

Clinical Outcome of Non-occlusive Versus Occlusive Dressing in Postoperative Sutured Wounds

DINESH KUMAR¹, AMOL DANIEL²

ABSTRACT

Introduction: The main objective of dressing wounds is to prevent wound infections. Successful wound management depends on an understanding of the healing process combined with knowledge of the properties of the various dressings available. Wounds can heal primarily, secondarily, or by delayed primary closure. The method of dressing includes occlusive and non-occlusive dressing.

Aim: To evaluate the clinical outcome of non-occlusive versus occlusive dressings in postoperative sutured wounds.

Materials and Methods: This was a prospective study done on 298 patients over a period of one and half years from 1st January 2012 to 30th June 2013. All elective inpatients with sutured wounds in the Department of General Surgery requiring local wound care postoperatively were included in this study.

The patients were divided into two groups according to the type of dressing used i.e., occlusive or non-occlusive. The results obtained were statistically analysed by student t-test and Chi-square test.

Results: In our study, we found that wound infection and wound dehiscence were noted more in non-occlusive dressing group as compared to occlusive dressing group. We also found that mean cost of dressing, frequency of dressing changes, the pain during dressing change, mean duration of hospital stay for non-occlusive dressing was more than occlusive dressing.

Conclusion: After a careful review of current study on wound management and type of dressing, it is evident that occlusive dressing had better clinical outcomes as compared to non-occlusive dressing.

Keywords: Wound dehiscence, Wound infection, Wound management

INTRODUCTION

Wound management requires dressing materials and techniques that address the specific needs of the wound. The method of dressing ranges from totally occlusive where the gauze is completely covered by adhesive plaster to non-occlusive where light gauze dressing is held in place by few tape strips [1]. An ideal dressing should provide an optimum environment for moist wound healing because research demonstrates that a moist environment encourages wounds to heal more quickly than a dry one [2]. If left to dry, wounds form a scab or eschar which forces migrating epidermal cells to move deeper, prolonging the healing process [2].

The vast majority of these 'modern' dressings are described as occlusive. Occlusive dressings affect wounds by trapping moisture next to the wound bed. This moisture is thought to protect the wound surface by preventing desiccation and additional trauma [3]. It may consist of a sheet of thin plastic affixed with transparent tape" [4]. The majority of non-occlusive dressings include wound dressing pads which includes knitted viscose dressings and gauze dressings [5].

Only few studies have been done on the outcome of occlusive versus non-occlusive dressings in postoperative sutured wounds [6,7]. These constitute a substantial number of publications but an overall low amount of evidence. Hence, virtually no guidelines but a wide range of opinion exist. This study has been planned to obtain a high-level of evidence on the clinical outcome of non-occlusive versus occlusive dressings in postoperative sutured wounds.

MATERIALS AND METHODS

The study was conducted in the Department of General Surgery at Christian Medical College and Hospital, Ludhiana, Punjab, India, from 1st January 2012 to 30th June 2013. It was a hospital based, time bound, prospective study and included patients with postoperative sutured wounds requiring local wound care. The patients were only included after explanation of the study and who

gave written informed consent. Ethical clearance was obtained from the Institutional Ethical Committee (IEC).

The cases were randomized into two groups according to the type of dressing used. Group A included patients with non-occlusive dressings and Group B included patients with occlusive dressings for postoperative sutured wound care. Allocation was concealed till subject had been allotted.

Dressings included the conventional non-occlusive gauzes or the occlusive, non-gauze based materials (opside, primapore). Patients with open wounds, infected wounds, emergency procedures, outpatient procedures and combinations of occlusive and non-occlusive dressings were excluded from the study.

Wounds were examined for any sign of infection. Wound infection was classified according to the centers for disease control and prevention criteria for defining a surgical site infection as follows [8]:

1. Superficial incisional
2. Deep incisional
3. Organ space

The parameters studied were pain during dressing change, frequency of dressing change, duration of hospitalization, wound infection, wound dehiscence and cost of dressing.

Pain was scored by the patients during hospitalization after each dressing change on a 10 cm visual analogue scale, ranging from 0 (no pain) to 10 (worst pain imaginable) [9].

