Ministry of Higher Education
And Scientific Research
University of Baghdad
College of Dentistry

Laser Doppler and Histological Evaluation of the Effect of Eucalyptus/Cypress Oil on Wound Healing of Rat

A Thesis
Submitted to Council of the College of Dentistry/ University Of Baghdad in Partial Fulfillment of the Requirements for the Degree of Master of Science in Oral and maxillofacial radiology

By
Hawraa Amer Abdullah
B.D.S.

Supervised by
Assist. Prof. Dr. Enas Fadhil Kadhim
B.D.S., M.Sc., PhD. (Oral Histology)

2019 A.D. **1440 A.H**

Abstract

Background

Laser Doppler flowmetry is a non-invasive technique that is useful in determining blood flow in superficial skin; it is useful in assessing blood flow during the wound healing process.

A wound can be defined as a loss of the integrity and function of the skin. Wound healing is a normal biological process; it involves complex and dynamic events that lead to the repair of injured tissues.

Herbal therapies had been used in treating dermatologic disorders for thousands of years, was shown to be useful in the treatment of wound and injuries.

Eucalyptus essential oil is used in herbal medicine because of its antibacterial, antifungal, anti-inflammatory, and antiviral effect, it can be used to heal wounds, ulcers, burns, and abrasions.

Cypress essential oil has antibacterial, antiviral, anti-inflammatory, and antioxidant properties, it can be used to promote wounds healing, and treat infection.

Aims of study

The study was designed to evaluate the effect of local application of Eucalyptus and Cypress oil on wound healing in the skin of the rats, both by using Laser Doppler Flowmetry and histologically.

Materials and methods

A total of (45) male Albino rats (7 weeks old, weighing about 250-300g) were used in this study, a full skin thickness incision (2cm) was made in the dorsal skin of the rat. The animals were randomly divided into the following groups:

A-Control group: including 15 male rats treated with 1drop of distilled water daily.

B-Experimental groups:

Group I: including 15 male rats treated with 1drop of Eucalyptus oil daily.

Group II: including 15 male rats treated with 1drop of Cypress oil daily.

The treatment conducted every day until the animals were sacrificed (5 rats for each period) at 3, 7, and 10 days of treatment. Red blood cell velocity, concentration, and blood perfusion were assessed by laser Doppler flowmetry. Histological sections were stained with (H&E stain) for the assessment of inflammatory cells numbers as well as the epithelium thickness in the wound area. Wound contraction assessed by ruler based technique to estimate the wound area.

Results

Red blood cell velocity, concentration, and blood perfusion reveled that Eucalyptus and Cypress oil accelerated the wound healing of rat skin. There was significant difference among studied groups, the highest mean value was for Eucalyptus group at 7 days, and the lowest mean value was for the control group at 10 days, regarding all results.

Histological analysis revealed that Eucalyptus and Cypress oil accelerated the wound healing of rat skin. There were highly significant differences among studied groups in the mean values of epithelial thickness, and inflammatory cell count in 3, 7, and 10 day's duration in experimental groups than control group.

Wound contraction was faster in experimental groups than in the control group.

Conclusion

The present study demonstrated that laser Doppler flowmetry could be an effective method for the measurement of RBC velocity, concentration, and blood perfusion. It is also showed that the local application of Eucalyptus and Cypress oil could be an effective therapy for skin wound healing; which is promising for the future clinical use.