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Hypoallergic Tape: A Tool for Prevention of Peri-Incision Skin Injury after Hip Surgery

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Abstract: A tape blister, a skin excoriation that occurs under the taped portion of surgical bandages, can be a source of postoperative morbidity. Tape blisters are caused by the separation of the epidermis from the dermis at the dermal-epidermal junction. Although tape blisters are a pervasive clinical problem, their incidence after hip surgery has rarely been reported in the orthopedic literature. Sixty patients were included in this study. They were classified into 3 groups. A control group, group with regular tape and a group with hypoallergic tape. Assessment was done by researchers using special assessment checklist. Peri skin was examined over a period of 5 days postoperatively to investigate the role of hypoallergic tape. Also of skin injury in the form of erythema was manifested in group I, less in group II and the least in group III. In addition, sociodemographic data was assessed. It was concluded that hypoallergic tape is a simple and effective tool in decreasing the incidence of peri skin injury after hip surgery.

Key words: Tape · Hip surgery · Peri inncision skin injury

INTRODUCTION

Adhesive tapes are used to fix the tracheal tube, nasopharyngeal temperature probe, nasogastric tube and nerve stimulator and surgical operations [1]. Injury to the epidermis from tape is a common problem in any care setting [1]. It is more occurred in orthopedic department, especially after hip surgery due to intra operative positioning and joint manipulation leading to soft tissue edema. In addition, the type of tape used to secure the post operative dressing as well as the method and direction of the tape application and removal may be the cause of injury [2,3]. Quality improvement implies that patient care systems are monitored. It has a great impact on patient outcomes. For patients undergoing hip surgery, maintenance of skin integrity and comfort as well as prevention of infection are measurable outcomes.

In this study, hypoallergic tape was used to investigate its role and effectivness at the peri wound skin injury after hip surgery.

MATERIALS AND METHODS

Setting: This study was conducted in Elhadara University Hospital, Alexandria University in both Orthopedic Department and operating room.

Subjects: A convenient sample of 60 patients undergoing hip surgery was assigned to three groups. Group one acted as a control group and the other two groups acted as experimental groups.

The Criteria of the Sample Were: Conscious, age ranged from 40-60years old, Have no skin injury or wound at the site of operation before surgery and no co-morbid conditions such as: *diabetes mellitus, allergy, renal failure (normal blood urea and urea nitrogen) and incontinence* as these conditions considered high risk for skin damage and delay healing.

Tool: The tool used in this study was an Assessment checklist. It was developed by the researchers.

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It included an attached sheet for: bio-socio-demographic data including age, sex, date of admission, diagnosis, name of operation, duration of surgery.

It Aimed to Assess:

- The technique of adhesive tape application.
- The technique of adhesive tape removal.
- The clinical manifestation of peri incision wound, post operative skin injury.

Methodology:

- Permission was taken from the department.
- It was given then to 5 nursing professors and 3 surgical professors to check its content validity. No modifications were done according to their comments.
- A pilot study on three patients was done to assess its applicability.
- The operation list was checked the day before surgery, the patient who met the mentioned criteria was included in the study.
- The selected patient was interviewed and the aim of the research was explained.
- A patient approval to participate was received.
- The first twenty patients were assigned to group I (the control group), the second twenty patients to group II and the last twenty patients to group III.

Group I (the control group), it was dressed according to regular regimens as the adhesive tape was the type available in the hospital. The techniques were assessed using the developed check list.

Group II, the care of this group was started after finishing observation of the control group using available hospital tape.

Group III, it was dressed after assessment of group II using hypoallergic tape.

The tape was applied in the operating room. Then, it was changed twice in the ward. Three days after surgery (according to hospital policy as the physicians prefer changing dressing three days post operatively to reduce possible contamination of the incision or drain site) and on the fifth day postoperatively surgery.

The steps of the technique of adhesive tape application used for groups (II,III) was as following:

- Clean and dry the skin thoroughly to avoid chemical skin injury from the antiseptic solutions.
- Use the available tape in the hospital for group 2 and the hypo allergic tape for group 3(elastic non stretchable tape).
- Apply the tape from the center outward evenly without any tension on the skin and maximizing the effect of the tape by firmly rubbing it backing.
- Remove the tape carefully and gently while supporting the skin at the same time.
- Peeling the tape in the same direction of the hair growth during the technique of tape removal.
- The tape was rotated and not applied on the same site of the skin during the next dressing.

