A CLINICAL CASE REPORT ON CHRONIC WOUNDS USING GRANULOX

Tran Ngoc Diep, Vu Thi Thu Loan

Le Huu Trac National Burn Hospital

ABSTRACT

- Nowadays, oxygen is applied in the treatment of chronic wounds with many therapies: hyperbaric oxygen therapy, local oxygen.

- Granulox is a product that contains a high purity Hemoglobin dissolved in water and capable of binding oxygen from the air to the tissue of the wound and then diffusing on the background of the wound to increase oxygen saturation in a wound.

- We have used Granulox products containing Hemoglobin on some chronic wounds due to different reasons being treated at the wound healing center. In the first step, there are some comments about the clinical effectiveness of the drug:

- Granulox contributes to enhancing the local oxygen of chronic wound, therefore, it helps to support the healing of wound/to heal the wound.

- Granulox is easy to use and reduces the number of dressing changes.

1. INTRODUCTION[1]

- Wound healing is a process by which damaged tissue is, regenerated, and rearranged to create a scar. This process takes place in all organs in the body. If this process is interrupted, it will cause the wound to not heal properly.

- Researches have shown that: hypoxia due to damage to blood vessels in the wound is one of the main causes of impaired wound healing.

- Nowadays oxygen is widely used in treating chronic wounds such as hyperbaric oxygen therapy (HTBO), topical oxygen therapy.

- Granulox is a product containing highly purified hemoglobin diluted in water, capable of binding and diffusing oxygen from the air to the wound's tissues and the wound's surface, increasing oxygen's saturation.

2. CASES RESEARCH

2.1. Case number 1

The patient is named: Dao Thi Quynh Tr, 34 years old, female. Diagnosis: an ulcer of 5cm2 on the right leg. The patient has a birth defect. The patient was with multiple dark green birthmarks on the lower body. The patient had had a painful leg ulcer for 2 months. The wound is necrotic. Examination showed no limb deformity and normal lungs and heart functions. However, there had been signs of varicosities.

[1] *Corresponding author:* Tran Ngoc Diep, Wound Healing Center, Le Huu Trac National Burn Hospital
Email: dieptranngocvb@yahoo.com

Peripheral ultrasound showed no damage to the deep vein system and arteries. The patient had surgery to remove the necrotic tissues, skin grafting. Granulox was used 5 days after the surgery. 21 days after using Granulox, the wound is completely healed.

Figure 2.1. Patient hospitalization

Figure 2.2. After skin graft

The first day when using Granulox After 6 days Healed after 21 days

Figure 2.3. Patient using Granulox

2.2. Case number 2

The patient's name: Cao Ba T., 52 years old, male. Diagnosis: An ulcer of 10cm^2 on the left instep, hypertension, with psoriasis. Patients had an instep ulcer for 1.5 months. Constantly on Corticoid. The wound was necrotic, exposing tendons when stretching toe numbers 3 and 4. The patient's bandage was changed right after hospitalization. The ulcer was healed after 6 weeks of using Granulox.

Figure 2.4. Patient hospitalization

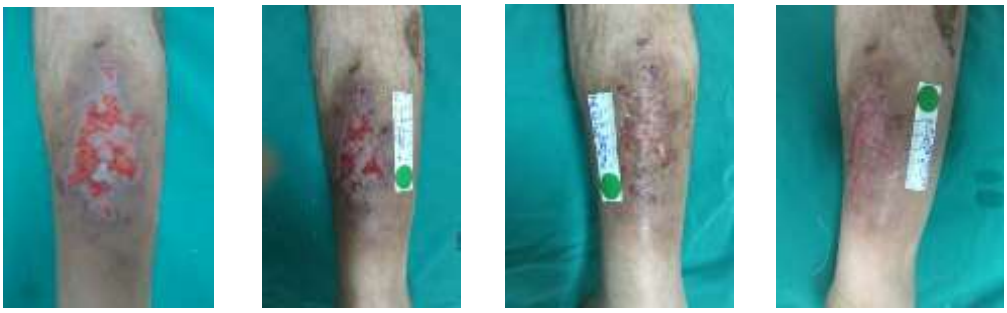
Granulox after 1 week | Granulox after 2 weeks | Granulox after 3 weeks | After 4 weeks

Figure 2.5. Patient using Granulox

2.3. Case number 3

The patient's names: Tran Xuan Ch., 28 years old, male. Reason for hospitalization: 20cm^2 ulcer on the left leg due to melanosis. The patient had telangiosis, constantly on corticoids. The patient had an ulcer on the left leg for 3 months. The patient was given Granulox right after hospitalization. The ulcer healed after 4 weeks.

