

EXPECTING THE UNEXPECTED: REPORTING A CASE OF WOUND HEALING OF THE FOOT WITH 70% LOSS OF SKIN OVER THE DORSUM WITHOUT FLAP COVERAGE WITH MULTIMODAL APPROACH IN 82 YEARS OLD PATIENT WITH MULTIPLE COMORBIDITIES

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October 25, 2021

Abstract

A 82 years old female presented with cellulitis with abscess of the left foot after 10 days. We are reporting a case report of complex wound healing with upto 70% skin loss over dorsum of foot with the application of Negative Pressure Wound Therapy and dressing with placental extract gel.

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KEY CLINICAL MESSAGE

1. Old age has negative implication in wound healing as inflammatory cells are not recruited properly
2. Choosing a flap coverage for large wound in a debilitated patient cannot be always a good option
3. Choosing the treatment option for a large wound should be individualized as it can be healed even without flap.

ABSTRACT

Wound healing depends on many factors categorized into local and systemic. Old age, male sex, diabetes, obesity and chronic kidney diseases are some of the systemic factors while infection and precarious vascularity is local factor affecting wound healing adversely. Massive wound on foot require flap developed from either local distant site which itself is a morbid condition. We present a case of unexpected wound healing in 82 years old female with multiple comorbidities with fulminant cellulitis with help of proper planning, negative pressure wound therapy and placental extract gel. In addition to surgical management, medical management should be considered for appropriate healing. Adequate protein in the diet is required to match the catabolic state of the patient and regular counselling and encouragement of the patient is necessary to relieve the stress.

Keywords : Cellulitis, Abscess, NPWT, VAC therapy, Chronic suppressive antibiotic therapy

Abbreviations

NPWT: Negative Pressure Wound Therapy

IL-1: Interleukin-1

TNF-alpha: Tumor Necrosis Factor alpha

INTRODUCTION:

Healing of wound is a process which always keeps the patients and relatives worried. Given that the wound is in lowest part of the lower extremity, it gives the patient nightmare about the upcoming amputation. Because of precarious blood supply of the foot and relatively less subcutaneous tissue, covering of a humongous wound is almost impossible without flap coverage and skin grafting. Flap can be developed locally or from distant site, however in a patient with multiple comorbidities and fragile skin and soft tissue, its double edged sword to raise a flap for coving the wound of the foot. Moreover, there is a risk of donor site morbidities like paresthesia, seroma formation, wound dehiscence, contour disturbance and apprehension of the patient (1). All these factors are necessary to consider before choosing the procedure in in old and debilitated patients. Furthermore, doing flap in such an old does not necessarily succeed (2) and there is always a risk of amputation which in itself is traumatic mentally as well as physically to a patient. We are presenting a case of 82 years old female, who made a great escape from impending amputation.

THE CASE

A 82 years old female presented with fever from last 10 days and swelling of the left foot from last 7 days . Initially, she was managed at a nearby general hospital for the fever but the condition did not improve and she was referred to us after development of swelling in the foot. After proper history taking and physical examination, it was found that she had coronary artery disease, hypertension and chronic kidney disease. Foot was diffusely swollen and non-fluctuant and red on lateral aspect. She was started on intra-venous antibiotics (third generation cephalosporin, fluoroquinolone and metronidazole). Her fever did not subside and next day she developed abscess on lateral aspect of the foot.

Immediate decision was made to decompress the abscess though the skin over the foot started necrosing gradually. Pus culture from the abscess was sent and found to be infected with *Staphylococcus aureus* and intravenous antibiotics were started as per the antibiotics sensitivity. Though the skin continued to necrose and started involving dorsum and medial side of the ankle too. Repeat debridement was done and necrose skin was removed (**Figure 1 a, b, c**). Two days later, plantar surface of the foot around the heel also developed the abscess and it was drained on the same day.

