

Treatment of hard-to-heal wounds after oncological surgery - the use of modern dressings

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ABSTRACT:

The problem of hard-to-heal wounds concerns 1–1.5% of the total population and about 3% of the population above 60 years of age. The risk factors associated with impaired wound healing are diabetes, arterial and venous insufficiency, advanced atherosclerosis, obesity and inadequate wound supply. As a result of these pathological processes may develop localized wound infection, disseminated infection, tissue necrosis, and even chronic inflammation carcinogenesis. In the group of patients with malignant tumors there are wounds arising in the course of the underlying disease and as a result of medical treatment. Wound healing is a significant problem and is often complicated due to patient's general condition, comorbidities and complex treatment of cancer, which includes surgery, radiotherapy and chemotherapy. Radiotherapy used for local regional control of disease after surgical treatment has a negative effect on healing by causing fibrosis of tissues and blood vessels damage, while chemotherapy interferes with the process of cell proliferation.

KEYWORDS:

wound, treatment, modern dressings, wound healing, VAC therapy, specialist dressings in oncology, skin cancer

The problem of issue of hard-to-heal wounds concerns 1-1.5% of the total population and about 3% of the population above 60 years of age. The main risk factors for poor wound healing are diabetes, arterial and venous insufficiency, advanced atherosclerosis, obesity, and inadequate wound supply. As a result of these processes, pathological processes such as localized wound infection, generalized infection, tissue necrosis, and even carcinogenesis due to chronic inflammation may occur, which in turn leads to a lack of therapeutic success. In patients with malignant tumors, we deal with wounds emerging in the course of the basic disease and as a result or complication of the treatment provided. Wound healing is a significant problem and is often complicated due to the patient's general condition, comorbidities and complex treatment of cancer, which includes surgery, radiotherapy, and chemotherapy [5]. Radiotherapy used for local regional control of the disease after surgical resection has a negative effect on healing by causing fibrosis of tissues and damage to blood vessels, while chemotherapy interferes with the natural wound healing process of cell proliferation [1].

Physiological changes occurring in patients with malignant tumors as a result of the disease process and arising during treatment have a significant impact on all aspects of their body's proper functioning. Besides iatrogenic factors that cause difficulties in treating wounds in oncological patients, poor nutritional status, vitamin and microelement deficiencies as well as their poor mental state should also be taken as a factor negatively affecting the healing process [2]. Many factors hamper the process of optimal oncological management; hence it is important to take into account the fact that radiotherapy, which plays a significant role in the local treatment of cancer, non-specifically damages the neighboring healthy tissues and thus complicates wound healing [9]. Inflammatory and proliferative phases as well as factors such as exposure time and total radiation dose determine the risk of complications in the form of skin damage, connective tissue, and vascularization [7]. This makes wound healing even more difficult. Adverse effects of skin radiation therapy include erythema, dry skin exfoliation, discoloration or hypopigmentation, local hair loss, skin atrophy,

telangiectasia, as well as fibrosis and ulcerations [10, 12]. A significant aspect of the correlation of radiotherapy in the treatment of wounds is the destructive effect of radiation on blood vessels, both acute and chronic cellular, molecular and genetic lesions as well as inflammation and oxidative stress leading to damage to vascular endothelial cells, followed by microvascular dysfunction and fibrosis [3, 11]. The consequence is disturbed blood supply leading to necrosis. In the treatment of malignant tumors, we use radiotherapy as a monotherapy, but also as a therapy combined with chemotherapy and surgical treatment. Depending on the type and severity of the cancer, the treatment regimen may include pre-operative radiotherapy and post-operative radiotherapy as complementary treatment. Pre-operative radiotherapy is recommended for achieving resection of previously inoperable tumors or for improving the expected effects of surgery [2]. Unfortunately, this is associated with the risk of an increased incidence of complications especially when radiation doses are greater than 50 Gy or if the interval between treatments between radiotherapy and surgical treatment is greater than three weeks [8]. Post-operative radiotherapy is associated with a lower risk of healing in the wound healing process. As for wounds that have occurred after surgical treatment of cancer, it is beneficial to delay the beginning of radiotherapy up to 6-8 weeks after surgery.

