

Comparison of Early Versus Delayed Showering on Post-Operative Wound Infections

Salman Habib Abbasi, Abdul Basit, Muhammad Farooq, Fazal Hussain Shah

ABSTRACT

Objectives: To compare frequency of SSIs with and without early showering after clean and clean contaminated surgical wounds.

Study Design and Setting: Randomized controlled trial was conducted at Department of Surgery. HIT Hospital, Taxila from June 2020 to December 2020.

Methodology: A total of 130 participants were recruited after taking informed consent. After clean and clean-contaminated surgery, first group was subjected to early showering (48 hours after surgery) while second group was not allowed showering until removal of stiches. Both groups were compared in terms of SSIs. Data was entered into SPSS version 25. The mean and standard deviation were used for the expression of continuous variables while frequency and proportion were used for qualitative variables. Both groups were compared by independent sample t test and chi square test. A p value of <0.05 was considered statistically significant.

Results: The mean age of the patients was 39.92 ± 11.42 years and there was male gender dominance i.e. 74 (56.9%) were males while 56 (43.1%) were females. Clean surgeries were 81 (62.3%) and clean-contaminated proportion was 49 (37.7%). Collectively, 12 (9.2%) patients developed SSIs during clinical followup. There was no difference between groups in terms of age, gender, and wound types (p values 0.680, 0.157 and 0.587 respectively). In shower group, 3 (4.6%) and in non-shower group, 9 (13.8%) patients developed SSIs (p value 0.069).

Conclusion: Early postoperative showering can be implemented safely in clean and clean contaminated surgical wounds to minimize SSIs. The results should be evaluated in large RCTs.

Key words: Clean and contaminated surgeries, Surgical site infection, Postoperative bath.

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INTRODUCTION:

In lifetime, many people undergo various surgical procedures which result in surgical wound. After surgery, skin is closed with sutures, staples or adhesive tapes and glues which is covered by sterile gauze and adhesive tapes. The wound management after any surgery is continuous ongoing debate and every institution has its own protocols to prevent wound complications. The prevalence of healthcare associated

infections (HCAIs) is more than 6% in developed countries and surgical site infections (SSIs) are third most common category. The bundled approach is required to combat these preventable infections. The dressing is done in sterile operation theatre environment. These protocols are followed to reduce surgical site infections (SSIs) which are one of the most common form of morbidity after any type of surgery.^{1, 2} SSIs are associated with over a third of postoperative deaths. The spectrum of SSIs ranges from minor wound discharge, short-lived wound infection to life threatening situations like major abdominal, thoracic wounds dehiscence, septicemia. The SSIs increase the healthcare related costs, reduction in quality of life, poor psychological wellbeing etc. It is estimated that over one third of postoperative deaths are attributed to SSIs. To prevent SSIs, every hospital follows optimum sterilization protocols in all surgical categories. The traditional management of surgical wounds involves wound cleansing, dressing, and keeping wound dry until removal of stiches or staples.^{3, 4}

To minimize the risk of SSIs, various measures are taken at each step of surgical management. Preoperatively, showers with antibacterial solutions or soaps can reduce the incidence

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of SSIs. Appropriate antibiotic prophylaxis with the aim of getting maximum serum concentrations at the time of surgery is recommended in almost all types of surgeries. Skin preparation with antiseptic solutions, preferably with alcohol based is an important step in operating room. During surgery prevention of hyperglycemia and hypothermia can decrease the incidence of SSIs. After surgery the optimization of lung functions and oxygen carrying capacity of blood is helpful in combating the various pathogens responsible for contagious complications.⁵ Even though these recommendations are circulated in almost all healthcare centers but evaluation regarding compliance is somewhat not up to the mark. The breaches in the infection control procedures can lead to significant increase in SSIs. Every center report difference stats of infectious complications due to various factors ranging from variable implication of infection control measures and diversity in the surgical cases.⁶

There is considerable controversy in the literature regarding impact of early showering on SSIs. Some studies advocate the wound clearing or showering with tap water or saline after 48 hours to reduce to local colonization of microorganisms.⁴ The National Institute for Health & Care Excellence (NICE) 2008 also recommended that showering after 48 hours in the postoperative period is safe. Both saline and tap water are equally effective and the wound infection rates are comparable.^{4,7,8} The showering removes dirt, sweat and debris which provides favorable environment for the wound healing. Moreover, patient's satisfaction is also increased with early showering. Some studies showed the decrease in wound pain after early showering and reduction in SSIs.^{5,9} A recent literature review showed that early showering does not cause the increase in frequency of SSIs or other wound complications.⁶

In our study, we focused on whether the frequency of SSIs is influenced by early showering after clean and clean-contaminated surgeries. Literature has controversy at both local and international data bases. Water forbidden strategy after surgery can be challenged against early water contact strategy but the many surgeons are hesitant to some extent.^{7,10} The results would help us to evaluate the role of early showering on frequency of SSIs which would result in better management of surgical wounds.