Peri Incision Wound Skin Assessment: Using the developed "Assessment checklist" was done to all three groups of patients. This follow-up in the ward was done to assess the peri wound skin condition or if any injury to the skin occurred before each dressing.

Assessment included patient's discomfort, itching, dryness, hotness, indurations, erythema, tension blisters, macerations, edema, pustules and folliculitis.

Statistical analysis of data was carried out by *SPSS* software program. Data were expressed as mean and standard deviation. Chi-square test was performed at the probability (p)value of 0.05

RESULTS

The overall results of this study were done to determine the effect of using hypo allergic tape and observing the hospital technique of tape application and removal on preventing peri-wound skin injury after hip surgery.

Results of the Study Were Categorized as Follows: The mean age among the three groups was 52.3, 57.3 and 50.3 year, respectively. There was no statistical significant difference among them regarding their age. In relation to their gender more than half of them were females (60, 50 and 65%). In relation to the level of their education, read and write representing (10, 55 and 35% among the three groups, respectively), (Table 1). Dynamic hip screw represented 40, 30 and 25%. Among the studied three groups, respectively. Partial hip replacement represented 35, 25 and 40%, respectively. There were no statistical differences among the three groups regarding to the type of hip surgery they had. As regards their mean period of hospitalization, it was the least in group 3 (the group received the hypo-allergic tape with the hospital technique of application and removal of adhesive tape) (Table 2). However, all the skin injuries were higher in control group than in the other two groups.erythema represents 35% in control group, 20 % in group II and only 10% in group III during the first dressing (Table 3).

Table 1: Frequency Distribution of patients according their socio-demographic data

	Control (GroupI) Total no=20		(GroupII) Total no=20		(Group III) Total no=20	
Socio-demographic data	52.3	4.5	57.3	7.6	50.3	3.5
Age X S.D	No	%	No	%	No	%
Gender						
Male	8	40	12	60	10	50
Female	10	50	7	35	13	65
Level of education						
Illiterate	5	25	2	10	10	50
Read and write	3	15	3	15	11	55
Diploma	4	20	2	10	3	15
Bsc	7	35	20	30	4	20

Table 2: Frequency distribution of the studied patients according their surgical data

	Control group		Group II		Group III	
Surgical data	No(20)	%	No (20)	%	No(20)	%
Type of surgery						
Dynamic hip screw	8	40	5	25	7	35
Total hip replacement	6	30	9	45	5	25
Partial hip replacement	5	25	7	35	8	40
Hospitalization period						
X S.D	23.7	6.6	21.8	6.2	19.6	5.8

Table 3: The percentage of peri-wound skin injuries during the first assessment among the three groups

	Control group		Group II		Group III	
Type of skin and injuries	No	%	No	%	No	%
Normal skin	3	15%	10	50%	12	60%
Dry skin	2	10%	4	20%	4	20%
Peri-wound skin injuries						
-Erythema	7	35%	4	20%	2	10%
-Itchy, inflammation	2	10%	2	10.7%	2	10%
-Blistering	3	15%	0	00%	0	00%
-Epidermal stripping	3	15%	1	5%	0	00%
Total	20	100%	20	100%	20	100%

Table 4: The percentage of peri-wound skin injuries during the second assessment among the three groups

	Control group		Group II		Group III	
Type of skin and injuries	No	%	No	%	No	%
Normal skin	0	00%	6	30%	12	60%
Dry skin	2	10%	5	25%	6	30%
Peri-wound skin injuries						
-Erythema	10	50%	6	30%	2	10%
-Itchy inflammation	3	15%	2	10.7%	02	00%
-Maceration	3	15%	0	00%	0	00%
-Epidermalstripping	2	10%	2	10%	0	00%

Table 5: The percentage of peri-wound normal and injured skin in the control group and group II during the two assessment procedures

	Control group					Group II					
	Normal skin		Injured skin			Normal skin		Injured skin			
Dressing technique	No	%	no	%	Total	no	%	no	%	Total	(*P*) value
First dressing	3	15%	17	85%	20	10	50%	10	50%	20	<0.05*
Second dressing	0	0%	20	100%	20	6	30%	14	70%	20	.<0.01*