By inhibiting cellular metabolism, cell division and angiogenesis, chemotherapeutic agents adversely affect wound healing [6]. Obstruction of wound neovascularization and collagen production as well as immunological lesions affecting inhibition of the inflammatory response and thus the increased risk of wound infection are responsible for the difficulties in surgical treatment in oncological patients [4]. During the administration of cytostatic agents to the patients, bone marrow damage is frequent, with neutropenia being one of the effects. The greatest risk of this complication occurs in the period between 6 and 14 days after their administration. As a consequence, the risk of infection in oncological patients, wound infection and development of complications increases significantly. Chemotherapy also has



Fig. 1. Condition after tumor excision Dimensions of wound 7x6cm.

Fig. 2. 3rd week of treatment. Wound granulated, prepared for epithelialization.

Fig. 3. 3 months from start of therapy



Fig. 4. Condition before Excision of massive lower thigh ulceration.

Fig. 5. Condition after excision. Wound involves 90% of lower thigh circumference at half the length.

Fig. 6. 4th week of treatment. Granulated wound, prepared for epithelialization

Fig. 7. 12th week of treatment. Wound during granulation, further treatment outside center.



Fig. 8. Condition after excision of squamous cell carcinoma of side part of the right foot.

Fig. 9. 6th week of treatment. Wound treated with a small amount of fibrin, prepared for epithelialization.

Fig. 10. 5th month of treatment. Wound healed, side view.

Fig. 11. 4th month of treatment. Wound healed, top view.

a significant influence on coagulation disorders. Thrombocytopenia induced by chemotherapeutic treatment increases the possibility of excessive wound bleeding, while excessive blood clotting also caused by the administration of cytostatics impairs healing. Furthermore, the use of glucocorticosteroids and other preparations in the hormonotherapy of malignant tumors has a negative effect on the healing process. The reason for this includes immunodepression and occurrence of thromboembolic complications [5]. The following are cases of patients after or during oncological treatment with diagnosed malignancies such as melanoma of the heel, squamous cell carcinoma arising from long-term lower leg ulcer, squamous cell carcinoma of the foot, sarcoma of the thigh and meningioma. All patients were treated

with modern antiseptic dressings, negative pressure therapy and dressings stimulating granulation and epidermal growth. The use of specialist dressings and negative pressure therapy in the presented cases allowed to shorten the time of treatment, control local infections, improve the patients' comfort of life and faster implementation of the necessary complementary treatment. With current strategies, combining surgical treatment, radiotherapy and chemotherapy, correct wound healing, which arose both in the course of the underlying disease and as a result of the treatment is an important factor that enables proper treatment of the underlying disease in the optimal time.

CASE 1

A 65-year-old patient treated for 7 years due to successive recurrences of local cutaneous melanoma around the heel. In spite of the described complete excision of the tumor, melanoma recurrence was observed during healing. On average, the healing time was about one year, but due to the need for further treatments, the wound had not healed for seven years until the implementation of modern methods. A negative pressure dressing significantly reduced the wound's cleansing time from necrotic tissues, granulation, and epidermination. The time from the last treatment to complete healing was four months. No recurrence of melanoma was found (Fig. 1, 2 i 3).

CASE 2

A 77-year-old patient with ulcer of the left leg enlarging for more than a dozen years. Conservative treatment did not improve the local condition. Specimens were collected from the wound for the purpose of histopathological examination. Squamous cell carcinoma was diagnosed in some. The patient was referred for further treatment in the oncological center where he underwent radical tumor resection. A wound infection occurred during the post-operative period, and targeted antibiotic therapy was applied. Due to the patient's lack of consent to skin transplantation to cover the defect after the procedure, the range of the lesion and the lack of signs of proper wound healing in the post-operative period, treatment was initiated using negative pressure therapy. After several changes of dressing, we managed to obtain granulation development filling the loss of soft tissues. Special dressings were used in further treatment to accelerate epithelialization. No recurrence of cancer was found in the treated area. Further treatment is conducted on an out-patient basis outside the oncological center (Fig. 4, 5, 6 i 7).