METHODOLOGY:

This randomized controlled trial was conducted in Department of Surgery, HIT Hospital, Taxila from June 2020 to December 2020. The research was approved by local independent institutional ethical review committee vide letter no. ERC/19/13(b), dated 15 December 2019. One hundred and thirty patients undergoing surgical procedure resulting in clean and clean-contaminated wound were selected for this study. Informed written consent was obtained from all patients. All the patients with age range of 20 to 60 years, from either gender undergoing general (open

appendectomy, hernia repairs) and orthopedic surgeries (all extremity surgeries) were included. All the patients with chronic wounds, burn wounds, contaminated or dirty wounds and wound having drains for more than 48 hours were excluded. Also, patients with chronic liver or renal insufficiencies, diabetes, immunosuppression, pregnancy, or lactating were excluded. The patients underwent surgical procedures as per hospital protocols including pre and postoperative broad-spectrum antibiotics. After surgery, sterile gauze dressing with adhesive tapes was done in operation theatre. The randomization with ratio of 1:1 was done by computer generated random numbers. In group A, the surgical dressing was removed after 48 hours and patients were instructed to have tap water showering without rubbing or vigorous rinsing of the wounds. After showering wound was cleaned with saline swab and left open until stitches removal. In group B, the dressing of the wound was changed after every 24 to 48 hours until stitches removal without any permission to wound contact with water. The patients were discharged from the hospital as per standard protocols and advised for followup after 7 to 10 days. At the time of stitches removal, wound was examined for SSI (local redness, swelling and purulent discharge).

All the data was entered into SPSS version 25 registered for Microsoft windows. The mean and standard deviation were used for the expression of continuous variables while frequency and proportion were used for qualitative variables. Both groups were compared in terms of qualitative and quantitative variables including SSIs by independent sample t test and chi square test. P-value of <0.05 was considered as statistically significant.

RESULTS:

Total n=143 patients were recruited for study during the entire process. Out of which 9 lost follow up and 4 had to undergo second surgery due to complications. Total n=130 patients were divided into two equal groups. The mean age of the patients was 39.92 ± 11.42 years and there was male gender dominance i.e. 74 (56.9%) were males while 56 (43.1%) were females. Clean surgeries were 81 (62.3%) and clean-contaminated proportion was 49 (37.7%). Collectively, 13 (9.2%) patients developed SSIs during clinical followup.

There was no difference between groups in terms of age, gender, and wound types (p values 0.680, 0.157 and 0.587 respectively). In group A, n=3 (4.6%) and in group B, n=9 (13.8%) patients developed SSIs (p value 0.069).

DISCUSSION:

Showering is considered a good hygiene practice for humans which has been associated with various positive healthy effects.⁸ Showering before surgery is considered beneficial due to potential decrease in bacterial colony counts.⁹ After surgery water contact with wound has been traditionally associated with increased frequency of wound complications but the research area has been debatable among surgeons.

Table 1. Demographic data among groups

Variable	Group A (Shower) (n=65)	Group B (Non-shower) (n=65)	P value
Age (years)	39.51 ± 11.75	40.34 ± 11.15	0.680*
Gender (M/F)	41/24	33/32	0.157†
Type of surgery (clean/clean-contaminated)	39/26	42/23	0.587†

* Independent sample t test

† Chi square test

Table 2. Frequency of SSIs among groups

SSIs	Group A (Shower) (n=65)	Group B (Non-shower) (n=65)	P value
Yes	03 (4.6%)	09 (13.8%)	0.069†
No	62 (95.4%)	56 (86.2%)	
Total	65 (100%)	65 (100%)	

† Chi square test

After 48 hours when wound is considered sealed due to early epithelization, the showering may be considered safe.^{1,3}

