

Comparative study between the effect of local and systemic antibiotic on the wound healing of the rabbit

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Abstract

This study included the knowledge of the best ways to understand the stages of wound healing visual contact in the skin of adult rabbits. we used (15) Rabbit by three groups each group (5) rabbits (control + group local antibiotic + systemic antibiotic) and we using Tetracycline antibiotic in this study. We see complete healing of wounds rate in the group treated with systemic antibiotic lasted (3) days, while the group treated with local antibiotic drained (4) days compared with the control group, which drained (6) days. The study also addressed the preview of cells that full the space between the edges of the surgical wound and the scar tissue over the edges of the wound. we found the proportion of cells and scar that full the space in the group was treated with systemic antibiotic least when compared to the group which treated with locall antibiotic, which recorded a rate of scar tissue less than a third group control group which left without any antibiotic. During the study found that the use of systemic antibiotics is better than local antibiotic use by the speed of wound healing and hide scars on the skin.

Key word: wound heeling, local antibiotic, systemic antibiotic.

Introduction

The wound healing is a complicated, interactive integrative process that commences right after injury invading cellular and chemotaxis activity [1, 2].The wound is a physical bodily injury and characterized by disruption of the normal continuity of body structures. Wounding may cause injury in superficial cutaneous structures and reach to structures underlying the skin [3].The tolerance of injury was a varies with tissue type. Therapeutic considerations are based on the type of skin wound and often determine the amount of tissue damage [4, 5].The present research is to study and emphasize on the results which ,achieved by the previous studies to study the effect of the antibiotic of the healing , the rapid of healing and formation of scar tissue on the wound).

Wound healing

Wound healing is a complex physiological process that is dependent on a number of inter-related factors. Wound assessment and treatment should be based on an understanding of normal tissue repair and factors affecting the process[6].

The process of wound healing All tissues in the body are capable of healing by one of two mechanisms: regeneration or repair[7]. Regeneration is the replacement of damaged tissues by identical cells and is more limited than repair[8]. In humans, complete regeneration occurs in a limited number of cells for example, epithelial, liver and nerve cells. The main healing mechanism is repair where damaged tissue is replaced by connective tissue which then forms a scar. Wound healing can be defined as the physiology by which the body replaces and restores function to damaged tissues.[9]. Local conditions for good wound healing the provision of a supportive microenvironment at the wound surface is of the utmost importance when trying to maximise a wound's healing potential[10,11]. Maintaining a controlled set of local conditions that is able to

sustain the complex cellular activity occurring in wound healing should be the primary aim of wound management. In simple terms the process of wound healing can be divided into four dynamic phases: vascular response, inflammatory response, proliferation and maturation. There is considerable overlap between these phases, and the time needed by an individual to progress to the next phase of healing depends on various factors.[3,4] Careful assessment should help to identify each stage of wound healing. This is important as treatment objectives may differ as each phase of healing progresses. Inappropriate wound management often occurs due to the practitioner's inability to differentiate between normal and abnormal characteristics associated with wound healing.[12].The vascular response any trauma to the skin which penetrates the dermis will result in bleeding. The damaged ends of blood vessels immediately constrict to minimize blood loss[13,14]. The exposure of blood to the air helps to initiate the clotting process which is accelerated due to platelet aggregation. A blood clot is produced by a complex chain reaction called the coagulation cascade. This is characterized by the formation of a fibrin mesh which temporarily closes the wound and gradually dries out to become a scab. At this stage, wounds usually produce large amounts of blood and serous fluid, which help to cleanse the wound of surface contaminants[15].The inflammatory response tissue damage and the activation of clotting factors during the vascular phase stimulates the release of inflammatory mediators such as prostaglandins and histamine from cells such as mast cells. These mediators cause blood vessels adjacent to the injured area to become more permeable and to vasodilation[16]. This inflammatory response can be detected by the presence of localized heat, swelling, erythema, discomfort and functional disturbance. Although the clinical signs are similar, inflammation