Table 6: The types of peri-wound skin injuries among the control and group II during the first assessment

Control group					Total		Group II						Total	
Normal skin		Injured skin			%		Normal skin		Injured skin				100%	
3	60%	Dry(scaling)	2	40%	5	100	10	71.4%	Dry(scaling)	4	28.6%		14	100
3	30%	Erythema	7	70%	10	100	10	71.4%	Erythema	4	28.6%		14	100
3	60%	Itchy inflammation	2	40%	5	100	10	83.3%	Itchy inflammation	2	16.7%		12	100
3	50%	Blistering	3	50%	6	100	10	100%	Blistering	0	00%		10	100
3	50%	Epidermal stripping	3	50%	6	100	10	90.9%	Epidermal stripping	1	9.1%		11	100

Table 7: The percentage of peri-wound normal and injured skin in the control group and group III during the two assessment procedures

	Control group		Total number		Group III				Total number		Test
Dressing technique	Normal skin		Injured skin		Normal skin		Injured skin				(*P*) value
First dressing	3	15%	17	85%	20	12	60%	8	40%	20	<0.01**
Second dressing	0	00%	20	100%	20	12	60%	8	40%	20	<0.001**

Table 8: The types of peri-wound skin injuries among the control and the experimental group III during the first assessment

Control group					Total		Group III						total	
Normal skin		Injured skin			%		Normal skin		Injured skin				100%	
3	60%	Dry(scaling)	2	40%	5	100	12	75%	Dry(scaling)	4	25%		16	100
3	30%	Erythema	7	70%	10	100	12	85.7%	Erythema	2	14.3%		14	100
3	60%	Itchy inflammation	2	40%	5	100	12	85.7%	Itchy inflammation	2	14.3%		14	100
3	50%	Blistering	3	50%	6	100	12	100%	Blistering	0	00%		12	100
3	50%	Epidermal Stripping	3	50%	6	100	12	100%	Epidermal stripping	0	00%		12	100

Table 9: The types of peri-wound skin injuries in the control and group III during the second assessment

Control group					Total		Group III						Total	
Normal skin		Injured skin			%		Normal skin		Injured skin				100%	
0	00%	Dry(scoling)	2	100%	2	100	12	66.7%	Dry(scoling)	6	37.3%		18	100
0	00%	Erythema	10	100%	10	100	12	85.7%	Erythema	2	14.3%		14	100
0	00%	Itchy inflammation	3	100%	3	100	12	100%	Itchy inflammation	0	00%		12	100
0	00%	macerated	3	100%	3	100	12	100%	macerated	0	00%		12	100
0	00%	Epidermal Stripping	2	100%	2	100%	12	100%	Epidermal stripping	0	00%		12	100

Table 10: The percentage of peri-wound normal and injured skin in group II and group III during the two assessment procedures

	Group II					Group III					
	Normal skin		Injured skin			Normal skin		Injured skin			Test
Dressing technique	No	%	no	%	Total	no	%	no	%	Total	(*P*) value
First dressing	10	50%	10	50%	20	12	60%	8	40%	20	0.5
Second dressing	6	30%	14	70%	20	12	60%	8	40%	20	0.06

Table 11: The types of peri-wound skin injuries among group II and group III during the first assessment

Group II					Total		Group III					Total	
Normal skin		Injured skin			%		Normal skin		Injured skin			100%	
10	71.4%	Dry(scaling)	4	28.6%	14	100	12	75%	Dry(scaling)	4	25%	16	100
10	71.4%	Erythema	4	28.6%	14	100	12	85.7%	Erythema	2	14.3%	14	100
10	83.3%	Itchy inflammation	2	16.7%	12	100	12	85.7%	Itchy inflammation	2	14.3%	14	100
10	100%	blistering	0	100%	10	100	12	100%0	blistering	0	00%	12	100
10	90.9	Epidermal stripping	1	9.1%	6	100	12	100%	Epidermal stripping	0	00%	12	100

Table 12: Types of peri-wound skin injuries among group II and group III during the second assessment

