



COMPARATIVE STUDY OF FIXATION OF SPLIT SKIN GRAFT WITH SUTURE VERSUS CYANOACRYLATE TISSUE ADHESIVE

Surgery

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ABSTRACT

Skin is considered to be the best covering of Human body. Because it interfaces with the environment, it plays an important immunity role in protecting the body against pathogens [1]. Skin performs many important and crucial functions of body, therefore loss of skin results in many complications. Because of which it is imperative to cover skin loss at the earliest. There are many options available to cover skin loss and one of the best and convenient methods is Split skin Grafting (SSG). However, SSG fails, if not fixed. If not fixed, mobilization of graft may occur leading to failed revascularization and then necrosis of graft. Therefore, it is mandatory to fix the split skin graft to donor site for its survival. Many techniques and materials have been used for fixation of split skin graft. Each has its merit and demerit. In this article, we present comparative study of effectiveness of fixation of SSG with sutures versus Cyanoacrylate tissue adhesive.

KEYWORDS

Split Skin Graft, Fixation Of Graft, Cyanoacrylate Tissue Adhesive.

Introduction

Common causes of loss of skin include burn, trauma, surgical excision and reconstructive surgery for post burn contracture or congenital anomaly. There are many methods available nowadays to provide cover to wound, caused by skin loss, Which include skin grafting (e.g. Split Skin Graft, Full thickness graft, Composite Graft), Collagen sheath dressing, Amniotic Membrane Application, Honey application etc. However, Split Skin graft (SSG) remains one of the most convenient and useful treatment methods [2]. Proper fixation of split skin graft is important to prevent graft mobilization, otherwise impaired revascularization and poor graft survival may occur [3, 4]. This study was performed to compare the effectiveness of skin graft fixation by sutures versus Cyanoacrylate tissue adhesive.

Method & Material

A prospective study was carried out on patients attending Unit-I of department of Surgery in our tertiary medical care centre from 15 December 2015 to 31 March 2018. The study was conducted on 48 patients, who were divided in two groups. In Group-I of 25 patients, N-Butyle-2-Cyanoacrylate ester was used for fixation of split skin graft [Image-1,2,3]. While 23 patients of Group-II underwent split skin graft fixation by three zero prolene suture [Image-4,5].

Patients with healthy wound ranging from 5 to 15 c.m.in sizes, resulting from burn, trauma, surgical excision of tumor and reconstructive surgery for post burn contracture/ congenital anomaly were included. Those patients, who had Uncontrolled Diabetes mellitus-2, Sepsis, Unhealthy wound, AIDS, Anemia, Uremia, Jaundice, coagulation disorders were excluded from study. All routine investigations were carried out, as per exclusion criteria. The wound size was measured. Time taken for fixation of split skin graft was also noted in all cases. Percentage of survival of SSG was also recorded on first, second and final dressing. Observation was also recorded in which sepsis developed. Haematoma/seroma formation, graft dislocation, graft necrosis and graft take up were taken in account postoperatively.

Result

All the parameters were performed by single examiner. Study showed that 29 male and 19 female underwent SSG, in which fixation was done by suture or N-Butyle-2-Cyanoacrylate ester. Their age ranged from 3 to 70 years (Table 1). Surgery for Post burn contracture followed by burn was most common cause for which patients were treated with SSG (Table 2). Time taken for fixation of split skin graft was much less in Group I as compare to Group II (Table 3). Infection and Hematoma /Seroma formation were most common complications observed in both group. However, only 8% cases in Group I developed complication, while 30.4% cases in Group II developed complication

(Table 4). Graft take up rate was 100% in Group I and 91.3% in Group II (Table 5).

