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ORIGINAL ARTICLE

COMPARISON BETWEEN RAZOR BLADE AND DEPILATION CREAM FOR PRE-OPERATIVE HAIR REMOVAL IN RELATION TO SURGICAL SITE INFECTION

Chandrika Sah,[1]* Nabin Pokharel,[1] Sunil Shrestha,[1] Praveen Kumar Singh,[1] Aditya Prakash Yadav,[2] Sanjiv Kumar Shahi[2]

[1]Department of General Surgery, Nepal Medical College Teaching Hospital, Kathmandu, Nepal

[2]Department of General Surgery, National Medical College Teaching Hospital, Birgunj, Nepal

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Correspondence to:
Chandrika Sah
Department of Surgery
Civil Services Hospital of Nepal, Kathmandu, Nepal.
Email: ups_chandrika@yahoo.com
Contact No: 977-9851173925

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ABSTRACT

Introduction: *Surgical site infection is one of the significant complications in post-operative patients. Method of preoperative hair removal is also considered as one of the risk factors for causing SSI. Razor blade, depilatory cream, clippers are used for hair removal. The objective of this study is to assess the incidence of SSI with razor blade and depilatory cream.*

Materials and methods: *A comparative study was conducted on 202 patients divided into 101 in each razor blade and depilatory cream group admitted in department of general surgery. Patient aged 15 years and above who required preoperative hair removal was recruited in the study. Patients undergoing surgery for clean and clean contaminated cases were included in the study. Postoperatively, the presence of SSI was evaluated using the Southampton wound grading system.*

Results: *Out of 202 patients, 63(31.2%) patients developed SSI. Among razor group, 41(40.6%) patients and among depilatory group, 22(21.8%) patients had developed SSI. Skin injury was observed in 57(28.2%) of total 202 patients, 51(50.5%) patients in razor and 6(5.9%) patients in depilatory group. Out of 57 patients who had skin injury, 25(43.9%) patients had SSI while 38(26.2%) patients out of 145 patients who had no skin injury developed SSI. Skin reaction was seen in 24 patients, 18(17.8%) patients had depilatory cream and 6(5.9%) patients had razor shaving.*

Conclusion: *TAmong two methods of preoperative hair removal, depilatory cream found to be superior to razor blade in reducing the incidence of SSI.*

Keywords: *Depilatory Cream, Razor Blade, SSI*

INTRODUCTION

Surgical site infection remains a significant problem in post-operative patients. According to Centre for Disease control and Prevention (CDC), Surgical Site Infection (SSI) is defined as infection occurring within 30 days of surgery or within 1 year of surgery with prosthesis implanted as a part of surgery.[1]

SSIs are mostly caused by inoculation of skin flora into the incision during surgery. The microorganisms involve depends upon site of surgery, types of surgical wounds, surgical procedures and whether the surgery involve entry into body cavity or not. The most common organisms causing SSI are Staphylococcus epidermidis, S. aureus, Enterococcus species, Escherichia coli, Klebsiella species. SSI leads to the patient's discomfort, unnecessary pain, significant morbidity, increase hospital stay, increased cost and may lead to death.[2]

Traditionally, preparing the patient for surgery include routine removal of body hair from incision site.[3] Hair is removed in the belief that its presence can interfere with skin incision and its closure as well as with application of adhesive tape and wound dressing. Three most popular methods for pre-operative hair removal are; razor blade, depilatory cream and clippers.[4]

If hair removal is necessary; CDC guidelines recommend use of clippers immediately before surgery,[5] Norwegian Center for Health Technology Assessment guidelines recommend use of clippers or cream as close to surgery[6] and Hospital Infection Society Working Party guidelines recommend use of cream the day before surgery.[7]

In many of the developing countries, razor blade shaving is still popular but it has been noted that there is greater risk for developing surgical wound infection after razor shaving.[8]

During shaving with razor blade, there is microscopic cuts and abrasion which acts as a foci for infection in the skin[9], microorganism invades into these cuts and colonize thus leads to post-operative wound infections[10] and the abrasion may oozes exudates which provide culture media for the growth of the pathogenic organisms.[11]

The use of depilatory cream produce clean, intact skin without risk of developing laceration and abrasion but it may produce skin irritation and rashes. Depilatory cream affects the chemical composition of hair strands and breaks the keratin.[3]

This study therefore, has been planned to assess the incidence of SSI with depilatory cream and razor blade shaving in patients who underwent preoperative hair removal at our institution.

