VIITH IBERO-LATIN AMERICAN PLASTIC SURGERY CONGRESS

CARTAGENA - COLOMBIA

TITLE: A NEW BIOLOGICAL DRESSING IN BURN CARE

AUTHORS: * DR LECY MARCONDES CABRAL, Av. Pedro Bueno 1849
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** DR. MANOEL DE JESUS SIMÕES

* POSTGRADUATION AT MASTERSHIP LEVEL IN PLASTIC SURGERY AT ESCOLA PAULISTA DE MEDICINA

PLASTIC SURGEON AT SÃO LUIZ HOSPITAL AND MATERNITY WARD

PLASTIC. SURGEON AT IPIRANGA CHILDREN'S CLINIC

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INTRODUCTION

The burnt patient presents peculiar features. Burn care takes a lot of time, is painful for the patient, expensive for those paying for it and represents hard work, hard for those who execute it. It represents, therefore, a social-economic problem of difficult solution in any kinf of collectivity in which it occurs (1). We know that the priority in burn care is to attempt to modify the accelerated process of tissue destruction (2,3). This has been accomplished by an adequate nutritional support (4,5,6) and preventive measures to avoid infection in the burnt areas, thourgh an immediate covering of the lesions.

These steps have been responsible for an improvement in the survival of burnt patients along the last 15 years (2,7,8).

The material utilized by us was discovered three years ago by Brazilian researcher Luiz Fernando Xavier Farah, in the course of a research work on apiculture, in which

he was using cellulose. Upon its synthesis a great resemblance to human skin was observed, this fact alerted him to the possibility of a new temporary substitute for human skin. After some research and studies, the new product was utilized on a patient with a small second-degree burn area; the post-operative period ran free of complications, presenting a spontaneous reepithelization of the lesioned area (9). As of that moment was started our studies with this new material.

MATERIAL AND METHODS

The cellulose film is obtained through the biosynthesis of bacteria in a favorable culture medium.
The cellulose membrane resulting from this synthesis, after processing, is constituted by a microfibrillar not provided with selective permeability, thus permitting the passage of water vapor but hindering the passage of microorganism. It is semitransparent, homogeneous, with an average thickness of 0,05mm.
Its sterilization is made with Ethylene Oxide, no special precautions are required to transport and store it, and when preserved at room temperature it has excellent durability.

Clinical evaluation was based on the following criteria:

- Application and removal of the cellulose film over the disepithelized areas.
- Adherence to the disepithelized surface.
- Hemostasis.
- Pain.
- time and quality of cicatrization.

- Infection.
- Adverse reactions.
- Psychosocial aspects.
- Cost of treatment

CLINICAL APPLICATIONS

We utilized the cellulose film in a total of 60 cases, distributed as follows: 20 cases fo burnt patients, divided, according to the extension of the burnt areas (10,11), into superficially, average and severely burnt; in 5 cases we utilized the cellulose film on laminar type skin graft donor areas, 5 cases were graft recipient areas; 10 cases of small traumas on face, arm, hands, and in 20 cases we utilized it as a simple dressing for surgical wounds (after reductive mastoplasty and after abdominal dermolipectomies).

SECOND: DEGREE BURNS

In nearly all cases of burns the cellulose fim was applied with 48 hours elapsed after the lesion, except for electric burning cases. The burnt areas varied, as to their extension, from 10% to 25%. In most cases the cellulose film was applied in a surgical environment, with the patient under sedation or general anesthesia.

The sequence observed in applying the cellulose film was the following:

- Rigorous asepsis of the burnt area (12).
- Apposal of the film over the disepithelized area, similar to laminar type skin grafting.

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- Rigorous asepsis of the burnt area (12).
- Apposal of the film over the disepithelized area, similar to laminar type skin grafting.

- In order to obtain a perfect adherence between the film and the wounded area, we passed over it the gauze soaked in physiological saline, thus removing not only the air blisters formed under the film but also the excessive exudate and blood.
- The occlusive dressing (13) rests on the wound for the first 24 hours, after which it is removed and the previously mentioned clinical criteria can be observed.

From then on the patient may precociously deambulate and carry out some activities without the discomfort caused by normal dressings; at the same time he starts taking shower baths, normally without the need for any special precautions. After 48 hours under observation, the patients were discharged from the hospital and received ambulatory care every three days; no infection occurred, nor was there any type of adverse reaction. The average time needed for healing by reepeithelization was from 8 to 14 days.

THIRD-DEGREE BURNS

We utilized the cellulose film on 5 patients with third-degree burns, following the same methods as on the second-degree burns; the areas varied from 5% to 59%.

