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CONCEPT OF DAGDHA VRANA WITH TREATMENT ACCORDING TO SUSHRUTA SAMHITA

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ABSTRACT

In Ayurveda, burns are categorized under the term DagdhaVrana, and this concept has been extensively discussed in classical Ayurvedic texts. Among these, the Sushruta Samhita provides the most detailed account, offering insights into the classification, clinical features, and management strategies for burn injuries based on their type and severity. Sushruta Samhita outlines a structured approach to burns, emphasizing the importance of appropriate treatment at different stages of injury. It introduces not only local treatments, such as the application of medicinal herbs and oils, but also broader therapeutic practices aimed at promoting recovery and reducing complications. The text also stresses the significance of understanding the nature of the burn—whether it's mild, moderate, or severe—in order to implement the most effective remedy. This article delves into the various classifications and clinical features of burns as described in the Sushruta Samhita and highlights the Ayurvedic treatment protocols for DagdhaVrana.

KEYWORDS: DagdhaVrana, Burn Injury, Sushruta Samhita, Ayurvedic Treatment, Burn Classification.

INTRODUCTION

A burn is a wound in which there is coagulative necrosis of the tissue. Also defined as damage to the skin or deeper tissues caused by sun, hot liquids, fire, electricity, radiations or

chemicals is a burn.[2] Ayurveda which is an ancient science of treatment where the description of types, clinical features, treatments and complications of DagdhaVrana having similarity to burn injury described in modern medicine. DagdhaVrana (burn wound) which can be accidental or may be caused during para surgical procedures like Agnikarma. AcharyaSushruta, described DagdhaVrana in the chapter 'AgnikarmaVidhi Adhyaya' in Sutrasthana.[1] In this Adhyaya, Acharya explains the clinical features, types and treatment protocol for individual type of burns.[3]

Types of burn injury

a) Thermal injury[4]

Thermal injury are mainly scalds, flame, flash burns

Scalds: It is mainly due to spillage of hot liquids having temperature > 65°C. It is capable of creating a deep partial-thickness or full-thickness burn in 3 seconds of contact. The same burn occurs in 1 second if the temp is around 70°C. In children under 8 years of age, the most common burns are scalds, usually from the spilling of hot liquids.

Flame burns: It is the second most common mechanism of thermal injury. Damage causing mainly from superheated oxidized air. E.g.: Includes improper use of flammable liquids, motor vehicle collisions, and ignition of clothing by stoves. In older children and adults, the most common burns are flame-related, usually the result of house fires, and the ill-advised use of flammable liquids.

Flash burns: These burns are typically epidermal or partial thickness and are caused mainly by Explosions of natural gas, propane, butane, petroleum distillates, alcohols, and other combustible liquids.

b) Electrical Injury[5]

Injury severity is determined by the voltage of the source and the resistance of the victim. Tissue damage in electrical injury occurs when electrical energy is converted to thermal energy. The resulting injury is a thermal burn. Electrical burns are always deep burns, and wound present at point and entry and exit. The peculiarity of electrical burns is that it causes minimal destruction of the skin. The skin is involved at 2 points - at the point of contact with the electrical source and at the site of exit at which the patient is grounded. Depending on the voltage it is again divided into, Low voltage current: Where there is direct injury at point of contact and there will be local coagulation and necrosis.

High-Voltage current: Where there is minimum destruction of skin but damages tissues that conduct the electricity through the body. Tissue damage in electrical injury occurs when electrical energy is converted to thermal energy. The resulting injury is a thermal bum.

c) Chemical burn[6]

Chemical burn is caused by contact with strong acid / base.

Acids “tan" the skin, creating an impermeable barrier of coagulation necrosis and limits further penetration. E.g.: Sulphuric acid, Nitric acid.

Alkalis combine with cutaneous lipids, and continue dissolving the skin until they are neutralized. Eg: Ammonia, Cement.

