



Title: “ Management of Chronic burn wound by compound *Ayurvedic* preparation *Dagdhahar Malahar*”

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Abstract:

Burn injuries are one of the most devastating injuries encountered in medicine. Burn can be defined as tissue damage caused by a variety of agents such as heat, chemicals, electricity, sunlight, or nuclear radiation. Estimated annual burn incidence in India is 6-7 million per year. Loss of skin with all its protective and homeostatic functions exposes the body to variety of stresses which are not seen in any other type of injury except burn injury. The topical anti-microbial agents are of at peek importance in this regard.

The *Vrana* more than a week called *Dushta Vrana* which fail to heal for a long period and result into chronic wound (*Dheergha, Kalanubandhi Dushta Vrana*), such *Vrana* needs *Shodhana* (*Abhyantara*) and *Ropana* (*Bahya*) *Chikitsa*. Administration of *Mrudu Virechana* and local application of *Dagdhahar Malahar* can be the best line of management for *Tridoshaja Dushta Vrana*. A case report of 33 years old men, who was presented with complaints of an open chronic burn wound on the anterior aspect of the right foreleg associated with pain, discharge(slough), foul smell, edema and discoloration of the skin has been presented here. In this case *Dagdhahar Malahar* is applied locally twice daily and *Phaltrikadi Qwath* is administered internally twice daily after each meal for consecutive 21 days and the changes in the objective and subjective parameters were observed. Results showed that *Dagdhahar Malahar* and *Phaltrikadi Qwath* are effective in the management of burn wounds.

Keyword: Burn wounds, *Dushta vrana*, *Dagdhahar Malahar*

Introduction:

Burn injuries are the most frightful inducing permanent ugliness to human being and managing them are important because they are common, painful and can result in disfiguring and disabling scarring, amputation of affected parts or death in severe cases due to septicemia. There are various schools of thought regarding line of treatment of burn wound, like closed dressing, open dressing with gauze and bandages, vaseline gauze, antibiotic creams and the covering of wounds with polyurethane film collagen dressing etc. to reduce pain and to prevent infection[1] Initial treatment of burn wound aimed at preventing infection and early wound healing. Proper healing of wounds is essential for the restoration of disrupted anatomical continuity and disturbed functional status of the skin. Local infection such as *Streptococcus aureus*, *Streptococcus pyogenes*, *Escherichia coli* and *Pseudomonas aeruginosa*[2][3]. Hypoxia, trauma, foreign bodies and systemic problems such as diabetes mellitus, Malnutrition, immunodeficiency or medications, old age are the most frequent causes which hamper its proper healing of burn wounds[4][5]. The basic principle of optimal wound healing is to minimize tissue damage and provide adequate tissue perfusion and oxygenation, proper nutrition and moist wound healing environment to restore the anatomical continuity and function of the affected part. The traditional Indian medicine - *Ayurveda*, describes various herbs(phyto-active compounds), fats, oils and minerals with anti-aging as well as wound healing properties over the years .to treat burn injuries[6][7].

According to *Ayurvedic* classics it has been estimated that 70% of the wound healing *Ayurvedic* drugs are of plant origin, 20% of mineral origin, and the remaining 10% consisting of animal products. *Sushruta* has explained treatment of burn wound while describing

Agnikarma Adhyaya while describing treatment of wound due to *Agantu* (external) injury. Classical management of wounds according to *Sushruta Samhita* follows 60 therapeutic steps, starting with an aseptic dressing of the affected part and ending with the rehabilitation of the normal structure and function. These therapeutic measures were aimed not only to accelerate the healing process but also to maintain the quality and aesthetics of the healing.

“*Dagdha malahara*” is compound *Ayurvedic* preparation described as useful in all types of burn injuries in classical texts of *Rasatantrasara Sangraha* .The drugs explained in the preparation has anti-bacterial, anti-inflammatory and anti-exudative properties and also useful in wound healing, getting normal pigmentation of the skin, cooling and retaining normal vascularisation. As *Kankshi* is having wound cleansing due to antiseptic properties. Petroleum jelly and *Gairik* having wound healing property .Combined they help in faster and good quality healing of the burn wound so that outcome after its application is also better. So pursuing this reference, preparation of *Dagdhahar Malahar* was used for second degree chronic burn wound and healing process was observed.

