Student's Journal of Health Research Africa
e-ISSN: 2709-9997, p-ISSN: 3006-1059
Vol. 5 No. 3 (2024): March2024 Issue
https://doi.org/10.51168/sjhrafrica.v5i3.1132
Original Article

A CROSS-SECTIONAL STUDY ON PREOPERATIVE SURGICAL SITE HAIR REMOVAL FOR ELECTIVE ABDOMINAL SURGERY IN JHARKHAND, INDIA: DOES IT HAVE IMPACT ON SURGICAL SITE INFECTION?

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Abstract

Background

Hair removal at surgical sites, a common preoperative practice to prevent surgical site infections (SSIs) attributed to hair follicles, is often deemed hygienic. However, the literature indicates no significant correlation between hair removal and infection occurrence, making it a questionable ritual for infection prevention.

Method

This study was conducted prospectively at the surgery department of the Shaheed Nirmal Mahto Medical College & Hospital, Dhanbad. The abdominal surgeries conducted in a year were included in this study. Two groups were formed. The first group underwent removal of hair whereas the other group did not undergo the hair removal process. The occurrence of infection was thoroughly evaluated and the data obtained from both the groups were compared. The patients were evaluated during the 7th day, 14th day, and a month of the surgery

Results

In this study of 200 patients (138 males, 62 females) undergoing various surgeries (88 laparoscopic, 112 open), 21 developed surgical site infections (SSIs) during 7, 14, and 30-day follow-ups. Despite higher SSIs in the shaved group, differences in wound scores, pain, suture type, BMI, surgery type, gender, or anesthesia administration were not statistically significant. Clean contaminated surgeries and surgeries under 2 hours showed increased SSIs.

Conclusion

From this study, it is found that when the duration of the surgery is less than 2 hours and the surgery of the clean contaminated category then there is a statistically significant difference in the shaved and unshaved group considering the number of SSI. Otherwise shaving does not cause any alteration in the number of SSIs.

Recommendation

Shaving should be considered preoperatively if its potential benefits outweigh the occurrence of surgical site infection. Also in case of clean contaminated open surgeries, a rigorous prophylaxis of antibiotics should be given.

Keywords: *surgical site infection, wound healing, Removal of hair*
Submitted:2024-03-26 Accepted: 2024-03-28

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Introduction

Surgical site infection due to hair follicles on the site of incision is an avoidable postoperative complication. Removal of the hair from the surgical site has been practiced to avoid such occurrences. Hairs are often considered to be unhygienic and therefore removal of the hair is a ritual before the surgery. However, the literature shows that it does not correlate with the occurrence of the infection [1,2].

It is found that removing the hair vis shaving can cause the remains of the cuts which can lead to infestation of the bacteria leading to infection. Clippers and depilatory creams are the preferred methods of removal of hair compared to shaving. Various health organizations suggest that removal of the hair is not required before the surgery [3]. However,

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the studies conducted do not conclude anything against or in support of this ritual [4,5].

Nevertheless, it is thought that surgical site infection occurrence is not high but it is 16.3% considering the overall surgeries carried out [6]. This infection can increase the cost of the surgery and can lead to lengthening hospital stays. Identifying the type of surgery and evaluating the effect of hair removal on postoperative conditions can significantly improve the outcome of the surgery [7]. Also, if at all the occurrence of surgical site infection is inevitable in either of the cases it can be managed prophylactically by antibiotics. The attempt is made in this study to evaluate the outcome of removing the hair before the surgery on the occurrence of surgical site infection.

Method

Study design

A cross-sectional study was conducted prospectively.

Study setting

The study was carried out at the surgery department of the Shaheed Nirmal Mahto Medical College & Hospital, Dhanbad, Jharkhand, India. The abdominal surgeries conducted in a year were included in this study.

Participants

Patients more than 18 years old and less than 50 years old were included in this study. The patients participating in this study were undergoing abdominal surgeries which were either in the clean category or clean contaminated category. The patients excluded from the study were those who had previous dermatological conditions that could interfere with the process of investigation. Also, the patients with delayed wound healing such as those who had diabetes mellitus for a long time were not included in this study.

