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A Case of Diabetic Wound: The Coffee Powder Protects the Growth of Cells on the Wound Bed

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Abstract A case report of a chronic wound complication, in a 63-year-man, suffered diabetic mellitus type 2, that successfully treated using coffee powder. The coffee powder has used as a topical dressing in many wound cases with a useful result and faster healing. It is an effective topical dressing through maintaining contact of coffee powder along the wound bed to prevent any manipulation and protect the new superficial cell growth. The method claimed to be the best to protect the cells in superficial wound bed by the coffee powder producing a best toleration, comfort, adaptable, cost-effective, and create a new paradigm of wound management.

Keywords: *wound bed cells, wound healing, diabetes mellitus, coffee powder*

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1. Introduction

Wound healing is an exciting topic to study as the wound management varied by using topical agents, wound pads, negative pressure, hyperbaric oxygen chamber, that costs increasing. Today wound care becomes complicated as noted the first wound care began with applying gauze only. Now, the price of new wound cover is higher using modern wound dressing, and some that use negative pressure wound treatment, that all imported.

In Indonesia, the experience of using coffee powder for wounds has known since the existence of coffee plantations [1]. Reports from doctors working on the area stated that coffee powder that was sprinkled directly on the wound produced healing and did not cause any infected complications [1,2].

Next will discuss diabetic wounds managed using coffee powder, the physiologic healing mechanism, and the reason to use it.

2. The Case

A 63-year-old-man suffered infected diabetic wound abscess. He refused to be amputated, and then he sought the second opinion that resulted in abscess incision. The results of the laboratory examination of urine, blood lipid, and the function of the heart, lung, liver, and kidney, were in within a reasonable limit. There were three wounds after incision and debridement at the dorsal right foot which successfully treated using coffee powder. The coffee powder (100gram) put along with the wounds. The coffee powder and the gauze replaced every week regularly without soaking and rubbing of the wound bed. The old coffee powder seated on the superficial wound area usually maintained in its place and not change with the new coffee powder. The procedure keeps the new cells in the wound bed undisturbed.

Figure 1. A case of diabetes mellitus type-2 complicated with wound abscess at his dorsal right foot. After debridement, it made three wounds (small arrows). Some significant amount of coffee powder (100gram) put in the wounds (Figure no.2) and wrapped with gauze [2]. The wounds treated without sutures but healed and created an acceptable scar in three months.

The treatment using coffee powder was together with blood glucose control using insulin injection, diabetic diet, and a broad-spectrum oral antibiotic administered for five days and stop because of no more sign of infection. The healing scar tissue built closed the secondary healing

wound in the 3rd month. The method can faster the healing process by maintaining the thin layer of coffee powder that always in keep contact with the wound surface and prevent any manipulation to the wound bed surface. So then, the superficial wound cells will keep in health and proliferate without external manipulation. The patient was staying in the hospital for three weeks. Then he took care of himself his wounds with the help of his family until the wound healed.

The method has practiced and reproduced in many wound cases with a valid result. Coffee powder solution in wound fluid is proven to be safe in the case series. More than 200 clinical cases of non-ischemic wound covered with coffee powder since 2004 without any complication in primary and secondary healing. The coffee solution is reliable because coffee has the ability as an antioxidant, anti-inflammatory, strong antibacterial [2,3,4].

3. Discussion

3.1. The Coffee Powder Has Strong Antibacterial Capacity

The coffee powder has a durable power of antimicrobial, such as anti-MRSA, Escherichia coli, Pseudomonas [1,2]. The capability is an advantage that particularly important in prevention against bacterial infection in dirty (infected) wounds. The antibacterial mechanism of coffee is through the hyperosmolarity of the mixed solution with wound fluid, the production of H_2O_2, and the molecules of coffee penetrate the bacterial cells and impair the metabolism [3,4].

3.2. Coffee Powder Adhered in the Wound will not Disturb the Healing

Traditional experience in using coffee powder for wound treatment showed the coffee powder has capabilities to stay on the wound surface without any adverse complication [5,6]. The change dressing was done without repeated cleansing the wound, and keep the remaining old coffee powder in the wound bed. The remaining coffee was not disturbed in the healing process moreover it nurtures the new cells in the wound surface keep growing without a disorder. Sometimes there was a small sticky portion of coffee powder on the wound surface, leave it in place and do not remove it because it will not interfere with healing [6].

Experience told the coffee will not be trapped in the wound tissue but released itself after epithelialization completed. Experience shows in wound research in mice and human studies (clinics), giving coffee powder to wounds and without cleaning it when replacing wound covers, does not cause interference with wound healing.