Chemical burns are typically associated with industrial accidents, assaults, or the improper use of harsh household solvents and cleaners. Chemical burns because progressive damage and injury until the chemicals are inactivated by reaction with tissues or diluted by therapeutic irrigation. The depth of the burn can only be assessed after removal of slough.

d) Radiation burn[7]

Radiation burns are generally a complication of therapeutic administration and are result of free oxygen radical formation. Radiations are mainly classified as non ionizing radiation (Radio wave, Microwave, IR, UV) and ionizing radiation (x ray, Gamma rays). Because of radiation there are superficial and deeper injuries. In radiation burn two types of radio dermatitis are seen that is acute radio dermatitis and chronic radio dermatitis.

Acute Radio dermatitis which presents with acute inflammation with erythema, varying degrees of oedema and exfoliation.

Chronic Radio dermatitis may occur if small doses of irradiation are given for too long time, in this condition the skin shows irregular pigmentation or depigmentation. And Long span of exposure will lead to indolent ulcers.

e) Cold burn[8]

Cold burns are caused by exposure to cold which include freezing injury [frost bite], non-freezing cold injury [chill blain, trench foot]. Clinical features of frostbite are described by various degrees.

First degree frostbite: there will be hyperemia and oedema of the skin. Second Degree Frostbite causes hyperemia, vesicle formation and partial thickness necrosis of the skin. Third degree frostbite: causes necrosis of the entire skin thickness and may extend to subcutaneous tissue. Fourth degree frostbite: causes necrosis of full thickness of the skin including subcutaneous tissue, muscle and bone. This leads to gangrene of the affected part.

Trench foot: Due to prolonged exposure to cold weather with circulatory disturbances.

Chill blain: Due to cold weather there will be localized erythema in extremities.

According to Sushruta Acharya[9]

तत्र, स्निग्धं रूक्षं वाऽऽ(चा)श्रित्य द्रव्यमग्निर्दहति; अग्निसन्तप्तो

हि स्नेहः सूक्ष्मसिरानुसारित्वात्त्वगादीननुप्रविश्याशु

दहति; तस्मात् स्नेहदग्धेऽधिका रुजो भवन्ति ॥१५॥ I (Su. Su. 12/15)

Sushruta Acharya classified as Snigdha and Ruksha.

Heat which is produced by either Ruksha or Snigdha substances causes Dagdha. Burn produced due to Snigdha Dravyas are more painful, as the Sneha Dravya has the property of penetrating the minute pores and causes deeper and more painful burns.

Classification of burns

1. Depending on thickness of skin involved[8]

Depending on thickness of skin involved, they are classified into 4.

First degree: In which Epidermis looks red and it is painful, absence of blisters. It heals rapidly in 5-7days without scarring and shows capillary filling.

Second degree: the affected area is mottled, red, and painful, with blisters Heals by 14-21 days. It is again classified into Superficial 2nd degree burns which heal by causing pigmentation and Deep 2nd degree burns which cause scarring. Sensation will be present.

Third degree: The affected area is charred, parchment like painless and insensitive. There will be eschar formation and re-epithelization occurs from wound edge.

Fourth degree: It involves the underlying tissues including muscles, bones.

2. Depending on severity of burn[7]

Depending on severity of burns, it is classified as

Superficial partial-thickness burns which include superficial 2nd degree burns, involving the upper layers of dermis, form blisters with fluid collection. When blisters are removed, the wound is pink, wet; hypersensitive, and burns blanch with pressure. Deep partial-thickness burns extend into the reticular layers of the dermis. There will be blister formation, but the wound surface is usually a mottled pink-and-white color immediately after the injury because of the varying blood supply to the dermis. Full-thickness burns including 3rd and 4th degree burns involve all layers of the dermis and can heal only by wound contracture, and epithelialization occurs from the wound margin.

3. Depending on the percentage of burns[7]

Percentage of burns are mainly classified into mild, moderate, severe.

