

STARS therapy: "Sandeep's technique for assisted regeneration of skin"

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ABSTRACT

Background: The wound management is a huge complex problem consuming billions of dollars. The standard treatment includes advance therapeutics with drugs (such as antibiotics), intense local dressings (such as negative pressure/antimicrobial) and multiple surgical interventions/reconstructions. Such intervention and modalities requires experts and large resources. Still the outcomes are unpredictable and associated with morbidities at donor (otherwise normal) sites. **Materials and Methods:** The "Sandeep's Technique's for Assisted Regeneration of Skin" (STARS) is therapy for complete healing of wounds with Autologous self activated Platelet Rich Plasma (PRP), imparted as local subcutaneous infiltrate in the wound margin, on every 4th day, till complete repair takes place and local skin regenerates. The wounds are dressed daily/alternate day with only moist saline. It is a Pilot study of patients treated with STARS Therapy treated at Acharya Vinobha Bhave Rural Hospital, J.N. Medical College, Wardha, INDIA. The different types of wounds were acute wounds with exposed deep tissues such tendons and bones; compound fractures; infected wounds; necrotising post surgical flaps and chronic non healing ulcers including diabetic and pressure ulcers. **Result:** All the wounds healed by PRP infiltration not requiring any further drugs, complex dressings and surgical reconstruction. **Conclusion:** It is safe, effective, efficient, and easily reproducible technique with predictable results for even complex wounds in which surgical reconstructions are not possible. This method of treatment is a huge step forward in preservation of resources and prevention of morbidity.

Keywords: Autologous platelet rich plasma, complex wounds, Sandeep's technique for assisted regeneration of skin-therapy

Introduction

Wounds are at times very complex problem to deal with as it may get associated with chronicity, comorbidities such as diabetes, nonhealing, persistent infections and poor local biology such as

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loss of sensations. These are very difficult to manage and needs multiple modalities including complex local care such as with negative pressure therapy, antimicrobial dressings; antibiotics and multiple stage surgeries such as debridements, reconstructions with skin gratings, rotational flap or free flaps.^[1] Such modalities are associated with further morbidities of the donor site, risks and side effects of pharmacological agents, antibiotic resistance, etc.

Ross *et al.*^[2] first described growth factor from platelets. The regenerative medicine as being evolved in this era, offers a strong ray of hope to overcome many diseases. The key regenerative biologic product includes stem cells, mesenchymal cells, and platelets. Platelet as blood product is being used as platelet rich plasma (PRP) and have very promising results for the treatment of various impairments including of tendons and bones.^[3,4] It is also used as local gel application for local care in the treatment of wounds, concurrent (adjunct) to existing wound management practices.^[4-8] The early results, as reported in literature are encouraging.^[9,10]

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Materials and Methods

The authors have developed a novel therapy “Sandeep’s technique for assisted regeneration of skin” (STARS) which for the first time uses autologous PRP as local infiltration’s for wound healing and as a definitive therapy for wound management. This therapy uses autologous PRP as the regenerative product for assisting the natural wound healing. The “STARS” is intended to be the biotechnological intervention for assisting the skin regeneration and subsequent wound coverage, leading to complete wound healing.

The technical details are as following:

a. Preparation of PRP

Out of very many methods being developed for PRP separation and preparation, we have chosen the following, as it is simplest and can be easily reproduced with minimum and low-cost equipment.

This is as following:

This is a standard double spin method, using 20 ml of venous autologous blood, freshly drawn from the patient. The 5 mL blood is then transferred to 4 EDTA test tubes each and centrifuged at 2000 rpm for 15 minutes. RBCs will be settled in the lower portion of test tube where as plasma in upper part. Plasma is extracted and collected in separate test tube and further re-centrifuged at 1200 rpm for 10 minutes. The plasma further separates into upper buffy coat which platelet poor plasma (PPP) and the lower 2-4 mL layer containing platelet rich plasma (PRP).