Table 1
Age Distribution

AGE IN YEARS	NO.
1-10	4
11-20	5
21-30	3
31-40	16
41-50	10
51-60	6
61-70	4

Table 2 Cause of wound

Cause	No.
Burn	10
Operated cases of Post burn contracture	11
Diabetic foot	6
Non healing ulcer	8
Trauma	7
Operated cases of Congenital defect	6

Table 3 Time taken for Fixation of graft

SSG Fixation Time In Minutes	Group I	Group II
	4 minutes	11 minutes

Table 4 Post Operative Complications

complications	Group I	Group II
Infection	1	1
Hematoma/seroma	1	2
Graft dislocation	0	2
Graft necrosis	0	2

Table 5 Graft Take up rate

Graft Survival	Group I	Group II
Number	25	21
Percent	100	91.3

Our study showed good result of SSG fixation and Graft take-up with both the methods. However, result was much better in group-I, in which N-Butyle-2-Cyanoacrylate was used for fixation of split skin graft than Group II. Our result was comparable to study carried by Neta Adler, Shira Nachumovsky, Sagit Meshulam-Derazon, Dean Ad-El^[5].

Discussion

Skin is the largest organ of the integumentary system. The skin has up to seven layers of ectodermal tissue and guards the underlying bones,

ligaments, and internal organs^[6]. Because it interfaces with the environment, skin plays an important immunity role in protecting the body against pathogens and excessive water loss.^[7] Its other functions are insulation, temperature regulation, sensation, synthesis of vitamin D, and the protection of vitamin B folates. Severely damaged skin will try to heal by forming scar tissue. This is often discolored and depigmented and even can lead to contracture formation.

Skin grafting is one of the most convenient and useful treatment methods for skin defect caused by full-thickness burn, trauma, or tumor tissue excision. In skin grafting, graft fixation is important. Use of sutures or staples is a standard method for skin fixation (Zederfeldt 1994; Waiker and Shinalingappa 2015; Butts et al. 2015). Kenneth M Joyce, Cormac W Joyce, Nicola Mahon, and Jack L Kelly, published their work on use of a Barbed Suture Tie-Over Technique for Skin Graft Dressing for fixation of graft.^[8]

However, many others methods and materials have been used to achieve proper fixation of Split skin graft e.g. use of fibrin glue. Use of fibrin as an adhesive was introduced by Bergel in 1909, and Tidrick and Warner used fibrin for skin graft fixation for the first time in 1944 (Saltz et al. 1991). Fixation of skin Grafts with a New Silicone Rubber Dressing is also one of the methods^[9]. Skin graft fixation with negative pressure dressings have been mentioned by Isago T, Nozaki M, Kikuchi Y, Honda T, Nakazawa H in their study^[10]. Use of vascular clips to approximate skin graft on burned hand has been proposed by Rachael M et al^[11]. Honey has been used for medicinal purposes since ancient times. Its antibacterial effects have been established during the past few decades. It has been shown that honey is also a very effective agent for split thickness skin graft fixations. Because it is a natural agent, it can be easily used in all skin graft operation for the fixation of the split thickness skin grafts^[12].

The ideal method of skin grafting should be simple, safe, rapid, inexpensive, painless, bactericidal, and results in optimal cosmetic appearance of the scar. N-Butyle-2-Cyanoacrylate is a surgical tissue adhesive, which has been applied externally on skin for tissue approximation. Developed in 1949, the cyanoacrylate adhesives are applied topically to the outermost skin layer. It is also being used extensively for bone, cartilage and metal plate adhesion^[13]. A study of fixation of full thickness graft fixation with N-Butyle-2-Cyanoacrylate, showed good result^[14]. The cyanoacrylate is supplied as monomers in a liquid form. It polymerizes to form a strong bond between tissue and graft that holds graft. The cyanoacrylate adhesives usually slough off with epithelialisation within 5-10 days and there is no need to remove it. Use of cyanoacrylate has increased recently, because of its unique combination of chemical and physical properties, namely

- 1) It cures rapidly in ambient temperature.
- 2) It forms strong bond with a wide variety of material.
- 3) It can be easily and safely applied manually on raw surface.

Conflict of interest: None.

Images



Image-1



Image-2



Image-3



Image-4



Image-5

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