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Understanding Wound from the Past to the Present

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ABSTRACT: We humans had to deal with wounds since we existed. From a simple cut to large bleeding wounds, there are many varieties. Wounds are described by the time and level of understanding of humans. This article is a small attempt to study wounds from different literature and to evaluate their current situation.

KEYWORDS: Vrana, Wound Healing, Historical Review

INTRODUCTION

Wounds are a result of insult to viable tissues of any kind. The main dilemma was with the professionals dealing with these. Wounds also evolved from simple cut and burn wounds to large infected ones with time as the causes of wounds showed changes and hence the understanding of wounds by humans also changed. From the Vedic era to the newly developed world, the wound is understood with some development each time to reveal new chapters in its path.

VEDIC ERA (1500 B.C. to 600 B.C.)

Rigveda

- The war between Aryans and non-Aryans depicted *Kṣat Vraṇa*.
- Lord *Indra* performed surgery by making an incision at the neck without applying a tourniquet. Afterward, the wound was sutured and eventually healed in time.
- In reference to the head transplant of *Yagya* (*Madhu Vidya* and *Kaksya -Vidya*) (*Vidya Rig.* 1/116/12, 1/117/22, 1/119/09)

There is a description of a major injury of the leg of Queen *Viśpalā*, on the battlefield, the *Ashwini Kumaras* amputated the wounded leg, and an artificial limb was placed (*Rig*. 1/112/10, 1/116/115).

Samaveda

- In reference to the *Vraṇa Ropaṇa* of an injured prince (*Jamini Brahmana* 3/94-95).

Atharvaveda

उपजीका उद्भरन्ति समुद्रादधि भेषजम् । तदास्रावस्य भेषजं तदु रोगमशीमत् ॥

(काण्ड 2 आरोग्य सूक्त 4)

अदो यद्वधावत्यवत्कमधिपर्वतात.....तदास्रावस्य भेषजतदु रोगमनीनशत् ॥

(काण्ड 2 आरोग्यसूक्त 1.5)

- Use of *Mānsa Rohiṇi* for *Vraṇa Ropaṇa* (6/139/5).
- *Laksha* for *Vraṇa Rohana* and hemostasis (*Kaushikasutra* 28/5/14).

- *Rakśoghna Dravyas*.
- *Śītala Jala Dhārā* for haemostasis in *SadyoVraṇa* (8/9/1-10)
- *Gomutra* in *Vraṇa*.
- Exploration of *Pakva Vraṇa* (*Brahmana*).
- Use of salt for *Apakva Vraṇa* (*Atharvaveda* 7/10/1-2).
- *Sastra Kṣat* is mentioned in the *Kaushika Sutra.*

Yajurveda

- *Kṣat Roga* is mentioned.

PAURĀNIKA TIME PERIOD

2.1.2.1 Rāmāyaṇa (1500 B.C.)

- "*Sanjivani Jaddibutti*" is mentioned as *Vishalya Karni*, *Vraṇa Sandhanakara,* and *Vraṇa Svarnakara* by *Tulsidas* (*Srimad Valmiki Ramayan* 74 Chap., *Yuddakanda Shoaksha* 29-34)

2.1.2.2 Mahabharata (1500 B.C.)

- In the battle of *Kurukshetra*, soldiers brought with them first aid kits, having *Madhu*, *Ghṛta, Taila*, and *Vasa* for local application to reduce pain and for wound healing. Emperor *Yudhisthira* appointed *Vraṇa Vaidya* in his army to treat wounded soldiers.

2.1.2.3 Purāṇa Sāhitya (600 B.C.)

- ***Agnipurana*:** local application of *Doorva* on wounds for haemostatic purposes. And a description of surgical wounds. (*Agnipurana* 31.18-36)
- ***Kautilya Arthashastra*:** Any injury that causes bleeding apart from *Duṣṭa Vraṇa* or *Duṣṭa Rakta* is punishable.
- ***Jatakamala*:** Painful, pus-filled pockets referred to as *Duṣṭa Vraṇa* should be cautiously accessed and drained. The application of salt to the wound induces pain.
- ***Harshacharita*:** Complications such as shock, collapse, and unconsciousness are mentioned in cases of fresh wounds accompanied by pain and bleeding. Challenges in managing and stopping bleeding in wounds located in *Hruth Pradesha* are mentioned. Cotton fabric was used for bandaging, and in certain situations, it was quoted that the fine bark of the trees was required to cover the wounds.
- ***Kaadambari*:** Constant friction and severe injuries result in wounds that cause organ problems; scars persist even after the wound heals.

