



EVIDENCE SEARCH RESULTS

Question/subject of request:	To understand whether Chlorhexidine or Octenisan bodywash are more effective in preoperative washing. Adult population.
Date requested:	7 th August 2025
Date completed:	17 th September 2025
Compiled by:	Laetitia Delaleuf

CITING THIS SEARCH

If you reference this search in any paper, publication or presentation, please let us know.

The citation format is:

Delaleuf, L., (2025). *Evidence summary: Understand whether Chlorhexidine or Octenisan bodywash are more effective in preoperative washing* Taunton, UK: Somerset Foundation Trust Knowledge and Library Services.

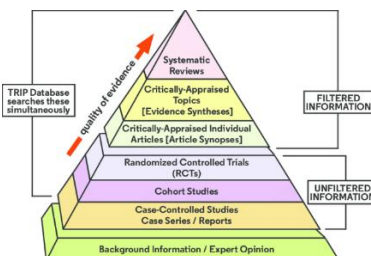
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The design of the study and the endpoints measured affect the strength of the evidence.

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Regrettably, direct cohort comparisons between Chlorhexidine and Octenisan have not been identified. However, a 2010 article by [Koburger et al.](#) evaluated several antiseptics—including Chlorhexidine and Octenidine—against Staphylococcus aureus, Enterococcus faecalis, Streptococcus pneumoniae, Escherichia coli, Pseudomonas aeruginosa, Clostridium perfringens, Haemophilus influenzae, and Candida albicans. The study ranked antiseptics by effective concentration and concluded that Octenidine demonstrated greater efficacy than Chlorhexidine when applied with prolonged contact durations.

Research on patients shows mixed results for Chlorhexidine and Octenisan (when looked at separately), with outcomes varying by surgery type, protocol, and targeted infection.

Octenidine:

A 2023 review by [Kock, R. et al.](#) found no studies comparing octenidine to other agents for pre-surgery skin preparation regarding Staphylococcus aureus carriage, highlighting the need for more research in this area. Studies comparing octenidine with benzalkonium chloride ([Bohle, S. et al., 2022](#)) reported better results with octenidine for reducing intracutaneous microbial load during joint surgeries. Jeans, E. et al. ([2018](#)) showed that a protocol including Octenisan body wash and nasal Bactroban before hip and knee surgery effectively eradicated Methicillin-sensitive Staphylococcus aureus. Conversely, Reiser, M. et al. ([2017](#)) found that using octenidine nasal ointment and showering before cardiac surgery did not significantly decrease surgical site infections.

Chlorhexidine:

The body of literature concerning Chlorhexidine is more extensive than for octenidine. Two systematic reviews ([Chen, Z. and Mont, M.A. 2023](#); [Forget, V. et al. 2022](#)) evaluated the use of chlorhexidine-impregnated cloths and both identified their potential benefits. Nevertheless, additional rigorous studies are required to substantiate these findings. In contrast, another systematic review ([Fadlalmola, H.A. et al. 2022](#)) focused on caesarean sections found that povidone-iodine yielded the most favourable outcomes in preventing post-caesarean endometritis.

The following table provides a summary of selected studies and their findings on infections:

1. For skin preparation

Studies	Type of studies	Methods	Conclusions
Sukvibul, P. et al. 2025	Randomised Controlled Trial (RCT)	Number of patients: 1,326 undergoing abdominal surgery	No significant difference





		Comparison of Alcohol-based chlorhexidine gluconate and Aqueous-based chlorhexidine gluconate.	
DeBolt, C. A. et al. 2024	RCT	Number of patients: 319 Use of both preoperative 2% chlorhexidine gluconate abdominal cloth and 4% chlorhexidine gluconate vaginal scrub before caesarean. 160 were randomized to the chlorhexidine gluconate abdominal cloth and vaginal scrub group and 159 were randomized to the standard of care group.	No decrease of SSIs (Surgical Site Infections) in caesarean and it doesn't decrease the other wound complications in caesarean after labour.
Sprague, S. et al. 2023	Cluster-randomized, crossover trial at 25 hospitals in USA and Canada	Number of patients: 6785 patients with a closed fracture and 1700 patients with an open fracture. "use a solution of 0.7% iodine povacrylex in 74% isopropyl alcohol (iodine group) or 2% chlorhexidine gluconate in 70% isopropyl alcohol (chlorhexidine group) as preoperative antisepsis for surgical procedures to repair extremity fractures"	Patient with closed extremity fractures: "skin antisepsis with iodine povacrylex in alcohol resulted in fewer surgical-site infections than antisepsis with chlorhexidine gluconate in alcohol" Patients with open fractures: results similar with iodine povacrylex and chlorhexidine gluconate patients
Dunn, D. et al. 2024	RCT	Number of patients: 120 Use of vaginal antisepsis with either 10% povidone-iodine scrub (62 patients) or 4% chlorhexidine gluconate with 4% isopropyl alcohol (58 patients)	No significant difference reported by patients.
Andrade, F.O. and Poveda, V.B. 2023	Pilot study of RCT	Number of patients: 48 Use of 2% chlorhexidine gluconate-impregnated cloth (25 patients) and 2% liquid chlorhexidine gluconate (23 patients). Use of the night before and at the morning of the surgery.	No statistical difference between liquid and cloths
Cho, M-R. et al. 2023	RCT	Number of patients: 150 Knee replacement patients. Separation in 3 groups: Group 1 (povidone-iodine scrub-and-paint), Group 2 (chlorhexidine gluconate paint after povidone-iodine scrub), and Group 3 (povidone-iodine paint after chlorhexidine gluconate scrub)	"chlorhexidine gluconate paint after povidone-iodine scrub or povidone-iodine paint after chlorhexidine gluconate scrub had a superior effect on sterilizing native bacteria compared to povidone-iodine scrub-and-paint method."
Smith, S. et al. 2023	RCT	Patients number: 712 Comparison of three antiseptic skin preparation agents commonly used prior to incisional surgery for clean implant surgery: chlorhexidine with alcohol (C-Alc), povidone iodine with alcohol (PI-Alc), and aqueous povidone iodine (PI-Aq)	Similarities between chlorhexidine with alcohol and povidone iodine with alcohol and no more efficacy of povidone iodine with alcohol and aqueous povidone iodine.
Rockefeller, N. F. et al. 2022	RCT	Number of patients: 119 Comparison of the effectiveness of chlorhexidine and iodine as presurgical vaginal antiseptic solutions to prevent urinary tract	"Chlorhexidine was not inferior to iodine for vaginal antisepsis before urogynecologic