Mild: Includes Partial thickness burns which is < 15% of total body surface in adults or <10% in children. When it is Full thickness which include < 2% of body surface area.

Moderate: Includes Second degree of burns which involved15 -20% in adults (10-20% in children) and 3rd degree burns between 2-10%. Not involving eyes, hands, ears, face and perineum.

Severe: Includes 2nd degree burns which is >25% in adults and >20% in children. Also 3rd degree burns of 10% or more. Involving eyes, ears, feet and hand.

According to sushrut aacharya[9]

तत्र प्लुष्टं दुर्दग्धं सम्यग्दग्धमतिदग्धं चेति चतुर्विधमग्निदग्धम् || (Su.Su.12/16)

The types according to AcharyaSushruta,

▪प्लुष्टं, ▪ दुर्दग्धं, ▪ सम्यग्दग्धम,▪ अतिदग्धं

Plusta dagdha[9]

तत्रयद्विवर्णं प्लुष्यतेऽतिमात्रं तत् प्लुष्टं(su.su,12/16)

There will be discoloration of the skin of affected part along with burning sensation. Dalhanacharya specifies that Plusta Dagdha is the one causing discoloration and Daha but no Spotha. It can be co-related to 1st degree burns.

Durdagdha[9]

यत्रोत्तिष्ठन्ति स्फोटास्तीव्राश्चोषदाहरागपाकवेदनाश्चिराच्चोपशाम्यन्ति तद्दुर्दग्धं (Su.Su,12/16)

Burns presenting with blisters, and different types of pain, burning, redness, inflammation. Also takes a long time to subside. Can be correlated to 2nd degree burns.

Samyak dagdha[9]

सम्यग्दग्धमनवगाढं तालवर्णं सुसंस्थितं पूर्वलक्षणयुक्तं च; (Su.Su.12/16)

Burns which are not deeply seated nor superficial. Having the color of TalaPhala - Asian palm fruit. Tissues will be in their own site. And having signs and symptoms described earlier.

Atidagdha[9]

अतिदग्धे मांसावलम्बनं गात्रविश्लेषः सिरास्नायुसन्ध्यस्थिव्यापादनमतिमात्रं ज्वरदाहपिपासामूर्च्छा श्चोपद्रवा भवन्ति, व्रणश्चास्य चिरेण रोहति, रूढश्च विवर्णो भवति ||| (Su.Su.12/16)

The patients having high grade fever, burning pain, increase thirst, features of dehydration. The wound healing delayed with discoloration of affected part. The condition is almost similar to advanced 3rd degree and 4th degree burn.

Assessment of burn[10,11]

1. **Wallace rule of 9:** In this method, every part of body is assessed. For Children which have a relatively larger portion of the body surface area in the head and neck, which is compensated for by a relatively smaller surface area in the lower extremities. Infants have 21% of the TBSA in the head and neck and 13% in each leg, which incrementally approaches the adult proportions with increasing age.

2. **Lund and Browder chart:** Each part is individually assessed for burns. More useful in children taking in consideration the age and BSA of the patient.

3. **Palmar method:** Patient own hand is used to know the extent of burn. The entire palm of person who is burned is considered as 0.8 % in adults and 1 % in children, and using the palm to measure the body surface.

4. **Sage diagram:** Software program which helps in calculating the extent of burn and also the fluid resuscitation levels Pathophysiology.[12]

Due to injury, Heat causes coagulation necrosis of skin and subcutaneous tissue which lead to release of vasoactive peptides. Because of this there will be altered capillary permeability which further leads to Loss of fluid and Severe Hypovolemia. Hypovolemia leads to Decreased cardiac output which leads to altered pulmonary resistance, Decreased Myocardial function and Decreased Renal blood flow (Oliguria) which further leads to SIRS and MODS.

Management of burns[12,13]

Initial management

- Clothing should be removed initially.
- Cooling of the part by running water for 20 mins (should not use cold water, to prevent from Hypothermia)
- Chemoprophylaxis - tetanus toxoid (0.5ml), antibiotics, local antiseptics
- Comforting with Sedation and Analgesics.

