RESEARCH ARTICLE

TWO METHODS OF PRE-OPERATIVE HAIR REMOVAL AND THEIR EFFECT ON POST-OPERATIVE PERIOD

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ABSTRACT

Background: Preparation for surgery has traditionally included the routine removal of body hair from the intended surgical wound site. Hair is removed as its presence can interfere with the exposure of the incision and subsequent wound, the suturing of the incision and the application of adhesive drapes and wound dressings. Hair is also perceived to be associated with a lack of cleanliness and hair removal is thought to reduce the risk of surgical site infections (SSIs). SSIs are experienced by around 10% of patients in the UK each year and can result in delayed wound healing, increased hospital stays, unnecessary pain and in extreme cases the death of the patient. Three methods of hair removal are currently used: shaving, clipping and chemical depilation. When a surgical operation is to be conducted through a hair bearing part of the body, hair removal is often performed.

Aims & Objective: This study aimed to evaluate the relationship of two methods (shaving and depilation cream) of preoperative hair removal to adequacy of hair removal, skin injury and reaction during hair removal, postoperative wound infection in a developing country where razor shaving is very popular.

Material and Methods: Consecutive consenting patients scheduled to have such operations were randomized into two groups. One group had hair removal by shaving with a razor blade while the other had hair removed by depilatory cream. Adequacy of hair removal and presence of skin injuries and/or reactions were noted preoperatively. Details of the procedures were recorded and patients were then assessed for postoperative wound infection.

Results: A total 215 patients were studied. Of the 103 patients who had hair removal by depilatory cream, hair was completely removed in 93 (91%) compared to 69 (62%) of the 112 patients who had razor hair shaving. Skin injuries were noted in 32 (29%) of the razor group and 4 (4%) of patients who had depilatory cream. 18 patients (8%) had postoperative wound infection including 3 (3%) in the depilatory cream group and 15 (13%) of the razor group. A significant association was found between preoperative skin injuries and postoperative wound infections.

Conclusion: Preoperative hair removal with razor shaving predisposes to skin injuries which in turn significantly influence postoperative wound infection rates. Such injuries and resultant wound infection are fewer when depilatory cream is used for hair removal.

Key-Words: Hair Removal; Postoperative Wound Infection; Depilation Cream; Skin Reaction

Introduction

Postoperative wound infection may lead to significant morbidity, patient discomfort and increased cost of surgical care.[1] In the United Kingdom, it is estimated that postoperative wound infections cost the National Health Scheme about one billion pounds annually.[2] As part of the antiseptic steps taken to reduce postoperative wound infection, different methods of hair removal are employed when preparing patients for operations and many of these have been previously evaluated.[3-5] The most popular methods are the use of razor blade, clippers, and depilatory creams.[6]

In many developing countries such as India, the age-long practice of preoperative razor shaving is still popular. However, studies reviewing hair shaving, the commonest and most economical method of hair removal, have noted its association with a greater risk of wound infection.[3,7,8] Furthermore, the psychological effect of hair removal on patients undergoing cranial surgeries has led to doubts about the necessity of hair removal.[4,9-14] These among other reasons make the practice of hair removal controversial today with both proponents and opponents.[3,7,14] Those who advocate the practice of preoperative hair removal do so in the belief that presence of hairs can interfere with skin incisions and the subsequent closure as well as the application of adhesive drapes and wound dressings.[15] A systematic review of several randomized

controlled trials in the Cochrane Database, however, 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. It also advocated for more trials comparing hair removal with a razor with depilatory cream at different times and settings, among other factors.[6]

The infection rate in this category of wounds in the literature is reported to be about 1%.[16] The difference was striking and the need to bring down the infection rate at our institute stimulated our interest to study the relationship (if any) of preoperative hair removal with postoperative wound infection. The null hypothesis is that no difference exists in the adequacy of hair removal or development of post-operative infection between patients undergoing razor or depilatory cream for preoperative hair removal.

Materials and Methods

A prospective study was conducted in the General Surgical Units of the Smt. SCL General Hospital, Smt. NHL Municipal Medical College, Ahmedabad between April 2010 and March 2012. Consecutive patients who were to undergo clean operations with access through hair-bearing areas of the body were thereafter recruited after obtaining an informed consent. Patients with history of jaundice, immunosuppressive disease, and those on preoperative antibiotics were excluded from the study. The patients were then randomized into two groups using a balloting method; i.e., consecutive patients were asked to pick one of two sealed envelopes containing a folded paper on which one of the two methods was written. The first group had hair removal by depilatory cream on day of the operation by a nursing staff while the second group had razor shaving carried out on day of operation by the nursing staff in the routine manner. Potassium thioglycolate, was used for depilation in this study. Before commencement of the operation, a particular surgical resident assessed the operative field for adequacy of hair removal, presence of skin injuries, erythema, rash, or other reactions and the findings recorded on an assessment form kept in a sealed envelope bearing only the patient's hospital number. The same resident, who assessed all the patients, was excluded from participating in the surgeries on these patients. The type of operation performed and its duration, type and length of anaesthesia, method of skin closure as well as the suture materials used were then recorded for each patient by the surgeon. Postoperatively, wounds were inspected by a senior resident who had not participated in the surgery on the third, fifth and seventh days. All patients were followed up for at least six weeks. A modification of the Southampton wound infection scoring system was employed for grading infections when present.[17] Grade I wound infection was taken as presence of undue wound redness and swelling, Grade II as discharge of serous or serosanguinous fluids from the surgical wound, Grade III as discharge of pus from the wound, and Grade IV as discharge of pus and wound dehiscence.