Need

The available topical antimicrobial applications in the management of minor burn injuries do not give much satisfactory relief to the associated features like pain, burning sensation, over whelming exudation and rate of healing, discoloration of skin and scar formation. In spite of tremendous advances in the pharmaceutical drug industry, the availability of drugs capable of stimulating the process of wound repair is still limited. Moreover, the management of chronic burn wounds is another major problem due to the high cost of therapy and the presence of unwanted side effects such as



allergy, drug resistance due to emergence of multi-resistant organisms etc. and this situation has forced scientists to seek alternative drugs. Alternative or traditional medicines are increasingly becoming popular to overcome these multi resistant organisms.

Aim:

To evaluate the efficacy of the *Ayurvedic* preparation and principle in the management of chronic Burn wounds.

Objectives:

To evaluate the safety of the *Dagdha Malahara* in the management of chronic Burn wound

Material and method:

A single case study

A 33 years old male patient presented with the complaint of an chronic burn wound over medial and anterior aspect of right foreleg associated with pain, discharge(slough), itching and burning sensation, foul smell, edema and blackish discoloration of the skin near by the ulcer since one months. One month back patient was alright but there was history of burn due to hot silencer of motor cycle one month back. Patient had received treatment by a local doctor but the wound failed to respond, presumably because of wound contamination and movement of the part. Treatment continued as oral medication with Antibiotics (Moxclave BD) and analgesics and anti-inflammatory (Serrato-peptidase and Diclofenac Sodium) was continued for consecutive 15 days .He was managing the wound by dressing with Savalon at home but no recovery in wound healing and the wound became worst. Patient was feeling feverish sensation with increase in slough in more quantity with foul smell from wound. Another Surgeon expert advised him debridement of wound with application of Silvergen ointment externally and Zifi

Turbo internally. So he consulted on telecommunication.

Personal & family History: There is no history of DM,HTN and no specific family history.

Local examination:

Local examination revealed an open oval shaped an chronic burn wound over medial and anterior aspect of right foreleg (approximately 7*4*2 cm burn wound of second degree.) associated with pain, discharge, mild slough, foul smell, profuse purulent discharge, edema and blackish discoloration of the skin. There was tenderness near by the lesion with elevated local temperature and surrounding indurations with central necrosis and signs of cellulites were observed. There is no varicosity in the affected limb.

The classical *Lakshanas* of *Dushta Vrana* such as *Durgandhata*, *Pooti Puya Sraava*, *Vedana* etc .were observed[8].The *Adhithana* was *Mamsa* with *Tridosha* predominance.

All systemic examinations are intact.

Diagnosis:

Chronic burn wound -Second degree partial-thickness burns with central necrosis

(Dustha Vrana due to Ruksa Dugdha)

Intervention: Initially patient was given wash with normal saline on the first day of treatment over the affected area. Then the surrounding part of the wound was cleaned with Savalon liquid and then it was wiped with dry cotton. Sufficient quantity of *Dagdha Malahar* was applied over the wound with the sterile cotton swab held and ensured that it spreads uniformly all over the surface of the wound. closed dressing with *Dagdhar Malahar* took place twice daily for consecutive 21 days. For internal use Tab *Septilin (Himalaya)* 2 tabs and *Phalatriadi Qwath(Nagarjuna)* 15 ml twice daily was administered daily



before each meal with equal quantity of lukewarm water regularly for 21 days.

Drug review:

Dagdhar Malahar is a petroleum jelly based formulation having drugs *Suvarn Gairik*(5%), *Kankshi*(10 %),*Manjistha*(*Rubia cordifolia*)(2.5

),*Lodhra*(*Symlococcus racemosa*)(2.5%), petroleum jelly(80%).

Observation and Results (Assessment):

Patient was advised to have normal diet and habits. Observations on the subjective and objective changes with the treatment for 21 days. Wound was observed for its healing process under following criteria.