CASE 3

A 64-year-old patient with histopathologically diagnosed squamous cell carcinoma of foot. The lesion covered a significant part of the foot. During surgical and radical treatment, the patient's 4th and 5th finger and about 40% of the front and side part of the right foot were removed without surgical interference in the heel. Histopathological examination of the preparation allowed to obtain complete tumor excision. Treatment was initiated using specialist dressings including negative pressure therapy. The time from surgery to total healing was 10 months. No cancer recurrence was found during this time (Fig. 8, 9, 10 i 11).

CASE 4

Complex antibiotic therapy, antifungal treatment, rinsing wounds with antiseptics and lavaseptics, antiseptic dressings, systematic surgical treatment of the wound and negative pressure therapy have allowed the patient's general condition to improve, and the wound healed. The total duration of treatment was five months (Fig. 12, 13 i 14).

CASE 5

81-year-old patient after excision of recurrent basal cell carcinoma of the sacral region (20x18 cm). Despite the attempt to obtain completeness of excision, histopathological examination revealed tumor cells in the cutting line. No possibility of surgical widening of the cutout in the bottom. It was decided to use negative pressure therapy for faster cleansing of the wound and stimulation of granulation, considering the area and depth of excision and numerous burdens of the patient, delaying normal healing. The duration of surgical treatment correlates with the initiation of systemic treatment. The diameter of the unhealed wound in the last photo is about 10 cm. Treatment was conducted for seven months (Fig. 15, 16, 17, 18 i 19).

CASE 6

67-year-old patient after neurosurgical surgery performed due to CNS meningioma with an unhealed temporal wound about 1.5cm in diameter. Since the procedure, attempts of treatment using various techniques, including closure of the wound with secondary sutures or local antibiotic therapy have been undertaken for almost 4 years. MRSA revealed in collected post-surgical wound swab culture. Special dressings were used in combination with negative pressure therapy. The treatment result obtained in the 3rd week after the change of technique is shown in the pictures (Fig. 20, 21 i 22).

CONCLUSION

The use of specialist dressings and negative pressure therapy in the presented cases allowed to shorten the time of treatment, control local infections, improve the quality of life and accelerate the implementation of complementary treatment. In no case was local recurrence observed during wound healing. Oncologists express divergent opinions regarding the use of VAC therapy in cancer patients. In our opinion, in the case of histopathologically confirmed complete tumor excision, one should not be afraid of an increased risk of recurrence. The results obtained constitute strong arguments for the use of modern wound healing methods in cancer patients.

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Fig. 12. Condition after enucleation of right lower limb in the hip joint. Hip bone not covered by soft tissues.

Fig. 13. 6th week of treatment. Wound during healing, partially stitched, peeled. Epithelialization from edges of wound.

Fig. 14. 5th month of treatment. Wound healed.



Fig. 15. Wound after excision of basal cell carcinoma of skin on back secured in the postoperative period with absorbent dressing.

Fig. 16. Condition after excision and removal of absorbent dressing 3 days after procedure. Wound dimension 17x13cm.

Fig. 17. 7th week of treatment. Wound granulated, during epithelialization.



Fig. 18. 10th week of treatment. Epidermis covers about 50% of primary wound.

Fig. 19. 12th week of treatment. Greater part of wound covered with skin. Remaining wound with a diameter of 5cm. Further treatment outside center.



Fig. 20. Wound condition during the first visit. Wound contaminated, covered with fibrin. Wound diameter approximately 1.5 cm.

Fig. 21. 1st week of treatment. Wound cleaned, filled with granulation.

Fig. 22. 3rd week of treatment. Wound healed, covered with epidermis.

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