MATERIALS AND METHODS

The prospective study was carried out in Department of Surgery, Nepal Medical College and Teaching Hospital over period of 1 year. Approval was taken by Institutional Review Committee. All the cases which meet inclusion criteria were enrolled in the study. Informed consent was taken from the patient or his/her relatives. Information regarding patient demography such as name, age, sex, address, date of admission and date of discharge and other data relevant to this study were recorded. Detail history and findings of clinical examinations were recorded. Preoperatively hair was removed either with depilatory cream or with razor blade. All the patients were divided into 2 groups depending on the odd and even bed numbers. Patients in odd bed numbers were allocated in 1st group who had their hair removal with depilatory cream (P_1) while patients in even bed numbers were allocated in 2nd group who had their hair removal with razor blade. (P_2).Hair was removed just before the surgery in emergency cases whereas in elective cases, hair was removed in the morning of the surgery. Sharp razor blade was used for razor blade shaving. Veet cream-having potassium thioglycolate as active ingredients was used as Depilation. The cream was applied in layers; after 10-15 minutes, it was removed with a wet gauze piece/ pads applying pressure in the direction of growth of the hair. Signs for any skin reaction, skin injury were noted. All patients received prophylactic antibiotic at the time of induction of anesthesia. In the both groups of patients, skin was painted with povidone iodine 10% prior to draping. The types of wounds and types of surgeries performed were recorded.

Post-operatively, wound was assessed as per Southampton wound grading score by residents themselves.

Southampton wound scoring system.[12,13,14]

- Grade 0- Normal healing
- Grade I- Normal healing with mild bruising or erythema
- Grade II- Erythema plus other signs of inflammation
- Grade III- Clear or sero-sanguinous discharge
- Grade IV- Pus discharge
- Grade V- deep or severe wound infection with or without tissue breakdown

Wound examination and follow up of the patients were done up to one month after the day of surgery.

Collected data and statistically analysed parameter was presented as mean ± standard deviatation. Categorical Value were mentioned in numbers and percentage. SPSS 25.0 was used for statistical analysis.

RESULTS

Table 1: Relations of SSI with two different methods of hair removal

		Methods of hair removal		Total	P value
		Cream	Razor		
SSI	No	79 (78.2%)	60 (59.4%)	139(68.8%)	0.004
	Yes	22 (21.8%)	41(40.6%)	63(31.2%)	

Table 2: Grading of SSI according to Southampton wound grading score in two different methods of hair removal

Grade of SSI	Methods of hair removal		Total
	Cream	Razor	
I	7	9	16
II	10	24	34
III	4	6	10
IV	1	2	3

Table 3: Skin injury with two different methods of hair removal

		Methods of hair removal		Total	P value
		Cream	Razor		
Skin injury	No	95 (94.1%)	50 (49.5%)	145 (71.8%)	0.000
	Yes	6 (5.9%)	51 (50.5%)	57 (28.2%)	

Table 4: Skin injury and SSI

		SSI		Total	P value
		NO	YES		
Skin injury	No	107 (73.8%)	38 (26.2%)	145 (100.0%)	0.015
	Yes	32 (56.1%)	25 (43.9%)	57 (100.0%)	

Table 5: Association of skin reaction with two different methods of hair removal

		Methods of hair removal		Total	P value
		Cream	Razor		
Skin reaction	No	83 (82.2%)	95 (94.1 %)	178 (88.1%)	0.009
	Yes	18 (17.8%)	6 (5.9%)	24 (11.9%)	

