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AN ADDITION OF HARIDRA TO WHITE OINTMENT A GOVERNMENT AYURVEDIC PHARMACY PRODUCT-HARIDRA MALAHARA:

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ABSTRACT:

Malahara are Ointment preparation with a base of Beeswax and a combination with other ingredients. Here, haridra malahara is the suggested possible name for the formulation being discussed through this article. Components of Haridra Malahara are Beeswax, Coconut oil and Haridra Churna which are easily available and effective. Coconut oil with active principles like Monolauric acid and Vitamin E which is known for its Antibacterial activity and wound healing properties. Curcumin is the chief alkaloid present in Haridra which is known for its Antibiotic, Antioxidant and Wound healing properties. Hence Haridra Malahara is a simple and effective Ointment which can be easily prepared and used irrespective of any season, with main focus on its possible wound healing property suggested through the use of the aforementioned ingredients. Haridra Malahara since it contains commonly used and known ingredients it can be prepared even at domestic level which makes it approachable by everyone.

KEYWORDS: Malahara, haridra, coconut oil, madhuchishta(beeswax), white ointment, wound healing

INTRODUCTION:

Skin is the largest organ of the human body; the word skin is derived from an old Norse word “skin” meaning animal hide. It plays an important role in protecting the body against various pathogens by acting as a physical barrier. It also plays an important role in one’s confidence. Hence maintaining its health is very much essential. For maintaining healthy skin we tend to use various topical applications like ointments, jellies, creams etc. Generally, these topical applications contain a mixture of active ingredients and a base, the widely used base agent is petroleum jelly, a product based of petroleum. On substituting it with beeswax we can provide for a more eco-friendly alternative combined with the properties of bee’s wax.

The word malaharar was adopted by Yogaratnakara from the word ‘malaham’ or ‘maraham’ which basically originated from the Unani system of medicine. This is called ‘malahara’ because it removes mala (residue etc) from vrana, vidradhi, twak vikara etc. conditions. Malahara has a property like Snehana (oleation), cleansing, Ropana (healing), Lekhana (scraping), and Varnya (beautifying), depending on the drugs used in the preparation. Marahama (malahama) is an Arabic word, meaning plaster, dressing for wounds and salve. The synonym Lepa directly infers the link between Malahara Kalpana & Lepa Kalpana. During 8th A.D., both Charak and Sushruta Samhitas were translated into Arabic and Persian languages, which would have influenced the Unani System to the origin of Marahama Kalpana from Ayurvedic Lepa Kalpana.[1]

A variety of ingredients having medicinal properties like haridra(*Curcuma longa*) guduchi (*Tinospora cordifolia*),guggulu(*Commiphora mukul*),etc. may be added to fortify the effects of the widely used preparation white ointment (‘white ointment’, which is made using the combination of coconut oil and beeswax)developed in the Government Ayurvedic Pharmacy Bangalore; with the addition of Haridra (*Curcuma longa*) known for its anti-inflammatory and wound healing properties it would be possible to bring forth a simple yet effective preparation which is also cost-effective and can be used by common man.

Since the roots of the principle was taken up from the malahara kalpana, a suggested naming of the formulation as –Haridra Malahara, which would be henceforth used throughout the passage

A suggestion on the possible experimental model for proving the efficacy of the same is being hinted upon as well.

In the preparation of Malahara, the base may contain any one of the following viz oil, ghee, Beeswax. Sarjarasa etc.

General Method of preparation of a Malahara is as follows:The base of the Malahara Kalpana is prepared by melting 1 Part of Bees-wax and 5 Parts of coconut/sesame oil. If any physical impurities are seen in the wax, (after melting) it should be sieved through a cloth. To this, as per the formulation, add the fine powder of various ingredients and mix well. The fine powders may be of Tankana/Gandhaka/Kajjali/MrddaraSrunga/Gairika/Ginsindura/ Manashila/Haratala/Karpura etc.

The prepared ointment must be preserved in a wide mouthed plastic or glass container having tight fitting corks.[2]

The white ointment composition which is an Ayurvedic proprietary medicine, prepared in Government Central Pharmacy, Bengaluru and available at all Government Ayurveda Medical Colleges in Karnataka as mentioned in the GCP Pharmacopoeia. In this each 100gm contains Madhuchishta (beeswax), which is the solid part in the honeycomb in the quantity of 31.25 gm and narikela (Cocus *nucifera*) in the quantity of 68. 75gm.The Madhuchishta is melted in coconut oil till it becomes an ointment like consistency. The current study proposes the addition of an additional ingredient that is haridra (Curcuma longa) into the base of the white ointment, in order to combine with the anti-inflammatory, wound healing efficacy as well, to make a preparation which can be correlated to a malahara of sorts.

