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Review Article

CONCEPTUAL STUDY ON THE MANAGEMENT OF FRESH WOUND: A REVIEW ARTICLE

Manmahendra Singh¹, Shailendra Singh², P.Hemanth³, Sanjeev Sharma⁴

1. M.S(Ayu)Scholar, P.G Deptt.of Shalya Tantra, NIA, Jaipur, India

2. M.S(Ayu)Scholar, P.G Deptt.of Shalya Tantra, NIA, Jaipur, India

3.Prof. & HOD, P.G Deptt.of Shalya Tantra,NIA,Jaipur, India

4. Professor & Director,NIA, Jaipur, India

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Corresponding author- **Dr.**
 Manmahendra Singh, P.G
 Deptt.of Shalya
 Tantra,NIA,Jaipur, India
 Email:-
 manayush567@gmail.com

Abstract-

Wound healing is a normal biological process that occurs naturally as long as the infection does not hinder it. Both freshly prepared incisional and excisional wound experimental models, several monoherbal and polyherbal formulations have been reported to hasten / accelerate wound healing process. Different herbal formulations have been reported to hasten/accelerate the process of wound healing by enhancing epithelialization, neovascularization, formation of granulation tissue, collagen synthesis, wound contraction, tensile strength, etc. As these studies have been conducted in freshly prepared non-infected wounds, it is difficult to ascertain the wound healing potential of these formulations in absence of microbial colonization/infection and results are not

justifiable because the healing is limited to non-infected wounds. In experimental animals in the presence of colonization / infection, it would be more appropriate to determine the wound healing potential and not to hasten / accelerate the wound healing property of newer herbal

formulations on wound healing. Hence, it is recommended to strengthen these study protocols further using suitable controls to find out the antimicrobial activities of herbal formulations and their effect on wounds colonized/infected with pathogenic microbes in significant numbers to achieve more meaningful and concrete conclusions.

Keywords-Wound healing,Herbal formulations,Infection,Antimicrobial activity

INTRODUCTION

Wound is a physical injury to any of the body's tissues, resulting in a break in the cohesion of body structures ' soft parts. A wound healing process is a normal biological reaction to the natural injury as long as the local treatment is adequate. The normal phases of wound healing i.e. reaction, regeneration, and remodeling take place without any difficulty, if wound is debrided properly of non-viable tissue and repaired it in a physiological manner [1]. In the absence of infection, trauma and ischemia, which are the most significant obstacles in the process of healing (especially the infection), in an orderly scheme, wound healing continues without any problem. Nevertheless, the proliferation and multiplication of pathogenic microbes in significant numbers of wounds in this orderly wound healing scheme may cause disturbances. Therefore, wound infection is one of the major obstacles to slow wound healing and is the most common reason for impaired wound healing as the presence of bacteria in wound results in sustained elevation of proinflammatory cytokines such as interleukin-1 and tumor necrosis factor-alpha, which in turn causes increased levels of matrix metalloproteinases, decreased levels of tissue inhibitors to the metalloproteinases and decreased production of growth factors and thereby impair the process of wound healing [2].

Staphylococcus aureus, Escherechia coli, Pseudomonas aeruginosa, Streptococcus pyogenes, Klebsiella spp., Proteus spp. and the most common pathogens associated with wound infections are other pathogenic microbes.. Significant reduction in the number of microbes using a suitable topical agent is very helpful in regularizing the healing process, and effective wound healing is only possible when the infection is managed. Reducing the number of microbes in wounds therefore speeds up the healing process [[2], [3], [4], [5], [6]].

Recently, several medicinal plants (herbal formulations-monoherbal as well as polyherbal formulations) have been documented to hasten / accelerate wound healing activity and find useful in laboratory animals and in vitro studies in the treatment of wound models (freshly prepared incisional and excisional wounds). [[7], [8], [9], [10], [11], [12], [13], [14], [15], [16], [17]].

THE RESEARCH WORKS DONE:

[7] [At Gujarat ayurveda university, i.p.g.t. & r.a., Jamnagar] Vrana ek adhayayana, Vrana sodhana and role of karanjan, A study of the effect of certain indigenous, A comparative study of 60 measures of vrana and the role of madhusarpi in Vrana ropana, Role of certain indegenous drugs in the

management of vrana ropana, Role of karanjadi ghrita in dushta vrana with special reference to chronic Infected wound, Role of sodhana and ropana ayurvedic drug in special reference to dushta Vrana, Clinical and experimental studies of yastimadhvadi compound in vrana Ropana has been done.

[8][At i.m.s., banaras hindu university; Varanasi] Wound healing and tissue regeneration under influence of the drug “mansa Rohini” Historical review-Evaluation of the efficacy of arkadi gana ointment and lotion in vrana (an experimental study) page 9, Healing of wound in diabetes under the influence of “udumbara”, Corneal wound healing under the influence of indigenous drugs, Studies on vrana ropana, Studies on vrana sodhana has been successfully performed.

[9][At Ayurvedic college, Bangalore] Effect of ksara taila in dushta vrana, Study of action of “bandhana karana” through “patradana” in vrana Chikitsa, Effect of “kasisadi taila” in dustavrana by, Effect of “triphala guggulu” in the management of vrana, An experimental study of the effect of “ksudra seventika” in “sadyo vrana” researches has been done.