Two groups were formed. The first group underwent the removal of hair whereas the other group did not undergo the hair removal process. All of them underwent abdominal surgeries, the surgeries were conducted by the surgeons who had 3 or more than 3 years of experience. The preoperative antibiotic prophylaxis and the postoperative antibiotics and analgesics were given as per the routine. The occurrence of infection was thoroughly evaluated and the data obtained from both the groups were compared. The patients were evaluated during the 7th day, 14th day, and a month after the surgery. The wound pain and surgical site were the focus of this follow-up. The Southampton score was used to numerically determine the condition of the wound.

Sample size

To calculate the sample size for this study, the following formula was used for estimating a proportion of a population:

$$n = \frac{Z2 \times p \times (1-p)}{E2}$$

Where:

- n = sample size
- Z = Z-score corresponding to the desired level of confidence
- p = estimated proportion in the population
- E = margin of error

Statistical analysis

The data obtained from both groups were arranged in a tabular format and they were statistically compared using the chi-square method and Fischer's –t-test.

Ethical considerations

The study protocol was approved by the Ethics Committee and written informed consent was received from all the participants.

Result

In all 200 patients participated in this study including both groups out of which 21 got surgical site infection. There were 138 males and 62 females in this study. Surgery was performed by laparoscopy in 88 patients and 112 patients underwent open surgeries. Closing of the surgical wound was performed by using staplers in 4 patients, monofilament was used for closing in 112 patients, and polyfilament was used in 84 patients. Local anesthetics were applied in the majority of the cases.

During the follow-up of 7, 14, and 30 days surgical site infections were detected. 18 patients had surgical site infection on day 7, from this 10 belonged to the shaved group and the other 8 belonged to the unshaved group. Among the 18, 3 were cleared of infection before the 14th day. However, on the 14th day itself, new 4 patients having surgical site infections were detected. In total, the patients who had infections from the 7th day were 15, and new patients that is 19 patients had surgical site infections on day 14th. 6 patients from those 15 who had infection from the day 7th were clear before day 30th. On the 30th day follow up there were no new infections detected but the one that continued from day 7th that is 7 and among the 4 new detected during the 14th day, 2 were clear of the infection. So in total on the 30th day, there were 9 surgical site infections. Table no. 1 gives the summary of the number of SSIs during the postoperative follow-up.

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Table no. 1: Surgical site infection during follow-up

Follow-up period	Total patients with infection	Shaved group	Unshaved group	New infection	Statistical significance
7th day	18	10	8	0	p > 0.05
14th day	19	11	8	4	p > 0.05
30th day	9	7	6	0	p > 0.05

It was observed that the number of SSIs was numerically higher in the shaved group compared to the unshaved group but the difference between both groups was not statistically significant. When the wound score was compared there was no significant difference in both the groups. However, when clean contaminated surgery was compared with clean surgery it was observed that clean contaminated surgery had more number of SSIs. Similarly, the surgeries conducted for less than 2 hours had more surgical site infections among the shaved group. Otherwise, when shaved and shaved groups were compared based on pain, type of suture, BMI, type of surgery, gender, and administration of anaesthesia, it was observed that the difference was not statistically significant. Table no. 2.1 and 2.2 illustrates the demographic and clinical details of the patients.

Table no.2.1: Demographic details of the patients

Parameters	**7th day surgical site infection**		**14th day surgical site infection**		**30th day surgical site infection**	
	Shaved group	**Unshaved group**	**Shaved group**	**Unshaved group**	**Shaved group**	**Unshaved group**
Gender						
Male	6	5	6	6	4	5
Female	4	3	5	2	3	1
Body mass index						
Greater than 25	4	3	7	5	4	4
Lesser than 25	6	4	4	3	3	2

Table no.2.2: Clinical details of the patients

Parameters	**7th day surgical site infection**		**14th day surgical site infection**		**30th day surgical site infection**	
	Shaved group	**Unshaved group**	**Shaved group**	**Unshaved group**	**Shaved group**	**Unshaved group**
Anesthesia						
Applied	8	7	9	6	6	6
Not applied	2	1	2	2	1	0
Type of filament used for wound closure						
Monofilament	1	1	2	1	0	1
Stapler	7	6	8	7	6	4
Polyfilament	2	1	1	0	1	1`
Duration of surgery						
Less than 2 hours	1	0	2	0	1	1
2 to 4 hours	8	7	6	5	4	5
4 to 6 hours	1	1	2	2	1	0
More than 6 hours	0	1	0	1	1	0
Mode of surgery						
Open	9	6	8	8	5	6
Laparoscopic	1	2	3	0	2	0