STATISTICAL ANALYSIS

The results obtained were statistically analysed by student t-test and Chi-square test and p-value less than 0.05 was considered to be statistically significant. Permuted block randomization was carried out using randomization software (RALLOC). Blocks of four were used.

RESULTS

In our study, out of total 298 patients there were 150 (75 male and 75 female) patients in Group A and 148 (72 male and 76 female) patients in Group B. Majority of the studied patients {115 (38.6%)} were in the age group between 46-60 years and the least number {8 (2.7%)} of them were of ages between 76-90 years. Age groups between 15 to 90 years were included in the study. In all the age group, patients were almost equally randomized to Group A and Group B [Table/Fig-1].

The pain occurring during change of dressing was reported more in the non-occlusive dressing group. In both groups, it was seen that the VAS was usually two and three. Mild pain (score=one) and severe pain (score=five) was rarely reported in both the groups [Table/Fig-2].

We found that the majority of patients, 89 (59.3%) and 142 (95.9%) had once daily dressing change in non-occlusive and occlusive dressing group respectively [Table/Fig-3]. We also found that the non-occlusive dressings were changed sooner than the occlusive ones.

The duration of stay in the hospital was almost equal in the two groups where majority of the patients stayed in the hospital for two to seven days. However, a small number of patients in non-occlusive dressing group also had a more prolonged stay for more than 13 days [Table/Fig-4]. Mean duration of hospital stay for non-occlusive dressing group was 6.59 days while for occlusive dressing group it was 3.71 days. Only a minor number of patients from the group with occlusive dressing stayed in the hospital for longer than 7 days.

Wound infection was reported more in those patients who were treated with non-occlusive dressing (28%) as compared to occlusive dressing (10.1%) [Table/Fig-5].

Wound dehiscence was not a common finding in our study. Only eight (2.7 %) of the overall patients had wound dehiscence and all of them were from non-occlusive dressing group [Table/Fig-6].

On comparing the cost of dressing, it was noted that total cost of dressing used in both the groups was mainly between Rs. 60–500. Amongst these, it was the occlusive group that had more number of patients with a lower cost of dressing. Mean cost of dressing for non-occlusive dressing group was Rs. 365.49/- while for occlusive dressing it was Rs. 265.18/- [Table/Fig-7].

DISCUSSION

The present study was conducted to assess the clinical outcomes of occlusive and non-occlusive dressings in postoperative sutured wounds.

In the present study, it was observed that the pain occurring during change of dressing was reported significantly more in Group A. This is similar to the finding by Provan A and Phillips TJ who found that the pain was lesser in occlusive type of dressing [10]. This may be due to non-occlusive dressings (particularly gauzes) easily stick to the wound when left in situ and cause pain on removal. This was apparent in our study.

Our results are in agreement with study by Ubbink DT et al., which reported that frequency of dressings changes are significantly lower in Group B patients when compared with Group A patients [11]. Factors contributing for decrease frequency of dressing change in occlusive dressing could be due to the properties of waterproof, conform to body contours, and may stay in place for longer periods of time [12].

In our study, the duration of stay in the hospital was reported significantly more in Group A. This finding is similar to findings by and Mertz PM and Harris B et al., [12,13]. This could be possible as occlusive dressings provide a moist environment, retain wound fluid that contains growth factors, and the potential abilities of proteinases to activate latent growth factors and generate chemotactic peptides through connective tissue breakdown may also contribute to the

Age (years)	Type of dressing		Total	p-value
	NO (Group A)	O (Group A)		
15-30	22	21	43	0.530
% within type of dressing	14.7%	14.2%	14.4%	
31-45	38	30	68	
% within type of dressing	25.3%	20.3%	22.8%	
46-60	51	64	115	
% within type of dressing	34.0%	43.2%	38.6%	
61-75	34	30	64	
% within type of dressing	22.7%	20.3%	21.5%	
76-90	5	3	8	
% within type of dressing	3.3%	2.0%	2.7%	
Total	150	148	298	
% within type of dressing	100.00%	100.00%	100.00%	

[Table/Fig 1]: Age versus type of dressing.