The centrifuge machine used is simple noncooled one. The centrifuge process is standard with balancing tubes in place. The process is performed at a room temperature of 22–24°C. This autologous PRP is then utilized as the standard regenerative biologic product for STARS therapy.

b. “STARS” therapy protocol

The protocol involves following:

- This Autologous PRP is then transferred to a 10 ml syringe and locally infiltrated in the wound margins through a 22 G needle, just like a local infiltration of local anesthesia, at a distance of approximately 0.2 mL/cm with equal quantity
- The process is repeated every 4th day (gap of 3 days)
- Local dressing is performed on alternate days, with moist saline only
- Diluted Cetrimide and chlorhexidine gluconate solution (Savlon) both are given to wounds that are dirty
- No further major surgical intervention such as debridements or reconstructions with flaps/grafts are undertaken
- No antibiotics are given unless life-threatening or for treating any co-morbid infections. From infected wounds swabs are taken for culture and sensitivity every week, to monitor the infection status of wound
- No analgesics are given unless the pain visual analog scale score is 7 or more
- Only Vitamin C tablets twice daily are given.

It is an innovative therapy with autologous PRP as a monotherapy.

The current mode and manner include uses 50 ml of venous blood, than further activation of PRP, development of it as a gel and local application of this gel over the wound (mostly every 7th day). This is carried along with the standard treatment of wound, which goes concurrently. The current focus is using PRP as a local application over wounds than as a definitive regenerative therapy.

STARS therapy has distinct advantages, as it focus on the simple manner of preparation, uses a low volume of venous blood (only 20 ml) and is infiltrated in the wound margins. It is used as definitive therapy for tissue repair and regeneration without the use of intense local care, antibiotics, and further surgeries.

The STARS therapy is an entirely different concept. It is basically based on utilizing the growth factors (such as vascular and endothelial) inflammatory and phagocytic (ILN4, ILN6, alpha tumor necrosis factor, etc.),^[11] and antimicrobial properties^[12] of PRP for enhancing wound healing in a natural way and assisting the regeneration of skin from the margins.

It is developed with the intention of keeping it reproducible at all level of health care including primary, which can be imparted by any trained physician, who have accessibility to a low rpm centrifuge machine, which in Indian market costs only Rs. 25,000–35,000.

We have used this technique for management of many types of wounds with excellent results.

Results

Twenty patients were prospectively included in the study and were given PRP infiltration according to above protocol. The mean age of patients was 40 and average PRP infiltrations required were 9. All wounds showed encouraging signs of healing and healed almost completely. The wound healing was achieved in patients with juvenile diabetic with non healing ulcer [Figure 1]. Excellent wound coverage was observed in patients with compound fractures and bone deep pressure sores in paraplegic patients where flap surgery was advised by the plastic surgeon [Figures 2 and 3]. No complications were seen during the course of study.



Figure 1: 19-year-old female, juvenile diabetic with uncontrolled sugar levels with nonhealing ulcer of the left foot. Near complete healing after treatment with 8 Sandeep’s technique for assisted regeneration of skin therapy session



Figure 2: A 27-year-old male, 1 month old compound infected fracture of left tibia, previously failed treatment by vacuum assisted device: Complete healing after 5 Sandeep's technique for assisted regeneration of skin therapy session

Discussion

The regenerative medicine holds promising future to many untreatable and complex problems.

The current solutions and treatment are associated with unpredictable results and involves huge resources including involvement of expert care, which is not available at all the places.

The current treatment with regenerative biologic products is costly, limited to few places and cannot be imparted by everyone as it involves complex cell culture processes.

This "STARS" therapy with autologous PRP as biotechnological intervention for wound management is safe as its uses autologous venous blood; is easily reproducible; can be widely accessed and is effective; leading to complete healing.

It has the potential to be the game changer and perhaps the ideal management for wounds without the involvement of any pharmacological drugs/devices and their risks; any major surgical interventions and its morbidities; any need for experts and hence restricting the accessibilities.

It is perhaps also far much cheaper than current standard care of the wound.

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Conflicts of interest

There are no conflicts of interest.



Figure 3: A 67-year-old female with a bone-deep pressure sore: Near complete healing after 5 Sandeep's technique for assisted regeneration of skin session

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