



## Comparative Study of Shaving and Depilatory Cream for Hair Removal in Inguinal Hernia Surgical Site Preparation

### KEYWORDS

depilatory cream; shaving; surgical site infection

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**ABSTRACT** *Introduction: Hair interferes with exposure of incision, suturing and wound dressings. Hair removal is thought to reduce the risk of surgical site infections. Three methods of hair removal are used: shaving, clipping and chemical depilation.*

*Aims and objectives: This study aimed to evaluate shaving and depilatory cream for hair removal in inguinal hernia surgical site preparation and to compare incidence of surgical site infection, safety, time needed and cost of hair removal.*

*Material and methods: The study was a prospective & comparative study carried out on 100 patients undergoing inguinal hernia surgical repair at Command Hospital (WC), Chandimandir. Patients were randomized into two groups, i.e., razor shaving group and depilatory cream group.*

*Results: 9 patients (9%) had surgical site infection including 1(2%) in depilatory cream group and 8(16%) in razor group. Infection was significantly associated with razor than depilatory cream.*

### INTRODUCTION

Postoperative wound infection may lead to significant morbidity, patient discomfort and increased cost of surgical care.<sup>1</sup> Hair interferes with exposure of incision, suturing and wound dressings.<sup>2,3</sup> Hair removal is thought to reduce the risk of surgical site infections.<sup>4</sup>

Three methods of hair removal are used; shaving, clipping and chemical depilation. Shaving uses a sharp blade, held within head of a razor, which is drawn over patient's skin to cut hair close to surface of skin but skin may experience microscopic cuts and abrasions. Clippers use fine teeth to cut hair close to patients' skin, leaving short stubble of around 1 millimeter in length. Depilatory creams are chemicals which dissolve hair itself but there is a risk of allergic reactions.<sup>5,6</sup> Hair removal should be carried out by skilled personnel to prevent abrasion injuries.<sup>2,7</sup>

Different hair removal practices are recommended throughout the world. Centers for Disease Control (CDC) strongly recommends that hair should not be removed preoperatively unless hair at or around incision site will interfere with operation.<sup>8</sup> This recommendation differs from Norwegian Centre for Health Technology Assessment which states that it is not strongly recommended to avoid preoperative hair removal and strong evidence does not exist either in favour or against preoperative hair removal.<sup>9</sup> The British Hospital Infection Society Working Party Guidelines recommend that only area to be incised needs to be shaved and shaving should be avoided if possible.<sup>10</sup>

If removal of hair is necessary, these three organisations recommend slightly different methods of removal. The CDC guidelines recommend that hair is removed immediately before surgery and preferably with clippers, Norwegian Centre for Health Technology Assessment guidelines recommend using clippers or cream as close to surgery as possible and Hospital Infection Society Working Party guidelines recommend using cream day before surgery.<sup>8,9,10</sup>

There has been no consistent agreement between recommendations of different trials and review groups over past few decades. A systematic review of several randomised controlled trials in Cochrane Database observed that if it is necessary to remove hair, then both clipping and depilatory cream result in fewer surgical site infections than shaving with a razor.<sup>5</sup> Hence present study was conducted to compare shaving and depilatory cream for hair removal in patients undergoing inguinal hernia surgery in Indian population.

### MATERIAL AND METHODS

A prospective & comparative study was conducted in Department of General Surgery at Command Hospital (WC), Chandimandir, Panchkula between November 2013 and October 2015. This study was conducted on 100 patients above 18 years of age undergoing inguinal hernia surgical repair after taking informed consent. Patients with complicated inguinal hernia such as obstructed hernia, incarcerated hernia, strangulated hernia and immunocompromised patients were excluded from the study. Patients were then randomized into two groups, i.e., razor shaving group and depilatory cream group using balloting method. Patients in depilation group were subjected to hair removal 12 hours prior to surgery. Patients in shaving group were subjected to shaving in the morning on day of surgery. Area was prepared from umbilicus to mid thigh. Before surgery, operative field was assessed for adequacy of hair removal, presence of skin injuries or reactions. Postoperatively, wounds were inspected on 2<sup>nd</sup>, 4<sup>th</sup> and 7<sup>th</sup> day. All patients were called for review on 30<sup>th</sup> day. Patients who didn't come for review were contacted telephonically. CDC classification was used for level of surgical site infections when present: Superficial Incisional SSI, Deep Incisional SSI and Organ/Space SSI.<sup>8</sup>

