

Histological healing effect of olive oil on wounds contaminated with *Acinetobacter baumannii*

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Abstract

This research dealing with the restoration homes of olive oil on contaminated wounds in mice, with 3 sets. Group I of Con-ve represented (healthy non injured mice), group II (represented the olive oil-treated injured mice) and group III of Con+ve (injured mice without treatment). The therapeutic method turned into the way of collagen fibers occurrence from the granulation tissue and regenerated the epithelial tissue of the epidermis reformation. The outcomes confirmed that the mice exposed to olive oil had a shorter restoration time as confronted to control. Since pores and skin burn wound are experienced in surgical operation and outcomes showed that the olive oil accelerates the recuperation procedure of wounds, this makes the premises for meaningful research on recovery defected pores and skin as part of the wound-recovery method.

Keywords: histological healing, olive oil, wounds contaminated, *Acinetobacter baumannii*

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INTRODUCTION

Multiple different wounds, most crucially burned, are prone to infection due to the necrotic vascular tissue, being present. The principal consequence of burn wound is the loss of integrity of skin epidermis. Thermal electric and chemical accidents are the most commonplace causes of those wounds. The seriousness of burn injuries is determined in step with the intensity of pores and skin involvement and the proportion of total frame floor location concerned (Tehrani et al. 2016).

A complicated procedure leading to the formation of the scar is burn wound cure of older pores and skin at three essential rates, these are the inflammatory phase, proliferative section and transforming of the greater cell-matrix phase. The first stage is the primary feature of preparing the wound for repair. Fibroblasts tend to restore lattices and angiogenesis at the beginning of the second section. Epithelisation of transmigration, distribution and differentiation of epithelial cells from the edges of a wound to resurface the defect is the ultimate step of this section. Fibroblasts and their matrix proteins are important for the repair and transformation of tissues, particularly collagen. The third portion, which ranging from several weeks to several years. The wound contraction eventually undertakes the obligation of fibroblasting by moving the wound margins to the middle, thereby reducing the wound's length. The healing of burn has remained robust for modern medicines and other capsules will improve wound

healing. Toxicity is one of the most important measures designed to stop the use of promising sports compounds for the formation or proliferation of collagen (Khazaeli et al. 2014).

In evolutionary phrases, secondary metabolism of the plant substantially shared in the habitat of overland environments by plants. So, in an ecological context, secondary metabolites relate flowers to their surroundings. Aromatic compounds, secondary metabolites and pigments have antimicrobial and some therapeutic properties (Sharifi-Rad et al, 2017).

Because of the antimicrobial and some therapeutic properties of olive oil, which was chosen for several motives: whilst demolition of the skin takes place, as happens with scares and wounds, one of the first reactions of the cells inside the stratum corneum is to secrete fatty acids on the way to restore the permeability barrier. (Walters, 2002; Moustafa & Atiba, 2015).

Olive oil is received from olive fruit by mechanical processing method is widely recognized and ordinary as a first-rate aspect of the (DaLdalen, 2016).

Olive oil, through its phenolic material, inhibits the development of different types of cancers such as the stomach, prostate and breast, neurological problems, and cardiovascular and thrombotic diseases. In the case of olive oil, phenol acids, phenol alcohols, glycosides,

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flavonoids, lignans and secoiridoids are numerous phenols. Different agents included geographical starting point, olive growing age, olive grown aging and extraction techniques that affect phenolic content (Douzane et al. 2013).

Phenolic has a tremendous position in the tastes, flavors, and antioxidants assets of olive oil and these consequences have been stated previously. They also contribute to the stability and security of olive oil in the oxidative market. Extra unfastened radicals can lead to oxidative damage and the likelihood that many persistent illnesses, including atherosclerosis, persistent infection and stroke, will increase (Cicerale, 2012).

Phenolic compounds in the olive show antimicrobial activity towards viruses, microorganism, yeasts, and fungi (DaLdelen, 2016).

The plant and their compounds, which tested to have surest moves, were used to increase pharmaceutical merchandise in modern medicinal drug, due to several therapeutic consequences and few facet effects (Gholamian-Dehkordi et al. 2017).

