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Effect of Hydrocolloid Dressing versus Paraffin Gauze Dressing on Wound Healing and Pain for Split Thickness Skin Graft Donor Site

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Abstract: Ideal wound care for split-thickness skin graft donor sites should include dressings that promote healing, prevent complications, and are cost-effective. The *aim* of this study is to evaluate the effect of hydrocolloid dressing versus paraffin gauze dressing for split thickness skin grafting donor sites in terms of pain and wound healing. **Methods:** quasi-experimental design was conducted over period of one year for 35 patients who admitted for skin graft. The participants were recruited from one of the big teaching hospitals in Cairo at Egypt. The Numeric Rating Scale (NRS) and Bates Wound Assessment Tool (BWAT) were used alongside a background/medical data sheet to collect the data. The selected two dressing material were changed for three to four times. **Result** it was observed that there was a gradual decrement in the Bates Wound Assessment Tool scores during 4th, 7th, 10th, and 14th days during changing the dressing at duoderm /hydrocolloid and paraffin gauze dressing sites, But, decrement at the duoderm sites was greater and faster than paraffin gauze dressing sites with a mean and standard deviation equal to (23.34±.998, 16.20±2.03, and 13.77±1.13 versus 25.80±1.53, 23.14±2.15, and 18.85±1.61) respectively. The mean healing time for complete re-epithelialization was equal to 8.6 day ±1.08, for hydrocolloid sites versus 15.2 day± 3.02 for paraffin gauze site) respectively. Also, there were a statistical significance difference between the three durations of changing the dressing at the paraffin and duoderm sites for the same subjects with F/ratio/P value equal to (17783.959 / .000*). As regards to pain subjects exhibited lesser pain intensity during 7th, 10th, and 14th days during changing duoderm dressing sites in comparison with paraffin gauze sites. **Conclusion:** Hydrocolloid dressing resulted in shorter healing time, faster re-epithelialization, fewer dressing changes and reduced pain when compared with paraffin gauze dressing. **Recommendation** Hydrocolloid dressing is recommended dressing for partial split thickness skin grafting donor sites. A larger randomized study is required to generalize the findings.

Key words: Hydrocolloid/duoderm, Paraffin gauze, Split Thickness, Skin Graft, Donor Site

INTRODUCTION

Split-thickness skin grafting (STSG) is a commonly used rehabilitation technique for the replacement of broken or missing skin caused by burns, trauma, and chronic wounds. Split-thickness auto-grafts are harvested by excising the epidermis and part of the dermis, leaving a donor-site wound which will vary in thickness. Donor-site wounds heal by re-epithelialization in 7–14 days, although the rate may be affected by the local wound environment (Argirova, Hadjiski, and Victorova, 2007[1]; Demirtas, Yagmur, and Soylemez, 2010[2]; Masella, Balent, Carlson, Lee, and Pierce, 2013) [3].

In spite of assorted newer advances in wound dressing coverage materials. Although the technique of skin grafting is more or less standardized, the treatment of the donor site has been a subject for discussion. The STSG donor site sometimes receives very little attention and is often a source of delayed healing with considerable pain (Spear, and Bailey 2018) [4].

Dressings are applied underneath bandages. The goal of treating skin graft donor sites is providing a moist environment to aid healing while minimizing the risk of introducing new complications and pain at donor site. Nowadays, several types of dressing seek to achieve a moist environment, the aim is to promote re-epithelialization of the wound, providing comfort, controlling exudates and

helping to prevent bandages from adhering to the wound bed. The ideal conditions required for wound healing in terms of dressing application have been explained as follows: maintenance of a moist wound environment without risk of maceration (tissue breakdown); avoidance of toxic chemicals, particle in the dressing fabric; a minimal number of dressing changes; and maintenance of an optimum pH level (NPF, 2011)[5].