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Type of surgery						
Clean contaminated surgery	8	7	9	7	5	6
Clean surgery	2	1	2	1	2	0

Discussion

Out of 200 participants, 21 developed surgical site infections during the follow-up period. Around 10% of the participating population in our study had surgical site infection. Various other studies also had similar findings [8,9]. There were more male participants (138) than female participants (62) in the study. Surgery types were divided between laparoscopy (88 patients) and open surgeries (112 patients). Different methods were used for closing surgical wounds, including staplers, monofilament, and polyfilament sutures. Local anesthetics were commonly applied during the procedures.

SSIs were monitored on days 7, 14, and 30 post-surgery. On day 7, 18 patients had SSIs, with 10 in the shaved group and 8 in the unshaved group. By day 14, there were 19 new infections, and on day 30, 9 patients still had infections persisting from earlier days. While the shaved group had numerically more SSIs throughout the follow-up period, the statistical analysis did not show a significant difference between the shaved and unshaved groups regarding SSI rates. It was observed in this study that an increase in the duration of the surgeries significantly increased the number of SSIs irrespective of the removal of the hair. As per the literature, this is because if the hours of the surgery increase, there is increased exposure to the contaminants [3,7]. However, if the time required for the surgery is less than 2 hours then the shaved group had more surgical site infections. Overall considering the other factors as well, it was observed that there was no statistical difference in the number of SSIs among the shaved and the unshaved group. Certain studies have proven that the number of infections increases significantly when the removal of the hair occurs [10,11].

It is believed that shaving may cause abrasion and cuts on the surface of the skin from which serum oozes out causing an ideal environment for the growth of bacteria. Although some studies have supported it others did not find any statistical difference due to shaving [12,13,14]. From comparing BMI, no significant difference was observed, a study has proved that an increase in BMI causes an increase in infection [15].

A study proved that laparoscopy technique decreases the number of SSIs but in this study, no significant difference was found [16]. Similarly, there is a study that shows that surgical site infections are gender biased but in this study, the contrary has been proven [17]. The type of wound closure and the type of material used for it did not have significant differences among the groups. Hairs on the surgical site can interfere with the surgery and dressing thus it can lead to more pain [18]. However, the findings of this study were contradictory.

The study explored various factors like wound score, pain, suture type, BMI, surgery type, gender, and anesthesia administration. No statistically significant differences were observed based on these factors except for certain scenarios. For example, clean contaminated surgeries and surgeries lasting less than 2 hours had higher SSI rates. The number of patients with surgical site infection increased numerically with shaving but this increase was not statistically significant. Also, specific factors controlling the occurrence of surgical site infection were clean contaminated open surgeries with a duration of more than 2 hours. The type of filament used for closure of wound, anesthesia, and other criteria such as body mass index and gender of the patient did not influence the occurrence of surgical site infection. If the duration of surgery is more than 2 hours, it's a clean contaminated, and open surgery then a rigorous prophylaxis of antibiotics should be given to prevent the occurrence of surgical site infection.

Generalizability

The findings of this study are likely to be generalizable to similar patient populations undergoing elective abdominal surgeries, particularly in settings where similar surgical techniques, wound closure methods, and post-operative care practices are employed. However, it is important to consider the specific context of each clinical setting and patient population when applying these findings to ensure relevance and validity.

Conclusion

From this study, it is found that when the duration of the surgery is less than 2 hours and the surgery of the clean contaminated category then there is a statistically significant difference in the shaved and unshaved group considering the number of SSIs. Otherwise shaving does not cause any alteration in the number of SSIs.

Limitation

There was a single investigator in this study. Which could affect the bias of the study.

Recommendation

Shaving should be considered preoperatively if its potential benefits outweigh the occurrence of surgical site infection. Also in case of clean contaminated open surgeries, a rigorous prophylaxis of antibiotics should be given.

Acknowledgment

We express our gratitude to the hospital's personnel and the patients who participated in the study for their valuable cooperation throughout the research.

List of abbreviation

SSI- Surgical Site Infection
BMI- Body Mass Index

Source of funding

No source of funding.

Conflict of interest

No conflict of interest.

