

Role of Autologous Bone Marrow Aspirate Therapy in Preventing Abnormal Scar in Burns

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How to cite this article:

Sushant Kaushal, Ravi Kumar Chittoria, Barath Kumar Singh. P/Role of Autologous Bone Marrow Aspirate Therapy in Preventing Abnormal Scar in Burns/Indian Journal of Medical & Health Sciences. 2023;10(2):65-67.

Abstract

Aim of this case report is to assess role of Autologous bone marrow aspirate in preventing abnormal scarring. 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 abnormal scarring. Bone marrow Aspirate may be used preventing abnormal scarring.

Keywords: Autologous Bone Marrow Aspirate Therapy; Abnormal Scar; Prevention; Regenerative Therapy; Burns.

INTRODUCTION

Wound healing in case burn scars can be considered as a co-ordinated 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 the prevention of abnormal scar in burns.

MATERIALS AND METHODS

The study is done in a tertiary care hospital in South India. The subject is a 37-year-old male, with no comorbidities came with alleged history of accidental spill of hot water over head and sustained second degree burns involving head and neck. (Fig. 1) Patient was admitted in Burns ward, managed according to standard WHO protocol with antibiotics, Intravenous Fluids, analgesics and regenerative therapies. We used regenerative therapies like autologous bone marrow aspiration therapy over the burn injury for prevention of development of abnormal scar. Bone marrow

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Received on: 08.04.2023

Accepted on: 31.05.2023

aspiration was done in the anterior superior iliac spine. (Fig. 2) The aspirated blood was centrifuged and plasma was injected into the multiple sites in the burn wound for 3000 RPM for 10 minutes. VSS score at the time of discharge was 4/13.



Fig. 1: At the time of admission



Fig. 2: Bone marrow aspiration

RESULTS

Autologous bone marrow aspirate therapy is helpful in wound healing and prevention of abnormal scarring in burns. No complications were noted with this procedure. The patient was discharged successfully. (Fig. 3)

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.²



Fig. 3: Healed burn wounds

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.³ 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.⁴ 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.⁵ Hydrogels, because of their hygroscopic nature of extracellular matrix, has been a preferred choice for MSC delivery.⁶

CONCLUSION

Bone marrow aspirate is useful in preventing abnormal scar in burns.

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