### RESULTS

This study was conducted on 100 patients with 50 patients in each group. 31 (62%) patients had complete hair removal by shaving razor while 46 (92%) patients had com-

plete hair removal by depilatory cream. From table 1 ( $\chi^2 = 11.06$ ;  $p = 0.0009$ ), complete hair removal was significantly associated with depilatory cream application than razor shaving. 14 (28%) patients had skin injury by shaving razor which were single, multiple or large while no patients had skin injury by depilatory cream. Table 2 ( $\chi^2 = 14.03$ ;  $p = 0.0002$ ) showed that depilatory cream was much safer than razor shaving. Skin reaction occurred in 1(2%) patient by shaving razor and in 3(6%) patients by depilatory cream. Table 3 showed ( $\chi^2 = 0.26$ ;  $p = 0.61$ ), that there was no significant association between skin reaction and hair removal methods. 8(16%) patients in shaving razor group while 1(2%) patient in depilatory cream group had post operative SSI. Total 9 patients had surgical site infections, all of these were superficial SSIs. SSI was significantly associated with razor than cream ( $p = 0.031$ ). Wound swab was sent for culture and sensitivity from all 9 cases. Among them causative pathogens were detected in 7 cases. Coagulase negative Staphylococcus was commonest organism which was found in 4 cases (44.45%). Staphylococcus aureus, Escherichia coli and Klebsiella was found 1 in each case, and no growth was detected in 2 cases. Time required for hair removal was lower in shaving razor group, with a mean time of 15.72 min while mean time required in depilatory cream group was 25.48 min, suggesting that razor shaving was less time consuming than depilation cream ( $p < 0.0001$ ). Cost of hair removal was lower in razor group, with average cost of Rs. 18 as compared to Rs. 102.20 in depilatory cream group and this difference was statistically significant ( $p < 0.0001$ ).

**Table 1 : Adequacy of hair removal**

Adequacy of hair removal		Razor shaving	Depilatory cream	Total
Complete hair removal		31(62%)	46 (92%)	77
Incomplete hair removal (Residual hair)	Scanty	15(30%)	4(8%)	19
	Large	4(8%)	0	4
Total		50	50	100

**Table 2: Skin injuries in the two methods of hair removal**

Skin injury		Razor shaving	Depilatory cream	Total
No injury		36(72%)	50(100%)	86
Injury	Single tiny	8(16%)	0	8
	Multiple small	5(10%)	0	5
	Large	1(2%)	0	1
Total		50	50	100

**Table 3: Skin reaction in the two methods of hair removal**

Skin reaction	Razor shaving	Depilatory cream	Total
No reaction	49(98%)	47(94%)	96
Reaction	1(2%)	3(6%)	4
Total	50	50	100

## DISCUSSION

High wound infection rates have been observed in last 10 years in surgical wards, in spite of seemingly appropriate pre-operative preparation and prophylactic post-operative antibiotics, which have initiated a need to study the cause and source of high infection rates. It was thought that a review of skin preparation protocol could bring about reduction in the wound contamination from the skin. So, two methods of hair removal, i.e., shaving razor and depilatory cream were used for hair removal. An attempt was being made here to compare the incidence of surgical site infections, time taken for skin preparation, cost of skin preparation as well as safety of both the methods of hair removal. Safety was assessed by comparing skin injuries and skin reactions. The findings in present study showed that cream depilation achieved complete hair removal in more cases than shaving razor. These findings compare favourably with reports of previous studies.<sup>11-14</sup> In one of earliest studies on use of depilatory cream for preoperative hair removal, Prigot et al reported excellent hair removal in 89.5% of cases.<sup>12</sup> Shaving was found to be associated with increased incidence of local lesions in form of abrasions and cuts compared to depilation, suggesting depilatory cream is much safer than razor shaving for skin preparation and this difference was significantly associated with cream application than razor. These findings are consistent with results of previous studies.<sup>13,14</sup>

This study revealed that shaving results in significantly higher rates of surgical site infection as compared to depilation. Meta-analysis of seven trials in cochrane systematic review in 2006 showed that patients are more likely to develop an SSI when they are shaved with razor rather than having hair removed with a depilatory cream.<sup>5</sup> Other studies had similar results with higher incidence of SSI in razor group than cream.<sup>13,14</sup> In present study, Coagulase negative Staph were found as the commonest organism causing 44.45 % of the surgical site infections. Staphylococcus aureus, Escherichia coli and Klebsiella was found 1 (11.11%) in each case, and no growth was detected in 2 cases.