Figure 2.6. Patient hospitalization



Granulox after 1 week | Granulox after 2 weeks | Granulox after 3 weeks | Healed after 4 weeks

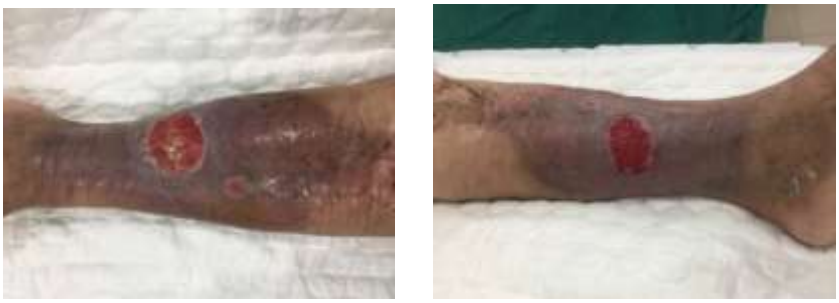
Figure 2.7. Patient using Granulox

2.4. Case number 4

The patient is named Chu Van T., 71 years old, male. *Diagnosis:* ulcer on the right leg, varicose veins on the right leg, hypertension. The patient had had varicose veins for many years, and an ulcer on the right leg for 4 months. The patient was given Granulox treatment together with positive airway pressure therapy right after hospitalization.

Patient when admission | Granulox after 1 week

Figure 2.8. Patient hospitalization



Granulox after 2 weeks | Granulox after 3 weeks

Figure 2.9. Patient using Granulox

2.5. Case number 5

The patient is named: Nguyen Thi Th., 61 years old. Diagnosis: An ulcer on the right heel, varicose veins, damage to the peripheral nervous system. The patient had varicose veins, numbness due to the damaged peripheral nervous system, and decreased sensation on the feet. The patient had had the ulcer for 5 months. The patient was given Granulox after wound cleansing, together with positive airway therapy. The wound healed after 9 weeks.

Patient hospitalization | After 3 weeks

Figure 2.10. Patient hospitalization

After 6 weeks | After 8 weeks | Healed after 9 weeks

Figure 2.11. Patient using Granulox

3. DISCUSSION

Oxygen plays an important role in all cell activities. oxygen is also present in every stage of wound healing. Apart from being a source of nutrition and antibiotics, oxygen also helps in cell migration and the formation of the extracellular matrix.

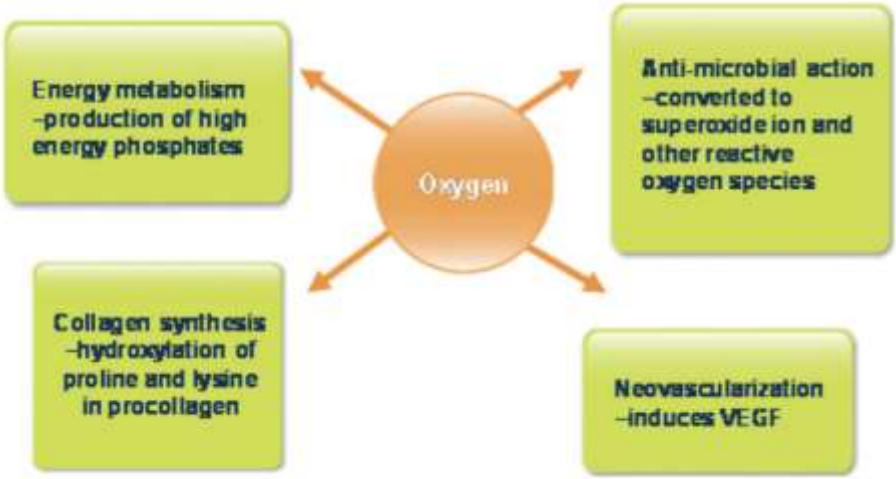
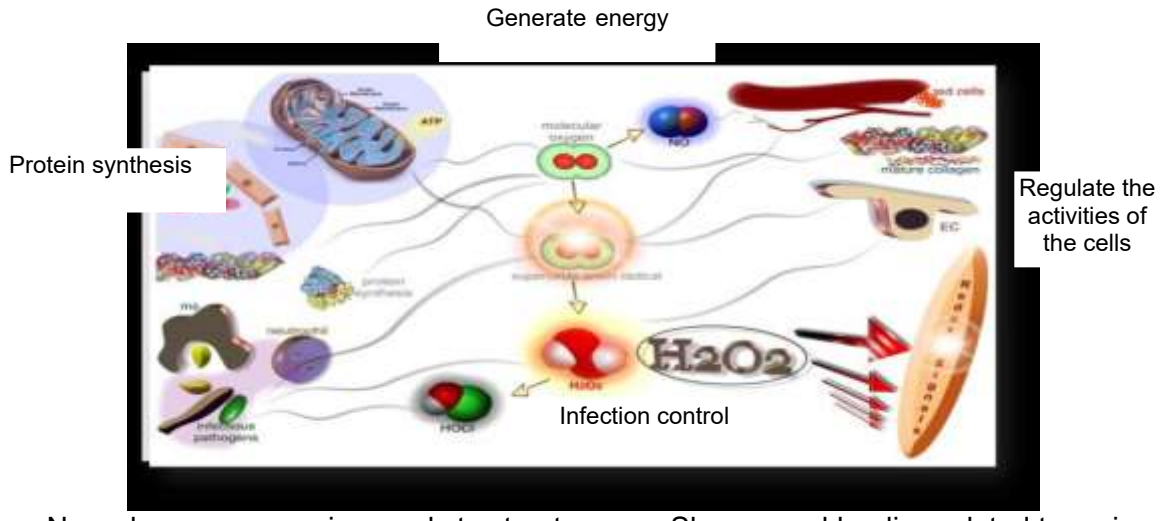