Fluid resuscitation

First 24 hours, Crystalloids should be used because it is easily permeable through capillaries and replace blood volume. After 24 hours up to 48 hours colloids should be used to compensate plasma loss (they are retained in intravascular compartment)

Ryle's tube insertion: Should be done initially for aspiration then feeding (burns <15%)

Total parenteral nutrition (TPN) using CVP line, lipids and vitamins for faster recovery

Urinary catheterization - to maintain fluid volume - 30-40ml/hr

Vitals: hourly pulse, SPO2, BP, electrolyte analysis, PO2, PCO2, blood urea etc.

Frequent total count and platelet count - identify sepsis along with fever, tachycardia etc.

Local management[14]

Regular dressing should be done with Paraffin gauze, Hydrocolloids etc. under suitable anesthesia.

Open method: Application of silver sulfadiazine without any dressings, used commonly in burns of face, head and neck.

Closed method: Dressings done to soothen and to protect the wound, to reduce the pain

Tangential excision: Excision of burn wound with skin grafting can be done within 48 hours in patients with less than 25% burns. Done in deep dermal burn wherein dead dermis is removed layer by layer until fresh bleeding occurs. Later skin grafting is done. It reduces the chance of secondary infection, the hospital stays, and formation of hypertrophic scar or contracture.

Treatment according to sushruta acharya

Plusta dagda chikitsa[15]

दग्धस्योपशमार्थाय चिकित्सा सम्प्रवक्ष्यते ॥१९॥

प्लुष्टस्याग्निप्रतपनं कार्यमुष्णं तथौषधम् |

शरीरे स्विन्नभूयिष्ठे स्विन्नं भवति शोणितम् ॥२०॥

प्रकृत्या ह्युदकं शीतं स्कन्दयत्यतिशोणितम् |

तस्मात् सुखयति ह्युष्णं ननु शीतं कथञ्चन॥ (Su.Su.12/19-21)

Acharya Sushruta has mentioned the use of warm medication for the treatment of Plusta Dagdha, so as to prevent Skandana of the Sonita.

Durdagda chikitsa[16]

शीतामुष्णां च दुर्दग्धेक्रियांकुर्याद्भिषक्पुनः |

घृतालेपनसेकांस्तुशीतानेवास्यकारयेत्| (Su.Su.12/22)

Acharya Sushruta mentions the use of both warm and cold medication in this type of burn. Acharya Dalhana, commented on it saying that; if it is a deep burn then internal medicine having cold active principles should be used and if it is a superficial burn then drugs having warm active principles to be used. For external application - Ghrita Lepa, Seka and cold application is used.

Samyak dagda chikitsa[16]

सम्यग्दग्धेतुगाक्षीरीप्लक्षचन्दनगैरिकैः |

सामृतैःसर्पिषास्निग्धैरालेपं [१९] कारयेद्भिषक् ॥२३॥

ग्राम्यानूपौदकैश्चैनंपिष्टैर्मांसैःप्रलेपयेत् |

पित्तविद्रधिवच्चैनंसन्ततोष्माणमाचरेत् [२०] ॥ (Su.Su.12/23-24)

As per Acharya Sushruta advises Lepa prepared of Tugakshiri, Plaksha, Chandan, Amrita & Gairik with Gritha can be used as local application. Paste of flesh of animals like horse, pig etc. may also be used as Lepa. If there is continuous burning sensation then line of treatment should be same as Pittaj Vidradhi.