Chi-square Test

VAS	Type of dressing		Total	p-value
	NO (Group A)	O (Group A)		
1	3	13	16	<0.001*
% within type of dressing	2.0%	8.8%	5.4%	
2	35	68	103	
% within type of dressing	23.3%	45.9%	34.6%	
3	59	62	121	
% within type of dressing	39.3%	41.9%	40.6%	
4	50	5	55	
% within type of dressing	33.3%	3.4%	18.5%	
5	3	0	3	
% within type of dressing	2.0%	.0%	1.0%	
Total	150	148	298	
% within type of dressing	100.00%	100.00%	100.00%	

[Table/Fig 2]: VAS versus type of dressings.

Chi-square Test

*Indicates p significant

VAS (Visual Analogue scale)

Frequency of dressing change	Type of dressing		Total	p-value
	NO (Group A)	O (Group B)		
Once Daily	89	142	231	<0.001*
Once Daily (%)	59.30%	95.90%	77.50%	
Twice Daily	56	1	57	
Twice Daily (%)	37.30%	0.70%	19.10%	
Thrice Daily	5	0	5	
Thrice Daily (%)	3.30%	0.00%	1.70%	
Alternative Days	0	5	5	
Alternative Days (%)	0.00%	3.40%	1.70%	
Total	150	148	298	
Total (%)	100.00%	100.00%	100.00%	

[Table/Fig 3]: Frequency of dressing change versus type of dressing.

Chi-square Test

*Indicates p significant

enhanced healing of occluded wounds [14].

It is generally assumed that occlusive dressing increases the risk for infection by completely sealing the wound and allowing the bacterial count to increase [15,16]. However, we found that the frequency of occurrence of infections were significant more in Group A as compared to Group B. This could be mainly due to the better

Duration of hospital stay (days)	Type of dressing		Total	p-value
	NO (Group A)	O (Group B)		
2-7	97	145	242	<0.001*
% within type of dressing	64.70%	98.00%	81.2%	
8-13	46	3	49	
% within type of dressing	30.7%	2.0%	16.4%	
14-19	7	0	7	
% within type of dressing	4.70%	0.00%	2.3%	
Total	150	148	298	
Total (%)	100.00%	100.00%	100.00%	

[Table/Fig 4]: Duration of hospital stay versus type of dressing.
Chi-square Test
*Indicates p significant

Wound infection (Yes or No)	Type of dressing		Total	p-value
	NO (Group A)	O (Group B)		
No	108	133	241	<0.001*
% within type of dressing	72.0%	89.90%	80.9%	
Yes	42	15	57	
% within type of dressing	28.0%	10.1%	19.1%	
Total	150	148	298	
Total (%)	100.00%	100.00%	100.00%	

[Table/Fig-5]: Wound infection versus type of dressing.
Chi-square Test
*Indicates p significant

Wound dehiscence (Yes or No)	Type of dressing		Total	p-value
	NO (Group A)	O (Group B)		
No	142	148	290	0.004*
% within type of dressing	94.7%	100.0%	97.3%	
Yes	8	0	8	
% within type of dressing	5.3%	0%	2.7%	
Total	150	148	298	
Total (%)	100.00%	100.00%	100.00%	

[Table/Fig-6]: Wound dehiscence versus type of dressing.
Chi-square Test
*Indicates p significant

Dressing	Non Occlusive (150) (Group A)	Occlusive (148) (Group B)	p-value
Mean cost	365.49	265.18	0.003*

[Table/Fig 7]: Mean cost of dressing.
Student t-test
*Indicates p significant

antibacterial coverage present in the occlusive type. This finding is similar to a study done by Helfman T et al., [17].

In our study, we also found that cost of the dressing of Group A were significantly higher as compared to the Group B. This finding is similar to a study done by Shinohara T et al., [7]. Factor contributing for cost effectiveness of occlusive dressing could be due to

association with faster healing rates, fewer dressing changes and less complication rates [18].

LIMITATION

This study was limited to postoperative inpatients sutured wounds. Hence, we cannot comment on chronic, open, infected, emergency procedures and outpatient procedures wounds. There is a scope for more elaborate studies involving all kind of wounds.

CONCLUSION

Occlusive dressings simplify wound care and are an excellent choice in the management of most postoperative sutured wounds. We found superiority of occlusive dressings for postoperative wound care regarding wound healing; wound complication, patient comfort, costs of dressing and nursing time in a clinical setting of surgical patients with sutured wounds. The results of this study have been implemented on our surgical wards and have led to a change in postoperative wound care.