		infection. Primary outcome: measurement infection within 2 weeks after surgery. Secondary outcome: measurement infection at 2 and 6 weeks after surgery.	surgery concerning urinary tract infection” Therefore it's safe to use it.
Dai, W. and Fang, F. 2022	Cohort study	Number of patients: 2,251 undergoing total knee arthroplasty. Experimental group (1,218) used chlorhexidine-impregnated gauze the evening before surgery and control group was a retrospective cohort that underwent the surgery four years ago without the experimentation.	Using of chlorhexidine-impregnated gauze for skin preparation is an effective practice to reduce peri-prosthetic joint infection.
Nuangphuet T. and Suwanthanma, W. 2021	Randomized Controlled Trial	Number of patients: 87 Comparison of chlorhexidine in water and povidone iodine before abdominal surgery.	Preoperative skin preparation with chlorhexidine in water tend to had lower surgical site infection rate compared to povidone iodine
Luwang, A.L. et al. 2021	a pilot randomized control trial	Number of patients: 311 Comparison of the efficacy of chlorhexidine-alcohol and povidone-iodine for caesarean patients. Patients were followed for a period of 30 days in postoperative period to monitor for surgical site infections	“patients who received chlorhexidine-alcohol as skin antiseptic had less chance of developing SSI than those who received povidone-iodine; however, it did not reach a statistical significance”

2. Washing.

Studies	Type of studies	Methods	Conclusions
Card, E. et al. 2024	Randomized Controlled Trial	“use 2% chlorhexidine cloths versus soap and water the night before and morning of surgery prior to the operation” Number of patients: 157.	The use of chlorhexidine shows a reduce of microbial density for up to 4 days.
Prayugo, B. et al. 2022	Quasi-experimental method study	Number of patients: 60 Comparison antimicrobial baths using 4% chlorhexidine with patients taking no baths	Pre-operative bath with 4% CHG is effective in preventing surgical site infections and have a long lasting effect on reducing microbial density.
Yilmaz, A., Ates, S., Aysun, K. 2022	RCT	Number of patients: 120 undergoing thoracic surgery Intervention group (61) used bath gel that contains chlorhexidine gluconate and the control group (59) used bath gels/soap without any antiseptics	Benefit of using chlorhexidine gluconate before thoracic surgery to prevent Coagulase-Negative Staphylococci colonisation.
Franker, L. M. et al. 2021	Pilot study	Number of patients: ? Comparison of 2% chlorhexidine gluconate (CHG) cleansing–impregnated cloths and current practice of bathing with 4% CHG solution	There was no significant difference found between the use of 2% CHG-impregnated cloths and 4% CHG solution
Rohrer, F. et al. 2021	A randomized controlled trial with 2-year follow-up	Number of patients: 613. Before randomized, group were separated into two groups: carrier of Staphylococcus aureus and non-carriers. Then groups were further randomized into intervention group: daily chlorhexidine showers and application of mupirocin nasal ointment twice a day for 5 days before surgery and control group.	After 2 years, no periprosthetic joint infections found in all groups so a definite conclusion can't be drawn.





		For non-carriers: only chlorhexidine showers were prescribed	
<p>The results are limited to the last 10 years to ensure the inclusion of the most current information. In addition, reviews and selected studies from 2015-2020 are separated, as the NICE Guidelines on surgical site infections were updated in 2020.</p>			
<p>I hope this is helpful. Please do let us know if you need any further information.</p> <p>The library keeps a repository of evidence searches on the inSPIRE institutional repository. These results will only be shared in the repository if you have given your permission to do so.</p> <p>Please note: the summary of the results was enhanced using AI Copilot.</p> <p>Thank you.</p>			

GUIDELINES

[Global guidelines for the prevention of surgical site infection.](#)

Author: World Health Organization

Publication Date: 2018

Abstract: For preoperative bathing the recommendation is to bath or shower prior to surgery but recommendation is made on using chlorhexidine gluconate due to the low quality of evidence. (p. 58)

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CHLORHEXIDINE

Systematic Reviews & Meta-analysis

[The Utility of Chlorhexidine Cloth Use for the Prevention of Surgical Site Infections in Total Hip Arthroplasty and Surgical as well as Basic Science Applications: A Meta-Analysis and Systematic Review](#)

Authors: Chen, Zhongming and Mont, Michael Albert

Publication Date: 2023

Journal: Orthopedic Clinics of North America 54(1), pp. 7–22

Abstract: Skin antisepsis, such as ready-to-use, no-rinse, 2% chlorhexidine-impregnated cloths, is one of the fundamental cornerstones for reducing periprosthetic infections after primary lower extremity total joint arthroplasties. This systematic review presents background material concerning the problem and methods to deal with and then describes the use of chlorhexidine cloth prophylaxis related to various surgical applications. The authors found an almost universal benefit of the cloths. In the meta-analysis, the total pooled effect showed a reduction in infection rates. The use of chlorhexidine cloths is appropriate for prophylaxis for knee arthroplasty, hip arthroplasty, and a variety of other surgeries.



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[Vaginal preparation with different antiseptic solutions before cesarean section for preventing postoperative infections: A systematic review and network meta-analysis](#) [Note this article contain one retracted citation: Vaginal cleansing prior to caesarian section: To do or not to do?: A randomized trial]

Journal of Gynecology Obstetrics and Human Reproduction

Aref, Nisreen Khaled

Authors: Fadlalmola, Hammad Ali;Al-Sayaghi, Khaled Mohammed;Al-Hebshi, Abdulqader Abdlah;Alshengeti, Amer Mohammad;Almohammadi, Nawal H.;Alawfi, Abdulsalam Dakheel;Aljohani, Maher M. and Elhaddad, Nourhan F.