Even with multiple attempts of debridement and intravenous antibiotics, her condition was not improving so it was decided to combine the treatment with Negative Pressure Wound Therapy (NPWT) (**Figure 1 d, e, f**). Dressing was changed after every five days and status of the wound was inspected (**Figure 2 a**). Though it sucked the fluid literally out of the patient and the canister was filling in only two days. Total 4 dressings were done and the condition of the wound improved drastically with the NPWT. Adequate granulation tissue was formed and wound turned reddish (**Figure 2 b, c**). Now, Megaheal (Nano silver colloid) Placental extract gel was applied on the wound daily to produce adequate granulation tissue so that exposed bone could be covered. Meanwhile, patient was advised to undergo flap coverage of the wound, however she and her relatives denied to undergo the surgery considering the age and comorbidities. Compressive dressing with Placentex and Megaheal was done on alternate day. A below knee slab was also applied to correct impending equinus and ankle varus as lateral ligaments became attenuated because of infection. With passing time, neo-epithelialization started from periphery and gradually wound was being covered with the new epithelial tissue (**Figure 3 a, b**). Meanwhile, patient was given 4 unit of human albumin and three unit of packed red blood cells on different time. She was put on high protein diet, vitamin C and zinc tablets. It around took 7 months for the complete coverage of the wound and patient and her relatives were satisfied with the outcome as she achieved the functional foot without any deformity (**Figure 3 c, d**).

DISCUSSION

Wound healing is affected by multiple factors categorized into systemic and local. Old age, female sex, stress, diabetes and obesity are related to delayed or impaired wound healing. Delayed wound healing in

aged is related to altered inflammatory response such as delayed infiltration of T-cells at the wound and alteration in chemokines and macrophages recruitment (3). Every phase of the wound healing becomes delayed or modulated like platelet aggregation, macrophage recruitment, cytokines release, epithelialization, neovascularization and collagen synthesis, reduced collagen turnover and reduced wound strength. Stress caused by prolonged illness has also inverse impact on wound healing. Stress can lead to anxiety and depression which can result in unhealthy behavior and impaired sleep pattern. In addition, it also disturbs the endocrine system leading to hyperglycemic state because of increased nor-epinephrine, which itself can impair wound healing.

Local factors responsible for delayed or non-healing wound are poor soft tissue coverage, hypoxia and infection. Because of the deep and large wound, vascularity of the area is reduced and oxygen tension decreases. It causes reduced cytokines production and macrophages recruitment. This patient had all of these condition which were cocktail for impaired wound healing. In addition, the wound was grossly infected. Bacteria and endotoxins can lead to prolonged elevation of pro-inflammatory cytokines such as IL-1 and TNF-alpha and elongate inflammatory process and if this continues, the wound may enter into chronic state.

So the appropriate planning is necessary to treat these wounds. Intravenous antibiotics along with repeated debridement is necessary to reduce the microbial load. Sometimes radicle debridement can lead to loss of large amount of soft tissue, hence Negative pressure wound therapy (NPWT) is needed to suck the infection out and reduce the swelling to enhance micro vascularity. NPWT has also been found to be helpful in enhancing the formation of healthy granulation tissue and wound contraction, hence reducing the exposed surface area (4,5).

The role of placental extract gel is to stimulate the formation of granulation, which was quite helpful in this particular case as the foot has almost nil subcutaneous tissue (6). Daily change of dressing should be done to prevent the contamination by microbes and dirt. In addition to these, it is must to add extra-amount of protein in the diet, adequate amount of hydration should be maintained. Proper counselling and assurance is necessary to relieve the stress related to the wound.

The amputation should be kept as reserve even at old age as it causes psychological trauma to the patient. Even the large wound can heal with time and correct decision so efforts must be done to let it heal naturally. Choosing a flap in old age is little doubtful, as vascularity of the flap is naturally reduced because of the age.

Because of these adverse factors of the wound healing, there remain a possibility of chronic non-healing wound and impending amputation. It needs multimodality to treat a wound like this. With combined effort from surgeon, physician, nutritionist, psychologist and time, these wounds can be treated and limb salvage can be possible even without a major surgery and without increasing morbidity.

CONCLUSION

Treating of a wound should be individualized based on the patient profile and available resources. Even a large sized wound can heal with appropriate planning, counselling and utilizing resources.

ACKNOWLEDGEMENT

I acknowledge my patient for having so much patience and co-operative. There were no funds granted from any institution. There was no conflict of interest.

CONSENT STATEMENT

All the authors during submission have confirmed that the patient consent has been signed and collected in accordance with the journal's patient consent policy.

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