

Shaving Versus Depilation Cream for Pre-operative Skin Preparation

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Abstract A prospective, randomised study was carried out to compare the effect of pre-operative shaving with chemical depilation on wound infection in 100 patients. It was shown that depilatory creams saved time for pre-operative preparation and had an advantage in areas where shaving was difficult. The use of depilatory creams was shown to be effective, atraumatic, non-toxic and could be self-administered. Depilatory creams could be used safely on granulating wounds and did not give rise to bacterial growth. Their use was associated with a significant

reduction in skin-surface bacteria and was cheaper compared with shaving. The best practice is to refrain from hair removal unless it interferes with the surgical procedure or wound closure. If hair has to be removed, it should be done using a depilatory cream. The depilatory cream has an advantage in areas which are difficult to shave or if the patient is scheduled to undergo diagnostic procedures and operations in the same area in close succession. The fight against post-operative wound infections has long been undertaken by practitioners. The authors realise that surgical-site infections are frequently caused by the bacteria commonly found on the skin; hence, reducing the number of bacteria on the skin has been a common pre-operative practice.

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Introduction

Skin preparation is defined as the removal of as many bacteria as possible from the patient's skin through shaving, washing and chemical disinfection. The purpose of skin preparation is to reduce the number of micro-organisms in the field of operation and prevent infection.

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 dressing. Hair is also perceived to be associated with a lack of cleanliness, and hair removal is thought to reduce the risk of surgical-site infection (SSI). The SSIs are experienced by around 10% of patients in the United Kingdom each year and can result in delayed wound

healing, extended hospital stays, unnecessary pain and in extreme cases death of the patients [1].

The preparation of people for surgery has traditionally included the routine removal of body hair from the intended surgical wound site. However, there are studies which claim that pre-operative hair removal is deleterious to patients, perhaps it causes SSIs, and should not be carried out [2].

The use of depilatory cream produces clean, intact skin without the risk of developing lacerations or abrasions. It can, however, cause skin irritation or rash, especially in the groin area. If possible, long hair should be cut with a pair of scissors before applying the cream so that less amount of cream is used. The chemical in the hair removal cream affects the chemistry of the individual hair strands. The active chemicals in the cream break down keratin, the principal protein, which normally requires a blade for depilation or any other harsh treatment. The effects of the cream vary, based on the strength, colour and coarseness of the hair being removed as well as the length of time the cream is left undisturbed on the hair to act. Most common complications with creams are rashes and erythema which can also increase the risk of post-operative infection [3].

SSI rate was 5.6% in patients who underwent shaving for hair removal compared with a 0.6% rate among those who used depilatory cream to remove hair [4].

The wound infection rate was 2.9% when routine pre-operative shaving was done and it was 1.5% when shaving was not done [5].

The necessity of shaving before operation in 716 cases, prospective, randomised study [6].

Materials and Methods

The present prospective randomised study included 100 patients for shaving and 100 patients for depilation as part of pre-operative preparation.

A small, discrete area in the same region of the body should be tested with the depilatory cream before a more wide-spread application is attempted. This helps determine how long the cream should be left in situ and also helps discern any negative skin reactions.

The cream should be applied thickly and evenly over the area to be treated and should be left undisturbed for the recommended period of time. After the appropriate time has elapsed, a small portion of the cream should be removed to test the effectiveness of the treatment, and if the hair comes off easily, the remaining cream should be removed.

The hair removal cream should neither be applied over small abrasions, scratches or cuts nor on sunburned areas.

The cream was applied in a layer A1/2 Prime (1.3-cm thick). After about 10 min, it was removed with a damp wash cloth, applying firm strokes in the direction of the hair

growth. Once the bulk of the cream was removed, the skin was thoroughly rinsed to remove any residual traces of the cream.

The following points should be especially considered before depilating an area for surgery: the proposed incision site should be known; modesty should be exercised, and the patient should be given privacy; permission of the patient should be obtained for skin preparation; the area to be shaved should be examined for any signs of irritation or any abnormal conditions; particular attention should be paid to the umbilicus in abdominal surgery; the operative site should be shaved the day or the night before surgery; in shaving, direction of the hair growth should be followed; if a wound is present in the area to be shaved, the depilation procedure should start from the clean area moving towards the dirty area.