MATERIALS AND METHODS

Animals: 18 pathogen-free/mice (half male and half female, weight 12–14g, age 4 weeks) were kept at a temperature of 18–25°C and humidity of 40–70%.

Bacteria: *Acinetobacter baumannii* was isolated were collected *A. baumannii* from different of Iraqi hospitals and these isolates collected from different types of infected patients history taking and complete clinical examination of samples according to methods explained in (Dai et al, 2012). *Acinetobacter baumannii* was preserved after the insurances of its purification by transferring single pure isolated colony to glycerol with brain heart infusion broth medium and Nutrient broth medium (this preservation medium was prepared by adding 20 ml of glycerol to 80 ml of brain heart infusion broth (BHIB) and Nutrient broth medium. Then 10 ml from this medium was dispensed in each sterile and well-capped screwed test tube. It was used for preserving bacterial isolates for long period (1-8 months or more) at -20°C, (Casas et al, 2014). Bacterial Inoculum preparation was done by pick up few single colonies into a 50 ml conical flask with 10 ml of Brian heart infusion estimated the turbidity with (0.5) McFarland standard solution spectrophotometrically (BHI) at 37 ° C the tube was incubated for 3.5 h with spinning agitation (250 rpm).

Wound Infections in Mice: For skin scraping infections, 18 mice were separated into 3 grouped sets: group I (Negative control) of non-injured mice (n=6), group II oil-treated injured mice (n = 6) and group III of control (Positive control) of non-oil treated injured mice (n = 6). Before infection, on day 0 all mice were given 2 intra-peritoneal (i.p.) cyclophosphamide inoculums. The first dose was 150 mg of cyclophosphamide per

Table 1. The animals' experimental groups

Groups		
Group I	Group II	Group II
positive Control	Burn with treatment	Burn without treatment
No change	Healing	No healing

kilogram of mouse body weight (150 mg/kg), and then the second dose was 100 mg/kg per (1-4days). This procedure was used to reduce the peripheral blood neutrophils to much less than 100/KL of blood, thus fostering a greater susceptibility to infection within the mice. Until pores and wounds were added, mice were anaesthetized with use of I P. Inoculums of a ketamine-xylazine mixture (8-10 mg/kg), after which the electric clipper was rasped on the dorsal surfaces. Mouse pores and skins were scraped then with 15 Scalpel blades till a reddish region emerged (just shy of blood draw). This technique ended in 1st -degree pores and wounds, with the extreme of the dermis removed. Each wound measured 1.2 cm. *A. baumannii* suspension smeared onto the wound surface.

Histopathological analysis

Histopathological examination; The eschar tissue and muscle groups that are part of the pores and skin of every day were collected from 3mm*4 mm tissue samples. The eschar, pores and skin samples collected from rats were 10 per cent formalin and paraffin-embedded. From the paraffin blocks, 4-micrometre pass section was cut and the pass section obtained was stained with hematoxylin-eosin and Giemsa to determine bacterial colonization, tissue viability and morphological changes (Tianhong et al. 2012).

RESULTS

The animals' experimental groups were group I of Con-ve represented (healthy non injured mice), group II (represented the olive oil-treated injured mice) and group III of Con+ve (injured mice without treatment), **Table 1.**

The sections in group II showed that the epidermis appeared normally and composed of a thick non-keratinized stratified squamous epithelium. The dermis revealed sever fibrogenesis and compose of irregular dense collagenous connective tissue and had more hair follicles and sebaceous glands (**Figs. 1 and 2**).

The sections in group III Cont+ group showed that the epidermis appeared normally and composed of non-keratinized stratified squamous epithelium. The dermis revealed mature irregular dense collagenous connective tissue and had more hair follicles (**Fig. 3**).

Macroscopic assessment confirmed the tissue of dealt with mice discovered mild to full regenerated epithelialization with a subepithelial edema. Granulation tissue was related with edema along with inflammatory cells which restriction the edge of lesions.

