

PLATELET-RICH PLASMA VERSUS AYURVEDIC LOCAL THERAPIES IN CHRONIC ULCERS: A COMPARATIVE REVIEW**Dr. Bhagya Shaji***

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ABSTRACT

Chronic ulcers are injuries which do not heal in a proper and timely way and generally continue for more than three months even when appropriate treatment is given. They place a heavy burden on the healthcare system due to the long period of treatment, frequent infections, a lower quality of life, and greater healthcare costs. Diabetes mellitus, venous insufficiency, peripheral arterial disease, pressure injuries, and trauma are some of the main causes of chronic ulcers. Since conventional wound care generally leads to unsatisfactory results, there has been a search for advanced regenerative therapies as well as complementary traditional methods. Platelet-Rich Plasma (PRP) has become an important form of biological treatment since it provides a high concentration of

autologous platelets which contain growth factors and thus speed up tissue regeneration. In Ayurvedic medicine, chronic ulcers are referred to as Dushta Vrana and are managed according to the principles of Vrana Shodhana (cleansing of the wound) and Vrana Ropana (healing of the wound) by means of herbal preparations such as Jatyadi Taila, Panchavalkala Kashaya, Madhu (honey), Ghrita preparations, and other local therapies. The present review compares the principles, mechanisms of action, clinical evidence, advantages, limitations, and future prospects of PRP and Ayurvedic local therapies as they relate to the management of chronic ulcers.

KEYWORDS: Platelet-Rich Plasma, Chronic Ulcer, Dushta Vrana, Jatyadi Taila, Vrana Shodhana.

INTRODUCTION

A wound is considered to be chronic if it does not go through the usual stages of healing within a expected time frame, generally over twelve weeks.^[1] The normal course of wound healing includes four overlapping stages: haemostasis, inflammation, proliferation, and remodeling. If any of these stages are disrupted because of infection, ischemia, diabetes, malnutrition, or repeated trauma, this leads to delayed healing and the development of a chronic ulcer.^[2,3] Around the world, chronic wounds affect millions of people and cause a significant socioeconomic burden as a result of frequent hospital visits, the need for prolonged antibiotic treatment, surgical interventions, and loss of productivity.^[3] Alone, diabetic foot ulcers affect almost one-quarter of all diabetic patients during their lifetime and are still one of the main causes of non-traumatic amputations of the lower limb. Modern medicine has introduced a number of advanced treatments such as Platelet-Rich Plasma (PRP), stem-cell therapy, skin substitutes, and growth factor-based treatments in order to speed up the healing process.^[4] PRP in particular has attracted a great deal of attention since it is derived from the patient's own blood and thus helps to reduce immunological reactions while at the same time promoting tissue regeneration via concentrated growth factors.^[5] Ayurveda gives a thorough account of wound treatment in the section on Vrana Chikitsa. Sushruta, who is known as the Father of Surgery, set out the Shasti Upakrama (sixty therapeutic measures) for the management of wounds and stressed the importance of wound cleansing, controlling infection, and promoting tissue regeneration by means of herbal medicines and local treatments.^[6] These principles still have an influence on Ayurvedic surgical practice nowadays.

Pathophysiology of Chronic Ulcers

Chronic ulcers are characterized by ongoing inflammation, the presence of bacteria, excessive protease activity, a lack of angiogenesis, decreased fibroblast proliferation, and faulty collagen synthesis.^[2] The elevated levels of matrix metalloproteinases (MMPs) cause degradation of the extracellular matrix proteins and prevent normal tissue repair.^[7] At the same time, a decrease in the expression of growth factors slows down epithelialization and the formation of granulation tissue. In the case of diabetic ulcers, hyperglycaemia leads to damage of the microvessels, neuropathy, a malfunction of the leukocytes, oxidative stress, and a reduced immune response, which in turn makes the wounds more prone to infection and slower to heal.^[8] The same pathological mechanisms are found in venous ulcers, since venous hypertension and chronic inflammation disrupt tissue oxygenation. The Ayurvedic

system identifies these pathological features as Dushta Vrana, a condition marked by a bad odour, a large amount of discharge, pain, unhealthy granulation tissue, discoloration, and slow healing as a result of the vitiation of the Doshas and the contamination of the local tissues.^[9]

Platelet-Rich Plasma

Platelet-Rich Plasma is a plasma preparation which is autologous and has a platelet concentration three to five times higher than that found in normal blood.^[4] It is made by centrifuging whole blood and is then activated before it is applied, in order to cause the release of the growth factors stored in the alpha granules of the platelets. These growth factors include Platelet-derived growth factor (PDGF), Transforming growth factor-beta (TGF- β), Vascular endothelial growth factor (VEGF), Epidermal growth factor (EGF) Insulin-like growth factor (IGF), Fibroblast growth factor (FGF) etc. These mediators promote fibroblast proliferation, angiogenesis, collagen synthesis, epithelialization, extracellular matrix remodeling, and stem cell recruitment and thus speed up wound healing.^[5,10] PRP also has antimicrobial properties and regulates inflammatory cytokines, thus producing a favourable environment for tissue regeneration.^[11]