Table 6: SSI in different surgical procedures

NO		SSI		Total
		YES		
PROCEDURES	APPENDECTOMY	60 (61.2%)	38 (38.8%)	98 (100.0%)
	HERNIOPLASTY	55 (73.3%)	20 (26.7%)	75 (100.0%)
	OPEN CHOLECYSTECTOMY	10 (83.3%)	2 (16.7%)	12 (100.0%)
	CBD EXPLORATION	1 (50.0%)	1 (50.0%)	2 (100.0%)
	EVERSION OF SAC	11 (91.7%)	1 (8.3%)	12 (100.0%)
	ORCHIDECTOMY	2 (66.7%)	1 (33.3%)	3 (100.0%)

Table 7: comparison of SSI using two different methods of hair removal in various surgical procedures

PROCEDURES	METHODS OF HAIR REMOVAL					
	CREAM			RAZOR		
	SSI			SSI		
	NO	YES	TOTAL	NO	YES	TOTAL
APPENDECTOMY	35 (74.5%)	12 (25.5%)	47 (100.0%)	25 (49.0%)	26 (51.0%)	51 (100.0%)
HERNIOPLASTY	26 (76.5%)	8 (23.5%)	34 (100.0%)	29 (70.7%)	12 (29.3%)	41 (100.0%)
OPEN CHOLECYSTECTOMY	8 (88.9%)	1 (11.1%)	9 (100.0%)	2 (66.7%)	1 (33.3%)	3 (100.0%)
CBD EXPLORATION	1 (50.0%)	1 (50.0%)	2 (100.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
EVERSION OF SAC	7 (100.0%)	0 (0.0%)	7 (100.0%)	4 (80%)	1 (20.0%)	5 (100.0%)
ORCHIDECTOMY	2 (100.0%)	0 (0.0%)	2 (100.0%)	0 (0.0%)	1 (100.0%)	1 (100.0%)

In this study, SSI was compared among 202 patients. One hundred one patients of which underwent razor shaving and next 101 used depilatory cream for preoperative hair removal. SSI was seen in 63(31.2%) patients which includes 22(21.8%) in depilatory group and 41(40.6%) in razor group. P value is equal to 0.004 which was statistically significant. Therefore depilatory cream can be considered superior to razor shaving as methods of choice for hair removal during preoperative skin preparation. Total 63 patients had developed SSI, out of which 41 patients belonged to razor group and 22 patients belonged to depilatory cream group. Among them, 16 patients had grade I SSI, 34 patients had grade II SSI, 10 patients had grade III SSI and 3 patients had grade IV SSI. 57 patients had skin injury. Out of which 51(50.5%) belonged to razor shaving and 6(5.9%) patients belonged to depilatory cream. 57 patient had skin injury, out of which 25 patients (43.9%) had SSI and among 145 patients who had no skin injury, only 38 patients (26.2%) had SSI. Data here shows that skin injury is associated with increased risk of surgical wound infection. Data is statistically significant. (p=0.015). Among 202 patients, twenty four patients developed skin reaction of which 18 patients (17.8%) belongs to depilatory group and 6 patients (5.9%) belongs to razor blade group(P=0.009). Maximum number of cases is of appendectomy which includes 98 patients in which 38 had SSI followed by 75 patients who had hernioplasty in which 20 had SSI, regarding Appendectomy, 12(25.5%) out of 47 patients in cream group had SSI while 26(51%) of 51 patients in razor group had SSI. Similar was with hernioplasty where 8(23.5%) out of 34 in cream group and 12(29.3%) out of 41 in razor group had SSI.

DISCUSSION

In our study, 202 patients were divided into 2 groups; 101 in each razor blade shaving and depilatory cream. Total 63(31.2%) of 202 patients developed SSI, out of which 22(21.8%) patients belonged to depilatory group and 41(40.6%) patients belonged to razor group which was statistically significant (p=0.004).

