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Plastic Surgery

A PROSPECTIVE STUDY ON CHALLENGES FACED BY SKIN BANK AT A GOVERNMENT TERTIARY CARE CENTRE (OSMANIA GENERAL HOSPITAL, HYDERABAD)

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ABSTRACT **Background:** A skin bank is an organization having sufficient structure, equipment, laboratories and knowns how to ensure safety and efficacy of the entire skin banking process.Skin banking is a process in which skin grafts are harvested from eligible cadaver donors, processed and stored for future use. Annual incidence of burns in India is about 6-7 millions. In India most of the burn victims are from the lower socio economic strata.Since use of human skin allograft has been found to be an extremely useful and life saving temporary biological skin cover in the management of extensive burn patients, skin banking for a tertiary care centre & for MCh post graduates training is prerequisite to make the treatment procedure affordable for patients with deep burns, for which cadaveric skin allograft is a better option as a life saving measure. **Methods:** Skin allograft was taken from eligible cadaveric donors with the prior consent from next of kin of donor. All samples of skin allograft are being processed, stored to use in future for patients with burns or extensive trauma. **Results:** A total of about 18,108 sq cm allograft was obtained, Out of which, about 6,339 sq cm allograft was used for burns patients with better outcome interms of decreasing the morbidity, hospital stay and better quality of life and a better chance at survival. **Conclusions:** :Since use of human skin allograft has been found to be an extremely useful and life saving temporary biological skin cover in the management of extensive burn patients, and there is huge gap in demand and supply of the required allograft skin, more and more skin banks needed in various parts of India.

KEYWORDS : Skin banking, Skin allografts, Skin transplantation, Tissue banking.

INTRODUCTION

A skin bank is an organization having sufficient structure, equipment, laboratories and man power & knowns how to ensure safety and efficacy of the entire skin banking process. Skin banking is a process in which skin grafts are harvested from eligible cadaveric donor, processed and stored for future use. Annual incidence of burns in India is about 6-7 millions. In India most of the burn victims are from the lower socio economic strata.The skin in a major burn patient is deficient even after meshing of skin graft.

The cost of burn treatment depends also upon the type of dressing material that is being used. Available skin substitutes such as Integra are not economical for burn patients; skin cultures are available in limited quantity in few centers. In such situation, cadaveric skin graft may be the major source of the skin. In case of deficient donor skin, immediate early excision and cover can be done with allograft.This is done to protect the excised area and to prepare the wound for future autograft take.

Allograft can be used for coverage of wound or it can be used with autograft as "sandwich technique". The allograft reduces fluid, electrolyte, and protein loss, reduces potential infectious disease transmission, prevents tissue desiccation, suppresses bacterial proliferation, reduces pain, reduces energy requirements, stimulates epithelialization, and prepares wounds for definitive cover.

Since use of human skin allograft has been found to be an extremely useful and life saving temporary biological skin cover in the management of extensive burn patients, skin banking for a tertiary care centre, & a superspeciality training institute, is prerequisite to make the treatment procedure affordable for patients with deep burns,for which cadaveric skin allograft is a better option.

The first tissue bank in Europe, the Yorkshire Regional Tissue Bank, was established in England in 1960; the Dutch National Skin Bank in The Netherlands followed this, in October 1976. With the further evolution of techniques to preserve skin, the Euro Skin Bank was opened in 1992.

In India, the first deceased donor skin bank was established in 2000 at Mumbai, which was only one skin bank till 2009. In 2009, a collaboration of the National Burns Centre Mumbai,Rotary International, and Euro Skin Bank developed an effective model of skin bank at airoli, Mumbai.

There are about 20 skin banks in India,4 skin banks are in government setup & 16 skin banks are in private setup, with a huge gap in demand and supply of the required allograft skin, with more and more skin banks needed in various parts of India.

Looking at the necessities ,Osmania General Hospital along with Rotary Club Of Hyderabad East and National Burns Centre,Mumbai, developed skin bank in the Department of Plastic Surgery, Osmania General Hospital, Hyderabad, Telangana State.

This study analyses the challenges faced to establish a skin bank and the outcomes of using skin allograft for patients with post burn or post trauma raw areas.

