Original Article

Comparison of the Effect of Using Collective Plus Ag Dressing and Vaseline Gauze Dressing in the Donor of Split-Thickness Burn Grafts

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ABSTRACT

Background: Skin graft involves removing a part of the skin and using it in another part of the body. One of the most common reasons for using a graft is burns. We aimed to compare the effect of Colactive plus Ag dressing with Vaseline gauze dressing in donor sites of split-thickness skin grafts of burned patients.

Methods: The present study was conducted as a randomized clinical trial (RCT) in the Motahari burn Hospital, Tehran, Iran in 1401. The sampling method was done using Cochran's formula and available patients so 15 people were enrolled. The findings of the study were collected using a researcher-made form.

Results: The average duration of recovery, the amount and intensity of pain, and the amount of itching between the two types of Colative plus Ag plus Ag dressing with Vaseline gauze are statistically significant at the 95% confidence level. (P-value<0.05). In addition, the findings showed that the average amount of scar left by the wound in the two types of dressings examined is not statistically significant at the 95% confidence level (P-value > 0.05).

Conclusion: The use of Colactive silver dressing has less pain, less itching in the donor area, and a shorter average recovery time than Vaseline gauze. The use of the Colactive plus Ag will be more effective than Vaseline gauze.

KEYWORDS
Colactive plus Ag; Vaseline gauze; Donor site; Split-thickness skin graft

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INTRODUCTION

One of the most common reasons for using split-thickness skin grafts is burns split-thickness skin graft or (STSG)[1] and since burns are the fourth most common cause of trauma[2], for example, in America in 2004, about 32,500 burns hospitalizations was recorded, and one out of every three patients needed a skin graft. On the other hand, STSG is also used to treat chronic wounds (leg ulcers and traumatic wounds)[3], usually donor sites are sources of delayed healing that causes considerable pain. According to the WHO, the longer the wound healing, the more likely the complication will be[4].
The part of the body from which the graft is removed is called the

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donor part[5]. The donor site usually heals with epithelialization (the migration of epithelial cells at the edges of the wound) which can usually take 14 days and but the healing and sometimes more, depends on many factors, including the depth, causes, size of the wound, age of the patient[5-7].

Skin graft involves removing part of the tissue from one part of the body and using it in another part of the body. The skin consists of two parts, the epidermis and the dermis, which in split-thickness grafts, a part of the epidermis and the dermis is removed and used to close a part of the tissue that cannot be closed simply by sutures, including in areas of chronic skin defects. In order to speed up wound healing, STSG is also used[5].

In 1962, Mr. WINTER showed that occlusive dressings make epithelization happen faster than those that are in contact with air. It also showed that wounds need moisture to heal optimally, and this moisture prevents mechanical damage to the wound during changing the dressing, and reduces pain[3].

The types of dressings that are used in the treatment of the donor graft site include mesh gauze, polyurethane semi-permeable and transparent films, fiber dressing, hydrochloride, and retention dressing, of course, none of them are optimal so an ideal dressing has not yet been introduced[3]. In chronic wounds such as burns, there are proteases, including MMP (matrix metalloproteinase), which stop the wound healing process. The ideal dressing should have an effect on MMP, create minimal exudate, have proper moisture, and reduce pain. In addition, another dressing that is used today is collagen dressing, which covers the exposed nerves of the dermis, thus reducing pain and the possibility of infection[8-10].

One of the types of dressing based on collagen matrix is Colactive plus Ag dressing, which is combined with silver and its components are collagen, sodium alginate, CMC (carboxymethyl cellulose), EDTA (Ethylenediaminetetraacetic acid), which is combined with with silver chloride. This dressing is in the form of a gelatin sheet that is in contact with the wound and exudate and creates a moist environment that helps to create epithelialization and granulation tissue. EDTA in the dressing causes zinc to decrease its level in the wound, thus inhibiting MMP (matrix metalloproteinase) which requires zinc for its activity and makes the environment suitable for wound healing. CMC and alginate create a moist environment around the wound and on the other hand activate the silver ion inside the dressing. The silver chloride inside the dressing causes a broad and effective antibacterial activity in the environment by breaking the metabolic cycle inside the bacteria[11].

