

DOES PREOPERATIVE SURGICAL SITE HAIR REMOVAL FOR ELECTIVE ABDOMINAL SURGERY HAVE AN IMPACT ON SURGICAL SITE INFECTION? AN OBSERVATIONAL STUDY.

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Abstract

Background

The surgical site infection and the role of hair on the surgical site play an important role in avoiding the stated complication. This study is conducted to determine the effect of shaving on the occurrence of surgical site infection

Method

This was a prospective observational study conducted for a year. The participants who underwent abdominal surgery participated in the surgery. One of the two groups before the surgery had shaved, and the other did not shave. The occurrence of surgical site infection, the grading of the wound, and the grading of the pain were compared statistically among both groups.

Results

The study included 100 participants with a mean age of 43.5 years and a mean BMI of 22.88 kg/m². SSIs were reported in 11% of cases, with no statistically significant difference between the shaved and unshaved groups. Wound grading and pain assessment also showed no significant differences.

Conclusion

This study concluded that shaving did not have any effect on the occurrence of surgical site infection after the surgery.

Recommendation

Shaving should be avoided before performing the surgery; this decreases the chances of post-operative complications such as surgical site infection

Keywords: *Surgical site infection, shaving, preoperative hair removal*

Submitted: 06-07-2024 Accepted: 07-27-2024

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Introduction

As a routine practice for all the surgeons, the surgical sites are subjected to the removal of hair. The basis of this practice is the age-old belief that hair is associated with an unhygienic condition, which might cause the growth of microorganisms leading to infections. However, recently, multiple studies have been conducted to find out the effect of the removal of hairs from the surgical site on the infections reported after the surgery [1, 2, 3]. Some of them found that removing the hair could lead to infections. The method of hair removal plays an important role in determining the vulnerability of the surgical site to infections.

General methods of removal from the surgical site include using depilatory creams, clippers, and razors. Removal of the hair using razors can cause abrasion of the surface of the skin. The intactness of the skin barrier is disrupted, which

causes a favorable site for the growth of microorganisms. While clippers are recommended for removal of the hair before the surgery, The literature available in this domain is scarce and contradictory. The researchers have also studied the time elapsed between the surgery and the removal of the hair [4]. They reported that removal of the hair in the operation theatre can make the skin susceptible to infection; however, if it is removed a while before the surgery, it reduces the chances of infection.

Some studies have favored the removal of hair, some have found it to be the cause of infection, and others have found no association [5, 6]. There are various factors associated with the removal of hair, considering the anatomy of the skin and the method used for the removal of hair. 16% of the surgeries conducted have reported surgical site infections post-surgery [7]. The surgical site infection post-surgery increases the length of hospitalization, the cost of the treatment, and the complications associated with the surgery. The infections post-surgery are generally

nosocomial infections, which increase the risk of morbidity and mortality of the patients

A study reported that post-surgery surgical site infection causes psychological stress on the relatives of the patients and the patients themselves [8]. Finding the optimum solution to the removal of the hair and how it can impact the post-surgical consequences can help surgeons make better choices that lower the healthcare burden and bring about better outcomes of the surgery by lowering the complications associated with the infection.

This study is undertaken to determine the impact of the removal of hair from the surgical site before conducting abdominal surgery.

Method

Study design

A prospective observational study

Study setting

This study was conducted to compare the effects of pre-operative shaving prospectively at the tertiary hospital for a period of 2 years, from March 2022 to February 2024

Participants

In total, 100 patients participated in this study. Groups were formed; the first group underwent surgery after preoperative shaving and the other group underwent surgery without shaving.

Inclusion criteria

The patients undergoing surgery in the abdominal region were included in the study. The surgery should be with a closed wound and belong to the clean and clean-contaminated categories according to the CDC classification.

Exclusion criteria

Patients with compromised immunity due to chronic illnesses such as diabetes, gestating women, and patients with skin conditions that can alter the healing process of the wound after the surgery were not included in the study.

Bias

There was a chance that bias would arise when the study first started, but it was avoided by giving all participants identical information and hiding the group allocation from the nurses who collected the data.

Procedure

The surgery was performed by surgeons with comparable expertise. Post-operatively, the wounds were assessed by the wound scoring system. The grades were given to the wound as follows: 0 grade if the wound was healing normally. Grade 1 if the wound was healing but had erythema in, around, and along the wound. Grade 2 if there was erythema with other signs of inflammation in, around, and along the wound. Grade 3 if there was discharge from the wound and it was 2 cm in size in, around, and along the wound. Grade 4 pus discharged from the wound. Grade 5 deep infection in the wound. The procedure for preparation of the surgical sight and other prophylactic antibiotics was given similarly in both groups. Except for the first group, which underwent shaving before the surgery, The follow-up of the surgical site was taken for 7, 14, and 21 days. The pain during the changing of the dressing on the 7th day of the surgery was also compared among both groups.

Ethical consideration

The approval was obtained from the institutional ethics committee before the conduct of the study.

Statistical analysis

The data obtained regarding the wound scoring was compared statistically in both groups, and the pain during wound dressing amongst both groups was subjected to comparison after the surgery.

Result

In total, there were 100 participants, of whom 11% had surgical site infections postoperatively. The mean age of the participants was 43.5 years, and the mean BMI was 22.88 kg/m². There were 66 males and 34 females taking part in the surgery. 43 of them underwent the clean category of surgery, and 57 of them underwent the clean-contaminated category of surgery. The laparoscopic method was chosen by 44 patients, and 56 patients underwent open surgery. Closure of the wound was performed using different methods, For 3 patients, staplers were used for closing, and the remaining patient's wound was closed using sutures, for 56 of them, a monofilament suture was used, and for 41 of

them, a polyfilament suture was used. Wound closure was done with local anesthetics in 76 cases.