Nowadays, organ donation of the kidney, liver, and eye is becoming common, and skin donation should also be promoted. Awareness program for the public about skin donation should be emphasized along with organ donation. Various nongovernmental organizations, print media, radio, and television media should be used to spread the knowledge about skin donation.

METHODS

Most of the major burns and trauma patients getting admitted and being managed at our department are from lower socio economic

strata, and also being a government institute there is a necessity to establish a skin bank at our centre for providing cost effective treatment for these poor and needy people who are being admitted with extensive burns.

Here the main challenge is acceptance of the proposal of skin bank at this tertiary care centre, which was rejected initially due to various reasons. With the contribution from NGO - Rotary Club Of Hyderabad East & HETERO group of drug company, and with the support from administrative staff of OGH, skin bank OGH was established in the department of plastic surgery in the month of 28th june ,2021.

Challenges In Establishing A Skin Bank

Availability of funds: we had to take the help of Non Governmental Organizations like Rotary Club Of Hyderabad East and HETERO group of drug company in getting required funds to establish skin bank at OGH.

Identifying the space : There is a requirement of adequate space to establish a skin bank, so here, we adjusted a space for skin bank beside plastic surgery operation theatre.

Adequate and qualified manpower To run a skin bank it is a pre requisite to have adequate staff who are qualified and trained to handle, process and store skin allograft. Here we have experienced faculty and 24 MCh postgraduates, and also paramedical staff for effective functioning of skin bank without compromising patient care.

Infrastructure issues As mentioned above, RCHE and HETERO provided funds to obtain required infrastructure. It is a team approach to organize & co-ordinate at each and every level of administration in getting the infrastructure for its safe delivery and installation.

Licencing authorities **Getting permissions**To start a skin bank which handle with skin allograft from eligible donor, it is mandatory to get permission from respective state governments and higher authorities.

Equipment Installation Installation and demonstration of infrastructure follows its procurements. Donor issues—spreading awareness & getting potential donors to donate skin after taking conscent.

Getting Approvals Getting approval from respective governments and concerned organizations to harvest skin from donors is another challenge. Skin bank OGH has been registered under JEEVENDAN, for which we had inspection of skin bank by concerned authority.

Jeevandan Skinbank, OGH is included under JEEVANDAN(A scheme for cadaver organ transplantation, in Telangana State). **Inauguration** After passing through all these obstacles, Skin bank OGH was inaugurated on 28th June 2021.

Training Staff from OGH went to NBC Mumbai to get trained in skin bank related tasks and activities. **Awareness** As a part of creating awareness our team conducts awareness programmes with jeevandan co-ordinators and at meetings of some communities.

Review The guidelines shall be reviewed on a regular basis and revised as necessary to incorporate current research findings and improved clinical practice.

RESULTS

Till now we harvested skin from 14 cadaveric donors.Allare processed and being stored according to the protocol .A total of about 18,108 sq cm allograft was obtained, Out of which, about 11000 sq cm allograft was used for 26 burns patients with better outcome interms of decreasing the morbidity, hospital stay and better quality of life.

Statistical representation

Reciepients:-

A total of 26 patients have received skin allograft till now. Out of which there are 13 female and 13 male patients.

Table1: Gender distribution of reciepients in the study

GENDER	No .ofpatients	Percentage
MALE	13	50%
FEMALE	13	50%

Age of youngest patient is 18 months and that of eldest is 56yrs

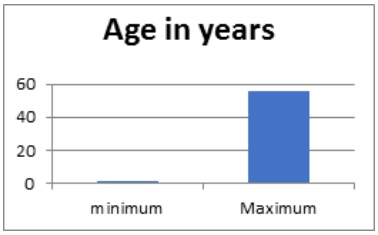

Chart 1: Age distribution in the study

Donors

Out of 14 donors, there were 13 males and 1 female.

Table2:-Gender distribution of donors.

Gender	No.ofpatients	Percentage
MALE	13	93%
FEMALE	1	07%

Maximum age was 72 years while minimum age of the donor in this study was 41years.

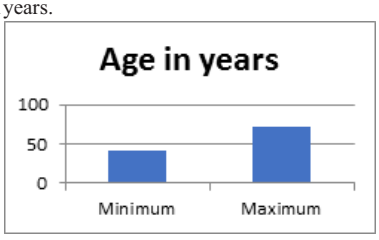

Chart 2 : Age distribution of donors.

