

The Effect of Banana Leaf as Poultice on Wound Healing In Rabbits

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Summary

The objective of this study is to determine the effectiveness of banana leaves as a wound dressing in rabbits. Ten adults local breed male rabbits weighing between 1.5 – 2 kg were used. The animals were divided into two equal groups. Animals were anesthetized by xylazine 5 mg / kg BW mixed with ketamine 40 mg / kg BW intramuscularly. Under aseptic technique (4-6) avulsion wounds 1cm in diameter were made on the back region of each rabbit. Control group didn't receive any treatment, while the treated group the wounds were covered by the banana leaf as poultice for 14 days. Histopathological and gross evaluation revealed that there are significant differences between the two groups, because banana leaf provides a clean, waxy non adherent, water proof, and cheap dress to prevent the wound from the contaminated external environment.

Keywords: Banana leaf, poultice, wound healing, rabbits.

Introduction

Plants and their extracts have immense potential for the management and treatment of wounds (1). The photo-medicines for wound healing are not only cheap and affordable but also purportedly safe as hyper sensitive reactions are rarely encountered with the use of these agents. These natural agents induce healing and regeneration of the lost tissue by multiple mechanisms. However, there is a need for scientific validation, medicine before these could be recommended for healing of the wounds (2). All parts of the banana plant have medicinal applications, due to the many medical benefits of bananas includes using them as a treatment for burns and wounds, especially when beating a ripe banana into a pasty substance, and spreading it over a burn or wound, it can give immediate pain relief. The banana paste should be covered by a cloth bandage for best result (3). Even the leaves of a banana tree can be used as a cool compress for burns or wounds (4), so it designed this research whether the banana leaf is a benefit wound dresser or not.

Materials and Methods

Ten adult healthy local breed male rabbits weighing between (1.5 -2 kg) had been used. The animals were divided randomly into two equal groups, control and treated groups. Back region of each animal was prepared surgically then the animals were anesthetized by intra-muscular injection of (40 mg/kg ketamine -5 mg/kg xylazine (5) then several (4 - 6) avulsion wounds about 1 cm in diameter through the entire skin were made on the prepared area of the back region of each rabbit (Figure,1-A).

The control group were left for natural healing without using any dressing material whereas a banana leaf were used as a compress to cover the wounds of the treated group (Figure,1 B and C). In both groups specimens for histopathological examination were collected at the 1st,3rd, 5th,7th, and 14th day post operation, specimens were fixed in buffer formalin 10% and prepared routinely for slid section, then stained with hematoxylin and eosin (6).



Figure, 1: Avulsion wounds were made on the back region (A), the wounds were covered by banana leaf (B) and fixation of banana leaf by bandage (C).

Results and Discussion

Clinically there is no observation of any problem associated with the period of clinical healing like inflammation, delayed healing or ulcer formation in all experimental animals. The dressing material was easily removed without pain during the dressing exchanging.

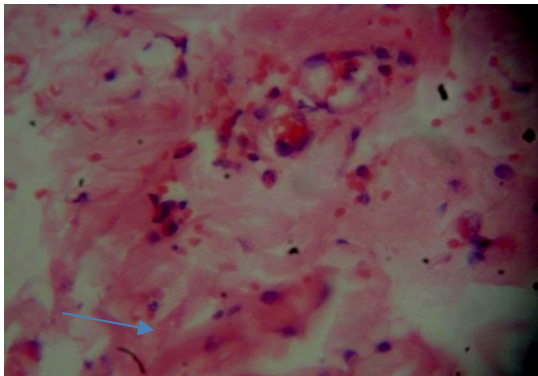
The histopathological examination revealed that in control group at one day post-operatively revealed that there were neutrophils infiltration with necrosis (Figure,2). While in three days characterized by inflammatory cells infiltration mainly with macrophages and lymphocyte in the sub cutaneous tissue (Figure,3). In five days showed that inflammatory cells infiltration with necrosis extended to the muscle layers (Figure,4). In seven days fibers connective tissue proliferation and infiltrated by inflammatory cell extended to necrotic area in the dermis and epidermis (Figure,5). While in 14 days show that necrosis and neutrophils infiltration in the dermis and the

inflammatory cells present in the muscular layers (Figure,6).