Group II					Total		Group III					Total	
Normal skin		Injured skin			%		Normal skin		Injured skin			100%	
6	54.5%	Dry(scaling)	5	45.5%	8	100	12	66.7%	Dry(scaling)	6	37.3%	18	
6	50%	Erythema	6	60%	12	100	12	85.7%	Erythema	2	14.3%	14	100
6	75%	Itchy inflammation	2	25%	8	100	12	100%	Itchy inflammation	0	00%	12	100
6	50%	macerated	6	50%	12	100	12	100%	macerated	0	00%	12	100
6	75%	Epidermal Stripping	2	25%	8	100	12	100%	Epidermal stripping	0	00%	12	100

Maceration occurred among 15% of the control group and did not occur in groups (II, III), (Table 4). The intact skin represents 15% in control group and 50% in group II during the first dressing with statistical significant differences. However, the injured skin was 100% in control group and 70% in group II during the second assessment with statistical significant difference (Table 5). Erythema represented the highest percent in the two groups, 70 and 28%, respectively. Blistering was the lowest percentage among the patients in the two groups (Table 6).

The intact skin represents 15% in control group and 60% in group III during the first assessment with statistical significant differences. However, the injured skin was 100% in control group and 60% in group III during the second assessment with statistical significant differences (Table 7). Although, erythema represented the highest percent in the control group (70%). It was only 28% in group III. There was statistical significant differences between the control group IIIn addition, blistering represented 50% in the control group and did not occur in group III (Table 8). There was no normal skin among the control group, while it reached 100% in group III. Injured skin in the form of itching inflammation and maceration in the control group was 100%, while it was not present in the patients of group III (Table 9). Although the differences between group II and group III do not rank as statistically significant, it was considered to be of clinical importance in the intact skin represents 50% in group II and 60% in group III during the first dressing. However, the injured skin was 70% in group II and remain 40% in group III (Table 10). Normal skin was 75% in group III and 71.4% in group II with statistical significant differences. Erythema represented 14.3% in group III and 28.6 in group II (Table 11). Erythema represented 14.3% in group III and 28.6 % in group II during the first dressing.In the second dressing, erythema represented 60% in group II and 14.3% in group III (Table 12).

DISCUSSION

At the beginning of the third millennium, 70% of all elective surgical procedures are done on an ambulatory basis, 40% of those being orthopaedic [4]. The bone and joint decade has been characterized by exciting innovations in total hip arthroplasty and hip surgery in general. Minimally invasive techniques, computer-assisted procedures and bone-conserving implants are becoming useful tools to improve clinical results and patient satisfaction [5]. The benefits of implementing specific skin care products have been studied and methods have been developed that can shorten nursing care time while improving wound care outcomes [6]. Although patients with comorbid conditions were excluded from the study, our patients had several risk factors that may have predisposed her to skin injury, including age, poor nutritional status and prolonged surgery [7,8]. In the present study, females were more than half of them in all groups (60, 50 and 65%). This may be explained by the tendency of female patients to carry out major work inside the house. Also, lack of practising sport and overweight are additional factors. These data is supported by other studies [9]. Widespread