Different dressing methods are used in split thickness skin grafting donor sites. Paraffin gauze dressing is an old and still practiced strategy to cover the donor sites and allow it to dry out. (Spear, and Bailey, 2018).(4) However it always dries up & converts into a dry dressing eventually, leading to in considerable pain & discomfort to the patient with movements & at removal. These dressings produce a waterproof paraffin cover over the donor site, but this could cause maceration as the water vapor and exudation might not pass through and be trapped within the wound. These dressings are permeable to bacteria, might adhere to the donor site and in some cases may cause trauma on removal and can need a secondary dressing. Healing time of paraffin gauze dressing in some studies is within the range (10 – 20 days). It takes longer time to heal (Fan, Tang, and Kirsner, 2011[6]; Adhikari, and Khatiwada, 2017)[7].

However, Many surgeons is still preferred paraffin gauze dressing because it is easy available, cheaper and maintains moist environment (Shaileshkumar et al.)[8].

Hydrocolloid dressings are designed to regulate the environment for wound healing, by maintaining hydration, and by facilitating autolytic debridement of death tissue. These dressings form a gel in the presence of exudates to facilitate rehydration in lightly to moderately drainage wounds and promote autolytic debridement of necrotic wounds (NPF, 2011)[9]. It contains a variety of constituents including gelatin, pectin and sodium carboxymethyl cellulose in an adhesive polymer matrix. Examples of a hydrocolloid dressing include Comfeel (Coloplast) and (DuoDerm). DuoDerm is the brand name for a commonly used hydrocolloid. (Hydrocolloids are self adhesive and water repellent. In the presence of wound exudates, hydrocolloids absorb liquid and form a gel. Hydrocolloid dressings only need changing every 3-5 days (Edwards, Gibb, Finlayson, Jensen, and Brisbane, 2013)[10].

A hydrocolloid dressing creates an acidic environment which inhibits bacteria growth, promotes autolytic debridement in wounds with necrotic or sloughy tissue and helps with granulation or epithelialization. Because of hydrocolloids their occlusive nature, it should not be used if the wound or surrounding skin is infected. Hydrocolloid dressings are conformable to split thickness skin grafting donor sites (Ilenghoven, et al. J 2017)[11].

Dressing choice depends on the practitioner's skilled assessment of the wound and his knowledge of away to offer this optimum wound healing environment through the use of utilization of contemporary interactive dressings. Wound dressing will continue to advance rapidly therefore, clinicians should try to obtain the maximum benefits from this evolving technologies and therapies (NPF, 2011)[9].

There is no current up-to-date proof to tell clinicians of the impact of hydrocolloid dressings in treating split thickness skin grafting donor sites. The result of hydrocolloid dressings compared with different dressings and conventional methods of take care for split thickness skin grafting donor sites needs to be established (Palfreyman, Nelson, and Michaels, 2007)[12]. There is not enough evidence to clearly decide on the best dressing for split thickness skin grafting donor sites (Martin et al., 2010)[13].

Nurse role for wound care is directed towards assess, treat, and create care plans for patients with complex wounds. This role requires staying up-to-date on current procedures techniques, and dressing materials. Nurses can decrease wound complications by being proactive about prevention. Scrupulous handling and care of wounds helps prevent contamination and possible infection. Wound care nurses also help educate and provide care instructions for patients and families. Wounds often need continual care in order to properly heal. Wound care nurses teach patients and caregivers how to clean and dress wounds, and report complications like infection. Nurses should also, document every wound in detail, including the size, color, depth, stage and drainage (Perkin, 2018[14]; MacLellan, Gardner, and Gardner, 2002)[15]. Therefore the aim of this study is to evaluate the effect of hydrocolloid dressing versus paraffin gauze dressing at split thickness skin grafting donor sites.

Significance:

Surgical site infections (SSI) are the common nosocomial infection among surgical patients, and are a major reason behind of surgical morbidity leading to prolonged hospital stay, and increased cost. The global estimates of surgical site infections (SSI) have varied from 0.5-15%, in the United States, studies in India have shown higher rates of SSI ranging from 16-38.8%. In Nepal, some retrospective studies have indicated that prevalence rate of SSI to be 4-7% for all kinds of operation. In Egypt, a prospective study by Wassef et al. recorded that surgical site infections was 9.2% (Wassef, Hussein, Abdul Rahman, and El-Sherif, 2012)[16].