Publication Date: 2022

Journal: Journal of Obstetrics & Gynaecology Research 48(11), pp. 2659–2676

Abstract: Aims: We aimed to investigate the effect of various vaginal wash solutions on reducing risks of post-cesarean endometritis, wound infections, fever, and hospital stay duration. Methods: Scopus, Web of Science, PubMed, and Cochrane Library were searched for randomized clinical trials that compared different vaginal wash solutions to each other or to "no vaginal cleaning"; without restriction on the age of parturients or site where trials were conducted. We analyzed this frequentist network meta-analysis using the netmeta package in R software version 4.1.2; synthesized data as mean difference or risk ratio with their 95% confidence intervals. Results: Our network meta-analysis included 29 RCTs with a total sample size of 9311 women undergoing CS. Regarding post-cesarean endometritis, we found that povidone-iodine had the highest significant risk reduction compared to "no vaginal cleaning" (RR = 0.08, 95% CI 0.01, 0.69]). While regarding post-cesarean reduction of wound infection, fever, and hospital stay duration, we found that chlorhexidine 4% (RR = 0.17, 95% CI 0.05, 0.65]), saline 0.9% (RR = 0.12, 95% CI 0.03; 0.48]), and saline 0.9% (MD = -1.29, 95% CI -2.18; -0.39]), respectively, had the highest significant risk reduction compared to "no vaginal cleaning." Conclusion: Vaginal wash solutions were associated with a significant reduction of post-cesarean endometritis, wound infection, fever, and hospital stay duration. Since povidone-iodine had the highest significant reduction of post-cesarean endometritis, we recommend setting povidone-iodine as the standard practice as pre cesarean vaginal wash solution; consistent practice guidelines of Enhanced Recovery After Surgery (ERAS).

[What is the benefit of preoperative washing with chlorhexidine gluconate-impregnated cloths on the incidence of surgical site infections? A systematic review and meta-analysis.](#)

Authors: Forget, V.;Azzam, O.;Khouri, C. and Landelle, C.

Publication Date: Jun ,2022

Journal: Infectious Diseases Now 52(4), pp. 185–192

Abstract: Objectives: While the World Health Organization has recommended preoperative washing with plain or antimicrobial soap for surgical site infection (SSI) prevention, it has not formulated recommendations on use of chlorhexidine gluconate (CHG)-impregnated cloths. The purpose of this systematic review was to evaluate the benefit of preoperative bathing with CHG-cloths on SSI incidence. Patients and methods: Publications were searched on Medline, CENTRAL, Web of Science, Clinical Trial between 01/01/1990 and 30/06/2018. Randomized controlled trials (RCT), quasi-randomized, case-control and cohort studies on patients with surgery (Population) having preoperative bathing with CHG-cloths (Intervention) or antiseptic soap, plain soap, placebo, no washing, no instruction (Comparator) were included. The main outcome was SSI occurrence. The results were synthesized using the Odds-Ratio (OR) and 95% confidence interval [95%CI]. Study quality was assessed using the Cochrane and Newcastle-Ottawa tools and evidence quality with the GRADE method. Statistics were calculated on RevMan5.3. Results: All in all, 1108 publications were identified and 3 were included in the meta-analysis. OR of the 2 cohort studies was 0.25 [95%CI: 0.13-0.50] for use of CHG-cloths the evening and the morning before intervention versus non-compliance with preoperative washing. OR of the RCT was 0.12 [95%CI: 0.02-1.00] for use of CHG-cloths the evening and the morning before intervention versus a shower with antibacterial soap the evening before the intervention. Study quality was moderate. Conclusions: While the available studies show a benefit for CHG-cloths on SSI occurrence in orthopaedic surgery, there is no comparison with





usual practices. Further studies are needed to confirm the benefit of CHG-cloths for preoperative washing.

[**A Systematic Review and Network Meta-Analysis of Chlorhexidine Gluconate Versus Povidone-Iodine for Infection Prevention in Clean Surgery**](#)

Authors: Wade, R. G.;Burr, N. E.;McCauley, G.;Bourke, G. and Efthimiou, O.

Publication Date: 2022

Journal: AORN Journal 115(6), pp. 587–590

Abstract: Objective: There is uncertainty around preoperative skin antisepsis in clean surgery.

Network meta-analysis provides more precise estimates than standard pairwise meta-analysis and can rank interventions by efficacy, to better inform clinical decisions.

Background: Infection is the most common and costly complication of surgery. The relative efficacy of CHG and PVI based skin antiseptics in clean surgery remains unclear.

Methods: We searched for randomized or nonrandomized studies comparing the effect of different preparations of CHG and PVI on the dichotomous outcome of surgical site infection. We included studies of adults undergoing clean surgery. We excluded studies concerning indwelling vascular catheters, blood sampling, combination antiseptics or sequential applications of different antiseptics. We performed a network meta-analysis to estimate the relative efficacy of interventions using relative risks (RR).

Results: We included 17 studies comparing 5 antiseptics in 14,593 individuals. The overall rate of surgical site infection was 3%. Alcoholic CHG 4%-5% was ranked as the most effective antiseptic as it halved the risk of surgical site infection when compared to aqueous PVI [RR 0.49 (95% confidence interval 0.24, 1.02)] and also to alcoholic PVI, although uncertainty was larger [RR 0.51 (95% confidence interval 0.21, 1.27)]. Adverse events related to antiseptic application were only observed with patients exposed to PVI.

Conclusions: Alcoholic formulations of 4%-5% CHG seem to be safe and twice as effective as PVI (alcoholic or aqueous solutions) in preventing infection after clean surgery in adults. Our findings concur with the literature on contaminated and clean-contaminated surgery, and endorse guidelines worldwide which advocate the use of alcoholic CHG for preoperative skin antisepsis.

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Reviews

[**Perioperative infection prevention during inflatable penile prosthesis surgery: A narrative review.**](#)

Authors: Matthew Onabanjo A.N.;Matthew A.N.;Famati E.;Nguyen V. and Rogers, M. J.

Publication Date: 2024

Journal: Translational Andrology and Urology 13(8), pp. 1628–1640

Abstract: Background and Objective: Penile prostheses are an option for the management of erectile dysfunction (ED). Over the years penile prosthesis surgery has become increasingly safe owing to improvements such as antibiotic usage, coated devices, and surgical techniques. However, infection remains a dreaded complication during prosthesis surgery. Efforts to minimize risk of infection in the perioperative period have been extensively studied. Herein, we performed a narrative review on preoperative, intraoperative, and postoperative strategies for infection prevention during placement of a penile prosthesis with a comparison of infection prevention strategies to other surgical fields.

Method(s): A literature review was performed using PubMed and Google Scholar. Studies evaluating perioperative management of penile prosthesis infection were included. The following search terms were used to for our literature search: penile prosthesis, inflatable penile prosthesis, infection, prevention, perioperative management. Articles were graded based on the 2011 Oxford Centre for Evidence Based Medicine (OCEBM) guidelines and a table was generated with each intervention discussed and its level of evidence based on current literature. Key Content and Findings:

Optimization of patient's comorbid conditions can help reduce risk during prosthesis operations.





