound and choose the correct treatment method. The establishment of objective, unified, accurate, simple and clear observation and evaluation standards for evaluating wound healing is the primary issue. In addition, some methods promote wound healing by applying drugs, but they need to be applied to the wound during the application process, which goes against the principle of keeping the wound clean, so it deserves further thinking and research.

4 CONCLUSION

Problem wounds are a type of wound commonly encountered in surgical clinics. Surgical wound closure and dressing change are still basic requirements, but sometimes it is difficult to deal with. In medical practice, various methods are tried to promote wound healing, and some methods have been widely used. Clinically, some are still in the research stage. Some methods have obvious preventive and therapeutic effects, while the efficacy of some methods has yet to be observed and summarized. As clinical practice continues to deepen, new methods of treating problematic wounds will continue to emerge, and traditional methods will continue to be confirmed and improved. Understanding the pathophysiological process of wound healing, the impact of various factors on wound healing, accurately determining whether it is a problem wound, and mastering the characteristics and mechanisms of different methods of preventing and treating problem wounds are crucial to choosing a reasonable treatment plan.

COMPETING INTERESTS

The authors have no relevant financial or non-financial interests to disclose.

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