Experiment in-vitro by Ojeh et al. explained the caffeine as an adenosine receptor antagonist that may inhibit epithelialization [7]. We used caffeinated coffee (coffee powder in a whole) powder in our study that apply particularly as an antioxidant. The strong antioxidant capacity of the caffeinated coffee keeps the wound cells healthy and support the healing process better than caffeine [2,7,8]. The coffee (caffeinated coffee) powder has many ingredients (caffeine, chlorogenic acid, caffeic acid, cafestol, kahweol, trigonelline) with antioxidant capacity compared to caffeine [9]. It can protect the wound cells against oxidative stress by significant number of reactive oxygen species after tissue injury [8].

In an animal experiment using rat model stated chronic treatment (3 weeks or longer), but not acute treatment, with caffeine diminished traumatic brain injury [10]. The last statement highlights and supports the success of using coffee powder for wounds.

3.3. The New Growing Cells of the Wound Bed Are Sensitive to Manipulation.

The growing new cells in the wound surface should keep healthy and prevent traumatic mechanical damage. The cells are damaged by repeated cleaning the wound tissue using rubbing and pressurized irrigation. The experiment has shown the wound cells were easily broken down by sticky dressing, such as gauze, foam dressing or a kind of modern wound dressing [5,6]. The wound surface is susceptible and easily broken by manipulation. The clue provides an understanding that the surface of the wounds is an undisturbed area because it contains the fragile new cells. That is why the surface section of the wound is a decent piece of protection from any trauma. Wound surface tissue is a forbidden area for repeated manipulation because there are new growing cells easily damage [5,6].

The damaging cells result in the slower healing process disturbed by repeated inflammation, and the losing cells require replacements growth (Figure 2).

Figure 2. Every dressing changed some of the old coffee powder should remain in the wound surface to save the new cells growing in health under the powder. Then the healing process will continue without any manipulation. It should emphasize the critical function of the old layer of powdered coffee to maintain the healthy growing new cells. It is the reason for not recleaning the wound bed when change-dressing.

3.4. The Sound Dressing Changed is better than Manipulative Change

The advantage of the non-manipulative dressing replacement creates the fast wound healing by the support of thin layer coffee powder that unhurt the new cells in the wound bed. The use of coffee powder for wound is an easy procedure, often does not need treatment at the hospital (or shorten the duration of medical treatment at the hospital), because it can be done by the patient and his family at home. Debridement should perform thoroughly in the first time only, and apply in the dirty wound with unhealthy (necrotic, slough) or foreign bodies.

The manipulative dressing change, with repeated soaking and rubbing, make the wound tissue unhappy though it can be healed the process achieved longer, suffering and costly.

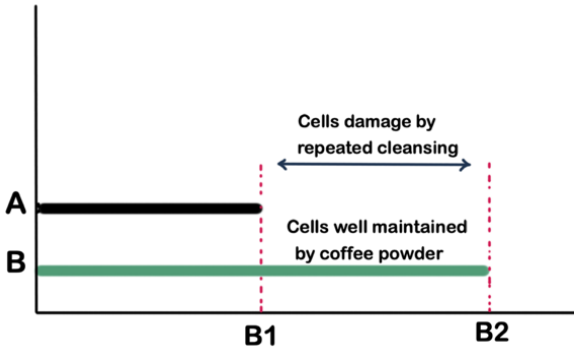

Figure 3. A schematic drawing shows the advantage of preserving the wound bed cells compared with the damaged cells after manipulative action. **A** is a condition in damaged wound cells after repeated cleansing. The bald area (damaged area) can repopulate and achieve healing, but need longer time. **B** is a condition with the healthy wound cell's growth will heal without impairment. The **B** would faster in cell growing to improve for not interrupted by any cell injuries.

3.5. Foul-smelling Wound Treatment

The wound complicated with an abscess in Figure 2 produced bad scent, so it needed a special dressing against the foul smell. Ground coffee directly put into the wound then the most appropriate for countering the smell. The coffee powder has a unique aromatic scent that eliminates the stinking wound in a second [1]. The advantage of coffee powder not only deodorized effect but may also put on every acute or chronic injury, smelly or not, profound or not, dirty or not. The aromatic scent of coffee is the best affordable wound dressing that not being owned by any other wound dressing [1,2]. It is possible applying Coffea arabica or Coffea robusta both have the same capability.

3.6. The Powdered Coffee Tends to Preserve Any Cells in the Wound Bed

The powdered coffee is a perfect wound dressing for any wound as for a circular injury at the extremity, in a neglected wound, or diabetic wound. The powdered coffee is also good for the base of the wound that near vascularization (arteries and veins) because the powdered coffee tends to preserve and not injured any cells in the wound.

So, coffee powder as a wound dressing, it is very adaptable, best tolerated, and comfortable.

3.7. The New Paradigm in Wound Management

An effort to maintain new cells growing on the surface of the wound tissue is a fundamental physiological principle for wound healing. These cells prohibited from being disturbed by any action that can cause damage.

4. Conclusion

The coffee powder is an effective topical dressing for faster healing by maintaining contact of coffee powder along the wound surface in the prevention of manipulation and protects the superficial growing new cells from any trauma.

Acknowledgements

None.

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