Monitoring and optimizing a patient's glycemic control has been investigated, but the current literature does not necessarily support a strict hemoglobin A1c (HbA1c) or pre-operative blood glucose level. Surgical field preparation using chlorhexidine-based solutions has been shown to be superior to iodine-based solutions. Appropriately selected peri-operative antibiotics have also been shown to reduce infection risk. Intraoperatively, the use of coated devices in addition to a 'no touch' technique have been shown to significantly reduce the risk of inflatable penile prosthesis (IPP) infection. Post operatively, available evidence of antibiotic use has not been demonstrated to be effective in reducing infection rates.

Conclusion(s): Surgical infection following placement of an IPP is a devastating and morbid complication with infection rate up as high as 1-3% in virgin cases and 7-18% in revision cases. While perioperative techniques exist and have reduced risk of infection, more prospective data is needed to evaluate the clinical significance of these different approaches. More research in these areas, along with future options such as nanoparticles, antibiotic coated suture, and next generation sequencing (NGS) for bacterial pathogens, may shed light on further ways to optimize infection reduction strategies for prosthesis surgery.

[Surgical Site Infection Prevention: A Review.](#)

Authors: Seidelman J.L.;Mantyh C.R. and Anderson, D. J.

Publication Date: 2023

Journal: JAMA 329(3), pp. 244–252

Abstract: Importance: Approximately 0.5% to 3% of patients undergoing surgery will experience infection at or adjacent to the surgical incision site. Compared with patients undergoing surgery who do not have a surgical site infection, those with a surgical site infection are hospitalized approximately 7 to 11 days longer. Observations: Most surgical site infections can be prevented if appropriate strategies are implemented. These infections are typically caused when bacteria from the patient's endogenous flora are inoculated into the surgical site at the time of surgery. Development of an infection depends on various factors such as the health of the patient's immune system, presence of foreign material, degree of bacterial wound contamination, and use of antibiotic prophylaxis. Although numerous strategies are recommended by international organizations to decrease surgical site infection, only 6 general strategies are supported by randomized trials. Interventions that are associated with lower rates of infection include avoiding razors for hair removal (4.4% with razors vs 2.5% with clippers); decolonization with intranasal antistaphylococcal agents and antistaphylococcal skin antiseptics for high-risk procedures (0.8% with decolonization vs 2% without); use of chlorhexidine gluconate and alcohol-based skin preparation (4.0% with chlorhexidine gluconate plus alcohol vs 6.5% with povidone iodine plus alcohol); maintaining normothermia with active warming such as warmed intravenous fluids, skin warming, and warm forced air to keep the body temperature warmer than 36 degreeC (4.7% with active warming vs 13% without); perioperative glycemic control (9.4% with glucose 150 mg/dL); and use of negative pressure wound therapy (9.7% with vs 15% without). Guidelines recommend appropriate dosing, timing, and choice of preoperative parenteral antimicrobial prophylaxis.

Conclusions and Relevance: Surgical site infections affect approximately 0.5% to 3% of patients undergoing surgery and are associated with longer hospital stays than patients with no surgical site infections. Avoiding razors for hair removal, maintaining normothermia, use of chlorhexidine gluconate plus alcohol-based skin preparation agents, decolonization with intranasal antistaphylococcal agents and antistaphylococcal skin antiseptics for high-risk procedures, controlling for perioperative glucose concentrations, and using negative pressure wound therapy can reduce the rate of surgical site infections..

[Chlorhexidine Cloth Overview for Surgical Infection Prevention.](#)

Authors: Chen, Zhongming and Mont, Michael A.

Publication Date: 08 17 ,2021

Journal: Surgical Technology International 39, pp. 395–403

Abstract: Infections are one of the most devastating complications that occur after lower extremity total joint arthroplasty or any surgical procedure. As such, it has become a major priority to reduce





them through various preoperative strategies. Popular prophylactic antimicrobials include alcohol-based solutions, povidone iodine, as well as combinations of chlorhexidine-based products to address an individual's microbial load on the skin. Chlorhexidine is a broad-spectrum biocide with activity against Gram-positive and Gram-negative bacteria. The use of chlorhexidine cloths may be a choice over solutions, since some studies have shown that they can reduce lower extremity infection rates by greater than two-thirds. In this report, we will describe the scientific basis for the dual application technique of these cloths, as well as our general recommendations for usage for lower extremity arthroplasties and other surgical procedures. Multiple studies have demonstrated their efficacy, with a prospective randomized study of joint arthroplasties demonstrating a 2.9% deep infection rate without their use versus a reduction to 0.4%. In conclusion, we believe that these cloths are appropriate for use in all hip and knee lower extremity arthroplasties as well as other surgical procedures.

[Review of Pre-Operative Skin Preparation Options Based on Surgical Site in Orthopedic Surgery](#)

Authors: Dockery, Dominique M.;Allu, Sai;Vishwanath, Neel;Li, Troy;Berns, Ellis;Glasser, Jillian;Spake, Carole S. L.;Antoci, Valentin;Born, Christopher T. and Garcia, Dioscaris R.

Publication Date: 2021

Journal: Surgical Infections 22(10), pp. 1004–1013

Abstract: Background: Surgical site infections (SSIs) are a primary contributor to surgical morbidity and mortality, causing a substantial financial burden on the healthcare system. Specifically, Cutibacterium acnes contributes greatly to infections in the shoulder and spine regions. Prevention of infection is crucial to improve patient outcomes and reduce costs. This article reviews current surgical skin preparation solutions, the unique distribution of organisms at common orthopedic surgical sites, and recommends solutions based on surgical location. Methods: A search of electronic databases (PubMed, MEDLINE, and Embase) was conducted for relevant literature until December 2020. Sources were compiled based on title and abstract, then full texts were read for possible inclusion. This review summarizes the most recent publications in the field of SSIs and preparation solutions. Results: The mechanism and efficacy of alcohol-, iodine-, and chlorhexidine-based preparations were reviewed, along with experimental preparations. This article identifies common colonization patterns for the shoulder, elbow, hip, knee, spine, foot, and ankle, and discusses recommendations for preparations based on current evidence. Recommendations: For shoulder and elbow operations, we recommend ChlorPrep™ (CareFusion, BD, El Paso, TX), DuraPrep™ (3M Health Care, St. Paul, MN), or Betadine® applied with 4 × 4 gauze sponge, three-day pre-operative benzyl peroxide, and application of 3% hydrogen peroxide before skin preparation. For the hip and knee, we recommend application of 2% chlorhexidine gluconate (CHG) cloth the night before and morning of surgery and either DuraPrep or iodine-alcohol skin prep prior to surgery. For spine surgeries, we recommended ChlorPrep. For foot and ankle, our recommendations are: ChlorPrep or DuraPrep, submersion of foot in 70% ethanol/10% isopropyl alcohol for five minutes prior to procedure, application with a bristled brush, and a second vigorous scrub with 4 × 4 soaked gauze. Conclusions: The current surgical skin preparations have both benefits and drawbacks. We recommend that orthopedic surgeons choose a skin preparation based on surgical site and prevalence of unique skin flora there.