REFERENCES

- Turner TD. Control the environment to heal the wound. *Chemist Druggist*. 1985;2:438-44.
- Field FK, Kerstein MD. Overview of wound healing in a moist environment. *Am J Surg*. 1994;167(Suppl 1a):2S-6S.
- Holland KT, Davis W, Ingham E. A comparison of the in vitro antibacterial and complement activating effect of Opsite® and Tegaderm® dressings. *J Hosp Infect*. 1984;5:523-28.
- Rheinecker SB. Wound management: the occlusive dressing. *J Athl Train*. 1995;30(2):143-46.
- Thomas DR, Kamel HK. Wound management in post-acute care. *Clin Geriatr Med*. 2000;16:783-804.
- Holm C, Petersen JC, Gronboek F, Gottrup F. Effects of occlusive and conventional gauze dressings on incisional healing after abdominal operations. *European Journal of Surgery*. 1998;164(3):179-83.
- Shinohara T, Yamashita Y, Satoh K, Mikami K, Yamauchi Y, Hoshino S, et al. Prospective evaluation of occlusive hydrocolloid dressing versus conventional gauze dressing regarding the healing effect after abdominal operations: Randomized controlled trial. *Asian Journal of Surgery*. 2008;31:1-5.
- Horan TC, Gaynes RP, Martone WJ, Jarvis WR, Emori TG. CDC definitions of nosocomial surgical site infections, 1992: A modification of CDC definitions of surgical wound infections. *Infect Control Hosp Epidemiol*. 1992;13(10):606-08.
- Wewers ME, Lowe N.K. A critical review of visual analogue scales in the measurement of clinical phenomena. *Res Nurs Health*. 1990;13:227-36.
- Provan A, Phillips T.J. An overview of moist wound dressings: the under cover story. *Dermatol Nurs*. 1991;3(6):393-96.
- Ubbink DT, Vermeulen H, Goossens A, Kelne RB, Schreuder SM, Lubbers MJ. Occlusive vs gauze dressings for local wound care in surgical patients. *Arch Surg*. 2008;143(10):950-55.
- Mertz PM. Intervention: dressing effects on wound healing. In: Eaglstein WH, ed. *Wound Care Manual: New Directions in Wound Healing*. Princeton, NJ: Squibb & Sons, Inc; 1990:83-96.
- Harris B, Cai J, Falanga V, Mertz P, Chin Y, Eaglstein W. The effects of occlusive dressings on the recruitment of mononuclear cells by endothelial binding into acute wounds. *J Dermatol Surg Oncol*. 1992;18:279-83.
- Chen WY, Rogers AA, Lydon MJ. Characterization of biologic properties of wound fluid collected during early stages of wound healing. *J Invest Dermatol*. 1992;99:559.
- Ogawa M, Tsukui H, Ishii H, Yokoyama S, Koh E. Clinical evaluation of hydrocolloidal dressing in 147 patients undergoing cardiovascular surgery (in Japanese with English abstract). *Kyobu Geka*. 2005;58(7):555-58.
- Marshall DA, Mertz PM, Eaglstein WH. Occlusive dressings. Does dressing type influence the growth of common bacterial pathogens? *Arch Surg*. 1990;125:1136-39.
- Helfman T, Ovington L, Falanga V. Occlusive dressings and wound healings. *Clin Dermatol*. 1994;12:121-27.
- Jones AM, San Miguel L. Are modern wound dressings a clinical and cost-effective alternative to the use of gauze? *Journal of Wound Care*. 2006;15(2):65-69.

PARTICULARS OF CONTRIBUTORS:

- Chief Consultant, Department of Surgery, Christian Medical College and Hospital, Ludhiana, Punjab, India.
- Chief Consultant, Department of Surgery, Christian Medical College and Hospital, Ludhiana, Punjab, India.

NAME, ADDRESS, E-MAIL ID OF THE CORRESPONDING AUTHOR:

Dr. Dinesh Kumar,
715, Gran Heritage Way, Dacula, GA, USA.
E-mail: drdinesh17@gmail.com

FINANCIAL OR OTHER COMPETING INTERESTS: None.

Date of Submission: Jul 19, 2017
Date of Peer Review: Aug 11, 2017
Date of Acceptance: Sep 21, 2017
Date of Publishing: Oct 01, 2017