The usage of white ointment is indicated in Padadari (cracked heels), vrana(wound), agni dagdha vrana (burn injuries), kandu (itching), chapped lips, dry skin.[3]

Discussion:

Malahara kalpana can be compared to ointments, creams, jellies, salves which are used for topical application. The suggested product makes use of just three naturally occurring ingredients which are:

Madhuchishta(beeswax)-In Ayurveda the terms madhuchishta, sikta, madana, madhu shesha, madhushit are used to refer to beeswax. Its qualities are mridu (soft), snigdha (unctuous) and having the properties vrana shodhana (cleansing the wound), vranaropana (healing the wound). Therapeutic uses include-Bhagna sandhanakrit - The substance used for treating fractures by its binding capacity. Vataraktahara - The medicine which cures arthritic conditions like gouty arthritis. Kushta hara - That which cures skin disease. Visarpahara- That which cures disease like herpes.[4]

The usage of beeswax for wound healing is supported by the fact that crude beeswax showed antibacterial activity against several bacterial strains and against the *Candida albicans* (*C. albicans*) yeast. The sample of beeswax was effective against both Gram-positive bacteria, in particular *S. aureus* ATCC25923 (*S. aureus* ATCC25923) (7 mm), *Streptococcus epidermidis* ATCC12228 (6.5 mm) and *Streptococcus pyogenes* ATCC19615 (6.5 mm), and against Gram-negative bacteria, in particular *Bacillus subtilis* ATCC27853 (*B. subtilis* ATCC27853) (7 mm), *Pseudomonas aeruginosa* ATCC27853 (4 mm), *Escherichia coli* ATCC25922 (*E. coli* ATCC25922), and a particular inhibitory effect was found against *C. albicans* NCTC2708 (20 mm); no effect was found instead against *Salmonella typhimurium* ATCC14028 and *Proteus mirabilis* ATCC14153.[5]

Haridra (Curcuma longa) the next ingredient has been used since ancient times for its vishagna (countering toxic effects), krimighna (destroys worms, pathogens) properties in treating wounded body parts.
Wound healing activity, tissue repair and wound healing are complex processes that involve inflammation, granulation and remodeling of the tissue. Sidhu et al (1998) observed that the localization of transforming growth factor beta and fibronectin, which are important criteria in wound healing, showed an increase in curcumin treated wounds as compared to untreated wounds. Phan et al (2001) investigated the effects of curcumin on hydrogen peroxide and hypoxanthine-xanthine oxidase induced damage to cultured human keratinocytes and fibro-blasts in an effort to elucidate the mechanism of wound healing action of curcumin. It was observed that exposure of human keratinocytes to curcumin (10µg/ml) offered significant protection against hydrogen peroxide. However, no protective effects were observed against hypoxanthine-xanthine oxidase injury. The authors concluded that curcumin is a powerful inhibitor of damage to human keratinocytes and fibroblasts. Thangapazham et al (2007) showed the beneficial effect of curcumin, a proangiogenic agent in wound healing by inducing transforming growth factor-beta, which induces both angiogenesis and accumulation of extracellular matrix and continues through the remodeling phase of wound repair. Panchatcharam et al (2006) found that curcumin treated wound heal much faster as indicated by improved rates of epithelialization, wound contraction and increased tensile strength confirmed by histopathological examinations.[6]

Coconut oil is one of the ingredients in suggested formulation.The application of virgin coconut oil is effective in promoting wound healing through faster epithelization. A histopathological study by Nevin et al. revealed increased neovascularization, fibroblast proliferation, pepsin-soluble collagen synthesis, and turnover of collagen in wounds. Kim et al. demonstrated that coconut oil increased expression of cornified envelope components, thereby contributing to protective barrier functions of the stratum corneum. Furthermore, the expression of inflammatory profile was lower in the coconut oil-treated group after exposure to UVB radiation. Topical coconut oil protects the skin from UV radiation. Of all the acid components of coconut oil, monolaurin has been shown to have additional significance. Monolaurin is a monoglyceride derived from lauric acid. It comprises nearly 50% of coconut's fat content. Monolaurin displays antimicrobial activity by disintegrating the lipid membrane of lipid-coated bacteria including Propionibacterium acnes, Staphylococcus aureus, and Staphylococcus epidermidis. Coconut oil in concentrations of 5% to 40% (w/w) exhibited bactericidal activity against Pseudomonas aeruginosa, Escherichia coli, Proteus vulgaris, and Bacillus subtilis. Cellular studies have also shown that monolaurin exhibits antiviral and antifungal activity.[7]

These above properties suggest the formulations possible effectiveness in wound healing.
In this study the efficacy of trial drug haridra malahara can be compared with povidone iodine which is a standard drug and with no intervention in the control group.
During experiments to avoid variables,rats should be housed in a well ventilated room in hygienic conditions.
Efficacy of the drug may be analysed by performing an experiment in which wound can be created with incision and excision model,
In the Excision wound model it is conducted according to the technique developed by Morton and Malone. The animals can be anaesthetized using pentobarbitone intraperitoneally. After the animals are sufficiently anesthetized,they can be secured to the dissection plate in a prone position. The hairs are removed using a shaving blade from the part to be operated and subsequently the area is cleaned. A round seal of 2.5 cm in diameter is impressed on the dorsal thoracic central region 5cms away from the ears of the anaesthetized rats. Full skin thickness from the marked area is excised in circular fashion with the help of forceps, surgical blade and scissors. The approximate area thus formed is 500mm^2. After achieving full hemostasis, the animals can be placed in individual cages.