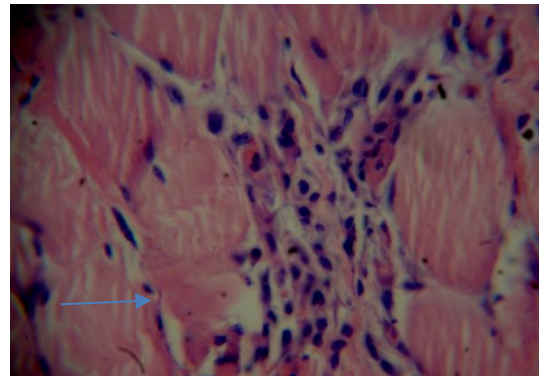
In treated group histopathological examination revealed that in one day there was neutrophils infiltration and hemorrhage in the dermis layer which extended to muscular layer. In the other section there are necrosis and neutrophils infiltration (Figure,7). On the third day post-operative the mainly lesion was characterized by necrosis, neutrophil debris and extended to the muscular layer (Figure,8). As well as in three days showed hemorrhage and neutrophils infiltration in the dermis and between muscles fiber (Figure,9). While in fifth day from treatment the granulation tissue start to extend to the inflammatory debris in the dermis and epidermis (Figure,10). The section of the seventh post-operative day there is fibrous connective tissue proliferation was characterized by more collagen deposition, moderate irregular direction and sever thickness of epidermis, formed papillae

extend to the dermis (Figure,11). On 14 days the main lesion characterized by granulation

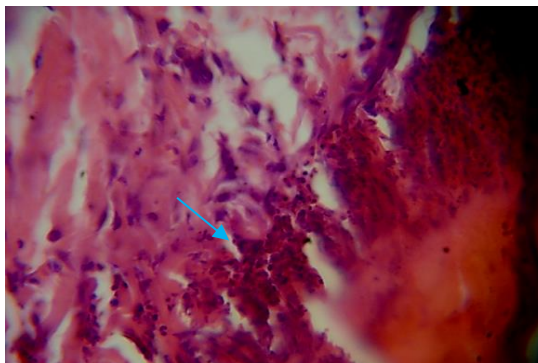
composed from blood vessels and fibroblasts extended in the wound area (Figure,12).



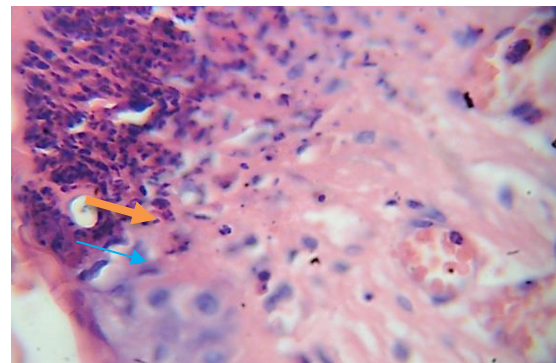
Figure, 2: Histopathological section of control group at one day postoperative revealed that neutrophils infiltration with necrosis (H&E 40X).



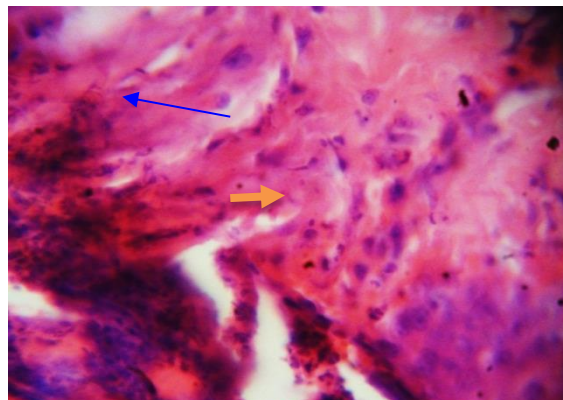
Figure, 3: Shows inflammatory cells mainly macrophage and lymphocyte are in the sub cutaneous tissue, 3 days post operation in control group (H&E 40X).



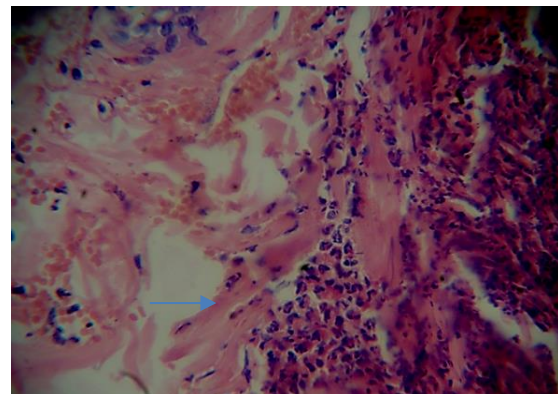
Figure, 4: Shows that inflammatory cells infiltration with necrosis extended to the muscle layers → , 5 days post operation in control group (H&E 40X).