The indications for using this dressing are full-thickness or partial-thickness wounds, including donor grafts, bed sore, diabetic, traumatic, and abrasion wounds, and the contraindication for their use is 3rd degree burn wounds. In addition, Vaseline gauze dressing is a conventional dressing for the donor graft site, and with its non-adhesion property, it prevents mechanical trauma to the wound during dressing change[12].

Therefore, according to the previous information, the present study was conducted with the aim of comparing the effect of Colactive plus Ag dressing with Vaseline gauze dressing in donor site of split-thickness skin grafts of burned patients.

MATERIALS AND METHODS

The present study was conducted as a randomized control clinical trial (RCT) with **IRCT20210831052348N1** registration code among 15 patients in Motahari burn hospital during 3 months in 2022. The present study population included patients referred to the Motahari Burn Center in Tehran. Sampling method in this research was done using Cochran's formula and available patients. Data was collected using direct observation, interview with the patient, and a checklist made by the researcher. This form included demographic characteristics, burn percentage, pain level, itching level, recovery period related to the scar of donor site. The formal and content validity of the evaluation form and criteria was done by asking the opinions of 10 expert doctors and medical colleagues.

In order to conduct the research, after obtaining the permission from the head of the studied hospital and with the coordination of the research assistant, the manager and the head of the hospital, the researcher went to Motahari Hospital located in Tehran to collect information. The intervention group (Coalative dressing) and the control group (Vaseline gauze) were the same, and only the area treated by two types of treatment (Colactive dressing and Vaseline gauze) was examined in people. This means that people were included in the study who

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had more than one donor area, one of which was treated with Colactive dressing and the other area was treated with Vaseline gauze.

First, in the patient, the graft was removed by an electric dermatome with a thickness of 0.4 mm (0.016 inches). Then the donor site is divided into two parts according to the sensory dermatomes of the limb, one area is covered with colactive plus Ag dressing, the other site was equally covered by Vaseline gauze of the same size. All patients were given 1 gram of Apotel three times a day, and the amount of pain in the morning was determined by the patient before receiving the dose of Apotel.

Before the surgery, the pain measurement scale (Visual Analog Scoring) was explained to the patient (standard chart) that is designed based on a straight line without division with a length of 10 cm (100 mm), in which zero means painlessness and its 10th shows the most severe pain. In the hour when the pain intensity should be measured, if the patient is asleep, the pain intensity was considered zero. The patients were free to indicate their level of pain by marking or showing a point of this line.

The inclusion criteria included patients in the age group of 12 to 65 years, with burns and candidates for STSG graft, no burns in the studied limb, and patient with burns of 10% to 50 %. In addition, exclusion criteria include; Children under 12 years of age, immunocompromised patients, patients who required too much analgesics, and mentally ill patients who could not explain the pain report.

The study data were analyzed using SPSS version 22 software (IBM Corp., Armonk, NY, USA). In the data related to descriptive variables, descriptive data tables were used, and non-metric (Mann-Whitney) tests were used for analytical variables due to the non-normality of the data.

RESULTS

The mean and standard deviation of the age of the patients participating in the study was 38.48 ±15.02 years. In addition, the gender frequency distribution of the participants showed that 60% of the participants were male. The burn percentage of the patients participating in the study was 46.6% with 10-15% burns. The demographic information of the participants in the study is shown in (Table 1).

To compare the average duration of recovery, the amount and intensity of pain and the amount of itching in the two treatment groups, first the normality of the data was checked using the Kolmogorov-Smirnov test, and the results were as follows:

According to the results, it can be seen that the variables mentioned in (Table 2) are not normal (*P*-value>0.05). Therefore, the non-parametric Mann-Whitney test was used to compare the average of the mentioned variables, and the results are as follows:

According to the results obtained from the software, it can be seen that the average duration of recovery, the amount and intensity of pain and the amount of itching among the two types of treatment used are statistically significant at the 95% confidence level, which means that the duration The recovery time, the amount and intensity of pain and the amount of itching in the Colactive dressing group were more effective than the Vaseline treatment group. (*P*-value<0.05). The average amount of scar left by

Table 1: Demographic frequency distribution of patients participating in the study