Results

A total of 238 patients were recruited into the study. 23 patients including 10 in razor and 13 in depilation cream group who missed some days in their follow-up were excluded from the final analysis. Therefore total 215 patients comprising 169 males and 46 females with age range from 15 to 75 years of age. 103 (48%) patients had hair removed by depilation cream while 112 (52%) had razor blade. When both groups were considered together, the assessment of adequacy of hair removal, presence of skin injuries, evidence of skin reaction, post-operative wound infections.

Complete hair removal done by both method in 162 (75%) patients and remaining 53 (25%) patients had incomplete hair removal. From table no 1 (χ^2 = 22.24; P < 0.0001) complete hair removal was significantly associated with cream application than razor (RR = 3.043; 95% CI =1.71-5.40). Total 179 (83%) patients had no any skin injury and 36 (17%) had skin injury which may single, multiple or large which shown in Table 2. Table no 2 shows (χ^2 = 21.72; P < 0.0001) injury was significantly associated with Razor than cream (RR = 4.98; 95% CI =1.96-12.67). Total 208 (97%) patients had no any skin reaction following any of the above mentioned procedure which shown in Table no 3. Table no 3 shows (χ^2 = 0.013; P = 0.91) There was no any association seen

between skin reaction and hair removal methods (RR = 0.83; 95% CI =0.43-1.60). Table 4 shows (χ^2 = 6.38; P = 0.012) post-operative wound infection was significantly associated with razor than cream (RR = 0.33; 95% CI = 0.12-0.93).

Table-1: Adequacy of Hair Removal

Adequacy		Hair Removal Method		Total
		Cream	Razor	
Complete		93 (91%)	69 (62%)	162 (75%)
Incomplete	Scanty	10 (09%)	33 (30%)	43 (20%)
	Large	00	10 (08%)	10 (05%)
Total		103	112	215

Table-2: Skin Injury from Procedures

Skin Injury		Hair Removal Method		Total
		Cream	Razor	
No Injury		99 (96%)	80 (71%)	179 (83%)
Injury	Single Tiny	03 (03%)	18 (16%)	21 (10%)
	Multiple Small	01 (01%)	12 (11%)	13 (06%)
	Large	00	02 (02%)	02 (01%)
Total		103	112	215

Table-3: Skin Reaction from Procedures

Skin Reaction	Hair Removal Method		Total
	Cream	Razor	
No Reaction	99 (96%)	109 (97%)	208 (97%)
Reaction	04 (04%)	03 (03%)	07 (03%)
Total	103	112	215

Table-4: Post-Operative Wound Infections

Grades	Hair Removal Method		Total
	Cream	Razor	
Grade I	01	03	04
Grade II	02	09	11
Grade III	00	03	03
Grade IV	00	00	00
Total	03	15	18

Discussion

Most surgeons who practice preoperative hair removal do so to avert interference of hairs with skin incisions and subsequent closure; to discourage hairs from falling into wounds; to prevent interference with the application of adhesive drapes and wound dressings; and to prevent patients from experiencing severe pain on removal of adhesive dressings.[15] Hence the selection of hair removal method would in part be based on its effectiveness in completely removing hairs. The findings in this study show that cream depilation achieved better complete hair removal in more cases than shaving with a razor blade. This finding compared favourably with reports of previous studies.[18,19] In one of the earliest studies on the use of depilatory cream for preoperative hair removal, Prigot and colleagues reported excellent hair removal in 89.5% of the cases.[19] In the current series, there was a period of learning curve in the application and use of the cream by the nurses as indicated by improvement in the completeness of hair removal after the first month of its use. This observation emphasizes the need for preliminary training of personnel involved in the use of the cream for hair depilation in order to assure its maximum benefit for complete hair removal.