The number of patients who reported surgical site infection was categorized according to their gender, CDC classification of the surgery, type of the surgery, duration of the surgery, body mass index, the closing of the wound, and the requirement of local anesthetics. It was found that the

number of patients who suffered from surgical site infections belonged to both groups. Irrespective of the category of patients both groups had almost an equivalent number of patients with surgical site infections. Table No. 1 gives the details of the number of patients belonging to both groups in the different demographic and surgical categories.

Table no.1: SSI in patients with demographic details and surgical parameters

Parameters	Shaving post-operatively			Unshaved		
	7 th day	14 th day	30 th day	7 th day	14 th day	30 th day
Sex						
Men	4	5	3	2	3	3
Women	2	1	1	3	2	1
CDC class						
Clean	0	1	1	1	1	0
Clean-contaminated	6	5	3	4	4	4
Type of surgery						
Open surgery	6	4	3	5	5	4
Laparoscopic	0	1	1	0	1	0
Time required for the surgery						
Less than 2 hours	0	0	0	0	1	0
More than 2 hours	6	5	4	5	5	4
Body Mass Index						
More than 25	2	1	1	2	2	2
Less than 25	4	4	3	3	4	2
Method of closing the wound						
Monofilament suture	5	3	2	4	4	2
Polyfilament suture	1	2	2	1	1	1
Stapler	0	0	0	0	1	1
Requirement of LA						
Yes	4	4	4	4	5	4
No	2	2	0	1	0	0

The number of patients who underwent surgery after shaving and those who underwent unshaven both had surgical site infections. Although the number of patients with surgical site infections was numerically high in the shaved group, the statistical significance of the difference

was not found to be substantial on the 7th, 14th, and 30th days after the surgery. Pre-operative shaving did not affect the occurrence of surgical site infections. The details of the number of patients in both groups are stated in Table 2.

Table no.2: Number of patients with SSI

Follow-up day	7 th day	14 th day	30 th day
Shaved preoperatively	6	6	4
Unshaved	5	5	4

The Southampton score for grading the wound was used to grade the wound that occurred after the surgical site infection. It was found that there was no statistically significant difference between the shaved and unshaved

groups on the 7th, 14th, and 30th days of the surgery. The details of the grades of the wound on the 7th, 14th, and 30th days of the surgery are illustrated in Table 3.

Table no.3: Grading of the wound

Grade	7 th day		14 th day		30 th day	
	Shaved	Unshaved	Shaved	Unshaved	Shaved	Unshaved
1	1	0	2	3	2	0
2	1	2	1	0	2	0
3	2	0	2	0	0	2
4	2	3	0	2	0	2
5	0	0	1	0	0	0

The pain of the patients was graded as mild, moderate, and severe. The patients from the shaved and unshaved groups had comparable pain. The difference between the grades of the pain was not found to be statistically significant. The

majority of the patients had a moderate change of dressing after the surgery. Table No. 4 gives the details of the grading of the pain in both groups.

Table no.4: Grading of the pain in the wound

Grade	7 th day		14 th day		30 th day	
	Shaved	Unshaved	Shaved	Unshaved	Shaved	Unshaved
Mild	1	0	2	0	2	0
Moderate	2	2	1	4	2	2

Severe	2	3	3	2	0	2
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Discussion

Shaving before the surgery is a traditional procedure due to the perception that hairs are associated with unhygienic practices. In this study, it was found that the overall rate of SSI was 11%. The findings of different studies conducted in similar domains had equivalent percentages of SSI in their studies [1, 9, 10]. A study states that removal of the hair before surgery should not be performed in the operating room as it increases the occurrence of surgical site infection [11]. In this study, it was found that irrespective of the gender and BMI of the patients, there was no significant difference between the number of patients in both groups.

Considering the duration of surgery, CDC classification, and laparoscopic or open surgery, it was found that in all these categories there was no statistically significant difference between the number of patients. However, it was observed that the clean-contaminated surgery, the surgery lasting more than 2 hours, and the open surgery had a higher number of patients with surgical site infections compared.

Overall, the difference between the number of patients in the shaved and unshaved groups was not significant statistically. The study, which reported that the number of patients with surgical site infections is high in the shaved group, justified it with the method of shaving [11, 12]. The shaving might cause abrasion on the skin and also the release

of exudates, which creates a favourable environment for the growth of bacteria [13]. On the contrary, a study found that the number of patients who underwent surgery unshaven had more complications [14]. The hairs would interfere with the surgical site. Also, the dressing after the surgery, which requires putting on a tape, can lead to folliculitis if hairs are present, which increases pain and discomfort.

The type of wound closure did not affect surgical site infection when compared between the shaved and unshaved groups. Although staplers decrease the occurrence of surgical site infections, which was found in this study as well [15]. A review conducted of the previous study stated that shaving or not shaving preoperatively did not have any effect on the occurrence of surgical site infection. This was based on the findings of this study [16].

Conclusion

This study concluded that shaving did not have any effect on the occurrence of surgical site infection after the surgery. However, avoiding shaving in favorable circumstances can reduce complications post-operatively.

Limitation

The cohort undertaken for this study was very limited. To confirm the findings of the study, a large cohort is required, along with the interventional design of the surgery.

Recommendation

Shaving should be avoided before performing the surgery; this decreases the chances of post-operative complications such as surgical site infection

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Acknowledgement

We are grateful to the hospital's staff and patients involved in the study for their cooperation during the study.

List of abbreviation

SSI-Surgical Site Infection

Source of funding

No funding received.

Conflict of interest

The authors declare no conflict of interest.

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