References

1. Alkaaki A, Al-Radi OO, Khoja A, et al. Surgical site infection following abdominal surgery: a prospective cohort study. Can J Surg 2019;62(02):111–117
2. Kumar K, Thomas J, Chan C. Cosmesis in neurosurgery: is the baldhead necessary to avoid postoperative infection? Ann Acad Med Singap 2002;31(02):150–154
3. 3Wilson APR, Treasure T, Sturridge MF, Grüneberg RN. A scoring method (ASEPSIS) for postoperative wound infections for use in clinical trials of antibiotic prophylaxis. Lancet 1986;1(8476):311–313
4. 4Krogstad U, Arntzen E, Baalsrud A, Gilbert M, Nilsen S, Ormstad SRL. Patient safety in hospital – knowledge or campaign? – NIPH [Internet]. Norway 2007 [cited 2018 October 25]. Available at:https://www.ncbi.nlm.nih.gov/books/NBK464731/
5. Al Maqbali MAH. Pre-operative hair removal: a literature review. Int J Nurs Clin Pract 2016;3(01):163. doi: htpp://dx.doi.org/10.15344/2394-4978/2016/163
6. Menéndez V,Galán JA, Elia M, et al. Is it necessary to shave the pubic and genital regions of patients undergoing endoscopic urological surgery? Infect Control Hosp Epidemiol 2004;25(06):519–521
7. Kjønniksen I, Andersen BM, Søndenaa VG, Segadal L. Preoperative hair removal–a systematic literature review. AORNJ 2002;75(05): 928–938, 940
8. Niël-Weise BS, Wille JC, van den Broek PJ. Hair removal policies in clean surgery: systematic review of randomized, controlled trials. Infect Control Hosp Epidemiol 2005;26(12):923–928
9. Kattipattanapong W, Isaradisaikul S, Hanprasertpong C. Surgical site infections in ear surgery: hair removal effect; a preliminary, randomized trial study. Otolaryngol Head Neck Surg 2013;148(03):469–474
10. Maksimović J, Marković-Denić L, Bumbasirević M, Marinković J, Vlajinac H. Surgical site infections in orthopedic patients: prospective cohort study. Croat Med J [Internet] 2008;49(01):58–65
11. Tang K, Yeh JS, Sgouros S. The Influence of hair shave on the infection rate in neurosurgery. A prospective study. Pediatr Neurosurg 2001;35(01):13–17
12. Miyagi Y, Shima F, Ishido K. Implantation of deep brain stimulation electrodes in unshaved patients. Technical note. J Neurosurg2002;97(06):1476–1478
13. Çelik SE, Kara A. Does shaving the incision site increase the infection rate after spinal surgery? Spine 2007;32(15):1575–1577
14. Onyekwelu I, Yakkanti R, Protzer L, Pinkston CM, Tucker C, Seligson D. Surgical wound classification and surgical site infections in the orthopedic patient. J Am Acad Orthop Surg Glob Res Rev 2017;1(03):e022
15. Kshirsagar A, Patil R, Nangare N, Agarwal S. Role of pre-operative no hair removal on surgical site infection. J Evol Med Dent Sci 2013;2:3327–3334
16. Bailey IS, Karran SE, Toyn K, Brough P, Ranaboldo C, Karran SJ. Community surveillance of complications after hernia surgery. BMJ 1992;304(6825):469–471
17. Weiss CA III, Statz CL, Dahms RA, Remucal MJ, Dunn DL, Beilman GJ. Six years of surgical wound infection surveillance at a tertiary care center: a review of the microbiologic and epidemiological aspects of 20,007 wounds. Arch Surg 1999;134(10):1041–1048
18. Hernandez K, Ramos E, Seas C, Henostroza G, Gotuzzo E. Incidence of and risk factors for surgical-site infections in a Peruvian hospital. Infect Control Hosp Epidemiol 2005;26(05):473–477

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https://doi.org/10.51168/sjhrafrica.v5i3.1132
Original Article

Publisher details:

SJC PUBLISHERS COMPANY LIMITED

Category: Non-Government & Non-profit Organisation
Contact: +256775434261(WhatsApp)
Email: admin@sjpublisher.org, info@sjpublisher.org or studentsjournal2020@gmail.com
Website: https://sjpublisher.org
Location: Wisdom Centre Annex, P.O. BOX. 113407 Wakiso, Uganda, East Africa.