Live Skin Allograft for Coverage of Deep and Extensive Burns: First Experience in Morocco

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ABSTRACT

The gold standard for closure of excised full-thickness burns is split-thickness skin autograft. Patients with very large burns have limited donor sites for harvesting of autograft and may benefit from the use of skin Allografts. Taken from cadaveric or human skin as part of tissue donation.

Allograft skin has been widely used for wound management in burn centers. Functional as biologic dressing, it can not only provide ideal temporary wound coverage in extensive burns when autograft is not immediately available but also prepare the wound bed for definitive autografting.

In this study, we present the results of the use of allograft from living donors in three children, the use of this live skin allograft has permitted to keep the children’s alive in a balanced physiologic state until autologous skin graft or spontaneous healing closed all wounds. The procedure of live skin allograft is simple and replicable, and can be applied in settings where no skin bank is available in the management of deep burns.

Keywords: After-effects of burns, allograft, autograft, skin graft.

I. INTRODUCTION

Deep and Extent (TBSA) are part of the burn severity criteria. When they combine, they become a life-threatening emergency for patients and require medico-surgical management, ideally done by autologous transplant excision [1], [2], [3].

The literature has defined the means of coverage in burns, which are either by culture of keratinocytes, autograft, and xenograft or by dermal substitutes [4].

When skin substitutes made of bioengineered synthetic material or derived from donor tissue are not available, burns wound excision becomes hazardous and may entail serious metabolic and infectious complications [5].

In Morocco, the culture of keratinocytes is being tested, and there is no skin bank, and given the inaccessibility and problem of availability of other means, in particular dermal substitutes.

The use of the living donor allogeneic transplant was the temporary solution pending the use of the autologous transplant [3]-[6].

The aim of our work is to present the results of the use of allograft from living donors in three children as well as the social and legal implications to be given.

II. TECHNICAL DESCRIPTION:

Tree patients treated with auto-allografting due to major burns were included in the study.

The Lund and Browder chart was used to calculate the size of the burn injury [7]. Allograft donors were close relatives, and specific preoperative screening tests for human immunodeficiency virus (HIV) and hepatitis were conducted for all allograft donors.

All operations were performed under general anesthesia. First, split-thickness skin allografts were harvested from the thigh in all allograft donors with the aid of an electrical dermatome (Padgett®) set at 0.012 inch. Immediately after the harvesting, the allografts were meshed. After tangential excision of the necrotic and eschar tissue, allografts were placed on the burn wound area.

Allografts were covered with Bactigras®, and the first dressing change was made on the postoperative 3rd day. After the first dressing change, graft care was performed on a daily
basis to monitor allograft rejection.

Subsequently the patients were prepared for the realization of autografts, which gradually replace allografts.

III. CASE REPORT

A. Case 1

5-year-old child, victim of a thermal burn from a butane flame, Lesions are localized on the face, lower limbs, and hands With an SCB of 40%. The boy was admitted to the intensive care unit. Fluid resuscitation based on Parkland formula with Lactate Ringer was started. Topical antimicrobial (silver sulfadiazine) was applied to the wounds in closed dressings.

Autografted excision was our first choice of treatment. Obviously, the patient was excised from the first days of his admission. However, it was then complicated by clinical and biological sepsis on a land of malnutrition, which prompted us to change our therapeutic plan and opt for an allograft. After talking and explaining to the family, an allograft was performed, which allowed him to maintain a balanced physiological state. Subsequently an autograft is performed replacing the initial allograft.

B. Case 2

3-year-old child, victim of a thermal burn, the lesions are localized in the right upper limb, back and lower limbs with a 40% SCB (Fig. 1). Allogeneic excision was the therapeutic strategy chosen for this patient. Which was performed on day 4 of the burn (Fig. 2) Followed by an autograft (Fig. 3).

C. Case 3

A 3-year-old girl, victim of a thermal burn from scalding, localized at the level of all four limbs, the anterior and posterior trunk with a 60% SCB. An allograft excision was the therapeutic choice from the start, given the age, the large surface area and the insufficiency of the donor areas.

On day 5 of the burn, an allograft after excision was performed in our patient with an autograft from the right axillary region; subsequently an autograft replaced the initial allograft after 22 days apart.

All our patients underwent functional physiotherapy upon admission with prescription of pressotherapy means and child psychiatric follow-up.

IV. DISCUSSION

In Morocco, as in Africa, no living skin bank is available. Apart from the skin of donors, biosynthetic materials (integra) can be used but the excessive cost and the susceptibility to infection have limited their use even in developed countries. The use of xenograft (fish skin, pork…) has been reported in the literature but with reduced visibility [8]-[9].

The amniotic membrane is considered an attractive solution, but its use in Morocco is limited by the legislation, which put the organs and tissues as equivalent. The need to resort to another service (the gynecologist) and found patients whose serologies are all done and since the law prohibits the donation of tissues from a person foreign to the patient made the use of amniotic membrane impractical in our service. In some countries (Turkey, Egypt, Togo ...) where skin banks did not exist, use of living donors was the only alternative [3], [10]-[11].

In the case of our service, the parents were not able to pay the cost of a synthetic material such as INTEGRA®, which is the only one available in our country. However, living donor allogeneic transplantation was a retained Alternative for our patients following the pioneers in the literature.

The use of allografts shortens the inflammatory phase, prevents infection, stops hypercatabolism, decreases pain at the site of the burn, and healing of superficial areas in the absence of autograft availability. The allogeneic transplant also serves as a means to test the wound bed before the autograft is placed [10], [6]-[12]. Indeed, the early excision and the blanket made the burns of the child almost savable (95% of burnt area) [1], [13]-[15].

In our context, legal and social constraints still surround
the use of allografts in burns; which is an alternative totally ignored by the majority of patients and their families.

V. CONCLUSION

Allograft is a simple, reliable and reproducible technique. While waiting to remove the social, economic and legal barriers for the establishment of a cryopreserved skin bank based on cadaveric skin. Using living donors was a lifesaving solution. Information and awareness campaigns for the population and political decision-makers should pave the way for the establishment of a skin bank in Morocco, the first in Africa.

CONFLICT OF INTEREST

Authors declare that they do not have any conflict of interest.

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