Split thickness skin grafting donor sites often resulted in pain and discomfort for the patient. Thus vigilance nursing care was needed to regularly trim the edges of the dressing as it peeled away from the healing wound. If not done, the dressing could catch on clothing, causing pain, and trauma to the wound. Therefore, different dressing materials have been used to provide optimum wound healing environment at split thickness skin graft donor sites (Shrestha, Wenju, Shrestha, and Karmacharya, 2016) [17]. Moreover (Cooper and Nolt, 2007) [18] emphasized that wounds should be carefully reassessed with every dressing change to ensure the most appropriate dressing products are used. Inappropriate management of wounds can lead to delayed healing, deterioration of wounds condition. Also it is hoped that the findings of this study might help in improving quality of patients care and establish evidence based data that can promote nursing practice and research.

MATERIAL AND METHODS

Aim:

Aim of this study is to evaluate the effect of hydrocolloid dressing versus paraffin gauze dressing at split thickness skin grafting donor sites in terms of pain and wound healing.

Hypotheses:

Two research hypotheses were formulated:

H1. Bates wound assessment scores of hydrocolloid dressing sites were lower than paraffin gauze dressing sites at split thickness skin grafting donor site

H2. Pain scores of hydrocolloid dressing sites was lower than paraffin gauze dressing sites at split thickness skin grafting donor site

Design:

Quasi-experimental design was utilized to accomplish this study

Sample:

35 eligible patients undergoing split thickness skin grafting were included for the study. All Suitable enrollees were adult male and female, their age ranged between 20 to 40 years, requiring split thickness skin grafting for various etiologies for the first time, the donor area being restricted to anterior thigh measuring between 20 X20 cm to 25 X25 cm, Hb level not less than 10 mg, total body surface area (TBSA) ranged between (40-50%). All participants were taken the same course of antibiotics for five days before operation day and five days after operation, patients who had ability to communicate. The exclusion criteria were

including smoker patients, patients who had co- morbidities diseases such as diabetes, renal diseases, cardio-vascular diseases...etc that interfere with wound healing.

Setting:

The study was conducted in burn department at El-Kaser Elini Hospital from June 2014 to August 2015. It is a teaching University Hospital in Cairo. This hospital is one of the largest public teaching hospitals in the Cairo region, where a great number of patients from different socio-demographic and economic backgrounds come to receive health care from different regions in Egypt.

Tools for Data Collection:

Background data sheet: include age, gender, and level of education
 Medical data sheet: diagnosis, day of complete re-epithelialization for hydrocolloid and paraffin gauze dressing.

Pain Scale: Numerical Rating Scale (NRS):

Patients are asked to circle the number between 0 and 10, which fits best to their pain intensity. Zero represents 'no pain at all' whereas the upper limit represents 'the worst pain ever possible'. Mild pain (1-3), moderate pain (4-6), and severe pain (7-10)(Haefeli and Elfering)[19].

Bates Wound Assessment Tool (BWAT):

This tool used to measure wound and used it at regular intervals to evaluate the effectiveness of therapy. The BWAT consists of 15 items. Each item scored from 1 to 5 to provide an assessment. A score of 1 indicates the healthiest and 5 indicates the unhealthiest attribute for each characteristic The total BWAT scores are categorized into four severity categories ;13–20 = minimal severity; 21–30 = mild severity;31–40 = moderate severity;41–65 = extreme severity.. The internal consistency for the overall BWAT score was 0.815. Cronbach's alpha ranges from 0 to 1 and a score of ≥ 0.7 is accepted value (Jensen, 2001)[20]

Procedure for data collection:

- Interview the patient to explain the purpose, nature, of the study and to obtain an informed consent. Also, interview the surgeons, nurses, and all healthcare providers to explain the purpose and nature of this study, and to obtain their acceptance and cooperation.
- The patients were met over four to five consecutive times to accomplish the following: First time during admission days to fill out the demographic and medical data sheet. Then the researcher met the study participants about three to four times to evaluate the wound healing process utilizing WABT and NRS tools to assess pain intensity. Second time in (4th) postoperative day, third time in (7th)postoperative day, fourth time in(10th)day postoperative day, the fifth time in (14th) postoperative day.
- Observational check list to examine wound healing and the effectiveness of dressing material

Intervention:

In the operative day the researcher preparing the patient's sterile field and needed equipment for dressing the donor sites .It was saline, duoderm patch 10cm x10cm and paraffin gauze dressing 10cm x10cm ,bandage ,adhesive tape , identification card included date of operation, and digital

camera. After that, the researcher performed complete surgical scrubbing .The surgeon harvesting the skin and taking the partial thickness skin graft from patient's thigh .while the surgeon applied the graft over the receipt site .The researcher apply a slight pressure over the donor site with large pieces of gauze soaked with saline for hemostasis for 15 to 20 min.