Assessment of subjective criteria [Table No.1.1]:

	Symptoms	Before Treatment (on 1 st day)	on 10 th day	After Treatment (on 21 th day)
1	Pain	III	II	0
2	Burning sensation	3+	1+	Absent
3	Tenderness	3 +	1+	Absent
4	Foul smell	Severe	No	No

Assessment of objective criteria [Table No.1.2]:

	Sign	Before	10 th day	After Treatment (21 th day)
1	Size of wound	7*4*2cm	3*2*0.5cm	No wound
2	Quantity & colour of Slough	Profuse deep seated blackish and yellowish slough at the base of the wound which was hard to remove initially	No yellowish discharge. Serous discharge And started to dissolve from the base	No discharge Wound become clean and healthy
2	Edema around wound	Significant edematous edges	Edema was minimal, bluish showing growing epithelium	Absence of edema
3	Appearance and color of base of wound	Redness and Presence of the raw surface of the wound, formation of the crust	Separation of the crust and appearance of the granulation tissue	Appearance wound was bright red in color with good granulation tissue and signs of epithelization at margins.

Before treatment[Fig.1.1]**On the 5th day[Fig.1.2]****On the 10th day
[Fig.1.3]****On the 15th day [Fig.1.4]****On the 21st day [Fig.1.5]**

Dressing was continued and on 10th day, it was observed that wound size was markedly reduced with normal skin coloration at the healed area. On the 21st day, the wound was healed completely with minimum scar tissue formation. The clinical features of *Dushta Vrana* were improved at the end of second week and the wound was healed completely at the end of 3rd week. There were no any signs of infection. Healthy granulation tissue was present. Daily dressing was continued up to 21 days and epithelialization of wound was covered within 14 days. The color of epithelialization was resembling with

surrounding tissue and epithelization was hastened.

There was significant improvement percentage of wound contraction. It was assessed by noting the progressive changes in wound area plan metrically..The sizes of wound were traced on transparent paper every 7 days through out days throughout monitoring period. The tracing was then superimposed on a 1 mm 2 graph sheet, from which the wound surface area was evaluated. Then evaluated surface area was then employed to calculate the percentage of wound contraction taking the initial size of the wound as 100 %.

Discussion

According to *Acharya Sushruta*, among the 60 measures of comprehensive wound management from its manifestation to the normal, *Malahar Kalpana* and *Mrudu Virechana* are indicated in cases of chronic wound, which is full of slough, deep seated in muscle and reluctant to heal[9]. Such Infective wound should be managed by combination of topical and systemic *Ayurvedic* agents. *Sushruta* has explained that for dry burn (*Ruksha Dagdha*) , application of *Sneha Chikitsa* (oily drugs) should be considered[10] So for local application, *Dagdhahar Malahar* having fatty base of petrolleum jelly is used and for internal administration *Tab Septilin* and *Phalatrikadi Qwath* are used.

Dagdhahar malahar is useful for wounds, painful ulcers, insect bite wounds, wounds caused by heat or fire and deep wounds by external application as per the classical texts of *Rasatantrasara sangraha*. was used. *Dagdhahar malahar* performs both the functions of *Shodhana* (cleansing) and *Ropana* (healing) in cases of *Dushta Vrana*. Probable mode of action of each ingredient are is follows:

1]Petroleum jelly is a non-polar hydrophobic (water-repelling) hydrocarbon and insoluble in water. It prevents fluid loss from burn wound and also lubricates surface of wound and prevents hard eschar formation. Petroleum Jelly is oil base preparation and lipophilic nature.

Various fatty acid in it have better healing property and good absorption. Moisture content is negligible so could adhere for more duration over skin surface ,more retention time and more absorption, This property could prolong the moisture atmosphere by that eschar which was formed soft and easily to get detached ,so it is good base for topical application[11]. The concept of moist wound healing has been generally well accepted and many practitioners are adopting this method[12].

The American Academy of Dermatology recommends keeping skin injuries moist with petroleum jelly to reduce scarring[13].Ointments(e.g. petrolatum) are thought to be occlusive, thereby blocking transcutaneous water loss and trapping water under the skin's surface[14].The natural essential fatty acids in the formulation easily penetrate into cell membranes to enhance drug penetration for early & uncomplicated wound healing.