Figure 3.1. All stages of wound healing are dependent on oxygen



Nowadays, oxygen is used to treat chronic wounds in many ways: HBOT, topical oxygen. However, there have been doubts about the effectiveness of HBOT. For example, oxygen poisoning because topical oxygen therapy can reduce significantly those risks, it has been widely researched and applied, especially in cases of patients with chronic wounds and [3][4].

Oxygen is a major factor in wound healing

- Required oxygen for normal cell division: 30mmHg.

- Optimal PO_2 for wounds: 50 - 100mgHg

- Slow wound healing in the hypoxic environment: < 30mmHg.

- Slow wound healing related to various pathologies:

+ Diabetes

+ Arteriopathy

+ Chronic venous insufficiency

+ Burn

+ Pressure ulcer

+ Infection

Treatments of oxygen deprivation at wound sites

- Providing oxygen from the inside: Oxygen supplement from the nervous system:

Providing oxygen from the outside: Oxygen supplement from the surrounding environment to the wound's surface:

A study from Sharon D, Hunt and Fredrik Elg (2016) on 40 diabetic patients with chronic wounds showed that after being treated with Granulox showed that the size of the wound reduced by 40% after 4 weeks and by 80% after 12 weeks [6].

In another study, 100 English patients were divided into 2 groups. Group number 1 received Granulox as their treatment, while group number 2 just received regular standard treatment. The results were that after 8 weeks, patients of group 1had healed for 80% and that of group 2 was 34% [1].

A study from Chadwick P 2016 concerning both prospective and case-control (retrospective) studies on 200 patients showed that after using Granulox for 4 weeks, the size of the wounds had reduced by 40 - 80%, and after 10 weeks of treatment. 80% of the wounds had healed completely [2].

Evaluation of 5 patients with ulcers of various etiologies showed that after the ulcer was cleared of necrosis and used Granulox on from week 1, there had been a positive and gradual change. At 3 to 5 weeks, there was a clear epithelium, the ulcer size was significantly reduced. The ulcer was completely healed after 9 weeks of continuous use of Granulox without surgical intervention.

Hemoglobin transports directly oxygen to the wound's tissues. The amount of oxygen depends on the venous capability to deliver; therefore, with cases where there has been damage to the venous system, topical oxygen therapy is the optimal solution.

Granulox contains highly purified oxygen diluted in water. When being used on the wounds, hemoglobin will bind with oxygen in the air to increase oxygen saturation on the wound's tissues.

4. CONCLUSION

The Granulox product being used on 5 patients with chronic wounds at the Wound Healing Center have shown certain effects:

- Granulox supports the wound healing process.

- Granulox is very easy to use, and reduces the number of times patients need to change bandages; therefore patients can easily take care of the wounds at home with the assistance of the medical staff.

However, there should be more studies on a larger number of patients and testing to get a thorough and systematic evaluation.

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