should not be confused with wound infection. The classic signs of inflammation are due to increased blood flow to the area and the accumulation of fluid in the soft tissues. Wound exudate is produced during this stage of healing due to the increased permeability of the capillary membranes[17]. Exudate contains proteins and a variety of nutrients, growth factors and enzymes which facilitate healing. It also has antimicrobial properties. Exudate production, which is most prolific during the inflammatory phase of healing, bathes the wound with nutrients and actively cleanses the wound surface. It also acts as a growth medium for phagocytic cells. However, excessive exudate production can cause skin sensitivities and tissue maceration. Neutrophils are the first type of white blood cell to be attracted into the wound, usually arriving within a few hours of injury[18]. These phagocytic cells have a short life span but provide initial protection against micro-organisms as they engulf and digest foreign bodies. After 2–3 days macrophages become the predominant leucocyte in the wound bed. Their function at this stage is to cleanse the wound[18]. Macrophages are present throughout all stages of the healing process, producing a variety of substances that regulate healing including growth factors, prostaglandins and complement factors (complex proteins). Patients who are immunosuppressed are often unable to produce a typical inflammatory response, so may fail to activate the normal healing process. Slough formation is common during the inflammatory stage and occurs when a collection of dead cellular debris accumulates on the wound surface. It may be creamy yellow due to the large amounts of leucocytes present. Chronic wounds may develop areas of fibrous tissue covering the wound base. This often combines with slough, making it harder to remove[19]. Formation of new tissue in the wound bed will not occur until the macrophages have stimulated the proliferative phase by the release of growth factors and the wound bed has been sufficiently cleansed by the inflammatory process[19]. Macrophages are responsible for control

Materials and methods

15 rabbits weighing about 1.5-2 kg. were divided to three groups each group contain (5) animals the first one were treated by tetracycline systemic injection (0.25 Kg/B.W) (Alsharq company, Syria), the second group were treated with tetracycline local ointment and the third group control without any addition. during one week period. The animals were fed a standard laboratory diet and had access to drinking water. The animals were given combination of ketamine (10 mg/kg B.W.) and xylazine (5 mg/kg B.W.) intramuscularly injected to anesthesia the animals. The incision made in the skin of all groups animals about (3) cm long full thickness. The incisions were performed under aseptic conditions on the back of rabbits and then suturing by 4 simple sutures. The rabbits were scarified by ether

inhalation, and removed of skin wound from the body after 5 day of all groups.

Results

During the post surgery period, the animals remained healthy, without clinical evidence of infection. The first group in (fig 1) .



(Fig.1)

The healing is very clear and scar tissue is small the period which need to leave the suture is about 3 day and the margin of the wound is disappear.



(Fig.2)

The second group in (fig.2) the healing is happened with scar tissue clear and the wound line is appear in the picture the period which need to leave the suture is about 4 day



(Fig. 3)

The third group in (fig.3) the margin of the wound is appear and scar tissue is clear the period which need to leave the suture is about 6 day.

Discussion

The inflammatory response is initiated very soon after the trauma on wound event, Its the first phase of the wound healing. During this response the wound and surrounding tissues become inflamed and cells, [6].In addition, the cell surface binding edges of wound have to myofibril contraction, also present of fibroblasts other cells [7]. Based on these precedents it is reasonable to propose that fibrin specific interact and the effect of the tetracycline of the proses of healing [15,17, 19].this studies evaluated the outside visual only and comparative between the local and systemic antibiotic of the proses of healing [9, 10,11].

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دراسة مقارنة بين تأثير المضاد الموضعي و الجهازى على شفاء الجروح فى الارانب

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المخلص

تضمنت هذه الدراسة معرفة افضل الطرق لفهم مراحل شفاء الجروح عيانيا في جلد الارانب البالغة. اذ تم استخدام (١٥) ارناب بواقع ثلاث مجاميع تكونت كل مجموعة من (٥) ارناب (سيطرة + مجموعة مضاد حيوي موضعي +مضاد جهازى) وتم استخدام مضاد التتراسايكلين في هذه الدراسة. اذ لوحظ ان معدل الشفاء التام للجروح فى المجموعة التي عولجت باستخدام المضاد الحيوي الجهازى استغرقت (٣) ايام في حين ان المجموعة التي عولجت باستخدام المضاد الحيوي الموضعي استغرقت (٤) ايام بالمقارنة مع مجموعة السيطرة التي استغرقت بدورها (٦) ايام. كما تناولت الدراسة معاينة الخلايا التي شغلت الفراغ الحاصل نتيجة الشق الجراحي بين حافتي الجرح وكذلك نسبة ظهور الندب فوق حافتي الجرح. اذ تبين ان نسبة الندب والخلايا التي شغلت الفراغ فى المجموعة الاولى التي عولجت بالمضاد الحيوي الجهازى كانت الاقل اذا ما قورنت بالمجموعتين الثانية التي عولجت بالمضاد الحيوي الموضعي التي سجلت نسبة ندوب بدورها اقل من المجموعة الثالثة مجموعة السيطرة التي تركت من غير اي مضاد حيوي. تبين من خلال الدراسة ان استخدام المضاد الحيوي الجهازى افضل من استخدام الموضعي من خلال سرعة التئام الجرح واخفاء الندوب الظاهرة على الجلد.

الكلمات المفتاحية: التئام الجروح، مضاد حيوي موضعي، مضاد حيوي جهازى

المؤتمر العلمي الثالث