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Randomised Controlled Trials (RCT)

[Alcoholic vs. aqueous chlorhexidine for abdominal surgery skin preparation: a randomized controlled trial.](#)

Authors: Sukvibul, Pakkapol;Tansawet, Amarith;Kultanaruangnonth, Metasist;Chatrung, Lalita and Techapongsatorn, Suphakarn

Publication Date: Aug 09 ,2025

Journal: Scientific Reports 15(1), pp. 29228

Abstract: Surgical site infections (SSIs) significantly affect patient outcomes and healthcare costs.



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Alcohol-based chlorhexidine gluconate (CHG) is widely used for preoperative skin preparation; however, aqueous CHG is being considered as a safer alternative in certain settings. This study was designed as an equivalence randomized controlled trial to compare aqueous versus alcoholic CHG for surgical site infection (SSI) prevention in major abdominal operations. A single-centre, randomised controlled equivalence trial (Thai Clinical Trials Registry No. TCTR20211028001, Date October 28, 2021) enrolled 1,326 patients undergoing elective or emergency abdominal surgeries. Participants were randomised to receive skin preparation with either 2% aqueous CHG or 2% alcohol-based CHG. The primary outcome was 30-day total SSI incidence. Secondary outcomes included seroma, wound dehiscence, and hospital stay. Analyses were conducted using intention-to-treat, per-protocol, and as-treated approaches. In the modified intention-to-treat population, total SSI rates were 8.45% (95% CI: 6.44-10.83) in the aqueous CHG group and 10.26% (95% CI: 8.05-12.82) in the alcohol-based group. There was no significant difference in total SSI rates between groups (RD -0.7%, 95% CI: -3.3 to 1.8). Similar results were found in other analyses. Secondary outcomes showed no significant group differences. All findings were within the predefined equivalence margin. Although SSI rates were similar, statistical equivalence was not demonstrated due to wide confidence intervals. Aqueous CHG may still be a suitable alternative where alcohol-based CHG is contraindicated.

[A Randomized Controlled Trial of 2% Chlorhexidine Gluconate Skin Preparation Cloths for the Prevention of Surgical Site Infections in Adults Undergoing Spine Surgeries: Residual Reduction in Skin Bacterial Load for 4 Days](#)

Authors: Card, Elizabeth;Shi, Yaping;Adesinasi, Wuraola;Shotwell, Matt;Wells, Nancy;Hall, Elizabeth;Cheng, Joseph and Sherwood, Edward

Publication Date: 2024

Journal: HCA Healthcare Journal of Medicine 5(5), pp. 539–549

Abstract: Background: Surgical site infections (SSI) result in increased morbidity and mortality, prolonged recovery, longer hospital length of stay for medication or possible additional surgeries, and escalated health care costs. The purpose of this randomized controlled trial was to compare SSI rates and overall skin flora burden between those using chlorhexidine (CHG) cloths versus soap and water preoperatively in the adult spine surgery population. Methods: Subjects were randomized preoperatively to use 2% CHG cloths versus soap and water the night before and morning of surgery prior to the operation. A skin culture was obtained at enrolment prior to any cleansing, again at post-operation day 4 or hospital discharge (whichever came first), and finally at the surgeons' postoperative visits. A blinded advanced practice nurse served as the assessor for SSI. Results: Those enrolled in the research arm had more growth on their screening skin culture than the control arm ($P = .02$). While there was no difference in rates of SSI between groups, the CHG group had lower skin flora burden at hospital discharge ($P = .004$), indicating residual protection. Conclusion: Surgical incisions are most vulnerable to bacterial entry prior to 72 hours post-operation before completion of epithelialization, which establishes a barrier from microbes. The use of CHG, which has a residual impact for up to 4 days, could offer additional risk reduction for SSI development.

[Preoperative Application of Chlorhexidine to Reduce Infection with Cesarean Delivery after Labor \(PRACTICAL\): A Randomized Clinical Trial](#)

Authors: DeBolt, Chelsea A.;Rao, Manasa G.;Warren, Leslie;Johnson, Shaelyn;Rekawek, Patricia;Kaplowitz, Elianna;Overbey, Jessica;Paul, Keisha;Tavella, Nicola;Monro, Johanna;Stone, Joanne and Bianco, Angela

Publication Date: Apr ,2024

Journal: American Journal of Perinatology 41(5), pp. 523–530

Abstract: Objective: To evaluate whether use of both preoperative 2% chlorhexidine gluconate abdominal cloth and 4% chlorhexidine gluconate vaginal scrub is effective in reducing surgical site infections (SSIs) in patients undergoing cesarean delivery after labor. Study design: This is a single-center, randomized clinical trial in which patients were randomized 1:1 to receive 2% chlorhexidine gluconate cloth applied to the abdomen in addition to the application of 4% chlorhexidine gluconate vaginal scrub versus standard of care. The primary outcome was rate of SSIs, including endometritis, by 6 weeks postdelivery. The secondary outcomes were other wound complications (erythema at the





operative site, skin separation, drainage, fever, hematoma, seroma) by 6 weeks postdelivery, hospital readmission for wound complications, and day of discharge after cesarean delivery. Results: A total of 319 patients between September 2018 and February 2021 met eligibility criteria: 160 were randomized to the chlorhexidine gluconate abdominal cloth and vaginal scrub group and 159 were randomized to the standard of care group. The groups did not have significant differences in maternal demographic characteristics. Of the 302 (95%) individuals included in primary analysis, there was no statistically significant difference in SSI and endometritis rate by 6 weeks postdelivery (6.6% in chlorhexidine vs. 5.3% standard of care, $p = 0.65$). Secondary outcomes were also similar among the two groups. Conclusion: The combination of preoperative 2% chlorhexidine gluconate abdominal cloth and 4% chlorhexidine gluconate vaginal scrub does not appear to reduce the risk of SSI with cesarean delivery after trial of labor when compared with standard of care. Key points: Preoperative chlorhexidine abdominal cloth/vaginal scrub does not decrease SSI in cesarean after labor. Preoperative chlorhexidine abdominal cloth/vaginal scrub does not decrease other wound complications in cesarean after labor. There was no difference in discharge day, 2-week or 6-week SSI rates..