2] *Phitkari* (Alum) is a mineral origin drug, Alum is a general double sulphates containing aluminium[15][16]. The presence of potassium alum reduces swollen mucous membranes and decreases excessive secretions. The induction of the coagulation cascade will also stop bleeding.[17] The main functions of potassium alum in drugs are as an astringent, antiseptic or adjuvant agent. The formation of alum ions neutralize the charges on plasma proteins, causing the blood to coagulate. Similar effect is observed in disinfectants where these ions react with the free organic acid and thiol groups of proteins on microbes and free proteins, resulting in protein precipitation. This action will generate the contraction of the tissue and dry up secretions[18]. Alum is having antibacterial activities so it prevents infection. *Lekhan* property (chemical debriding action of Alum helps in removing dead, necrosed tissue from burn wound and facillate formation of healthy granulation tissue. Antimicrobial activity of alum was evaluated of crude extract prepared from alum and clove against *S. Aureus*, *S. epidermidis*, *E. coli*, *Klebsiella pneumonia*. It exhibited antibacterial and growth inhibition activity of gram positive and negative bacteria isolated from different sites of infection and the effect was also compared with standard cefotaxime[19]. Alum exhibited a broad spectrum antimicrobial activity, which is an important requirement of wound healing by controlling and reducing the microbial load. In this case, the black



and yellowish slough removed on 10th day without surgical debridement because Alum has *Kashaya Rasa* (astringent taste), which exerted *Lekhana* (scraping) action that helped in removing slough and prepared the wound bed for healing complete and fast ulcer healing activity of alum concentration is established by Altaei et al.[20].

3) *Manjistha*- Evaluation of the wound healing activity of a crude extract of *Rubia cordifolia* L. (Indian madder) in mice. Tannins and anthraquinones are the major phytoconstituent present in this plant which may be responsible for wound healing action. Increased cellular proliferation may be due to the mitogenic activity of the plant extract, which might have significantly contributed to healing process. Early dermal and epidermal regeneration in treated mice also confirmed that the extract had a positive effect towards cellular proliferation, granular tissue formation and epithelialisation[21]. It is used for the treatment of major burns, ulcers and bone[22].

The effect of *Rubia cordifolia* against experimentally induced gastric ulcer and compare activity with its fractions by employing aspirin plus pylorus-ligated ulcer screening model in wistar rats. The study confirmed that chloroform fraction showed the significant activity at lower doses compared to parent extract. The mechanism can be attributed to decrease in gastric acid secretory activity along with strengthening of mucosal defensive mechanism by prostaglandin synthesis and antioxidant potential[23].

Wound healing was assessed by using poly herbal formulation containing *Rubia cordifolia* based on physical parameter namely, wound contraction, period of epithelization and histological study. It promotes contraction and epithelization of excision wound[24]. *R. cordifolia* is considered to be traditionally useful as an analgesic, astringent, external application in inflammations, ulcers and skin diseases

(Khalid, 1995). The plant is also claimed to relieve the symptoms of pruritus, burning and exudation .

Ayurvedic stalwarts such as *Charaka* and *Sushruta* included *Suvarna Gairik* in their dressing aids to purify sores and promote the healing of wounds. Properties of *Suvarna Gairika* are attributed to its low pH , its hygroscopic property. The hygroscopic property of *Gairik* improves tissue and promoting wound healing.

Probable Mode of action *Malahar*

Change in color of wound occurred when *Dushta Vrana* get converted into *Shuddha*, which was due to elimination of *Doshas* out from the body through *Mrudu Virechana* due to *Phalatrikadi Kwath* and local application of *Rakataprasadakar Dravya*.

Signs and symptoms such as pain, discharge, discoloration, foul smell, etc., are considered due to active involvement of *Tridosha*. The *kashaya Rasa* (bitter taste) of the *Gairika* and *Snigdha Guna* of Petroleum jelly, *Raktaaprasadkara* property of *Sariva*, *Manjistha* and *Lodhra* pacified the vitiated *Doshas*, rendered relief in pain, discharge which were proven helpful in the healing. The vitiated *Pitta* is responsible for *Paka Kriya*, which by vitiating the *Rakta* forms *Pooya*. The *Virechana* karma helps in elimination of vitiated *Pitta* from the body and thus controls upon the *Paka Kriya*, which results in the subsidence of *Srava*. Absence of *Srava*(pus) suggestive of the wound is devoid of infection. *Manjistha* [12] and *Sariva* [13] are having *Vranashodhana* (wound cleansing) property[25]. Wound became clean with healthy granulation on 21st day [26].