2.1.2.4 Buddha Kala (600 B.C.)

- *Mahavagga* (*Buddhist* tradition)- *Vraṇa* and *Pooya* underwent a treatment involving the external application of *Kṣār*. This resulted in the discharge of pus, a procedure performed after the inflammation was reduced, and thereafter, they were managed as wounds.
- Management of *Vraṇa* using *Dhoopana*, *Taila, Varti, Lepa* and *Kwath*.
- Bandaging and using *Tila Kwatha*.
- *Dhoopana Taila* and *VraṇaRopaṇarrth Taila* are the drugs also mentioned for *Vraṇa Ropaṇa*
- Salt *Kankari* for cutting off extra-grown *Mamsa*.

2.1.2.5 Maurya Kala (363-211 B.C.)

- Management of *Vraṇa* by "*Malhara Ksara Proyaga*". (*Bhadant Nagsen*)

SAṂHITĀ KĀLA

2.1.3.1 Suśruta Saṃhitā (1000BC)

- Being a pioneer in *Shalya Tantra, Suśruta Saṃhitā* mentions all the aspects of *Shalya Tantra* including wounds and their types and management.
- Detailed review of *Vraṇa*
- *Nasa Karna Khandoshtha Sandhana*
- *Sainya Cikitśā* in *Yuktasainya Adhyaya*
- Various herbs for wound management for local and systemic usage.
- Clinical assessment of wound, union
- Dos and don'ts for wound
- Bad prognosis for a wound according to symptoms

2.1.3.2 Caraka Saṃhitā

- The *Dvivraniya Adhaya* addresses *Vraṇa* and *Vraṇa* management in *Cikitśāsthana*.

2.1.3.3 Bhela Saṃhitā

- Similar to *Caraka, Bhela* explains *Vraṇa* management in *Cikitśā Sthana*.

2.1.3.4 Harita Saṃhitā

- Chapter 45 deals with *Vraṇa Cikitśā*, 7 types of *Doshaja Vraṇa*, 6 steps of *Vraṇa* management, and 4 types of *Agantuja Vraṇa*.

2.1.3.5 Kashyapa Saṃhitā

- *Nija* and *Agantuja Vraṇa* management especially in mother and the child.

***Navnitka* (2nd century)**

1st and 2nd *Khanda* deal with the management of *Vraṇa* using various types of *Lepas* and *Taila*.

SAṂGRAHA KĀLA

2.1.4.1 Aṣṭāṅga Saṃgraha (5th Century)

- Classification of wound and stages of wound healing
- Preparation and local application of *Ghṛta* and *Taila*-based ointments.

2.1.4.2 Aṣṭāṅga Hridaya

- Various aspects, types, and management of *Vraṇa* are explained in various chapters
- *Jatyadi Ghṛtam* for *Vraṇa*
- *Talisadi Tailam* for *Sadyo Vraṇa*

2.1.4.3 Mādhava Nidāna

- Description of types, characters, and classification of *Vraṇa* in chapter 41
- Description of *SadyoVraṇa/ Agantuja Vraṇa* in chapter 42.

2.1.4.4 Chakradutta

- Preparation of *Doorvadi Tailam* and other formulations and their therapeutic uses.
- Various formulations for *Duṣṭa Vraṇa* like *Triphala Guggulu*, and *Amritadi Guggulu*.

2.1.4.5 Vranda Madhava (9th century)

- Management of *Agantuja Vraṇa* by *Jatyadi Ghṛta*

2.1.4.6 Yoga Ratna Sammuccaya

- Description of *Tailaadhikara* and *Kashayasdhikara* amongst ten *Adhikaras* for wound management.

2.1.4.7 Sharangdhara Saṃhitā (13th century)

- *Taila* for *Vraṇa* under *Taila Kalpana* in *Purva Khand*

- Application of *Nimba Dala Kalka* in the management of *Vraṇa* and *Duṣṭa Vraṇa*.

2.1.4.8 Satasloki (Bopadevasataka 13th century)

- *Vraṇa* description in chapter *Taila Prakarana*

MODERN PERIOD (1501 A.D. ONWARD)

2.1.5.1 Bhava Prakasa (16th century)

- Details about *Vraṇa*, *Vraṇa-Sotha, Vraṇa Shodhana*, and *Vraṇa-Ropaṇa* can be found in *Cikitśā Sthana* chapter 47. There is also discussion on the many drugs and their uses, specifically concerning healing.

