

## Role of Autologous Bone Marrow Aspirate Therapy in Pediatric Scald Burns

Azhagu Sivani V<sup>1</sup>, Ravi Kumar Chittoria<sup>2</sup>, Barath Kumar Singh P<sup>3</sup>

### How to cite this article:

Azhagu Sivani V, Ravi Kumar Chittoria, Barath Kumar Singh P/Role of Autologous Bone Marrow Aspirate Therapy in Pediatric Scald Burns/Int J Pediatr Nurs. 2023;9(2):79-81.

### Abstract

Aim of this case report is to assess role of Autologous bone marrow aspirate in pediatric scald burns. Clinical examination of the extent of the burn was done. Standard management (antibiotics, Intravenous Fluids, analgesics, Dressings, regenerative therapies, scar management) of the burns was done along with that autologous bone marrow aspirate. Autologous bone marrow aspirate is effective in preventing scald burns. Bone marrow aspirate may be used preventing scald burns.

**Keywords:** Autologous bone marrow aspirate therapy; Pediatric scald burns; Prevention; Regenerative therapy; Burns.

## INTRODUCTION

Wound healing in case burn scars can be considered as a coordinated process involving complex mechanisms that proceeds in various stages from blood clotting to inflammation, cellular proliferation, angiogenesis, and

reconstruction of extracellular matrix. Failure of any of these processes due to ischemia, reperfusion injury, bacterial infection, or aging can result in chronic inflammation and a non-healing wound. In this article we discuss the role of autologous bone marrow aspirate therapy in pediatric scald burns.

## MATERIALS AND METHODS

The study is done in a tertiary care hospital in South India. The subject is a 1.5 years old female, with no comorbidities, with alleged history of accidental spill of hot milk over right side of chest right arm and forearm and sustained Accidental scald 2nd degree 14% TBSA involving head and neck on 23/03/23

Patient was admitted in Burns ICU (JIPMER), managed with antibiotics, IV Fluids, analgesics. Dressings done, regenerative therapies done and scar management done. VSS score at the time of admission was 6/13.

**Author Affiliation:** <sup>1</sup>Junior Resident, Junior Resident, Department of Oral and Maxillofacial Surgery, <sup>2</sup>Professor and Registrar (Academic), Head of IT Wing and Telemedicine, Department of Plastic Surgery and Telemedicine, <sup>3</sup>Senior Resident, Department of Plastic Surgery, Jawaharlal Institute of Postgraduate Medical Education and Research, Pondicherry 605006, India.

**Corresponding Author:** Ravi Kumar Chittoria, Professor and Registrar (Academic), Head of IT Wing and Telemedicine, Department of Plastic Surgery and Telemedicine, Jawaharlal Institute of Postgraduate Medical Education and Research, Pondicherry 605006, India.

E-mail: [drchittoria@gmail.com](mailto:drchittoria@gmail.com)

Received on: 25.04.2023

Accepted on: 01.06.2023

### 2 Cyclical NPWT were given

We used regenerative therapies like autologous bone marrow aspiration therapy over the burn injury for prevention of pediatric scald burns.

The aspirated blood was centrifuged and plasma was injected into the multiple sites in the burn wound for 3000 RPM for 10 minutes.

Before discharging the patient wound healed

well and Video dermoscopy done and scar VSS score at the time of discharge is 3/13

### RESULTS

Autologous bone marrow aspirate therapy is helpful in healing of wounds in pediatric scald burns. No complications noted with this procedure. Patient discharged successfully. (Fig. 3)



Fig. 1: At the time of admission



Fig. 2: Bone marrow aspiration



Fig. 3: Healed burn wounds

## DISCUSSION

With the increasing prevalence of burn scars, the therapies to tackle such problems have also increased. But there is substantial evidence to indicate our lacunae in the treatment of burn scars.<sup>2</sup> Stem cell therapy has been extensively studied to fill in this void. With the inherent difficulties involved in using embryonic stem cells, both from the technical and regulatory standpoints, adult autologous bone marrow derived stem cells become an attractive alternative. When bone marrow derived MSCs were linked to the origin of epidermal cells, their role in cutaneous wound healing was investigated. It is postulated that MSCs mobilize from the bone marrow niche and traffic to ischemic tissue through the peripheral circulation in response to cytokine signalling.<sup>3</sup> After reaching the site of injury, they differentiate into various cells of the epidermis and dermis. New vessel formation, or neovascularization, is a critical component of wound healing as it is necessary to supply oxygen and nutrients to and carry waste away from the damaged tissue. In vitro experiments have demonstrated that MSCs are capable of differentiating into vessel forming endothelial cells suggesting that they may contribute to postnatal vasculogenesis during the wound healing process. Another important mode of action of these MSCs is by the paracrine signalling pathways.<sup>4</sup> With the increasing evidence to prove the usefulness of stem cell therapy in wound healing, the focus of research is shifting toward modalities to optimize cell delivery as studies have shown that the clinical effectiveness of MSC therapy is dependent on the number of cells delivered. Newer modes of delivery have now been introduced with the aim of increasing the number of cells delivered and increase engraftment and reduce the impeding factors. Ichioka *et al.*, showed that bone marrow impregnated collagen matrix can promote the wound repair process through augmentation of angiogenesis.<sup>5</sup> Hydrogels, because of their hygroscopic nature of extracellular matrix, has been a preferred choice for MSC delivery.<sup>6</sup>

## CONCLUSION

Bone marrow aspirate is useful in healing of wounds in pediatric scald burns.

### Conflicts of Interest

This study does not require any institutional approval.

## DECLARATIONS:

### Authors' contributions

All authors made contributions to the article

**Availability of data and materials:** Not applicable

**Financial support and sponsorship:** None

**Consent for publication:** Not applicable

## REFERENCES

1. Mustoe TA, O'Shaughnessy, Kloeters O. Chronic wound pathogenesis and current treatment strategies: a unifying hypothesis. *PlastReconstrSurg* 2006;117:35S-41S.
2. Phillips TJ, Machado F, Trout R, Porter J, Olin J, Falanga V. Prognostic indicators in venous ulcers. *J Am AcadDermatol* 2000;43:627-630.
3. Hamou C, Callaghan MJ, Thangarajah H, et al. Mesenchymal stem cells can participate in ischemic neovascularization. *PlastReconstrSurg* 2009;123:45S-55S.
4. Kim WS, Park BS, Sung JH, et al. Wound healing effect of adipose-derived stem cells: a critical role of secretory factors on human dermal fibroblasts. *J Dermatol Sci* 2007;48:15-24.
5. Ichioka S, Kouraba S, Sekiya N. Bone marrow impregnated collagen matrix for wound healing: experimental evaluation in a microcirculatory model of angiogenesis and clinical experience. *Br J PlastSurg* 2005;58:1124-1130.
6. Lutolf MP, Hubbell JA. Synthetic biomaterials as instructive extracellular microenvironments for morphogenesis in tissue engineering. *Nat Biotechnol* 2005;23:47-55.