Atidagda chikitsa[16]

अतिदग्धेविशीर्णानिमांसान्युद्धृत्यशीतलाम् |

क्रियांकुर्याद्भिषक्पश्चाच्छालितण्डुलकण्डनैः ||२५||

तिन्दुकीत्वक्कपालैर्वाघृतमिश्रैःप्रलेपयेत् |

व्रणंगुडूचीपत्रैर्वाछादयेदथवौदकैः ||२६||

क्रियां च निखिलांकुर्याद्भिषक्पित्तविसर्पवत्| (Su.Su.12)

As per Acharya Sushruta, Atidadagdha is similar to advanced third / fourth degree burn, management included surgical removal of dead tissue followed by medical treatment by above mentioned drugs as local application. Acharya Sushruta indicated to avoid bandages on affected part, the area should be covered with wet Guduchi, KamalPatra etc. the rest of treatment should be same as PittajVisarpa (erysipelas). Gauryadi Ghrita for local application.

Acharya Sushruta has specially mentioned regarding Burns that caused by the Vaidya while performing Agnikarma for therapeutic reasons. They are;

Twak dagda[12]

शब्दप्रादुर्भावो दुर्गन्धता त्वक्सङ्कोचश्च त्वग्दग्धेII

If the burn caused in twak the symptoms includes Charring sound, Foul smell and Shrinking of skin.

Mamsa dagda[12]

कपोतवर्णताऽल्पश्वयथुवेदना शुष्कसङ्कुचितव्रणता च मांसदग्धे II

In Mamsa Dagda, there will be less inflammation, Discoloration, Shrinking and contraction of muscles.

Sira and Snayu dagdha[12]

कृष्णोन्नतव्रणता स्रावसन्निरोधश्च सिरास्नायुदग्धेII

In Sira Snayu Dagda, there will be blackish discoloration, Elevated swelling and Excessive exudation.

Sandhi dagdha[12]

रूक्षारुणताकर्कशस्थिरव्रणताचसन्ध्यस्थिदग्धेII

Sandhi Dagda Lakshanas include Dryness, Redness, Rough texture and Formation of wound.

DISCUSSION

Dagdhavrana is an important concept in Ayurveda, especially as described in the SushrutaSamhita, one of the oldest texts on surgery. AcharyaSushruta emphasizes the significance of understanding the intensity of burns, which is determined by the type of heat responsible for the injury. In the context of Agnikarma (Therapeutic heat treatments), the VaidyakrutaDagdha classification is used to gauge the depth and severity of a burn. Sushruta provides detailed descriptions of how burns manifest based on the layers of tissue involved, offering a deeper insight into their progression and symptoms.

For treating severe burns, particularly Plushta Dagda (Deeply charred burns), Ushna Chikitsa (Heat-based therapy) is the preferred approach. However, Seetopachara (Cooling treatments) is strictly contraindicated in such cases, as it may cause Skandathwa of Shonita—a stagnation of blood flow. This stagnation inhibits the body's ability to dissipate heat effectively, trapping it in the affected area and leading to further tissue damage.

Additionally, Swedana (Inducing sweating) is beneficial in these situations, as it helps promote the Vilayana of Shonita, which enhances local circulation. This process aids in cooling the affected area by dissipating heat and preventing further harm to the tissue.

In the VranalepanabandhanaVidhi Adhyaya, AcharyaSushruta addresses the importance of proper wound dressing, and specifically advises against using Bandhana (Bandaging) in the acute phase of burn injuries, including DagdhaVrana. Bandaging a burn wound too early can lead to Mamsapaka (Breakdown of muscle tissue), which exacerbates the injury and impairs healing. This aligns with modern medical understanding, where tight bandages or excessive covering are avoided in the acute stages of burns to prevent further complications such as infection, overheating, or restricted blood flow.

In essence, the Ayurvedic perspective on burns, as outlined by AcharyaSushruta, emphasizes a tailored approach that takes into account the severity of the burn, its impact on the body's tissues, and the most effective methods for promoting healing while preventing additional damage. Modern allopathic medicine concurs with many of these principles, particularly regarding the importance of careful temperature management and circulation in burn treatment.

CONCLUSION

In regard to etiology, clinical features, degree of burn, types and treatment modalities described by Acharya Sushruta resemble those described in other contemporary system of medicine.

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