2.1.5.2 Yoga Chintamani (17th century)

- In the *Mishraka Prakarana*, references to *Lepa, Malhama*, and other formulations.

2.1.5.3 Vaidya Vallabha (1726)

- Mention of using *Lepa*, which is made of wax, resin, and soap, when discussing the treatment of *Pada Vraṇa*.

2.1.5.4 Mugal Kala (1175–1836)

- *Sainya Cikitśā* and plastic surgery, particularly *Nasa Sandhana* are described during this period.

2.1.5.5 Bhaisajya Manimala (1953)

- *Krisharam Bhatt* describes *Unani Malham*

MODERN SYSTEM OF MEDICINE

The oldest documented evidence of a healing individual with a wound dates back to a cave drawing in Spain, approximately 20,000 to 30,000 years ago, marking an early record of wounds during the Stone Age.

Throughout the earliest historical accounts, it becomes evident that the Aryans possessed knowledge about healing, not only from an observational standpoint but also in terms of practical management. Hippocrates, for instance, utilized vinegar for irrigating open wounds and employed dressings.

Building upon the knowledge inherited from the Egyptians, the Greeks enhanced wound management by classifying wounds into acute or chronic categories. Galen of Pergamum, renowned as the physician to the Roman gladiators during 120-201 A.D., faced a considerable caseload of injuries resulting from gladiatorial combat. He stressed the significance of preserving a moist environment to facilitate proper healing. Remarkably, it wasn't until nearly 19 centuries later that scientific validation emerged for this concept. Research demonstrated a 50% increase in epithelialization rate within moist wound environments compared to dry ones, underscoring the importance Galen had advocated centuries earlier.[1]

In the 16th century, during the Renaissance, the understanding of anatomy and surgery saw notable improvements. However, medical practices were still influenced by ancient beliefs, and wound care often involved poultices, herbal remedies, and cautery. Ambroise Paré, a French barber-surgeon of the 16th century, made substantial contributions by rejecting the use of boiling oil for wound treatment and promoting more humane alternatives. Theodoric of Cervia, Ambroise Paré, and Guy de Chauliac each observed that clean wounds, when promptly closed, had the potential to heal without infection or pus formation.[2]

The 17th century witnessed the establishment of organized military medicine. Military surgeons of this era formulated protocols for managing wounds on the battlefield. William Harvey's introduction of ligatures for hemorrhage control emerged as a crucial development during this period, demonstrating the intersection of surgical innovation with anatomical understanding.

The 18th century saw further progress in wound care, with notable developments in hygiene and aseptic techniques. The work of Scottish surgeon John Hunter emphasized the importance of cleanliness and paved the way for the principles of modern wound care.

The 19th century marked a significant leap in surgical techniques and anesthesia. Ignaz Philipp Semmelweis observed lower rates of puerperal fever when medical students washed their hands with soap and hypochlorite before attending childbirth. The groundbreaking contributions of Ignaz Semmelweis underscored the significance of hand hygiene in decreasing the occurrence of infections. Louis Pasteur's work dispelled the theory of spontaneous germ generation, while Joseph Lister's use of phenol drastically reduced postoperative mortality rates. This led to innovations like Robert Wood Johnson's antiseptic dressing made of cotton gauze impregnated with iodoform.[3]

In the early 20th century, the extent of wound infections became apparent through conditions resembling war-induced necrotizing infections. World War 1 brought about novel types of wounds caused by high-velocity bullets and shrapnel injuries, exacerbated by contamination from trench mud. The advent of antibiotics, such as penicillin, transformed the treatment of wounds by effectively combating bacterial infections. The use of antiseptics gradually declined in favor of antibiotics, marking a pivotal moment in wound management.

Throughout the 20th century, advancements in wound dressings, surgical techniques, and medical technologies continued to improve patient outcomes. The development of synthetic materials, such as polymers and bioactive dressings, further enhanced wound healing.

In the 21st century, the field of wound care has seen continued progress with the integration of advanced technologies, including growth factors, stem cells, and bioengineering. The focus has shifted toward personalized medicine, taking into account individual patient factors for optimal wound management. Currently, wound healing comprises the utilization and management of inflammatory cytokines, growth factors, bioengineered tissue, and various other modalities to enhance and optimize the healing process.

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