Hsieh, P. Y., et al. (2016) compared early showering and non-showering groups in terms of various wound parameters in clean and clean-contaminated surgeries. This study randomized 222 patients and found that shower group had 1.8% while non-shower group had 2.7% SSIs (p value 0.751).⁴ This study included various wound parameters including size of wound, site, postoperative pain, patient's satisfaction which were lacking in our data. In our study, these frequencies were 4.6% versus 13.8% for shower and non-shower groups respectively (p value 0.069). Another study on total knee arthroplasty (TKA) showed that bacterial colony counts are similar after early or late showering (p value 0.28) but early showering had higher patient's satisfaction.¹⁰

Similarly, a study by Feilmeier, M., et al. (2014) showed that frequency of SSIs after clean surgeries of foot and ankle is 4.5% which remained unaltered by early or late showering.² A recent study by Jayathilake, A., et al. (2020) showed that showering just 24 hours after surgery can reduce the infectious complications significantly in clean and clean-contaminated cases. They concluded that to optimize the outcomes, surgical wounds should be kept moist, clean and patients should be advised early mobilisation.¹¹ Another recent study favored early showering in patients after coronary artery bypass graft surgery. This study had the evidence that the rate of sternal wound infections was lower in shower group as compared to non-shower group i.e. 7.7% versus 32% (p value 0.038).⁵

Various systemic reviews showed that early or late showering does not influence frequency of SSIs after clean and clean contaminated surgeries.^{3, 6, 7, 12, 13} All reviews concluded that

due to wide confidence interval it is difficult to label early showering harmful or beneficial in terms of wound complications. Further randomized controlled trials should be done to dig out the facts. Showering is not recommended for all types of wounds. The clean and clean contaminated wounds should be considered for early showering but rest of the wounds should be individually assessed for showering.^{1, 6}

Majority of the research data shows positive or neutral role of early showering on incidence of SSIs, but some studies warned the use of tap water for showering due to various pathogenic contaminations which may colonize the surgical sites like mycobacterium chelonae, pseudomonas.^{14, 15} A recent Japanese study warned that showering has emerged as independent factor causing Mycobacterium avium complex lung disease (adjusted odds ratio 5.72, 95%, CI 1.99 to 16.46).¹⁶

The concept of showering before surgery reduces the frequency of SSI.¹⁷ Both simple showering or showering with chlorhexidine solution are effective.¹⁸ In many centres of the world it has become integral part of preoperative care in high profile surgeries like onco surgery, coronary by pass etc.^{19, 20}

CONCLUSION:

Early postoperative showering can be implemented safely in clean and clean contaminated surgical wounds to minimize SSIs. The results should be evaluated in large randomized controlled trials as early showering was beneficial in reducing SSIs, but results were not statistically significant.

Authors Contribution:

Salman Habib Abbasi: Conception and design, Critical revision for important intellectual content, final approval, and guarantor
Abdul Basit: Collection and assembly of data
Muhammad Farooq: Analysis and interpretation of data
Fazal Hussain Shah: Statistical

REFERENCES:

- Zolot J. Showering Is Safe 48 Hours After Surgery with Some Wounds. Am J Nurs. 2016;116(4):16. doi:10.1097/01.NAJ.0000482129.51435.d2
- Feilmeier M, Dayton P, Sedberry S, Reimer RA. Incidence of surgical site infection in the foot and ankle with early exposure and showering of surgical sites: a prospective observation. J Foot Ankle Surg. 2014;53(2):173-5. doi:10.1053/j.jfas.2013.12.021
- Dayton P, Feilmeier M, Sedberry S. Does postoperative showering or bathing of a surgical site increase the incidence of infection? A systematic review of the literature. J Foot Ankle Surg. 2013;52(5):612-4. doi:10.1053/j.jfas.2013.02.016
- Hsieh PY, Chen KY, Chen HY, Sheng WH, Chang CH, Wang CL, et al. Postoperative Showering for Clean and Clean-contaminated Wounds: A Prospective, Randomized Controlled Trial. Ann Surg. 2016;263(5):931-6. doi:10.1097/SLA.0000000000001359