adoption of regional techniques in major hip surgery in the third millennium will require continuous demonstration of safety, creation of an efficient peri operative network and accurate surgeon and patient information. In this study, dynamic hip screw, partial hip replacement and total hip replacement were the common procedures performed in the operating theatre. Patients undergoing total hip replacement surgery may experience edema around the incision related to intraoperative positioning and manipulation of the extremity, as well as general soft tissue damage. The edema may contribute to the impairment of skin integrity when tape is applied to secure postoperative dressings [10]. A wet dressing with exudates may also expose the wound to microbial contamination from the surroundings. For the user, the dressing should be easy and quick to change. Blaylock and Murray stated that the three most common types of skin injuries with any type of tape are tension blisters, epidermal stripping and chemical injuries. Epidermal injury from tape may be caused by the method of application, frequency of application, characteristics of the product, individual sensitivities and edema at the wound site [10]. Fox *et al*. [2] found significant tape blisters occurred in 29% of hip surgery patients, resulting in increased use of nursing care for these patients' similar incidence of blisters (30%) in the postoperative hip population. Erythema and blistering of skin were common in control group I and decrease in group II and very low in group III. It is clear that erythema was the dominant type of skin injury in all groups. Blistering was less in groups II and III. Specialists in burns and reconstructive surgery have long recognized the association between the degree of scarring and the depth of skin injury. However, the threshold depth of injury required to produce scarring has not been previously demonstrated. Furthermore, the cellular and molecular basis of the relationship between depth of injury and scarring remains poorly understood [11]. In this work, the first assessment revealed that the intact skin represents 15% in control group and 60% in group III with statistical significant differences. Normal skin was 75% in group III and 71.4% in group II with statistical significant differences. In the 2nd assessment, the injured skin was 100% in control group and 60% in group III during the second assessment with statistical significant differences. In all conditions, hypoallergic tape (group III) predominates significantly over other groups. It is clear that hypoallergic tape is useful on postoperative outcome for patients underwent hip surgery. Adhesion between the epidermis and dermis is weaker than that between the adhesive tape and epidermis in these patients. On removal of the adhesive tape, epidermolysis occurs as the epidermis is stripped off the dermis. This complication can be minimized. Adhesive tapes should be applied to minimal skin areas without tension. Solvents can be applied to dissolve the adhesives before removal. Adhesive tapes should also be removed slowly with the skin supported [12,13] With the use of hypoallergic tape the postoperative course becomes safer.

CONCLUSION

Prevention of complications is of paramount importance to decrease the morbidity of medical care. The tremendous personal and financial costs of complications make prevention extremely important. The prevention of complications from tape is well worth the effort. The patients with pain from tape blisters are more difficult to mobilize and the use of a convenient dressing like hypoallergic tape should be considered.

REFERENCES

1. White, E. And M.M. Crosse, 1998. The aetiology and prevention of perioperative corneal abrasions. Anaesthesia, 53: 157-61.
2. Fox, E., L. Schakenbach and L.E. Abrahams, 1995. Tape blisters: Incidence and possible etiologies follow hip surgery. Poster Exhibit, NAON Congress
3. Polatsch, D.B., M.A. Baskies, J.P. Hommen, K.A. Egol and K.J. Koval, 2004. Tape blisters that develop after hip fracture surgery: a retrospective series and a review of the literature, 33(9): 452-6.
4. Nielsen, K.C. and S.M. Steele, 2001. Management of outpatient orthopedic surgery. Current Opinion in Anesthesiology, 14: 611-616.
5. Sharrock, N.E., G. Go, P.C. Harpel, *et al*., 1995. Thrombogenesis during total hip arthroplasty. Clin. Orthop. Relat. Res., 319: 16-27.
6. Bale, S., N. Tebble, V. Jones and P. Price, 2004. The benefits of implementing a new skin care protocol in nursing homes. J. Tissue Viability, 14: 44-50.
7. Stewart, T.P. and S.J. Magnano, 1988. Burns or pressure ulcers in the surgical patient? Decubitus, 1: 36-40
8. Kemp, M.G., J.K. Keithley, D.W. Smith and B. Morreale, 1990. Factors that contribute to pressure sores in surgical patients. Res Nurs Health, 13: 293-301.

9. Hahn, G.J., D. Grant, C. Bartke, J. McCartin and R.M. Carn, 1999. Wound complications after hip surgery using a tapeless compressive support. Orthop. Nurs, 18(3): 43-9.
10. Blaylock, B., M. Murray, K. O'Connell and J. Rex, 1995. Tape injury in the patient with total hip replacement Orthop. Nurs., 14(3): 25-8.
11. van Driel, A.A, M.A. Mureau, D.P. Goldstein, R.W. Gilbert, J.C. Irish, P.J. Gullane and P.C. Neligan Hofer, 2010. Aesthetic and oncologic outcome after microsurgical reconstruction of complex scalp and forehead defects after malignant tumor resection: an algorithm for treatment. Plast Reconstr Surg, (2): 460-70.
12. Lo, J., H. Oriba Maibach and P. Bailin, 1990. Transepidermal potassium ion, chloride ion and water flux across delipidized and cellophane tape-stripped skin. Dermatologica, 180: 66-8.
13. Campos, JH., 1999. A reaction to tape after tracheal extubation in a patient with systemic amyloidosis. J. Clin. Anesth, 11: 126-8.