Clinical Applications of PRP

PRP has been successfully used in diabetic foot ulcers, venous leg ulcers, pressure ulcers, traumatic wounds, surgical wounds, burns, plastic and reconstructive surgery. Randomized controlled trials have consistently shown that compared to conventional dressings there is faster wound contraction, earlier epithelialization, less pain, and higher rates of complete healing.^[12,13] The systematic review carried out by Martinez-Zapata et al. found that PRP significantly improves healing outcomes in chronic wounds while keeping an excellent safety profile.^[14]

Ayurvedic Concept of Dushta Vrana

Sushruta defined Vrana as a disruption of the body's tissues and Dushta Vrana as wounds which heal slowly because of vitiation of the Dosha.^[6] The characteristics of such wounds are a bad odour, unhealthy granulation tissue, a continuous discharge, discoloration, intense pain, and a chronic condition. Management is based upon two fundamental principles like vrana shodhana and vrana ropana. The 60 therapeutic measures (Shasti Upakrama) described by Sushruta are washing, fumigation, the application of herbs, bandaging, cauterisation, alkali therapy, bloodletting, and various surgical interventions according to the nature of the

wound.^[6]

Important Ayurvedic Local Therapies

Jatyadi Taila

Jatyadi Taila is one of the most commonly used wound-healing oils in Ayurvedic practice and the ingredients involved including Jati, Neem, Haridra, Daruharidra, and Tutha have antimicrobial, anti-inflammatory, antioxidant, and wound-healing properties.^[15] Clinical studies have shown a reduction in wound discharge, better granulation tissue formation, and quicker epithelialization.

Madhu (Honey)

Honey has long been suggested for use in the management of wounds. Because of its high osmolarity, acidic pH, the production of hydrogen peroxide, and the presence of phytochemicals, it prevents bacterial growth without disrupting the moist environment of the wound.^[16] It also promotes autolytic debridement, reduces oedema, stimulates angiogenesis, and speeds up epithelialization.^[17]

Panchavalkala Kashaya

Panchavalkala is made up of the bark of five species of Ficus and is generally used as a solution for irrigating wounds. It has the taste known as Kashaya Rasa and exhibits antimicrobial action, anti-inflammatory effects, and is astringent so as to decrease exudate and promote proper wound healing.^[18]

Yashtimadhu Ghrita

Yashtimadhu has glycyrrhizin and flavonoids which have antioxidant and anti-inflammatory effects. Ghrita acts as a bioenhancer and ensures that an optimal moist environment is maintained for tissue regeneration.^[19]

Neem Preparations

Neem has antibacterial, antifungal, antiviral, antioxidant, and immunomodulatory properties, which means it can be used in the case of infected chronic ulcers.^[20]

Comparative Mechanism of Action

PRP mainly operates via regenerative medicine by introducing a concentrated amount of the body's own growth factors directly into the wound, which in turn promotes angiogenesis, fibroblast proliferation, collagen deposition, and the formation of the extracellular matrix.^[5,10]

On the other hand, Ayurvedic local treatments act via a number of mechanisms such as antimicrobial activity, a reduction of inflammation, antioxidant effects, the maintenance of wound moisture, the promotion of granulation tissue, and the enhancement of normal healing processes.^[6,15,16] While PRP mainly focuses on cellular regeneration, Ayurvedic therapies at the same time deal with infection control, inflammation, tissue nutrition, and wound purification.

Comparative Advantages and Limitations

PRP promotes quick healing, is very safe because it is autologous, and has strong support from randomized clinical trials. The procedure, however, does require specialized equipment, trained staff, blood collection, centrifugation, and involves relatively higher treatment costs. Ayurvedic treatments are economical, widely available, easy to administer, and appropriate for repeated use in settings with limited resources.^[6] Their antimicrobial and anti-inflammatory effects are especially advantageous in the case of infected wounds. However, high-quality multicentre randomized controlled trials and standardized formulations are still scarce.

Future Perspectives

Future studies should assess the combined use of PRP with Ayurvedic local treatments. PRP could yield synergistic effects when applied following thorough wound cleansing using Panchavalkala Kashaya or Jatyadi Taila, since this combines the purification of the wound with stimulative action for regeneration. However, before integrated treatment guidelines can be established, well-designed multicentre clinical trials, standardised preparation protocols, molecular studies, and cost-effectiveness analyses are required.

CONCLUSION

Both Platelet-Rich Plasma and Ayurvedic local treatments have shown great promise in the management of chronic ulcers. PRP is a scientifically backed regenerative treatment, with strong clinical evidence showing that it promotes accelerated angiogenesis, collagen synthesis, and tissue repair.^[5,14] Ayurvedic local therapies, which are based on the principles of Vrana Shodhana and Vrana Ropana, offer a comprehensive and cost-effective method that includes antimicrobial, anti-inflammatory, antioxidant, and wound-healing effects.^[6,15] Instead of viewing these therapies as opposing methods, future evidence could support an integrative approach which combines the regenerative advantages of PRP with the wound-cleansing and healing ideas of Ayurveda; such an integrated method has the potential to

improve healing results, decrease complications, and raise the quality of life for patients who have chronic ulcers.

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