The donor area was then divided into two equal halves, the proximal half being marked "A" and the distal being "B". On space "A", ten x ten cm duoderm dressing was placed on space "B", a ten x ten cm paraffin gauze was placed. A dry dressing pad and bandage were applied over the first dressing (Shaileshkumar et al., 2012) [8].

On the fourth post operative day the outer dressing was inspected and removed over both the paraffin gauze and duoderm patch. Then Duoderm patch was replaced by new patch. But, leaving the paraffin gauze primary dressing in its place. If any signs and symptoms of infection occur, those patients were excluded from the study and were treated according to hospital routine wound care.

On the 7th ,10th ,14th post operative days both areas (A&B) were assessed for of complete epithelialization and healing process. Only outer dressing was removed for both areas(A&B). But the inner dressing was remained in it's place if complete wound epithelialization did not occur.

Also photographs of donor site was done five times in the operating room, 4th day 7th day and 10th day and 14th day for recoding the wound healing progress at two areas (A&B)of donor site.

Pilot study:

A pilot study was conducted on five patients, who were then excluded from the main study sample. The pilot study aimed to: (i) estimate the required sample size (ii) calculate the time necessary to interview the patients, (iii) test the clarity and understandability of the questionnaires and (iv) examine the feasibility of the dressing technique. All questionnaires items were clear, understandable and some modification was required. The results of the pilot study confirmed that the study was feasible.

Ethical considerations:

An official permission to conduct the study was obtained from the head of the hospital directors. Informed consent for patient's agreement was obtained after explanation of the nature and purpose of the study. Each patient was free to either participate or not in the study and had the right to withdraw from the study at any time without any rationale and it don't have an effect on upon care provided. Also, patients were informed that obtained information does not be included in any further researches. Confidentiality and anonymity of each subject were assured through coding of all information.

Statistical data analysis:

Statistical analysis was performed using SPSS for Windows, version 19. Descriptive statistics and frequencies were computed to explain sample characteristics, pain intensity for the dressing materials. Two ways ANOVA was used to

compare mean differences in continuous variables of BWAT total score for hydrocolloid and paraffin gauze dressing.

RESULTS

Table (1) Sample characteristics:

Items	Frequency	%
Age		
18-30	28	80
31-40	7	20
Mean ± SD	26.42±6.255	
Gender		
Male	29	82.9
Female	6	17.1
Level of education		
can read and write	9	25.7
Technical education	14	40.0
secondary education	12	34.3

Table (1) show that, the majority (82, 9%) of the studied group were male. Their age ranged between (18-30) years old, and were educated (74.3%).But only (25.7%) can read and write .

Table (2) Medical Data:

Items	Frequency		%	
Diagnosis				
Burn	20		57.1	
External fixation	15		42.9	
	Minimum	Maximum	Mean	Std. Deviation
Day of complete epithelialization for duoderm dressing	7.00	10.00	8.6286	1.08697
Day of complete epithelialization for Paraffin gauze dressing	13.00	21.00	15.2286	3.02038

Table(2) indicated that, 57.1% of the studied sample admitted with burn ,while 42,9% had external fixation transferred from orthopedic sections .All subjects were admitted for the purpose of skin auto-grafts. Subjects’ utilized duoderm dressing reported rapid skin epithelialization and faster wound healing than Paraffin gauze dressing with mean and standard deviation equal to (8.6286±1.08697, 15.2286± 3.02038)respectively.