Whereas in incision wound model animals in all groups can be anaesthetized by administering pentobarbitone intraperitoneally, and 2cm long incision is made through the skin and cutaneous muscles at a distance of about 3 cm from the midline on the depilated back of the rat. After the incision is made, the parted skin is kept together and stitched with Surgical Linen No 20 at 0.5 cm intervals using a curved needle (No.10) are used for stitching. The continuous threads on both wound edges are tightened for good closure of the wound and the wound is left undressed. After achieving full hemostasis, the animals can be placed in their individual cages.

After creating the wound external application of haridra malahara in the trial group,control group no application and povidone iodine in the standard group.

In the post-operative stage, external application of Haridra Malahara starts from the day of surgery (0day). Control groups leave without applying drugs to observe the natural healing process and povidone iodine is applied for the rats in the standard group. All the rats are treated with normal food and water.

Method which can be adopted in drawing observations from the excision wound model may be as follows:To monitor the changes in the wound shapes, the wound margins are traced on OHP sheet from the day of wounding (0 day) and continued till the complete healing of the wound. This is again retraced on a millimeter scale graph paper. The observations of percentage of wound closure are made on the 0^{th}, 4^{th}, 8^{th}, 12^{th},16^{th} and 20^{th} post wounding days. These wounds are also observed for periods of epithelization. On the 21^{st} day the animal is sacrificed and skin over the wound which is healed is cut and sent for histopathology and hydroxyproline study.

In case of the incision wound model on the 8 th day breaking strength of the wound can be checked by using a locally made tensiometer.

In the assessment of wound healing, wound contraction and epithelialization are the parameters that may be employed to study in excision wound model and this is achieved using histopathology and hydroxyproline study. As the role of collagen in wound healing is to be studied, the estimation of breaking or tensile strength is employed to study the incision wound model and this is achieved through local Tensiometer.

Wound contraction which is one among the main factors, which contribute towards wound healing. This is done by tracing the wound margins on a OHP sheet and subsequently retracing them on a millimeter scale graph paper. This is later calculated as the percentage of original wound size for each animal in the group depending on the days taken for wound contraction.

$$\% \text{ wound contraction} = \frac{(\text{Initial wound size} - \text{specific day wound size}) \times 100}{\text{Initial wound size}}$$

Another factor which helps in assessing the wound healing is period of epithelialization

 Falling of scar leaving no raw wound behind is to be taken as the end point of complete epithelialization and the days required for this is taken as the period of epithelialization.

 In all groups, on the 21st day, 3 rats from each group are randomly selected; the skin tissue carefully excised and sent for histopathological examination and Hydroxyproline estimation.

 Histopathological studies – preserved in 10% formalin for histopathological examination

 Hydroxyproline content estimation - sample is stored in normal saline and stored at -20^{o}C.

The obtained results of the test groups are compared with that of the standard and control groups.

 Statistical analysis of hydroxyproline data can be generated by One way ANOVA followed by Dunnets multiple comparison “t” test as post hoc test if p<0.05 using statistical software of graph pad prism 3.0 version.

 Wound healing Parameters include:

Hydroxyproline estimation in skin tissue,Histopathological examination of part of skin , Breaking strength and Tensiometer analysis.

In the study experiment, a custom made Tensiometer can be used, which consists of a wooden board to which four nails are fixed to restrict the movement of the rat. Apart from that, one more nail is fixed, to one end of the nail thread is fixed, whereas to another end easy movement of thread is allowed with the help of a pulley, to the edge of thread attached to the specially made plastic container. The rats are anesthetized individually and are placed in wooden board between nails. The threads are then carefully tied and attached to the skin on the opposite sides of the wound at a distance of 1 cm away from the wound. In specially made plastic container, which is made to collect the inflow normal saline that helps in increasing the weights until the healed wound opens. Once the wound opens, the flow of normal saline is stopped with the help of a clamp and the volume of the normal saline is measured and time taken for breaking the wound is also noted. The liquid used for the flow is normal saline water. Thus, the breaking strength of the wound can be measured and compared.

CONCLUSION:

This study aims at shedding light on an already widely used medical preparation manufactured by the Government Central Pharmacy, Bangalore, by adding just a simple ingredient Haridra (Curcuma longa) how a simple formulation's horizons can be widened to accommodate even more indications. The suggested experimental model can help us to understand the effects of the formulation. Further experimentation is necessary to prove its effects.

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