Inclusive criteria	Exclusive criteria
Patients >15 yrs of age	—
Both sexes	—
All surgeries where preparation needed	Neck, face and thyroid
—	Emergency surgeries
No local skin lesions	Skin lesion/infection
Skin test for reaction	

Discussion

The influence of pre-operative shaving on the incidence of post-operative wound infection is well documented in the literature. Seropian and Reynolds [7] observed a decrease in the infection rate when hair was removed using depilatory cream.

Cruse and Foord [8] reported a wound infection rate of 0.9% without any hair removal, 1.7% when hair had been clipped, and 2.3% after shaving

Data from the study by Alexander et al. [9], showed a correlation between hair removal on the eve of surgery and increase in the infection rate, when compared with shaving or clipping immediately before the operation. Depilatory creams containing thioglycolate have been shown to be effective enhancers for transdermal drug delivery. However, the mechanism of action remains unknown. The depilatory agents enhance transepidermal drug delivery by reducing resistance in both transcellular and intercellular routes of the stratum corneum [10].

Post-operative wound infection is a serious problem. Several strategies to decrease wound infections have been suggested and studied, including the use of prophylactic antibiotics, surgery in an aseptic operating room, improved surgical skills, surgical skin preparation and so on. Shaving

is the most common skin preparation method today as it has been for hundreds of years. It was thought that wound infections might be prevented if hair does not interfere with suturing [11]. Nurses should understand the rationale behind the choice of a particular antiseptic, and the clinical effectiveness of the use of an antiseptic pre-operatively, to achieve optimum results [12]. Many studies show that hair removal with a razor or clippers can cause skin abrasion, even nicks which can lead to the development of pseudofolliculitis and subsequent SSIs [4]. Studies show that use of chlorhexidine gluconate with alcohol for intra-operative skin preparation and appropriate instrument sterilisation led to a reduction in SSI rates in patients undergoing caesarean section [13].

The best practice is to refrain from hair removal unless it interferes with the surgical procedure or wound closure. If hair has to be removed, it should be done using a depilatory cream [14]. If electrosurgical scalpel is used for skin and soft-tissue dissection, bleeding is minimum; hence, the probability of wound infection appears to be reduced. Therefore, cranial surgery without head shaving does not increase the risk of wound infection [15].

Depilatory creams have an advantage in areas which are difficult to be shaved or if the patient has been scheduled for diagnostic procedures and operations in the same area in close succession [16].

Standards and recommended practices from the Association of Peri-Operative Registered Nurses state that pre-operative skin preparation of surgical patients should include little or no hair removal, cleansing of the area around the surgical site and use of an antiseptic agent immediately before the surgical incision [17].

Seven trials involving 1,213 people compared shaving with removing hair using a depilatory cream and found that there were statistically more SSIs when people were shaved than when a depilatory cream was used. One trial compared shaving on the day of surgery with shaving the day before the surgery and found no statistically significant difference in the number of SSIs [1].

Price [18] lists skin preparation as a major intrusion into the patient's body space; removal of hair also can be very embarrassing for the patient, giving them a sense of loss of control and even loss in sexual identity, especially when pubic hair is removed. The iodine-impregnated drape not only reduces the resident skin flora, but its use also clearly reduces intra-operative wound contamination [19].

The combination of ranalexin with lysostaphin warrants its consideration as a new agent to eradicate nasal and skin carriage of *Staphylococcus aureus*, including methicillin-resistant *Staphylococcus aureus* (MRSA). The exact mechanism of action remains unresolved, but its specific spectrum of activity includes fast killing kinetics and low resistance. This combination yields good results [20].

In 1979, Tkach et al. [21] conducted a study of patients undergoing lower abdominal surgery to compare close shaving of the pubic hair with a technique developed to leave approximately 1-mm stubble. By leaving stubble, it was felt that the patient would be less likely to develop pseudofolliculitis. Coarse, kinky hair is particularly susceptible to re-grow from the side of the follicle and curl up into the skin, causing an in-growth of hair.

Shaving did not increase the wound-infection rate and had no beneficial effect on wound infection in appendicectomy [22]. Pre-operative skin antisepsis with chlorhexidine is more effective than iodine for preventing SSI and is cheaper [23].

A prospective, randomised study of pre-operative shaving versus depilation on wound infection in 253 patients conducted by Thur de Koos [16] showed that there was no statistical difference between the two methods. But the use of depilatory creams saved time.

Conclusions

In conclusion, pre-operative skin preparation continues to be an area comprising a variety of procedures. Prevention of infection is of utmost concern. Pre-operative reduction of skin flora remains the goal and standard of care. The skin should be cleansed before surgery.