Table (3) (BWAT) Repeated measure ANOVA for hydrocolloid and paraffin gauze dressing during the 4th ,7th ,and 14th day

Items	Hydrocolloid			paraffin gauze		
	4 th day	7 th day	10 th day	4 th day	7 th day	10 th day
	Mean ±SD	Mean ±SD	Mean ±SD	Mean ±SD	Mean ±SD	Mean ±SD
Size	2.9±.24	2.09±.28	1.00±.00	2.48±.56	2.08±.37	2.02±.16
Depth	2.0±.00	1.20±.41	1.00±.00	1.91±.28	1.94±.23	1.62±.49
Edges	1.8±.41	1.28±.45	1.00±.00	1.91±.28	2.00±.00	1.91±.28
Undermining	1.0±.00	1.0±.00	1.00±.00	1.00±.00	1.02±.16	1.00±.00
Necrotic tissue type	1.0±.0	1.0±.00	1.00±.00	1.00±.00	1.05±.23	1.00±.00
Necrotic tissue Amount	1.0±.00	1.00±.00	1.08±.28	1.00±.00	1.00±.00	1.00±.00
Exudates type	2.4±.51	1.31±.63	1.28±.45	3.42±.69	2.94±.76	1.85±.73
Exudates amount	2.2±.43	1.31±.63	1.17±.38	4.05±.87	3.71±.95	2.28±.51
Skin color	1.0±.17	1.08±.28	1.03±.16	1.00±.00	1.00±.00	1.00±.00
Peripheral tissue edema	1.0±.00	1.00±.00	1.00±.00	1.00±.00	1.00±.00	1.00±.00
Peripheral tissue indurations	1.0±.00	1.08±.28	1.00±.00	1.11±.32	1.00±.00	1.00±.00
Granulation tissue	1.0±.00	1.00±.00	1.00±.00	1.00±.00	1.00±.00	1.00±.00
Epithelialization	4.86±.35	1.82±.56	1.20±.40	4.88±.32	3.37±.80	2.14±.73
Total score	23.34±.998	16.20±2.03	13.77±1.13	25.80±1.53	23.14±2.15	18.85±1.61
F ratio/ P value	17783.959 / .000***					

It is observed that there was a gradual decrement in the Bates Wound Assessment Tool (BWAT) total mean score changing the dressing at duoderm and paraffin sites on the 4th ,7th ,and 10th day, But, decrement at the duoderm sites was greater and faster than paraffin dressing sites with a mean and standard deviation equal to(23.34±.998, 16.20±2.03, 13.77±1.13 versus 25.80±1.53, 23.14±2.15,and18.85±1.61) respectively. According to

Bates wound assessment tool (BWAT) the lesser wound assessment score the heather skin tissues and better wound healing at the duoderm sites. Also, there were a statistical significance difference between the three durations of changing the dressing at the paraffin and duoderm sites for the same subjects with F/P value equal to(7783.959 / .000*).See figure(2).below

