RFP Journal of Dermatology
Volume 8 Number 1, January - June 2023

New Preservative Medium for Storage of Skin Graft

Barath Kumar Singh. P[1], Ravi Kumar Chittoria[2], Jacob Antony Chakiath[3]

How to cite this article:
Barath Kumar Singh. P, Ravi Kumar Chittoria et. al./New Preservative Medium for Storage of Skin Graft/RFP Journal of Dermatology 2023;8(1):21–23.

ABSTRACT

Preserved skin grafts can either be used in staged reconstructive procedures as autografts or for temporary coverage of wounds as allografts. Although several nutrient media and techniques have been developed for storage, the conventional method of preservation is wrapping the graft in a normal saline soaked sterile gauze and refrigerating this material in a sterile container at +4°C. As normal saline contains only certain electrolytes and nothing more, it is far from physiological. For that reason, saline stored skin grafts lose some of their viability in a short period of time and become edematous. In this study we have compared viability of skin grafts stored using autologous platelet rich plasma with that of grafts stored using normal saline alone.

Keywords: Preservative; Medium; Storage; Skin Graft.

INTRODUCTION

There is not an ideal or universally acknowledged medium for the preservation of skin grafts. In previous studies, Roswell Park Memorial Institute 1640 solution (RPMI) was reported superior to other media including Eagle's minimal essential medium, Euro-Collins preservation fluid, University of Wisconsin solution, Histidine-tryptophan-ketoglutarate solution, and saline.[1] Basaran et al. explained this superiority with the rich amino acid content of RPMI, which helps to improve cell preservation.[2] It is suggested that Roswell Park Memorial Institute-1640 solution (RPMI) seemed to be the most efficient short term solution. On the other hand, storage at 4-8°C after wrapping the graft in physiological saline soaked gauze is still a widely used method by most clinicians because of practicality and inexpensiveness.[3,4] However, this solution is known to be inferior to others.[2] In the present study, we aimed to compare histological changes of the human skin grafts stored in saline and autologous platelet rich plasma.

Author Affiliation: [1]Senior Resident, [2]Professor & Registrar, [3]Senior Resident, Department of Plastic Surgery, Jawaharlal Institute of Postgraduate Medical Education and Research, Pondicherry 605006, India.

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

Email: drchittoria@yahoo.com

Received on: 23.11.2022

Accepted on: 28.11.2022

Materials and Methods

This study was done in Department of Plastic Surgery, at tertiary care hospital. Split thickness skin grafts of 6 x 6 cm were harvested from 7 patients who had undergone grafting procedures for a variety of reasons. The grafts were harvested and split into two equal pieces (3x3 cm). Each piece was laid on a sterile gauze and moistened with sterile saline, this is labeled as specimen A. The other piece was stored in patient's own APRP, labeled as specimen B. Both specimens placed in a refrigerator at 40°C.

Each 3x3 cm graft piece was further divided into three equal parts to examine the autolytic changes on days 0, 10 and 20. 1x1 cm skin graft stored in saline was sent as specimen A and the one stored in APRP was sent as specimen Beach time. All histological examination was performed by the same histologist. The stored graft was examined for autolytic changes.

Preparation of APRP

After getting consent from patient 15 ml of blood taken and centrifuged at 3000 rpm for 10 mins. The upper 2/3 rd fluid is taken and again centrifuged at 4000 rpm for 10 mins. The lower 1/3 rd fluid which is rich in platelet concentration is taken and used for storage of skin graft.

Results

On histological examination of the specimens of 7 patients there was no difference at day 0 between the two groups but the autolytic changes were more in the saline stored grafts substantially at day 10 compared to grafts stored in APRP. Autolytic changes in both the stored grafts were almost the same by day 20 but still the grafts stored in APRP showed better storage than that stored in saline.

Table 1: Demographic details of patients

Age	Gender	Indication For Grafting
21	Male	PBC of hand release
17	Male	PBC ankle release
8	Female	PBC on Rt foot
56	Female	PBC on Left forearm
13	Female	Donor area of Local flap
22	Male	PBC on Rt elbow
37	Female	PBC neck

(PBC – Post Burn Contracture)

Table 2: Day 10 – autolytic changes

Days	Graft in Saline -Autolytic changes	Graft in APRP – Autolytic changes
10	Yes	No
20	Yes	Yes, but changes are less compared to that in saline
10	Yes	No
20	Yes	Yes, but changes are less compared to that in saline
10	Yes	No
20	Yes	Yes, but changes are less compared to that in saline
10	Yes	No
20	Yes	Yes, but changes are less compared to that in saline
10	Yes	No
20	Yes	Yes, but changes are less compared to that in saline
10	Yes	No
20	Yes	Yes, but changes are less compared to that in saline

Discussion

Storage of skin grafts with saline moistened gauze and using it later as a homograft or autograft is a widespread practice in plastic surgery. Recent studies have reported an increase in the quality and viability of skin grafts using different storage media and, as saline lacks the nutrients necessary for cellular metabolism, this practice should be reviewed.[2-4] Percentage graft take can be used to test the effects of different storage media on skin graft viability, but this may be affected by many factors other than viability such as infection, immobilization of the graft and hematoma, and so cannot be used as a primary measurement. We compared the viability of saline stored and plasma stored skin grafts. Plasma is a physiological fluid which can supply physiological concentrations of electrolytes and nutrients to a basal level of cellular metabolism and can buffer acid metabolites. The results of this study showed that plasma maintained a better environment for skin grafts by increasing the quality and survival time of skin grafts based on The complication of storing the skin grafts may be infection.[5] as plasma is a good medium for bacterial growth, but we did not observe any bacteria in our skin grafts during microscopic examination.

Conclusion

In conclusion, APRP maintained better histological outcomes for the preservation of human skin grafts. This is an economical

means of long-term storage compared to other preservative media. But further studies with larger sample size and better histological markers are needed.

References

1. Webster JP. Refrigerated skin grafts. Ann Surg 1944; 120:431 49.
2. Hurst LN, Brown DH, Murray KA. Prolonged life and improved quality for stored skin grafts. PlastReconstr Surg 1984; 73: 105-110.
3. Fahmy FS, Navsaria HA, Frame JD, Jones CR, Leigh IM. Skin graft storage and keratinocyte viability. Br J Plast Surg 1993; 46:292-295.
4. Smith JW, Aston SJ (eds). Grabb and Smith's Plastic Surgery. 4th Edn. Boston: Little, Brown and Company, 1991.
5. Titley OG, Cooper M, Thomas A, Hancock K. Stored skin stored trouble? Br J Plast Surg 1994; 47: 24-29.