As Alum and *Lodhra* (*Symplocos racemosa*) have antimicrobial activity which have the ability to disinfect and destroy the micro-organisms and to break bio films which are formed by micro organisms. Antimicrobial activity of *Lodhra* in The petroleum ether extract and



ethanol extract form is established by kumar et al.[27]

All those properties of drug assisted in cleaning the wound and helped to inhibit the growth of micro-organisms. Antioxidant property of *Manjistha* acts as scavenger and probably helped to remove free radicals as well as inhibited further generation of free radicals[[28][29][30]. Combined use of herbs (*Sariva*, *Manjisitha* and *Lodhra*) promote blood clotting, fight infection, and accelerate the healing of burn wound. *Sariva* *Manjisth* and *Lodhra* improves re-epithelialization, neovascularization and migration of endothelial cells, dermal myofibroblasts and fibroblasts into the wound bed. *sariva* has soothing and healing action on skin lesions topically. *Gairik* has *Vranashodhaka* prpperty. *Sariva* and *Manjistha* are having *Vranaropan* (Healing) and *Kantivardhan* (Improving luster) property so it helps in early healing with good pigmentation.

Regression of pain may be due to presence of *Sneha Dravya* in the preparation. Thus it can be say that use of *Dagdha Malahar* is effective in reducing pain, burning sensation and purulent discharge regressed due to hygroscopic nature of *Suvarna Gairik* and antiseptic nature of alum. All ingredients of *Dagdha Malahar* have got healing property which might have influenced in healing the burn wounds.

This over all beneficial effects of may be occurred by application of combination of therapy due to promotion of interactions among cytokines, growth factors, blood and cellular elements, and the extracellular matrix through

- Cleansing of wounds
- Decreasing inflammation by absorption of edema fluids
- Prevention of infection by their Antimicrobial activity, stimulating the production of components of the

basement membrane and checks over further progress of pathogenesis

- Increasing vascularity checking over infections due to antimicrobial, antioxidant properties
- Improving Free-radical-scavenging enzymes (FRSE) which are a cyto-protective enzymatic group that has an essential role in the reduction, de-activation and removal of ROS(reactive oxygen species) as well as stimulates wound healing process[31]. Wound healing Property of flavanoids present in herbs augments healthy process[32] By removing biofilms and permits penetration of medication to the affected region.
- Prevention of dry eschar formation by preventing dehydration and reduces pain.
- Promotion of healthy granulation tissue by improving nutrition, stimulating the production of components of the basement membrane

Favonoids and phytosterols in herbs promote Epithelialization for wound healing process with increased capillary formation & fibroblast proliferation enhancing the rate of epithelization[33].

Summary

This case study reveals that *Mrudu virechana* and burn wound dressing by *Dagdhahar malahar* produces good and faster wound healing. Also it can help in minimizing post healing complications like keloid formation, bad pigmentation and also it is cheap. There were no any adverse events noted throughout the treatment and healing occurred uneventfully. The dressing of *Dagdhahar malahar* in chronic burn wound is found to be cost-effective, safe, and easy to implement.



Conclusion:

- This single case study highlighted that combined effect of topical application of *Dagdhahar malahar* with *Mrudu Virechana* with *Phalatrikadi Qwath* was found very effective and shown excellent healing effect in a case of chronic infected burn wound.
- Since complete healing was formed within 21 days. The raw materials required for the preparation of *Dagdhahar malahar* are easily available in very less cost.
- This method is very simple, economical, and free from side effects and can be carried in OPD.
- Use of *Dagdhahar malahar* has given very good aesthetic outcome with very less post-burn complications like wound contracture and hypertrophied scar.
- *Dagdhahar malahar* is very effective in reducing the associated complaints like pain, burning sensation and overwhelming exudation.

In future, various researches of effect of *Dagdhahar malahar* over the healing process in chronic burn wound will be physically monitored by assessing the rate of contraction of the wound, period of epithelization, tensile strength, histopathology, and weight of granuloma in different wound models. So the demand of *Ayurvedic* management will be increasing day by day in developed as well as developing countries because they are safer, effective and well tolerated as compared to those allopathic drugs. Further such studies with purified constituents are needed to understand the complete mechanism of various wound healing activity.

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