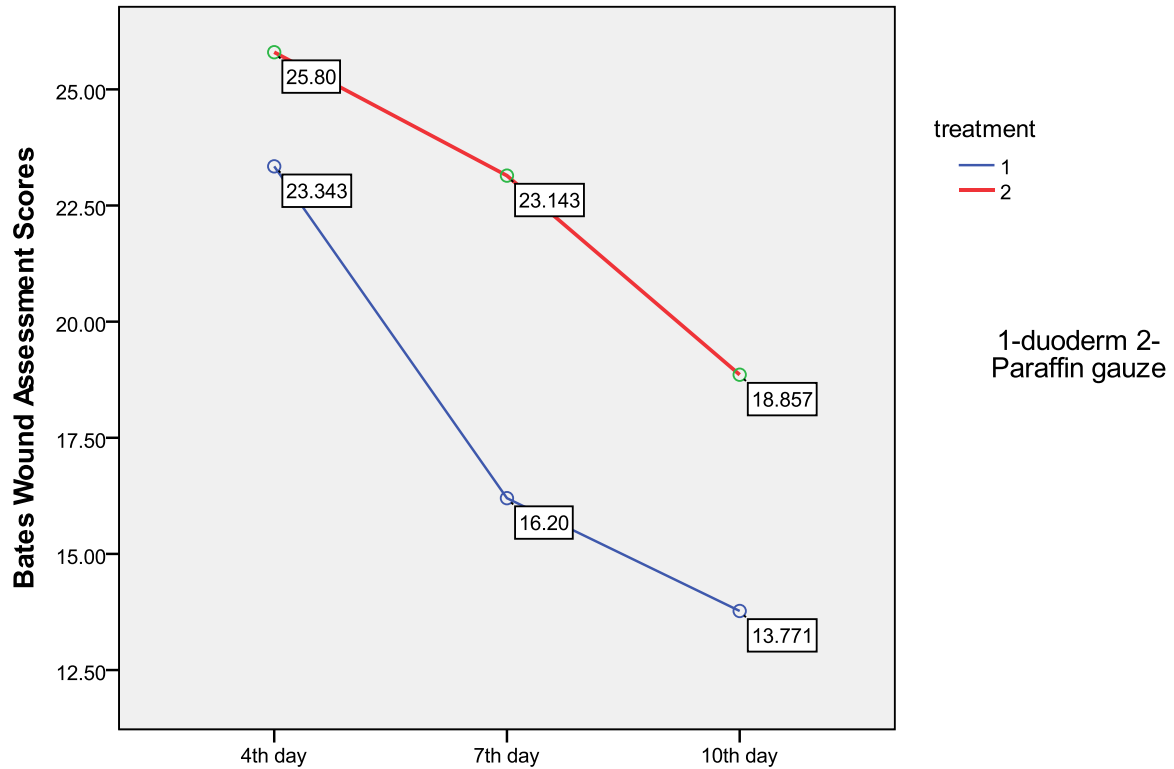


Figure.(2)Comparison of Bates Wound Assessment Score for Duoderm Dressing versus Paraffin Gauze Dressing

Table (4) frequency and percentage distribution for pain intensity among the studied subjects N=35

items	Hydrocolloid dressing		Paraffin gauze		Chi Square\	P Value
	Frequency	%	Frequency	%		
Pain in the 4th day					1.248	.536
None	16	45.7	---	---		
Mild	19	54.3	---	---		
Moderate	---	---	3	8.57		
Severe	---	---	32	91.42		
Pain in the 7th day					22.63	.000*
None	30	85.7	---	---		
Mild	5	14.3	---	---		
Moderate	---	---	19	54.29		
Severe	---	---	16	45.71		
Pain in the 10th day					21.32	.013*
None	32	91.4	---	---		
Mild	3	8.6	---	---		
Moderate	---	---	20	57.14		
Severe	---	---	15	42.86		
Pain in the 14th day					5.651	.059*
None	35	100	---	---		
Mild	---	---	10	28.58		
Moderate	---	---	20	57.14		
Severe	---	---	5	14.28		

In table (4) it was interesting that subject reported that 54.3% had mild pain, and 45.7% had no pain at the duoderm sites, while the majority (91.42%) reported severe pain at the paraffin gauze dressing sites during the fourth day changing the dressing for the same subjects. During the seventh and tenth and fourteenth day of changing the

dressing subjects exhibited lesser pain intensity at duoderm sites in comparison with paraffin gauze sites in percentages of (85.7%,no, 14.3% mild - 91.4% ,no, 8.6% mild ,100% .no versus 54.29% moderate, 45.71% severe-- 57.14%,moderate ,42.86% severe -57.14% moderate, 14.28% severe, 28.58,mild) respectively.

Figure (2): Combination pictures showing donor site in various stages: Immediately after graft harvest, and application of duoderm and paraffin gauze dressing sheet (a), Skin re-epithelialization (b)Day of Dressing removal (c).



Case(1) after harvesting the graft for duoderm and paraffin gauze dressing



Case(2) after harvesting the graft for duoderm and paraffin gauze dressing



Case (1) after 10th days duoderm show rapid Skin re-epithelialization rather than paraffin gauze



Case (2) after 6th days duoderm show rapid Skin re-epithelialization rather than paraffin gauze



Case (1) after 11th days duoderm show complete wound Healing rather than paraffin gauze



Case (2) after 9th days duoderm show complete wound healing rather than paraffin gauze

DISCUSSION

Surgeons has been used the paraffin gauze dressing for several years as the primary choice for the coverage of split-skin donor sites, because of its simple application, comfort, low risk of infection, and minimal cost. But it has been found inferior in several different necessary aspects; it is a painful, adherent dressing. Therefore the donor sites do not appear to heal rapidly(Harvey, Smith, and Patterson 2009[21]; Barnea et al., 2004[22]). Hydrocolloids can be used on low to moderately exuding wounds and are available in different sizes, shapes. They are easily to apply. This allows them to be used where greater flexibility is needed. Thinner, more transparent versions may also allow visual checks of the wound without removal of the dressing.