Quantity of skin retrived per Donor, minimum 912cm^2, maximum 2475cm^2, average 1763cm^2

Table3:- Quantity of skin harvested

	Donor skin area
MINIMUM	912
MAXIMUM	2475
AVERAGE	1763

Recipient hospitals

Out of 26 recepients 25 were patients from our hospital and one is from other government hospital.

Table4: Recipient hospitals

Hospital	No.ofpatients	Percentage
Osmania	25	96%
Gandhi	1	04%

Transplanted skin maximum per patient 1217.2cm^2, minimum 175.9cm^2

Table 5: Transplanted skin per patient

	skin area
MINIMUM	175.9
MAXIMUM	1217

Table 6: Transplanted skin per surgery

	skin area
MINIMUM	175.9
MAXIMUM	973.5

Survival rate

- Out of 26 patients who received skinbank allograft 22 patients survived and 4 deaths happened with survival rate of 85%.

Table7:- Survival rate

	Number of patients
Survived	22
Deaths	4

DISCUSSION:

Skin banking protocol at OGH- At each and every step of procurement, processing and storage of skin allograft, sterile techniques are being followed to minimize the risk of contamination.

Phase 1:-

Upon receiving call from NGOs or relatives of diceased, death certificate is checked for inclusion or exclusion criteria (like known case of malignancies, HIV,HBsAg,HCV,active jaundice ,STDs,Sepsis etc.)of cadaveric skin. After confirming the call, skin harvesting team is organized. The team consists of 3 – 4 members (doctors, paramedical staff) . The team reaches the hospital or home with the harvesting kit and explains to the family members about the purpose of cadaveric skin collection and takes their informed written consent. After body examination, skin is disinfected with povidone-iodine and alcohol.Blood sample collected at the time of skin harvesting for serological tests . Skin is harvested (within 6 hours after death) from both the legs, thighs and back under aseptic precautions. The team harvests skin using dermatome and collects strips of skin into 50% glycerol containing antibiotics (i.e 12 lac units of inj. pencillin and 1 gram of inj. streptomycin). Glycerol preservation helps to maintain anti microbial environment and minimized various enzymatic and hydrolytic changes. The anatomical structure and strength is well maintained and antigenicity is also reduced.

Phase 2:-

It is then carried to the skin bank by the same team and kept at 4-8 degree centigrade. After getting negative blood reports ,within 48 hours, the skin strips are transferred to 85% glycerol containing antibiotics in the bio safety cabinet ,and kept at 33 degree centigrade in shaking incubator for 3 hours, for glycerol lubrication. Skin strips are then stored at 4-8 degree centigrade for further incubation for 3 weeks.

Phase 3:-

After completion of incubation period, skin is meshed and quantity is measured and stored at 4-8 degree centigrade. At this stage skin strips are sent to microbiology lab to ruleout growth of any pathogens. After getting a negative report the skin is labeled as ready to use and it can be stored at 4-8 degree centigrade in walk in cold room. If it shows growth of any pathogen the glycerol is changed and stored for 3 months to check for growth. At this stage if a negative report is obtained the skin is labeled as ready to use and it can be stored at 4-8 degree centigrade in walk in cold room as mentioned above. Up to 5th microbiological report the glycerol can be changed for every3 months, if the 5th report also come as positive for growth then the skin has to be discarded.

Documentation

Documentation is an important part of skin banking .All the donor details are collected including medical reports and the cause of the death. The data is maintained at skin bank,OGH with a proper donor identity of each skin donated. All serological/microbiological reports are updated regularly.

CONCLUSION:

There are many challenges in establishing and running skinbank. At each and every step of procurement, processing and storage of skin allograft, sterile techniques to be followed to minimize the risk of contamination.

Stored allografts has preference over synthetic or biosynthetic based dressing material as it has the following advantages of

- Decreasing morbidity and mortality from hypovolemia, fluid and electrolyte imbalance in major burns patients.
- Reduced pain,
- Reduced risk of infection and sepsis ,
- Avoiding frequent change of dressing
- Cost effective.

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