Time required for hair removal was significantly higher in depilation group compared to shaving razor group. De Geest et al in also found that depilation took a significantly longer time than alternative methods.<sup>15</sup> In present study, shaving razor protocol was cheaper compared to depilatory cream protocol. In previous studies also, depilation was found to be costlier method of hair removal than shaving razor.<sup>15</sup>

## CONCLUSION

It can be concluded that depilatory cream preparation is superior to razor shaving in terms of safety, adequacy of hair removal and efficiency of prevention of surgical site infection. The cost and time needed for procedure though apparently higher compared to shaving razor, is not prohibitive for implementation.

## REFERENCE

1. Tanner J, Khan D. Surgical site infection, preoperative body washing and hair removal. *J Perioper Pract* 2008; 18 (6): 232-43.
2. Hallstrom R, Beck SL. Implementation of the AORN skin shaving standard. *AORN journal* 1993; 58 (3): 498-506.
3. Miller JJ, Weber PC, Patel S, Ramey J. Intracranial surgery: to shave or not to shave? *Otol Neurotol* 2001; 22(6): 908-11.
4. Kumar K, Thomas J, Chan C. Cosmesis in neurosurgery: Is the bald head necessary to avoid postoperative infection? *Ann Acad Med* 2002; 31: 150-4.
5. Tanner J, Woodings D, Moncaster K. Preoperative hair removal to reduce surgical site infection. *Cochrane Database Syst Rev* 2006; 3: 1-25.
6. Briggs M. Principles of closed surgical wound care. *Journal of wound care* 1997; 6 (6): 288-292.
7. Mews PA. Establishing and maintaining a sterile field In: Phippen ML, Wells MP, editors. *Patient care during operative and invasive procedures*. 2nd ed. Philadelphia: WB Saunders Co; 2000. pp 61-93.
8. Mangram AJ, Horan TL, Pearson ML, Silver LC, Jarvis WR. Guideline for prevention of surgical site infection, 1999. *Infect Control Hosp Epidemiol* 1999; 20(4): 247-78.
9. Kjonniksen I, Andersen BM, Sondenna VG, Segadal L. Preoperative hair removal: a systematic literature review. *AORN journal* 2002; 75(5): 928-40.
10. Woodhead K, Taylor EW, Bannister G, Chesworth T, Hoffman P, Humphreys H. Behaviours and rituals in the operating theatre: a report from the Hospital Infection Society Working party in infection control in operating theatre. *J Hosp Infect* 2002; 51: 241-55.
11. Seropian R, Reynolds BM. Wound infections after pre-operative depilatory versus razor preparation. *Am J Surg* 1971; 121: 251-4.
12. Prigot A, Garnes AL, Nwagbo U. Evaluation of a chemical depilatory for preoperative preparation of five hundred fifteen surgical patients. *Am J Surg* 1962; 104: 900-6.
13. Adisa AO, Lawal OO, Adejuyigbe O. Evaluation of two methods of preoperative hair removal and their relationship to postoperative wound infection. *J Infect Dev Ctries* 2011; 5(10): 717-22.
14. Suvera M, Vyas P, Patel M, Varghese V, Ahmed A, Kashyap R, et al. Two methods of pre-operative hair removal and their effect on post-operative period. *Int J Med Sci Public Health* 2013; 2(4): 885-8.
15. De Geest S, Kesteloot K, Adriaenssen G, Lenaerts K, Thelissen MJ, Mekers G, et al. Clinical and cost comparison of three postoperative skin preparation protocols in CABG patients. *Progress in Cardiovascular Nursing* 1996; 11: 4-16.