Hydrocolloid dressing may also lead to less pain on application and on removal (Queen, 2010) [23].

Therefore the aim of this study was to evaluate the effect of hydrocolloid dressing versus paraffin gauze dressing at split thickness skin grafting donor sites in terms of pain and wound healing measured by NRS and BWAT. To fulfill this aim two research hypotheses was formulated(1) Bates wound assessment total scores of hydrocolloid dressing sites were lower than paraffin gauze dressing sites at split thickness skin grafting donor site(2) Pain scores of hydrocolloid dressing sites was lower than paraffin gauze dressing sites at split thickness skin grafting donor site. The

study's findings are discussed in three sections: (1) Sample characteristics and medical data (2) comparison of BWAT total mean scores for hydrocolloid dressing and paraffin gauze (3) Frequency and percentage distribution of pain for hydrocolloid dressing and paraffin gauze.

(1) Sample characteristics and medical data. The study finding shows that, the majority of the studied sample was male. Their ages ranged between (18-30) years old, and were educated. This homogeneity of sample characteristic might help to promote wound healing. In support to this results, many studies examined the effect of age and gender indicated that in adult humans, optimal wound healing involves the following the events: (1) rapid hemostasis; (2) appropriate inflammation; (5) prompt re-epithelialization (re-growth of epithelial tissue over the wound surface); and (6) proper synthesis collagen to provide strength to the healing tissue. Increased age is a major risk factor for impaired wound healing. Women had significantly larger wounds (i.e. slower healing) than men in the younger group (Mathieu, Linke, and Wattel 2006[24]; Engeland, Bosch, and Cacioppo(2006)[25], ; Marucha 2006; Guo, DiPietro, and Dent, 2010[26].

Skin grafting is a surgical procedure that involves removing skin from one area of the body or transplanting it, to a different area of the body. This surgery may be done if a part of the body has lost its protecting covering of skin because of burns, injury, and or illness. Traumatic wounds, defects after oncologic resection, burn reconstruction, scar contracture release, congenital skin deficiencies as well. In this study skin graft was done for burns and traumatic wound injury such as external fixation for cases transferred from orthopedic sections. This was the common skin graft indication among the studied sample (Shimizu, and Kishi, 2012) [27].

As regards to mean healing time for duoderm and paraffin gauze dressing. Many studies recorded that there was no statistical significant difference in mean time to wound healing between hydrocolloid dressing and paraffin gauze dressing. The mean time was lower (10.6 days with hydrocolloid versus 11.1 days with paraffin gauze. A recent clinical trial showed that time to complete re-epithelialization was 7 days shorter with the use of duoderm than other dressing material such as with alginate, polyurethane film, paraffin gauze, hydrofiber, or silicone(Wiley and Sons, 2013[29]; Brölmann, Eskes and Goslings, et al. 2013[30].

In contrast to the pervious study, another study reported that there was no statistically significant difference between the total mean time to wound healing between hydrocolloid dressing and paraffin gauze dressing. The mean time is greater (14.18 days with hydrocolloid versus 11.83 days with paraffin gauze). Our findings, documented that mean time was shorter than the previous studies (8.6286 ± 1.08697 hydrocolloid, versus 15.2286 ± 3.02038 paraffin gauze). These finding, revealed the hydrocolloid allowed re-epithelialization and faster healing at split thickness skin grafting donor sites than paraffin gauze. Another possible explanation might be due to sample characteristics.