[**A Randomized Controlled Trial of Povidone-Iodine Versus Chlorhexidine Gluconate With Isopropyl Alcohol for Preoperative Vaginal Antisepsis**](#)

Authors: Dunn, Debra;Yannotti, Kara;Centrella-Nigro, Andrea;Correa, Stacy;O'Dea, Denise and Wiley, Sandra

Publication Date: 2024

Journal: AORN Journal 119(4), pp. 261–274

Abstract: Many surgeons request use of 10% povidone-iodine (PI) for vaginal antisepsis; however, when PI is contraindicated, some surgeons request use of chlorhexidine gluconate (CHG) instead. The purpose of this randomized controlled trial was to determine any significant differences in self-reported symptoms associated with vaginal antisepsis with either 10% PI scrub or 4% CHG with 4% isopropyl alcohol. The control group comprised 62 participants who underwent vaginal antisepsis with the PI product, and the intervention group comprised 58 participants who underwent vaginal antisepsis with the CHG product. Participants completed surveys immediately before surgery, immediately after surgery, and 48 to 72 hours after surgery. No significant differences were found in the reported vaginal symptoms between the two groups for any survey. One participant in the intervention group reported symptoms consistent with an allergic reaction. Additional studies are needed on the use of CHG for vaginal antisepsis.

[**Chlorhexidine gluconate-impregnated cloth in prevention surgical site infection: pilot randomized clinical trial**](#)

Authors: Andrade, F. O. and Poveda, V.B.

Publication Date: 2023

Abstract: Objective: To compare the use of 2% chlorhexidine gluconate-impregnated cloth and 2% liquid chlorhexidine gluconate in the preoperative skin preparation to prevent the occurrence of surgical site infections in patients undergoing clean-contaminated elective surgeries. Methods: Parallel, single-blind, pilot study of the randomized clinical trial (RCT), composed by forty-eight patients undergoing clean-contaminated elective surgeries were randomly assigned to the intervention group ($n=25$, 2% chlorhexidine gluconate-impregnated cloth) and the control group ($n=23$, pre-operative bathing with 2% liquid chlorhexidine gluconate). The primary outcome was surgical site infection within 30days after surgery. The patients were instructed to use the products at the night before and at the morning of surgery and received verbal and written instruction on their use. The tests Wilcoxon-Mann-Whitney, Two Sample t-test, Pearson X^2 and Fisher's exact tests, risk relative (RR) and 95% confidence interval (CI) were used. The level of significance for all variables was set at $\alpha = 5\%$. Results: 48 patients analyzed, eight (16.7%) developed a surgical site infection. There were no statistically significant differences between the groups regarding the incidence of surgical site infection (RR: 0.92; 95%CI: 0.25-3.25; $p=0.898$), however there were not cases of superficial incisional surgical site infection in the intervention group. Conclusion: The use of 2% chlorhexidine gluconate-impregnated cloth for preoperative skin preparation did not reveal a





statistically significant difference in the prevention of surgical site infection compared to the use of pre-operative bathing with 2% liquid chlorhexidine gluconate

[Efficacy of skin preparation solutions in patients with total knee replacement: A randomized controlled trial.](#)

Authors: Cho, Myung-Rae;Choi, Won-Kee;Che, Sug-Hun and Song, Suk-Kyoon

Publication Date: 2023

Journal: Journal of Orthopaedic Surgery 31(1), pp. 10225536231165358

Abstract: Purpose: Surgical site infection following total knee replacement is considered as one of the most severe postoperative complications. The presence of bacteria at the surgical site is the most important risk factor and therefore it is essential to prevent infection through appropriate preoperative skin preparation. The purpose of this study was to examine the presence and type of native bacteria on the incision site and to assess which skin preparation is most effective to sterilize those native bacteria. Methods: Scrub-and-paint 2 step method was used for standard preoperative skin preparation. 150 patients who underwent total knee replacement were grouped into 3 groups- Group 1 (povidone-iodine scrub-and-paint), Group 2 (chlorhexidine gluconate paint after povidone-iodine scrub), and Group 3 (povidone-iodine paint after chlorhexidine gluconate scrub). 150 specimens of post-preparation swabs were obtained and cultured. To analyze the native bacteria at the total knee replacement incision site, 88 additional swabs were performed before skin preparation and cultured. Results: The positive rate of bacterial culture after skin preparation was 5.3% (8/150). Positive rates of the groups were 12% (6/50) in group 1, 2% (1/50) in group 2 and 2% (1/50) in group 3 and positive rates of bacterial culture after skin preparation in group 2 and group 3 were lower than in group 1 ($p = 0.037$). Among the 55 patients who had positive bacterial culture prior to skin preparation, 26.7% (4/15) in group 1, 5.6% (1/18) in group 2, and 4.5% (1/22) in group 3 were positive. Group 1 showed 7.64 times higher positive bacterial culture rate after skin preparation than group 3 ($p = 0.084$). Conclusion: During skin preparation prior to total knee replacement surgery, chlorhexidine gluconate paint after povidone-iodine scrub or povidone-iodine paint after chlorhexidine gluconate scrub had a superior effect on sterilizing native bacteria compared to povidone-iodine scrub-and-paint method.

[Antiseptic Skin Agents to Prevent Surgical Site Infection After Clean Implant Surgery: subgroup Analysis of the NEWSkin Prep Trial](#)

Authors: Smith, S.;Abuhasanian, I.;Attia, J.;Carroll, R.;Lott, N.;Hampton, J. and Gani, J.

