

Full Thickness Skin Graft Nutrition Solution

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ABSTRACT

Since 1999, 9 cases of postburn complication of the face were managed by full thickness skin graft. A solution made of Ringer's and glucose 5% with its equivalent of insulin was used to supply nutrition to the graft in the last 3 cases. To our knowledge it is the first time to use this mixture to supply nutrition to the graft during the post-operative period, therefore we give ourselves the right to call it skin graft Egypt nutrition solution or (Skin Graft EGYNSOL). The composition of the solution, the physiological aspect, the histology of intercellular spaces, and the effect of the solution were discussed.

INTRODUCTION

Application of large sheet of full thickness graft for reconstruction of facial burn complication had been reported by many authors [1-4,7]. The problems that faced this procedure were many including survival. Many precautions were described to overcome these factors interfered with full thickness graft take, but none of them discussed the nutrition of the graft in the recipient site. In this work, we tried to find a supportive nutrition to the graft till the recipient bed provide this nutritional elements.

Physiological Aspects of Skin Cells Nutrition:

Skin cells are not different so much from other cells of the human body. Its main nutritional element is glucose, which is transported actively by insulin in the presence of calcium [6].

The integrity of the cell membrane depends on many factors, one of the most important is the sodium-potassium pump mechanism.

Presence of oxygen helps the cell to utilize glucose aerobically leading to energy, carbon dioxide and water. This energy supports the cell integrity and overcome any degenerative process.

The nutritional elements reaches the dermal and epidermal cells by diffusion through the intercellular spaces [6].

Histological Aspect of the Intra Cellular Spaces:

Plasma membrane forms the surface which establishes contact with other cells. Although cells may adhere to one another by virtue of the general biophysiological properties of their surfaces, specialized intercellular contacts are also important.

Normally, each cell is surrounded by an extracellular space in close-packed tissues. This is reduced to a characteristic gap of about 20nm. There are also however at least four types of special contact zone between cells. 1- Macula adherens. 2- Zonula adherens. 3- Zonula occludens. 4- A gap junction. These spaces allow molecular and ionic transportation between cells.

MATERIAL AND METHODS

Nine cases of post-burn facial keloid and cicatrix affected the three zones of the face were treated by full thickness skin graft after expansion of the scapular area by tissue expander in 3 cases and the lower abdominal area in the first 6 cases.

They were one child, 9 years old and 8 females aged 7: 35 years with an average of 20 years. Most of them left education for some time after the burn injury and started to look for any solution to their problems.

The surface area ranged from 6x10cm: 22x28cm with an average of 14x19cm. Gradual expansion of the abdominal or scapular skin over a period of 20: 30 days were used to get the surface area required. The piece of full thickness graft was adequately taken by the scalpel as well as adequately defatened. In the first 6 cases it was impregnated in normal saline till the recipient site was prepared. In the last 3 cases we used a solution made of 1: 1 Ringer-glucose 5% with its equivalent insulin in order to impregnate the full thickness graft in it for 30 minutes.

The graft was sutured in the recipient site with light dressing. In the first day post-operatively, we

started to inject the solution mentioned above (EGYNSOL) interdermally in the whole piece of skin. This procedure was done for the next days till all signs of superficial desquamation disappeared. Antibiotic and increasing the general condition measures were described to the patient with frequent dressing application.

RESULTS

Six grafts out of 9 showed 70%: 90% take within the first 3 days post operatively, 2 cases showed 50% take with areas of superficial desquamation and areas of deep loss in the remaining 50%. Only one case showed less than 50% take with large areas of superficial desquamation, but recovered with conservative management later.

Three cases, the last, showed more than 80% take. These cases were impregnated in EGYNSOL for 30 minutes preoperatively, and injected interdermally by it for 3 successive days post-operatively. The areas that showed superficial desquamation, responded to EGYNSOL injection and recovered early. On the other hand, areas with deeper suffering did not respond and areas of skin graft loss were evident in 5% of the surface area.

The first 6 cases showed variable degrees of take. The response to conservative management provided a line of treatment, with prolonged post-operative period and hospitalization.

The cases in which EGYNSOL was used, the post-operative period was shortened to two weeks and minimal degenerative changes in the full skin graft occurred.

Conservative management as well adequate medication helped to overcome any inflammatory process occurred.

The use of garment and silicon jel sheet to the surgical lines helped to decrease the keloid formation in these lines.

DISCUSSION

Skin graft nutrition depends on healthy recipient bed, adequate oxygen diffusion, the nutrients, and eradication of any inflammatory process. The thickness of the graft plays a role in graft take and survival. The thicker the graft the lesser the incidence of the take. Full thickness graft suffered from insufficient nutrients diffusion to its layers. The degenerative process that affect the skin due to prolonged starvation may lead to skin graft loss [7-10].

In this work, graft was artificially nourished though interdermal injection of glucose 5% with its equivalent amount of insulin and Ringer's solution assumed to provide the nutrient elements to the cells. We found that the degenerative changes that might occur in full thickness graft were markedly reduced after this EGYNSOL injection. Most of the superficially desquamated areas were been recovered and showed normal pattern.

We found that the areas suffered loss, haematomas interfered with adequate oxygenation of the cells. The ischaemic changes in these areas showed dry gangrene type. Most probably this haematoma prevented the proper oxygen diffusion. This may explain why these areas did not respond to EGYNSOL injection.

EGYNSOL may provide an adequate measure to support a large sheet of full thickness graft to survive. This measure requires more follow up and criticism from other surgeons to establish its value in full thickness graft survival.

Conclusion:

We concluded that skin graft Egypt Nutrition Solution (EGYNSOL) provide a helpful measure in full thickness graft survival.

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