The findings of some earlier studies did not justify the use of preoperative hair removal because the conventional preoperative shave was often associated with epidermal injuries and predisposed the patient to wound infection by causing the normal skin flora to contaminate the operative field.[3-5,7,20] In this study, more than 29% of the shaved patients had skin injuries of various degrees which are much higher when compared to the 4% of those who had depilatory cream application for hair removal. In a previous study, Seropian et al. recorded 16.1% skin injuries after razor shaving.[18] It is generally known that skin injuries following razor shaving may be influenced by the skill of the personnel but many studies have shown that even skillful shaving may inflict injuries, especially in body crevices, over scars and different skin conditions, and in an anxious patient.[18,19] However, none of the previous studies cited examined the relationship between skin injuries during preoperative hair removal and the development of postoperative wound infection. This study demonstrated an association between skin injuries and postoperative wound infection. Of the 36 patients who had injuries from preoperative hair removal, 18 developed postoperative wound infection (Table 4). This number is high compared to the 11 patients who developed postoperative wound infection among the 179 who had no injuries from preoperative hair removal. This finding was significant and it may be inferred that preoperative skin injuries inflicted by razor shaving possibly predisposes the patient to postoperative wound infection.

This study also demonstrated additional benefits of hair removal by depilatory cream. Hair removal with depilatory cream was adequately done with much reduced incidence of skin injuries and skin reactions and the higher postoperative wound

infections rate which accompany skin injuries inflicted by razor shaving may hence be minimized by the use of depilatory creams. A study involving a larger population including a wider range of patients and types of operations necessary to remove the influence of other endogenous and exogenous factors on the development of wound infection would enable a more extensive and detailed comparison of hair removal by depilatory cream and razor shaving.

Conclusion

This study demonstrates that postoperative wound infection is strongly associated with the presence and degree of skin injuries inflicted during preoperative hair removal commonly after shaving. It also shows that depilatory cream is superior to razor shaving for preoperative hair removal in our setting. We recommend larger population, multicenter, randomized controlled studies to further investigate the relationship of postoperative wound infection to the method of preoperative hair removal observed in this study.

References

1. Tanner J, Khan D. Surgical site infection, preoperative body washing and hair removal. J Perioper Pract 2008;18(6):232, 237-43.
2. National Audit Office. Improving patient care by reducing the risk of hospital acquired infection: A progress report. Report by the Comptroller and Auditor General. HC 876, Session 2003–2004 London, The Stationery Office. 2004.
3. Alexander JW, Fischer JE, Boyajian M, Palmquist J, Morris MJ. The influence of hair-removal methods on wound infections. Arch Surg 1983;118(3):347-52.
4. Scherpereel B, Rousseaux P, Bernard MH, Guyot JF. Preoperative non-shaving for neurosurgical operations. Neurochirurgie 1979;25(4):244-5.
5. Ratanalert S, Saehaeng S, Sripairojkul B, Liewchanpattana K, Phuenpathom N. Nonshaved cranial neurosurgery. Surg Neurol 1999;51:458-63.
6. Tanner J, Woodings D, Moncaster K Preoperative hair removal to reduce surgical site infection. Cochrane Database Syst Rev. 2006;(2):CD004122.
7. Long AE. The unshaved perineum at parturition: A bacteriological Study. Am J Obstet Gynaecol 1967;99:333-6.
8. Court-Brown CM. Preoperative skin depilation and its effect on postoperative wound infections. J Royal Col Surg Edinb 1981;26(4):238-41.
9. Gil Z, Cohen JT, Spektor S, Fliss DM. The role of hair shaving in skull base surgery. Otolaryngol Head Neck Surg 2003;128(1):43-7.
10. Winston KR. Hair and neurosurgery. Neurosurgery 1992;31(2):320-9.
11. Siddique MS, Matai V, Sutcliffe JC. The preoperative skin shave in neurosurgery: is it justified? Brit J Neurosug 1998;12(2):131-5.
12. Briggs M. Principles of closed surgical wound care. Journal of Wound Care 1997;6(6):288-92.
13. Sheinberg MA, Ross DA. Cranial procedures without hair removal. Neurosurgery 1999;44(6):1263-5.
14. Ratanalert S, Sriplung H. Social attitudes toward shaving for cranial neurosurgery. Br J Neurosurg 2001;15(2):132-6.
15. Horgan MA, Piatt JH. Shaving the scalp may increase the rate of infection in CSF shunt surgery. Ped Neurosurg 1997;26(4):180-4.
16. Bruce J, Russell EM, Mollison J, Krukowski ZH. The measurement and monitoring of surgical adverse events. Health Technol Asses 2001;5(22):1-194.
17. Bailey IS, Karran SE, Toyn K, Brough P, Ranaboldo C, Karran SJ. Community surveillance of complications after hernia surgery. BMJ 1992;304(6825):469-71.
18. Seropian R and Reynolds BM. Wound infection after preoperative depilation versus razor preparation. Am J Surg 1970;121(3):251-4.
19. 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.
20. Hamilton HW, Hamilton KR, Lone FJ. Preoperative hair removal. Can J Surg 1977;20(3):269-75.

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