After 24 hours, when we removed the dressing, we noted that the film satisfactorily adhered to its recipient. We encountered some difficulty in removing it from its bed after 72 hours, but this was solved by rehydrating it with compresses soaked in physiological saline.

The granulation tissue revealed itself regular and of good appearance, favoring a skin graft of good quality. Only in one case we did not effect skin grafting, as the patient was aged 63, his burns covered 74% of his bodily area, and there were complications inherent to his own clinical condition. In this case we left the film until its spontaneous detachment, which varied from 8 to 21 days.

LAMINAR TYPE SKIN GRAFT DONOR SITES

We noticed the cellulose film's hemostatic qualities when applied on the graft donor area, followed by an excellent adherence to the recipient bed. The donor areas were reepithelized at the end of the 8th to the 12th day.

- Small Traumas (incised wounds, cutting bruises and lacerated cuts)
- Surgical Wounds (after reductive mastoplasty and alter abdominal dermolipectomies).

We utilized the film simply as a dressing, since it adheres well, not permitting secondary bacterian invasions and due to the fact that, being semitransparent, it facilitates the visualization of the wound till its cicatrization.

CLINICAL RESULTS AND ELECTRONIC MICROSCOPY

Examined through electronic microscopy the dermis shows itself constituted by loose cellular tissue, rich in cells such as:fibroblasts, macrophages and blood vessels.

With regard to the intercellular substance we noted a large concentration of type III (reticular) collagen fibers and electrotranslucent spaces which probably.

On the other hand, in cases of patients with small and average size burnt areas, who presented second-degree burns, whenever it is imperative to change the dressing under sedation or even general anesthesia, we know how painful and difficult this treatment is both for those receiving and those executing it.

Research work continues investigating for agents and materials capable of permanently covering large burnt areas. Several temporary substitutes for human skin are invaluable in burn care as well as in cases of extensive cutaneous losses (14,15).

In our cases we utilized a temporary human skin substitute calle BIO-FILL, with excellent results.

Its primary progress lies in converting an open and contaminated wound into a closed and clean wound, with the further advantage of our being able to examine the burnt areas without the need for sucessive dressing changes.

In our opinion this point gains a capital, importance in the case of the severely burnt patient, considering that during the periods in which this patient eventually develops complications inherent to his clinical condition, we shall not be obliged to place him in the surgical ward for a successive change for dressings under general anesthesia, thus aggravating the morbidity of his case.

BIOFILL provided us with a satisfactory temporary covering. The adherence to the disepithelized surface causes an absence of pain in most cases, not permitting a secondary bacterian invasion, reducing the losses of water, protein and electrolytes. The film contributes in restoring the recipient bed, it is easily applicable, reepithelization (superficial burns) processes itself in a shorter period

represent glucosaminoglycines. Concerning the epidermis we observed the presence of a basal layer constituted by cuboid cells containing tonofilaments in their center. An intermediate (spiny) layer is represented by polyhedral cells with central nucleus, cytoplasm containing a large concentration of tonofibrils and establishing contact between them with interdigitations with desmossomes. On top of this last layer we observed a region constituted by 2 to 3 layers of cells containing within them electrodense granules, which represent keratohyaline granules (granulous layer). On top of this layer we noted the presence of flat cells without nucleous, with few interdigitations which represent the keratinized layer. After this layer we can observe the presence of a more electrodense region which represents the cellulose film. Within this film we can observe the presence of cellular remainders. It should be mentioned that the transition between epidermis and dermis revealed itself as rectified without the presence of skin annexes, therefore we may say that the cleavage plane for the removal of the cellulose film is either the corneal layer or the layer between epidermis and dermis, since the dermis does not present itself mature (type I collagen and dermic papillae). The best results were obtained in cases of second-degree burns, graft donor sites and in preparing recipient beds for skin grafting.

COMMENTS AND CONCLUSIONS

We believe skin grafts still prevail as primary methods utilized to cover cutaneous losses. In those cases, however, where we do not have available donor areas for satisfactory coverage, where the proportional difference between donor area and recipient area is great, we remain limited to grafting with meshed or stamp-like materials, awaiting the reepithelization of the donor areas as skin sources.

of time (8 to 12 days) and in the cases of cure by cicatrization (thick burns) we had a average of 18 days for cicatrization.

All aspects raised above area extremely favorable not only as to these patients' quality of life but also as to their survival, abbreviating the hospitalization period, making the job easier for the attending staff and reducing the cost of the global treatment.

SUMMARY

The authours report their experience in 60 cases with the use of a new temporary substitute for human skin (BIOFILL); they analyse its several applications, technical details and the cellulose film's behaviour in the light of electronic microscopy.

*A NEW BIOLOGICAL DRESSING IN BURN CARE**

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