If used properly, hair removal creams have many benefits including painless hair removal without the risk of developing nicks and cuts. It is a quick procedure and usually takes 3–15 min depending on the type of hair and the type of creams used. At the same time, hair removal creams are not suitable for all and can have serious drawbacks. Many creams have strong, unpleasant odours, and can result in chemical burns if left on for a long time.

The wound infection rate not only depends on the skin preparation, but also on the interval between skin preparation and surgery, the thickness of the subcutaneous tissue, the operating time and the suture materials used.

References

- (2008) Pre-operative hair removal to reduce SSI clinical update. Austr Nurs J. Available at: goliath.econnect.com
- Tanner J, Woodings D, Moncaster K (2007) Derby Hospitals NHS Foundation Trust, Derby City General Hospital, Research & Development, Derby, Derbyshire, UK, DE 22 3NE Cochrane Database Syst Rev. J Perioper Pract 17(3):118–121, 124–132
- Nursing_Keperawatan = ASKEP (2010) Pre-operative skin preparation. Available at: smart_nurse.blogspot.com/2010
- Mangram AJ, Horan TC, Pearson ML, Silver LC, Jarvis WR (1999) Guideline for prevention of SSI. Inf Control Hosp Epidemiol 20(4):257–258

5. Bird BJ, Chrisp DB, Scrimgeour G (1984) NZ Med J 97(766):727–729
6. Hoe NY, Nambiar R (1985) Is pre-operative shaving really necessary? Ann Acad Med Singapore 14(4):700–704, PMID 4083810. Available at: Ncbi.nlm.nih.gov
7. Seropian R, Reynolds BM (1971) Wound infections after preoperative depilatory versus razor preparation. Am J Surg 121(3):251–254
8. Cruse PJ, Foord R (1973) A five years prospective study of 23649 wounds. Arch Surg 107(2):206–210
9. Alexander JW, Fischer JE, Boyajian M, Palmquist J, Morris MJ (1983) The influence of hair removal methods on wound infections. Arch Surg 118(3):347–352
10. Lee JN, Jee SH, Chan CC, Lo W, Dong CY, Lin SJ (2008) The effects of depilatory agents as penetration enhancers on human stratum corneum structures. J Invest Dermatol 128(9):2240–2247
11. Gail M, Meyer RN (2004) Recommendation for surgical skin preparation: an integrative review of the literature worldviews. J Know Synth Nurs E2(1):73–79, Online publication 19 April, 2004
12. Murkin CE (2009) Pre-operative antiseptic skin preparation. Br J Nurs 18(11):665–669
13. Rauk PN (2010) Educational intervention, revised instrument sterilization methods. Am J Infect Control 38(4):319–323
14. McIntyre FJ, Mc Cloy R (1994) Shaving patients before operation: a dangerous myth? Ann R Coll Engl 76(1):3–4
15. Tokimura H, Tajtsu A, Tsuchiya M, Yamahata H, Taniguchi A, Takayama K, Kaj M, Hirabaru M, Hirayama T, Shinsato T, Arita K (2009) Cranial surgery without head shaving. J Craniomaxillofac Surg 37(8):477–480
16. Thur de Koos P, McComas B (1983) Shaving versus skin depilatory cream for pre-operative skin preparation: a prospective study of wound infection rates. Am J Surg 145(3):377–378
17. AORN (2000) Recommended practices for skin preparation of patients. In: Standards, recommended practices and guidelines. AORN, Denver, pp 329–333
18. Price B (1993) Dignity that must be respected, body image and the surgical patient. Profess Nurse 8(10):670–672
19. Wilson SE (2008) Microbial sealing: a new approach to reducing contamination. J Hosp Infect 70(Suppl 2):11–14
20. Desbois AP, Long S, Gemmell CG, Coote PJ (2010) Surface disinfection properties of the combination of an antimicrobial peptide ranalexin, with an endopeptidase, lysostaphin, against MRSA. J Appl Microbiol 108(2):723–730
21. Tkach JR, Shannon AM, Beastro R (1979) Pseudofolliculitis due to pre-operative shaving. AORN J 30(5):881–884
22. de Koos PT, McComas B (1983) Am J Surg (Elsevier) 145(33):377–378, csa.com
23. Lee I, Agarwal RK, Lee BY, Fishman NO, Umscheid CA (2010) Systemic review and cost analysis comparing use of chlorhexidine with use of iodine for pre-operative skin antisepsis to prevent surgical site infection. Infect Control Hosp Epidemiol 31(12):1219–1229