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Research Article

COMPARATIVE STUDY OF WOUND HEALING ACTIVITY OF SOFRAMYCIN & HONEY IN EXCISION WOUND MODEL

Prafulla C Tiwari*, Ahamed Noor, Keshari Chand, Kalpesh Nagar
Department of Pharmacology, Jaipur College of Pharmacy,
RIICO Institutional Area, Sitapura, Jaipur, India.
Email: tiwari.prafulla009@gmail.com

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Abstract:

Background: Soframycin and Honey supposedly increase the wound healing process and reduces the overall time taken by the wound to heal. Soframycin is an Anti-Bacterial drug used for treatments of Wounds, while Honey shows its wound healing activity by promoting Phase 3 and Phase 4 of wound healing. Phase 3 of Wound Healing is characterized by the presence of pebbled red tissue in the wound base and involves replacement of dermal tissues and sometimes sub dermal tissues in deeper wounds as well as contraction of the wound. In the remodelling phase (Phase 4) the wound matures. Collagen is remodelled and realigned along tension lines where the wound is contracting. During this process the cells that are no longer needed are removed by apoptosis. Thus by promoting Phase 3 & Phase 4 of Wound Healing Honey reduces the time taken by a wound to heal.

Aim: To Compare the effectiveness of Soframycin and Honey in Wound Healing of Excised Animals.

Excision Wound Model Method: Two groups of animals with three animals in each group were used for study. A round seal of 2.5 cm diameter was impressed on the hair removed dorsal thoracic area (5 cm away from the ears) of the ether anaesthetized rats. Full thickness skin from the demarked area was incised to produce a wound measuring around 500 mm^2. The wound will be washed with cotton soaked in warm saline. Then the drugs Soframycin Gel & Honey were applied topically on the wounds once daily, starting from the day of wounding, till the wound is completely healed. Wound contraction (4^{th}, 8^{th} and12^{th} day of wound healing) and period of epithelialization were the parameters studied.

Results: After 12 days of observation, it was found that wound of animals treated with Soframycin healed completely, leaving a minimum scar, where as the wound of animals being treated with Honey, heals very little, leaving a huge scar on the animal skin.

Conclusion: After completion of our study, we found that Soframycin has a higher wound healing capacity in comparison to the Honey.

Key Words: Excision, Epithelialization, Collagen, Sub Dermal.

Introduction: Wound healing, or wound repair, is an intricate process in which the skin (or another organ-tissue) repairs itself after injury. In normal skin, the epidermis (outermost layer) and dermis (inner or deeper layer) exists in steady-state equilibrium, forming a protective barrier against the external environment. Once the protective barrier is broken, the normal (physiologic) process of wound healing is immediately set in motion. The phases of normal wound healing include hemostasis, inflammation, proliferation, and remodelling. (1, 2)

Common Types of Wounds[3, 4, 5]

1. **Contusion:** A contusion is more commonly called a bruise. It is usually caused by a blunt blow, the overlying skin is unbroken, but tissues and blood vessels below are damaged. The discolouration is caused by bleeding from small vessels into the tissues. Red blood cells trapped in the tissue spaces become deoxygenated and dark coloured.

2. Abrasion: An abrasion is a scrape or graze. Typically, there is a superficial surface wound involving the epidermis and part of the dermis.

3. **Avulsion:** This term describes a wound where there is tissue loss, preventing the closure of the wound edges. An avulsion may be caused by gouging or tearing of tissue.

4. **Laceration:** Laceration describes a wound made by a blunt object, and has often involve considerable force. The wound edges are usually split or torn with ragged edges as the skin has been burst rather than cut.

5. Puncture wounds

These may well present as misleadingly small wounds and are also described as penetrating wound.

Excision Wound: An excision wound is inflicted by cutting away 500 mm^2 full thickness of a pre-determined area on the depilated back of the rat. Epithelialization period is noted as the number of days after wounding required for the eschar to fall off leaving no raw wound behind. (6)

Material and Methods:

Test Animals: The Animal Experiment will be conducted as per Guidelines laid by CPCSEA New Delhi. Either Sex Adult Albino Rats weighing (100-150gm) were used for study. Animals obtained from Animal House of Jaipur College of Pharmacy were divided in to two groups of three animals each. The Animals were housed separately at

ambient temperature and fed with standard pellet diet & water ad libitum. Honey (of Dabur Company) & Soframycin (of Sanofi India Ltd.,) were purchased from a local pharmacy.

Wound Healing Activity:

Excision Wound Model Method: Two groups of animals with three animals in each group will be used for study. A round seal of 1 cm diameter was impressed on the hair removed dorsal thoracic area (5 cm away from the ears) of the ether anaesthetized rats. Full thickness skin from the demarked area was incised to produce a wound measuring around 500 mm^2. The wound was washed with the cotton soaked in warm saline. Then the drugs Soframycin Gel & Honey obtained from market will be applied topically on the wounds once daily, starting from the day of wounding, till the wound is completely healed. Wound contraction (4^{th}, 8th and 12^{th} day of wound healing) and period of epithelialization will be the parameters studied. (7)

Soframycin Treated Animal on Day 12

Soframycin Treated Animal 2 on Day 12

Soframycin Treated Animal 3 on Day 12

Figure 1: Soframycin Treated Animals on Day 12 (final day) of study.

Honey Treated Animal 1 on Day 12

Honey Treated Animal 2 on Day 12

1Honey Treated Animal 3 on Day 12

Figure2: Honey Treated Animals on Day 12 (final day) of Study.

Results and Discussion

Table 1: Effect of Soframycin and Honey on Excision Wound Model.

S.No.	Group	Treatment	Area of wound(mm^2)			
			0 day	4^{th}day	8^{th} day	12^{th} day
1	Control		230	213	170	113
2	Soframycin Treated					
a)	1	Soframycin	200	143	66	9
b)	2		207	113	55	14
c)	3		200	132	70	3
3	Honey Treated					
a)	1	Honey	200	165	90	37
b)	2		187	159	119	74
c)	3		230	141	103	60

Data Analysis: Unpaired *t* test results

The two tailed P value equals 0.0012. By conventional criteria, this difference is considered to be very statistically significant.

Discussion: The above study was undertaken to compare the wound healing capacity of Soframycin and Honey. Acute studies were conducted in animals. The, animals were observed for behavioural changes and deaths. No death has occurred in these 12 days. Our study has concluded that Soframycin has high wound healing capacity in comparison to Honey.

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Corresponding Author:

Prafulla C Tiwari*,

Email: *tiwari.prafulla009@gmail.com*