Publication Date: 2023

Journal: Surgical Infections 24(9), pp. 818-822

Abstract: Background: There remains debate as to the ideal skin preparation agent to prevent surgical site infection (SSI) after clean implant surgery. This study is a subgroup analysis of all patients undergoing implant surgery in the NEWSkin prep trial. Patients and Methods: The NEWSkin prep trial is a randomized clinical trial (RCT; $n = 3300$) comparing the three antiseptic skin preparation agents commonly used prior to incisional surgery: chlorhexidine with alcohol (C-Alc), povidone iodine with alcohol (PI-Alc), and aqueous povidone iodine (PI-Aq). All participants who underwent clean incisional surgeries with implants from this trial were selected for analysis. The primary outcome was SSI rate; secondary outcomes were complication rates and re-admission rates. Results: A total of 712 patients in the NEWSkinPrep study underwent clean implant surgery between January 2015 and December 2018. Randomization resulted in the following distribution: C-Alc, 238; PI-Alc, 243; and PI-Aq, 231. Median age of participants was 63 years and 41% were female. Surgical site infection rates were: C-Alc, 10.13%; PI-Alc, 11.52%; and PI-Aq, 11.26%. Povidone iodine with alcohol did not appear to be non-inferior to C-Alc (mean difference, 1.39%; 95% confidence interval CI], -4.17 to 6.95) and PI-Alc was not superior to PI-Aq (mean difference, 0.27%; 95% CI, -5.45 to 5.99; $p = 0.9271$). There were no differences seen in secondary outcomes between groups. Conclusions: These results indicate a similarity between PI-Alc and C-Alc and that PI-Alc was not superior to PI-Aq. Because this study was not powered to assess these differences in clean cases with implants, additional studies





are needed to assess these agents.

[Chlorhexidine gluconate vs povidone-iodine vaginal antiseptics for urogynecologic surgery: a randomized controlled noninferiority trial](#)

Authors: Rockefeller, Nicholas F.; Petersen, Timothy R.; Komesu, Yuko M.; Meriwether, Kate; Dunivan, Gena; Ninivaggio, Cara and Jeppson, Peter C.

Publication Date: 2022

Journal: American Journal of Obstetrics & Gynecology 227(1), pp. 66.e1–66.e9

Abstract: Background: Although povidone-iodine (iodine) is the only Food and Drug Administration-approved vaginal antiseptic solution, there is a lack of comparative data evaluating alternatives. Chlorhexidine gluconate is readily accessible, recommended by multiple societies as an alternative for patients with iodine allergy, and preliminary data indicate that it may provide superior antiseptics. Objective: This study aimed to compare the effectiveness of chlorhexidine and iodine as presurgical vaginal antiseptic solutions in preventing the most common surgery-associated infection after gynecologic surgery, urinary tract infections. Study Design: We conducted a randomized controlled noninferiority trial among women undergoing urogynecologic surgery. The primary outcome measure was symptomatic urinary tract infection within 2 weeks after surgery. The secondary outcomes included culture-proven urinary tract infection at 2 and 6 weeks after surgery, symptomatic urinary tract infections at 6 weeks after surgery, any surgical site infection at 2 weeks after surgery, and patient-reported vaginal irritation after surgery. We required 58 participants per arm to demonstrate noninferiority of chlorhexidine vs iodine (margin of relative risk of <1.5 for the upper limit of 95% confidence interval) between groups for the primary outcome. Results: A total of 119 participants (61 in the chlorhexidine group and 58 in the iodine group) completed the primary outcome and were included in the analyses. There was no difference in the groups' demographic characteristics, medical history, operations performed, or perioperative factors. Chlorhexidine was not inferior to iodine concerning the primary outcome, symptomatic urinary tract infection at 2 weeks after surgery (10% vs 17%; relative risk, 0.6; 95% confidence interval -∞, 1.3]). Furthermore, chlorhexidine was not inferior to iodine for the secondary urinary tract infection outcomes (culture-proven urinary tract infection at 2 and 6 weeks after surgery and symptomatic urinary tract infection at 6 weeks after surgery). Groups were similar in terms of surgical site infection (overall 3/119 2.5%]) and presence of any vaginal irritation (4/54 7.4%], for both groups). Conclusion: Chlorhexidine was not inferior to iodine for vaginal antiseptics before urogynecologic surgery concerning urinary tract infection. Given the similar postoperative urinary tract infection rates demonstrated in this study and the lack of difference in vaginal irritation, chlorhexidine seemed to be a safe and reasonable option for vaginal antiseptics before surgical procedures. Additional studies are needed to further examine surgical site infection.

[Chlorhexidine Gluconate for Perioperative Skin Cleansing to Reduce Surgical Site Infection and Bacterial Colonization: A Randomized Controlled Trial.](#)

Authors: Yilmaz A.; Ates S. and Aysun, K.

Publication Date: 2022

Journal: Mediterranean Journal of Infection, Microbes and Antimicrobials 11(pagination), pp. Article Number: 15. Date of Publication: 2022

Abstract: Introduction: This study aimed to define the role of chlorhexidine gluconate (CG) in preoperatively skin cleansing and surgical site infection (SSI) and bacterial colonization reduction. Material(s) and Method(s): This study was conducted in a public hospital on 120 patients, of whom 61 consisted the intervention group and 59 in the control group. The intervention group used bath gel that contains CG and the control group used bath gels/soap without any antiseptics. Using a swab, samples from the surgical site were taken from all patients before and after bath. Surgical sites were inspected in terms of redness, edema, or fluid drainage daily during their hospital stay, as well as at the 10th and 30th days after discharge. Fever, heart rate, and blood pressure were also followed closely. This data was recorded and statistically analyzed. Result(s): Infection was detected in 3.3% (n=120) of participants. In the control group, 6.8% were infected. Infection was not observed in the intervention group. Five bacteria were analyzed in terms of the effect of CG use on bacterial colonization and it was found that only Coagulase-Negative



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Staphylococci (CNS) growth was decreased with the use of CG. This decrease was found to be statistically significant.

Conclusion(s): Our results suggest that cleansing the skin with CG before thoracic surgery may be beneficial in preventing SSI and reducing CNS colonization.

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[Chlorhexidine-alcohol versus povidone-iodine as preoperative skin antiseptics for prevention of surgical site infection in cesarean delivery-a pilot randomized control trial](#)

Authors: Luwang, A. L.;Saha, P. K.;Rohilla, M.;Sikka, P.;Saha, L. and Gautam, V.