5. Gok F, Demir Korkmaz F, Emreçan B. The effects of showering in 48-72 h after coronary artery bypass graft surgery through median sternotomy on wound infection, pain, comfort, and satisfaction: randomized controlled trial. *Eur J Cardiovasc Nurs*. 2021. doi:10.1093/eurjcn/zvab010
6. Copeland-Halperin LR, Reategui Via YRML, Levy J, Shank N, Funderburk CD, Shin JH. Does the timing of postoperative showering impact infection rates? A systematic review and meta-analysis. *J Plast Reconstr Aesthet Surg*. 2020;73(7):1306-11. doi:10.1016/j.bjps.2020.02.007
7. Yu YH, Chao S, Lin YK, Chou YY, Liao HH, Loh EW, et al. The gap between currently available evidence and awareness in clinical practice of wound care: It is the time to shower earlier. *Surgery*. 2018. doi:10.1016/j.surg.2018.01.013
8. Katsuyama H, Hamasaki H, Yanai H. Habit of Bathing or Showering Is Beneficially Associated With Body Weight and Abdominal Circumference in Patients With Type 2 Diabetes. *J Clin Med Res*. 2018;10(9):728-31. doi:10.14740/jocmr3510w
9. Edmiston CE, Jr., Leaper D. Should preoperative showering or cleansing with chlorhexidine gluconate (CHG) be part of the surgical care bundle to prevent surgical site infection? *J Infect Prev*. 2017;18(6):311-14. doi:10.1177/1757177417714873
10. Yu AL, Alfieri DC, Bartucci KN, Holzmeister AM, Rees HW. Wound Hygiene Practices After Total Knee Arthroplasty: Does It Matter? *J Arthroplasty*. 2016;31(10):2256-9. doi:10.1016/j.arth.2016.03.040
11. Jayathilake A, Jayaweera J, Kumbukgolla WW, Herath S. Influence of early postoperative showering in undressed surgical wound for better clinical outcome. *J Perioper Pract*. 2020;30(6):163-69. doi:10.1177/1750458919868903
12. Toon CD, Sinha S, Davidson BR, Gurusamy KS. Early versus delayed post-operative bathing or showering to prevent wound complications. *Cochrane Database Syst Rev*. 2015;2015(7):CD010075. doi:10.1002/14651858.CD010075.pub3
13. Chang IW. Early versus delayed post-operative bathing or showering to prevent wound complications: a Cochrane review summary. *Int J Nurs Stud*. 2016;61:258-9. doi:10.1016/j.ijnurstu.2016.04.008
14. Decalonne M, Lecorche E, Hau E, Petiteau A, Moreau C, Milan O, et al. Cause Analysis of an Infection in Facelift Surgery Due to *Mycobacterium chelonae*. *Front Med (Lausanne)*. 2019;6:243. doi:10.3389/fmed.2019.00243
15. Hopman J, Meijer C, Kenters N, Coolen JPM, Ghamati MR, Mehtar S, et al. Risk Assessment After a Severe Hospital-Acquired Infection Associated With Carbapenemase-Producing *Pseudomonas aeruginosa*. *JAMA Netw Open*. 2019;2(2):e187665. doi:10.1001/jamanetworkopen.2018.7665
16. Uwamino Y, Nishimura T, Sato Y, Tamizu E, Uno S, Mori M, et al. Showering is associated with *Mycobacterium avium* complex lung disease: An observational study in Japanese women. *J Infect Chemother*. 2020;26(3):211-14. doi:10.1016/j.jiac.2019.09.003
17. Berrios-Torres SI, Umscheid CA, Bratzler DW, Leas B, Stone EC, Kelz RR, et al. Centers for Disease Control and Prevention Guideline for the Prevention of Surgical Site Infection, 2017. *JAMA Surg*. 2017;152(8):784-91. doi:10.1001/jamasurg.2017.0904
18. Persichino J, Lee H, Sutjita M, Talavera K, San-Agustin G, Gnass S. Reducing the Rate of Surgical Site Infections After Breast Surgery With the Use of Larger Volumes of 4% Chlorhexidine Gluconate Solution as Preoperative Antiseptic Showering. *Infect Control Hosp Epidemiol*. 2017;38(3):373-75. doi:10.1017/ice.2016.293
19. Al Salmi H, Elmahrouk A, Arafat AA, Edrees A, Alshehri M, Wali G, et al. Implementation of an evidence-based practice to decrease surgical site infection after coronary artery bypass grafting. *J Int Med Res*. 2019;47(8):3491-501. doi:10.1177/0300060519836511
20. Johnson MP, Kim SJ, Langstraat CL, Jain S, Habermann EB, Wentink JE, et al. Using Bundled Interventions to Reduce Surgical Site Infection After Major Gynecologic Cancer Surgery. *Obstet Gynecol*. 2016;127(6):1135-44. doi:10.1097/AOG.0000000000001449.