Gender	Man	Abundance	9
		Percentage	60
	Woman	Abundance	6
		Percentage	40
Burn percentage	10 percent	Abundance	4.0
		Percentage	26.7
	10 to 15 percent	Abundance	7.0
		Percentage	46.6
	15 to 20 percent	Abundance	4.0
		Percentage	26.7
Age	Average	38.48	
	Standard deviation	15.02	

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Table 2: Normality test of recovery time, amount and intensity of pain and amount of itching in two treatment groups

Variables	Groups	Statistic	df	*P*-value
Recovery time	Colactive dressing	0.347	15	0.000
	Vaseline	0.147	15	0.051
The amount and intensity of pain	Colactive dressing	0.246	15	0.00
	Vaseline	0.182	15	0.058
The degree of itching	Colactive dressing	0.189	15	0.00
	Vaseline	0.164	15	0.061
Scar vascularity rate	dressing Colactive	0.241	15	0.00
	Vaseline	0.135	15	0.063
Scar pigmentation	Colactive dressing	0.298	15	0.00
	Vaseline	0.198	15	0.058
Scar thickness	Colactive dressing	0.243	15	0.00
	Vaseline	0.189	15	0.064
Pliability	Colactive dressing	0.245	15	0.000
	Vaseline	0.135	15	0.067

Table 3: Comparison of the average of the main research variables between the two treatment groups

Variables	Groups	Average	Standard deviation	Df	Results
Recovery time	Colactive dressing	11.5	2.74	15	Z=-2.251
	Vaseline	14.06	8.7	15	*P* -value = 0.02
The amount and intensity of pain	Colactive dressing	0.18	1.94	15	Z=-2.46
	Vaseline	0.32	3.80	15	*P* -value = 0.04
The degree of itching	Colactive dressing	0.21	1.83	15	Z=-3.26
	Vaseline	0.31	2.30	15	*P* -value = 0.048
Scar vascularity rate	Colactive dressing	1.14	0.53	15	Z=-0.386
	Vaseline	1.23	0.64	15	*P*-value=0.06
Scar pigmentation	Colactive dressing	1.83	0.563	15	Z=-0.412
	Vaseline	1.89	0.578	15	*P* -value=0.59
Scar thickness	Colactive dressing	1.48	0.687	15	Z=-0.293
	Vaseline	1.52	0.721	15	*P* -value = 0.08
Pliability	Colactive dressing	1.85	0.565	15	Z=-0.422
	Vaseline	1.91	0.581	15	*P* -value =0.051

Table 4: Normality test of recovery time in two treatment groups

Variables	Groups	Statistic	df	*P*-value
Recovery time	Colactive dressing	0.347	15	0.000
	Vaseline	0.147	15	0.050
Treatment is done	Colactive dressing	0.369	15	0.000
	Vaseline	0	15	0.000

the wound in the two types of dressings examined is not statistically significant at the 95% confidence level (*P*-value < 0.05) (Table 3).

To measure the relationship between the type of treatment performed and the duration of recovery in the two treatment groups, the normality of the data was first checked using the Kolmogorov-Smirnov test, and the results are as follows:

According to the results of (Table 4), the data related to the duration of recovery and the treatment performed in the two treatment groups are not normal. Therefore, Spearman's non-parametric test was used to compare the average duration of recovery, and the results are as follows:

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Table 5: The relationship between the treatment performed and the duration of recovery

		Treatment used
Recovery time	Spearman's Correlation	-0.261
	Sig. (2-tailed)	0.020
	N	70.000

The results of Spearman's correlation test showed that the therapeutic action had a significant effect and relationship on the recovery period of the patients. (*P*-value<0.05). This means that Colactive dressing has been effective in the recovery and repair of the donor graft (Table 5).

DISCUSSION

The present study was conducted with the aim of comparing the therapeutic effects of Colactive plus Ag dressing with Vaseline gauze in improving the skin graft site in burn patients of Shahid Motahari Hospital. One of the goals of this research was to determine the demographic characteristics of the samples. To achieve this goal, descriptive statistics were used and the results were presented in the findings section.