Incidence of SSI found low in depilatory group as compared to razor group. These findings are comparable to studies, conducted by Mukesh Suvera et al,[15] where SSI occurred in 3(3%) of 103 patients in cream group and in 15(13%) of 112 patients in razor group which was significant. Our findings is also similar to the study done by Y V Narayanaswamy et al,[16] where 9(12.16%) of 74 patients in razor group and 4(4.88%) of 82 patients in depilatory group had SSI which was significant. Similarly, Study conducted by Adisa et al,[17] revealed SSI in total 13(7.8%) of 165 patients. Among them, 2(2.5%) of 79

patients were of depilatory group and 11(12.8%) of 86 patients were of razor group which was significant. The Study by Manish B et al,[18] shown that 1(2%) of 50 patients in cream group and 8(16%) 0f 50 patients in razor group had SSI which was statistically significant. The study done by CC Okoli et al,[19] on 98 patients where incidence of SSI was 18(18.3%). Out of which, 7(14.0%) belonged to depilatory group and 11(22.0%) to the razor shaving group.

In our study, 63 patients had SSI. As per Southampton wound grading score; 16 had grade I, 34 had grade II, 10 had grade III and 3 patients had grade IV surgical site infections. Out of total numbers of SSI, maximum numbers of patients had grade II SSI. It correlates with study performed by Mukesh Suvera et al,[15] where out of total 18 patients who had SSI; 4 had grade I, 11 had grade II and 3 patients had grade III surgical site infections. The study by Adisa et al,[17] is also comparable to our study where out of total 13 patients who had SSI, 3 had grade I, 8 had grade II and 2 patients had grade III SSI.

Regarding incidence of skin injury by two different methods for hair removal, in our study, 57(28.2%) out of total 202 patients had skin injuries which include 51(50.5%) of 101 patients from razor group and only 6(5.9%) of 101 patients from depilatory group which was statistically significant ($p < 0.001$). The study done by Adisa et al[17] where total 26(15.7%) of 165 patients had skin injuries, out of which 23(26.7%) of 86 patients belonged to razor group and 3(3.8%) of 79 patients belonged to depilatory group which was significant. Our findings also correlates to the study by CC Okoli et al[19] where 21(42.0%) patients in razor group and 1(2.0%) patient in depilatory group had skin injuries which was significant ($p<0.0001$). Our study is comparable to the study done by N.A. Bala et al,[20] where total 4(4.1%) of 98 patients had skin injuries and all belonged to razor group. My findings for association of skin injuries with two different methods are also similar to that of study performed by Mukesh Suvera et al,[15] Y V Narayanaswamy,[16] Manish B et al.[18]

The study conducted by Adisa et al,[17] also concluded that total 26(15.7%) patients had skin injury, among them, 7(26.9%) developed SSI and among 136(82.4%) patient who had no skin injuries, only 6(4.3%) patients developed SSI which was statistically significant($p < 0.0001$). This finding is similar to our study where out of total 57(28.2%) patients who had skin injuries, 25(43.9%) patients had SSI and out of remaining 145(71.8%) patients who had no skin injuries, only 38(26.2%) patients had SSI which was statistically significant ($p=0.015$)

Explanation for increased risk of surgical wound infection associated with razor blade shaving is use of razor blade elicit skin injuries in the form of minor cuts, nicks, abrasion. Violation of skin barrier by shaving with razor cause migration of microorganism from epidermis and hair shaft in to the surgical site which leads to the colonization of organisms and finally infect the wound.

As concern to skin reaction, in our study total 24(11.9%) patients developed skin reaction. Among them, 6(5.9%) of 101 patients from razor group and 18(17.8%) of 101 patients from depilatory group had skin reaction which was statistically significant ($p=0.009$) which is comparable with the study done by N. A. Bala et al,[20] which showed skin reaction in 3(7.3%) of 41 patients who belonged to depilatory group and 1(1.8%) of 57 patient who belonged to razor group and is also similar to the study done by Adisa et al,[17] Manish et al.[18]

CONCLUSION

The study conclude that the post-operative wound infection rate is higher in those patients who had pre-operative hair removal by razor blade compare to those who had their hair removal by depilatory cream and this is statistically significant. Furthermore, skin injuries is more with those who had their hair removed by razor blade compare to those who had depilatory cream for hair removal and is statistically significant. More the injuries, higher the risk of surgical site infections. In relation to the skin reaction, depilatory cream group have increased risk of skin reaction which was managed without any serious effect.

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CONFLICT OF INTEREST: None

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