Moreover, there has been no proof of bleeding or aggregation of fibrin. In comparison, the control group

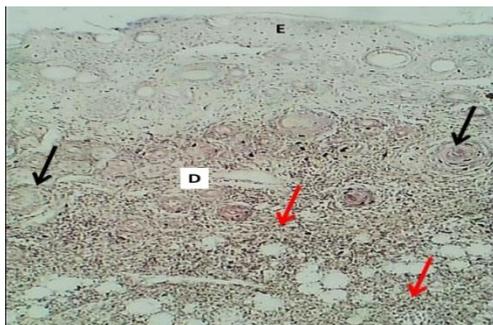


Fig. 1. Section of skin (groupII) shows after olive oil therapy: normal epidermis (E) the dermis (D) showed sever fibrogenesis (Red arrows) and hair follicles (Black arrows). H&E stain.40x

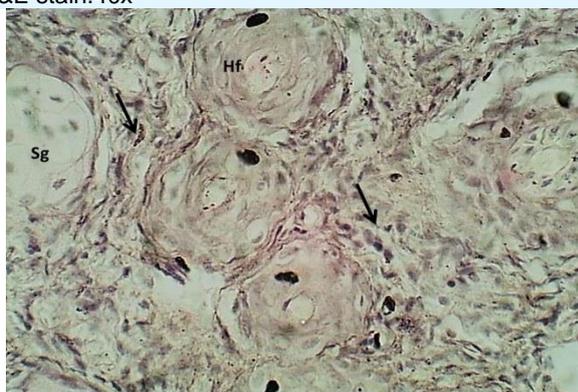


Fig. 2. Section of skin (dermis) (groupII) shows after olive oil therapy: fibrogenesis (black arrows) hair follicles (Hf) & sebaceous glands (Sg). H&E stain.400x

offered simplest partly healed skin with an obvious scar, edematous and inflammatory granulation tissue without renewed epithelium.

DISCUSSION

Histology of the tissues of the mouse indicates moderate to full re-epithelization, least intercellular or subepithelial oedema, without crusting, while some scar tissue becomes nonetheless seen for control non treated animals. In comparison among C-ve, olive oil treated, and C+ve groups, the ones dealt with olive oil showed a nearly fully renewed skin consisting of dermis, dermis and hypodermis. New epithelium becomes being put down and newly fashioned vessels, collagen fibres, and basal membrane could be visualized in the provisional fibrin matrix. The inner layer of epithelium becomes reconstruct by way of day 16 and granulation tissue thickened close to the base of the pores. Cells of skeletal muscle seemed more like a boundary between every day and influenced tissue in comparison with the control group of mice. In evaluation, untreated animals



Fig. 3. section of skin (groupIII Con+) shows without treatment: normal epidermis (E) , the dermis (D) with more of hair follicles (Hf). H&E stain.100X

supplied few recently formed and immature vessels side along with deposition of fibrin, haemorrhage, interstitial oedema and proof of popularized vascular overcrowding and accumulation. underdeveloped collagenous connective tissue stroma and mild granulation tissue accumulation with minimal adipose tissue substitution.

The Mediterranean weight-reduction plan indicates an implication in the persistent inflammatory illnesses due to its antioxidant and anti-inflammatory Homes, which might not simplest act on classical danger elements, however additionally on inflammatory biomarkers inclusive of adhesion molecules and cytokines (Casas *et.al.*,2014, WHO, 2003).

Dietary intake of certain flowers like Olive oil is understood to adjust the balance of lipid inflammatory mediators and, so, is worthy within the treatment of inflammatory skin pores issues. It becomes concludes that nutritional elements exert promising movements at the skin regarding basal skin houses, which includes hydration, sebum production, and elasticity. Olive oil changed into used for decades as pores and skin-protecting agent. The houses of therapy of chemical substances involved in olive oil are exciting researches (Hangan *et al*, 2016).

CONCLUSION

The outcomes confirmed that the mice exposed to olive oil had a shorter restoration time as confronted to control. Since pores and skin burn wound are experienced in surgical operation and outcomes showed that the olive oil accelerates the recuperation procedure of wounds, this makes the premises for meaningful research on recovery defected pores and skin as part of the wound-recovery method.

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