In terms of age, the samples of patients participating in the study were homogeneous, with an average of 38.48 and a standard deviation of 15.02. A meta-analysis study related to the epidemiology of burns and skin grafts in Iran showed that the participants in the study were in the age range of 16 to 29 years old[13]. Also, in a study in China the average age was 27 years, but the age group from 0 to 6 years accounted for the largest amount (34.7%)[8]. which is expected to be due to the lack of entry criteria for the participants in the study and the patients were included in the study without age restrictions.

The frequency distribution of the research samples for the burn percentage variable showed that the highest percentage of people in the study had burns at the rate of 10-15%, which can be justified due to the lack of definition of the admission criteria for patients with a special burn percentage.

Also, the findings of the study regarding the level of pain in the two groups using Colactive plus Ag dressing and Vaseline gauze showed that the amount and intensity of pain in the Colactive dressing group was less than in the Vaseline treatment group. This means that in the areas where Colactive plus Ag dressing was used for the patients, the patients felt significantly more satisfaction and less pain. In another study regarding the use of lyophilized bovine collagen (Gelfix spray) for dressing donor site of split thickness graft, it was shown that the use of Gelfix dressing was less painful than Vaseline gauze was [14].

Using composite dressing including collagen oxidase and cellulose-silver for medium thickness skin graft donor site for post op pain. And the bleeding was very little or insignificant[15]. In a study by Ramesh et al. regarding the comparison of Vaseline gauze dressing and collagen dressing in reducing post op pain. 40 patients were examined in two groups of 20 people, and the pain in the collagen dressing area was significantly less than the pain in the Vaseline gauze area[16]. In a study on 30 patients, the collagen dressing based on bovine collagen was compared with the paraffin gauze dressing area, and the pain in the collagen dressing area was clearly less in the first few days[17]. The results of all the mentioned studies were consistent with the present study.

Regarding the amount of itching and the healing time of the graft donor site, the findings of the study indicated that in the areas where Colactive dressing was used in the graft donor, patients felt less itching in that area and in a shorter period of healing time. also improved. In this way, the use of Colactive dressing compared to Vaseline gauze has a higher effectiveness in the amount of itching and the recovery time of the donor area. According to a study in 1998 on 20 patients, the improvement rate of the skin graft donor site was investigated using two types of polyurethane and collagen dressings, which significantly resulted in faster epithelization and less discomfort[18]. The results of Salehi et al.'s study in this regard also showed that burned patients treated with Colactive dressing had a shorter recovery time and patients recovered in a shorter period of time compared to treatment with Vaseline gauze[12]. Similarly, in the study by Ramesh et al. in relation to the comparison of Vaseline gauze dressing and collagen dressing, the epithelialization time was faster in the collagen dressing area than in

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the Vaseline gauze area[16].
Regarding the use of Gelfix dressing, epithelization occurs faster[14]. Also, the healing of the donor site is faster using collagen dressing[15].
According to the results obtained in this study, the scar of the colactive plus Ag dressing area was not significantly different from the scar of the Vaseline gauze area in a study conducted by Joseph Still et al. The skin of the newborn foreskin was presented in the form of a composite dressing (Orcel™) for the treatment of the donor site of burn patients. The scar in the area of the collagen dressing was clearly less, which could be due to the presence of keratinocytes and dermis fibroblasts along with collagen[19] in another study. which was presented by Fatih Uygur and bovine collagen (Gelfix spray) was used to dress the split thickness graft donor site showed that the scars were similar in both dressings and there were no significant differences. which was in complete agreement with the results of our study[14]. In the end, the results of the present study regarding the comparison of the amount of scar to the remnants of the wound in Colactive plus Ag dressing and Vaseline gauze showed that there is no significant relationship between the two types of treatment used.

CONCLUSION

The use of Colactive plus Ag dressing has less pain, less itching in the donor area, and a shorter average recovery time than petroleum jelly, and the use of the said dressing will be more effective than petroleum jelly. Therefore, it is suggested to conduct studies on a wider scale in the centers that provide skin and burn repair care services in order to provide more effective care and increase patient satisfaction, and the results of the studies should be considered in the relevant treatment.

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CONFLICT OF INTEREST

The authors have no competing interests to declare that are relevant to the content of this article.

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