(2) Comparison of BWAT total mean scores for hydrocolloid dressing versus paraffin gauze. The Bates wound assessment tool (BWAT) revealed the lesser wound assessment scores, the heather skin tissues and better wound healing at the duoderm sites versus paraffin gauze sites. Also, there were a statistical significance evidence between the three durations of changing the dressing at the paraffin gauze and duoderm sites with F/P value equal to (17783.959/.000*). Many studies results revealed that hydrocolloids such as duoderm demonstrate superior re-epithelialization and similar infection rates relative to other dressing materials. Consistent with this study Solanki, Mackie and Greenwood, 2013 reported that the median time to re-epithelialization was shorter in the duoderm group at 11 days compared to 17 days in the biosynthetic material group (P=0.007). However, no infection or scarring has been observed.

Literature reviews clarifies the rapid healing that duoderm is consists of an outer layer of hydrocolloid polymer complex which is both occlusive and hydrophilic, aiding removal of excess exudates whereas maintaining appropriate environment to facilitate increased collagen synthesis, keratinocyte and angiogenesis(Demirtas, Yagmur, Soylemez, et al. 2010[31]; Wiechula .2003[32]. In support with previous clinical studies researchers showed that duoderm induced the quickest rate of healing whereas being moderate in price, easy to use, and resistant to infection(Wiley and Sons, 2013[29]; Kaiser, Hafner, and Mayer, et al.2013[33]; Solanki, Mackie, and Greenwood, 2013[34]). We can concluded that, from discussion for section two that hypothesis ;H1. Bates wound assessment scores of hydrocolloid dressing sites were lower than paraffin gauze dressing sites at split thickness skin grafting donor site was supported, which revealed rapid wound healing at hydrocolloid sites.

(3) Frequency and percentage distribution of pain for hydrocolloid dressing and paraffin gauze. Over all percentage of pain intensity exhibited by subjects were lesser at duoderm sites in comparison with paraffin gauze sites during days of changes dressing in (4th, 7th, 10th and 14th) days. A review of the literature suggests that the application of hydrocolloid dressings provide advantages within the management of acute wounds of every type, for instance decreasing healing times of donor sites by about 40% compared with traditional dressing. The principal benefit seems to be a reduction in wound pain (Thomas, 2008)[35]. Consistent with our study finding, also, Barnea et al. (2004) found that hydrocolloid group exhibited more rapid healing, less pain, and less scarring reduced postoperative morbidity, which in turn affects the global cost-effectiveness. However, paraffin gauze group requires additional analgesics [36].

Alongside with this study finding, it had been noted that the patients tolerated the hydrocolloid dressings much better than the paraffin gauze dressings and demonstrated much easier to remove or change in contrast to the paraffin gauze dressings which became adherent to the wound surface and caused discomfort and pain during removal (Shaileshkumar, et al., 2012) [8]. We can concluded that, hypothesis two which stated that, H2: pain scores of hydrocolloid dressing

sites was lower than paraffin gauze dressing sites at Split thickness skin grafting donor site was supported.

It is worth noted, that hydrocolloid was not commonly demonstrated type of dressing, for split thickness donor sites in comparison with paraffin gauze dressing during period of conducting this study. Surgeon clarifying that hydrocolloid dressing was expensive. Although, cost assessment was not associate objective during this study. But, it worth mentioning that cost plays a vital role in choosing between wound dressing materials. Cost-effectiveness was related not only to costs of the dressings themselves, but also to average wound healing times since wounds taking longer to heal can increase costs of staff time associated with dressing changes and the number of dressings used and, cost of patients 'transportation for each visit(Jeffcoate,et al.2009[37]; Guest, Ruiz, Mihai, and Lehman ,2005[38]; Yan, Colin, Coudray-Omnes, Guido-Morin and, Kommala(2012)[39]; Matilda, Margareta, Ingmarie and Erkki, 2014[40].

CONCLUSION

Hydrocolloid dressing resulted in shorter healing time, faster re-epithelialization, fewer dressing changes and reduced pain when compared with paraffin gauze dressing. So, we can conclude that, hydrocolloid dressing is superior to paraffin gauze dressing.

RECOMMENDATION

The current study recommended that:

- Hydrocolloid dressing is recommended dressing for partial split thickness skin grafting donor sites
- A larger randomized study is required to generalize the findings
- Study the dressing cost effectiveness

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