[10][At government ayurvedic college, thiruvanthapuram] Effect of “murivenna” in healing of dushta vrana, Clinical study in dushta vrana with “ras karpooradi dhupanam” and rasa Sinduram, Management of dusta vrana with karkaradi ghritam work successfully done.

[11][At Ayurvedic college, Nagpur] Role of “udumbara kshara” in treatment of dushta vrana research done.

[12][At Ayurvedic college, Hyderabad] Study of vajraka tailam in dushta

vrana, Management of dagdha vrana with “swatha malhar”, Svarna kshiri in the management of dushta vrana, Management of dusta vrana with “karanjadi tailam” research work done.

[13][At n.i.a., jaipur] A comparative of shodhana effect of jalaukavacharana and tilanimbapatra Kalka lepa in dushta vrana, Historical review-Evaluation of the efficacy of arkadi gana ointment and lotion in vrana (an experimental study) page 10, A clinical study on role of sushrutokta madhumishrit tilkalka in non-healing Ulcer, Effect of patolyadi kwath & kampillakadi tail in the management of Sadyovrana with special reference to traumatic wound Phytochemical analysis and antimicrobial study of formulation prepared by Arkadi gana, Shodhana effect of karviradi rasakriya in the dushta vrana along with Antimicrobial study multiple researches had been done.

[14] Evaluation of the efficacy of Arkadi Gana Ointment and Lotion in Vrana (An Experimental Study) The trial drug has shown better results when used in ointment form has been carried out by Dr. Rakesh Prasad

[15] An Experimental Study to Assess the Anti-inflammatory and Analgesic Properties of Nirgundi Extract in partial fulfilment of the requirements] by Dr. Rakesh Kumar Rathore, on the basis of experimental study it is found that the trial drug *Nirgundi Extract* given significant result in analgesic haffenars tail clip model but not significant result in hot plate model so it could be concluded that trail drug worked in pressure induce pain but not worked in heat induced pai

[16] Conceptual Study on *Vrana* w.s.r. to *Vranaupakrama* and their Application in Present Context by Dr. Dinesh Kumar Aherwara-a thorough review of available literature comprising of *Sushruta Samhita*, *Charak Samhita*, *Ashtang Hridaya*, *Nibhandh sangraha*, *Bhava Prakasha*, *Shardangdhara Samhita*, contemporary reference texts, peer reviewed journals and the literature available on the various concerned sites on the internet has been made.

[17] An Experimental Study To Validate The Efficacy Of “*Samangadi Taila*” On Wound Healing in a Rat Model is under research process by Dr. Manmahendra Singh in NIA, Jaipur

Earlier studies show that these mono- and poly-herbal formulations can hasten / accelerate wound healing in freshly prepared wounds and their role as an accelerating agent in the wound healing process is beyond doubt. But it is obvious from the study protocol of these earlier reports that these studies have been conducted in freshly prepared non-infected incisional or excisional wounds which are not showing any sign of infection/colonization with microbes (microbe-free environment). More experimental wounds in animals were closely examined for signs of infection and the wound displaying signs of infection was removed from the experiments and replaced with newer [12]. In any of the above reports, no effort was made to shed light on the antimicrobial activity of these herbal preparations.

[7], [8], [9], [10], [11], [12], [13], [14], [15], [16], [17].

Although the impact of large numbers of medicinal plants on different aspects of wound healing is very fruitful, in the absence of microbial colonization, it is difficult to determine or reach the final conclusion regarding their capacity as a wound healing agent (and not as an accelerating agent) of different herbal formulations for wound healing based on studies reports in a microbe-free environment [18,19]. Since it has been proven beyond doubt that wound healing occurs naturally unless it is obstructed by infection, trauma and ischemia, especially infection is the most important and leading cause of wound healing, and it is scientifically proven that the presence of microbes or their products can cause disturbances in the orderly wound healing process. The presence of microbes or their products can affect each of the processes of wound healing [[2], [3], [4], [5], [6]]. Therefore, in the absence of infection, which is a leading cause of non-healing of wounds, it is difficult to determine the wound healing ability of any new formulation. It is very difficult to confirm the effectiveness in the absence of persistent tissue levels of bacteria. Healing of wound by using these monoherbal and polyherbal formulations in such situations is not justifiable because the healing in most of these studies is limited to the non-infected wounds, which could heal naturally without any medication.

Our recommendations are therefore to improve wound healing research protocols by including in vivo study design and adequate controls to study infection type (monomicrobial / polymicrobial), wound type (acute / chronic), needed treatment

period, outcome variables, etc. So, in the presence of colonization / infection, it would be more fitting to determine the efficacy of newer herbal formulations on wound healing in laboratory animals and also to research antimicrobial activity of these preparations in order to achieve more justifiable and meaningful performance. In a clinical situation where the chances of fresh wounds without colonization / infection are very low and therefore these study protocols need to be further improved in order to determine

the antimicrobial activities of these preparations and their effect on wounds that are colonized / infected with pathogenic microbes in large numbers. The positive results of these additional parameters will help to achieve more meaningful and concrete conclusions.

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None.

Conflict of interest

None.

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