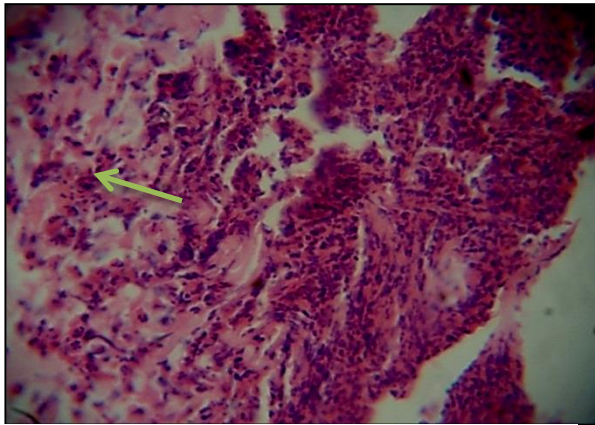
Figure, 5: shows fiber connective tissue proliferation → infiltrated by inflammatory cell extended to necrotic area in the dermis and epidermis → , 7 days post operation in control group (H&E 40X).



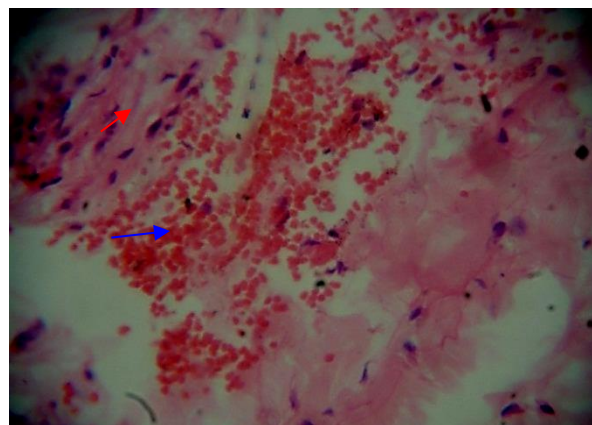
Figure, 6: Shows necrosis and neutrophils infiltration in the dermis → and the inflammatory cell present in the muscular layers → , 14 days post operation in control group (H&E40X).



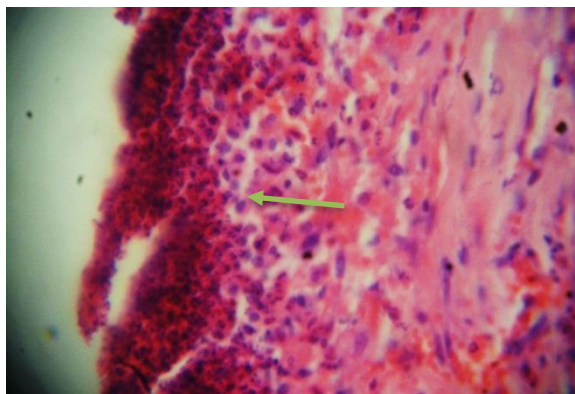
Figure, 7: Histopathological section in one day treated group, there is necrosis and neutrophil infiltration → (H&E40X).



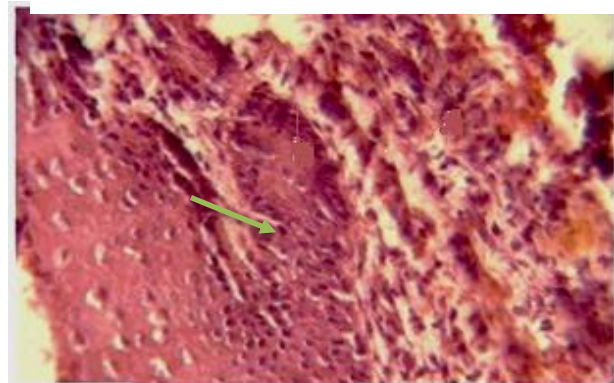
Figure, 8: Shows necrosis, neutrophil debris in the wound site and extended to the muscular layer 3 day in treated group →, (H &E 40 X).



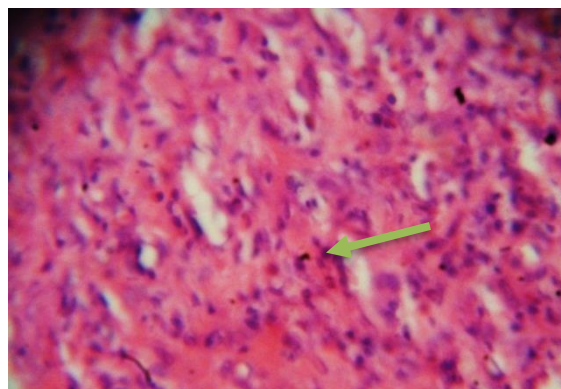
Figure, 9: Shows hemorrhage → and neutrophils infiltration in the dermis and between muscles fiber →, 3 days post operation treated group (H &E 40 X).



Figure, 10: Shows granulation tissue start to extend to the inflammatory debris in the dermis and epidermis →, 5 days post operation treated group (H&E 40X).



Figure, 11: The section of 7 days post-operative, treated group there is fibrous connective tissue proliferation which characterized by more collagen deposition, moderate irregular direction and sever thickness of epidermis; formed papillae extended to the dermis (H&E 40 X).



Figure, 12: Shows lesion characterized by granulation composed from blood vessels and fibroblast extends in the wound area, 14 days post operation treated group (H&E 40 X).

The purpose of dressing a wound is to promote an optimal healing environment by providing pain relief, protection from trauma and infection, a moist environment and removal of debris by simultaneously maximizing the patient's nutritional status and providing meticulous wound care, most wounds will heal appropriately. A simple occlusive dressing was consisting of an antibacterial ointment (non-adherent and absorbent layers) and securing tapes to heal (7). Although the results did not reveal marked significant variation between the two groups may due to the wound was too small and heal without any complications. For more complex chronic wounds and burns, treatment should be tailored uniquely to the patient's situation (8).

Wound dressings can cause problems, including maceration of surrounding skin (change dressing frequently and use a more absorbent dressing), and in this research banana dress did not cause any of these problem or complication. This result agree with Gore and Aklekar, (9) who concluded

that banana leaf dressing was less adherent and less painful easier to remove, and facilitated more rapid healing than Vaseline impregnated gauze and can recommended for use on all skin graft donor site.

The ideal dressing must be easy to apply, painless to remove and require fewer changes and required less human resources. It must be robust enough to be used by our patients (10), banana leaf has many advantages in its use in burns. Banana leaf reduces evaporation of liquid because there is a layer of wax. The leaf also creates a cooling sensation on the skin of the body, not attached to the wound and has a wide surface so that it can cover all parts of the body (9). Banana leaf provides non-permeable cover, which will help in moist wound healing process which distinct clinical advantages over non- moist products (11).

One of important characters of banana Leaf is low cost and available and that useful especially in chronic and long term wounds and large area wound or burn (12).

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تأثير ورق الموز ككمادة في التئام الجروح في الأرانب

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الخلاصة

استهدف البحث دراسة فاعلية ورق الموز ككمادة في التئام الجروح في الارانب. استعمل في التجربة عشرة ارانب بالغة ذكور تراوحت اوزانها بين 1.5-2 كغم . قسمت الحيوانات الى مجموعتين متساويتين. وخدرت الحيوانات بحقن عقار الزايلازين بجرعة 5 ملغ / كغم من وزن الجسم ممزوجا مع عقار الكيتامين بجرعة 40 ملغم / كغم من وزن الجسم . بعد التحضير تم احداث 4-6 جروح قلعية بقطر 1 سم على الجلد في منطقه الظهر لكل حيوان. مجموعة السيطرة (المجموعة الاولى) تركت للشفاء الطبيعي بدون ان تتلقى أي علاج . في حين استعمل في المجموعة المعالجة (المجموعة الثانية) ورق الموز ككمادة غطيت بها الجروح لمدة 14 يوم . اظهرت نتائج الفحص العياني والنسجي وجود فروق معنوية بين المجموعتين لأن ورق الموز قد وفر غطاء نظيف شمعي وغير قابل للالتصاق ورخيص لعزل الجرح عن المحيط الخارجي الملوث.

الكلمات المفتاحية : ورق الموز، كمادة، التئام الجروح، الارانب.