Publication Date: 2021

Journal: Trials 22(1), pp. 540

Abstract: OBJECTIVES: To compare the efficacy of chlorhexidine-alcohol and povidone-iodine as preoperative antiseptic skin preparation for prevention of surgical site infection (SSI) after cesarean delivery (CD). MATERIALS AND METHODS: A total of 311 eligible women who underwent CS were recruited in the study after fulfilling all the eligibility and exclusion criteria. Patients were randomized into two groups (153 in chlorhexidine-alcohol group and 158 in povidone-iodine group) by a computer-generated randomization table. Patients were followed for a period of 30 days in postoperative period to monitor for SSI. RESULTS: The rate of SSI in the chlorhexidine-alcohol group is 5.4% and that of the povidone-iodine group is 8.6%. E. coli, K. pneumoniae, and Acinetobacter baumannii were the most common organisms isolated. E. coli was found in 9.5% of the total SSI cases. CONCLUSIONS: The study found that the patients who received chlorhexidine-alcohol as skin antiseptic had less chance of developing SSI than those who received povidone-iodine; however, it did not reach a statistical significance. TRIAL REGISTRATION: Clinical Trials Registry of India CTRI/2018/05/014294 . Registered on May 31, 2018.

[A Randomized Controlled Trial Comparing Chlorhexidine in Water and Povidone Iodine for Surgical Site Preparation in Abdominal Surgery.](#)

Authors: Nuangphuet T. and Suwanthanma, W.

Publication Date: 2021

Journal: Journal of the Medical Association of Thailand 104(12), pp. S54–S60

Abstract: Background: Surgical site infection (SSI) is the common complication after abdominal surgery. Proper use of antiseptic can decrease SSI. According to previous studies, chlorhexidine in alcohol is superior to povidone iodine when used as skin preparation before abdominal surgery. Due to alcohol being a flammable substance, there are many reports showing usage of chlorhexidine in alcohol for skin preparation can cause skin burn. Our study will compare whether chlorhexidine in water is superior to povidone iodine as an effective antiseptic agent for skin preparation before abdominal surgery. Objective(s): The aim of the present study is to compare SSI rate between using chlorhexidine in water and povidone iodine in patients undergoing abdominal surgery. Material(s) and Method(s): Patients undergoing abdominal surgery by single surgeon (WS) between 1 July 2017 to 30 June 2018 in Ramathibodi Hospital were randomized to use skin preparation with chlorhexidine in water or povidone iodine. The inclusion criteria were elective clean-contaminated abdominal surgery, patient's age between 18 to 75 years, and patients who signed consent form. Exclusion criteria were history of allergic to antiseptic agents, previous skin infection at surgical site, refused to participate in study and cannot follow-up. The primary outcome was SSI rate within 30 days after surgery. Result(s): A total of 87 subjects (38 in the chlorhexidine in water group and 49 in the povidone iodine group) were enrolled. There are 19 males (50%) and 19 females (50%) in chlorhexidine in water group while there are 19 males (38.8%) and 30 females (61.2%) in povidone iodine group. The overall rate of SSI was 10.5% in chlorhexidine in water group and 16.3% in povidone iodine group (p-value=0.463). Conclusion(s): Preoperative skin preparation with chlorhexidine in water tends to have a lower SSI rate compared to povidone iodine, even without statistically significant. Future study with larger sample size may reveal any difference.





[Preoperative decolonization and periprosthetic joint infections-A randomized controlled trial with 2-year follow-up](#)

Authors: Rohrer, Felix;Wendt, Malte;Noetzli, Hubert;Risch, Lorenz;Bodmer, Thomas;Cottagnoud, Philippe;Hermann, Tanja;Limacher, Andreas;Gahl, Brigitta and Bruegger, Jan

Publication Date: Feb ,2021

Journal: Journal of Orthopaedic Research : Official Publication of the Orthopaedic Research Society 39(2), pp. 333–338

Abstract: Preoperative decolonization, especially of *Staphylococcus aureus* carriers, has been proposed to reduce periprosthetic joint infections (PJI), but the evidence-based consensus is still lacking and data on long-term outcomes is scarce. In a previous randomized, single-blinded trial, decolonization produced no significant reduction of surgical site infections in overall elective orthopedic surgery at 3-month follow-up. A 2-year follow-up was then performed to specifically detect the impact of decolonization on delayed-onset PJI (3-24 months after surgery). Between November 2015 and September 2017, 613 of 1318 recruited patients underwent prosthetic surgery. Individuals were allocated into either the *S. aureus* carrier group (34%, 207 of 613 patients) or the noncarrier group (406 of 613 patients), according to nasal swab screening results. Both groups were then randomized into intervention and control arms. In the *S. aureus* group, the intervention consisted of daily chlorhexidine showers and application of mupirocin nasal ointment twice a day for 5 days before surgery. In noncarriers, only chlorhexidine showers were prescribed. Sample size calculation was based on the initial trial for overall and not for the prosthetic surgery group. No PJI was found at 2 years in either the carrier or in the noncarrier group. Therefore, no definite conclusion about the efficacy of preoperative decolonization to reduce PJI can be drawn. PJI proportions in this study were lower than described in the literature (mostly around 0.3%). Despite the insufficient sample size, this trial is the largest randomized trial on decolonization with a long-term follow-up, and results may be helpful for future meta-analyses.

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Studies

[Skin Antisepsis before Surgical Fixation of Extremity Fractures.](#)

Authors: Sprague S.;Slobogean G.;Wells J.L.;O'Hara N.N.;Thabane L.;Mullins C.D.;Harris A.D.;Wood A.;Viskontas D.;Apostle K.L.;O'Toole R.V.;Joshi M.;Johal H.;AlAsiri J.;Hymes R.A.;Gaski G.E.;Pilson H.T.;Carroll E.A.;Babcock S.;Halvorson J.J., et al

Publication Date: 2024

Journal: New England Journal of Medicine 390(5), pp. 409–420

Abstract: Background Studies evaluating surgical-site infection have had conflicting results with respect to the use of alcohol solutions containing iodine povacrylex or chlorhexidine gluconate as skin antisepsis before surgery to repair a fractured limb (i.e., an extremity fracture). Methods In a cluster-randomized, crossover trial at 25 hospitals in the United States and Canada, we randomly assigned hospitals to use a solution of 0.7% iodine povacrylex in 74% isopropyl alcohol (iodine group) or 2% chlorhexidine gluconate in 70% isopropyl alcohol (chlorhexidine group) as preoperative antisepsis for surgical procedures to repair extremity fractures. Every 2 months, the hospitals alternated interventions. Separate populations of patients with either open or closed fractures were enrolled and included in the analysis. The primary outcome was surgical-site infection, which included superficial incisional infection within 30 days or deep incisional or organ-space infection within 90 days. The secondary outcome was unplanned reoperation for fracture-healing complications. Results A total of 6785 patients with a closed fracture and 1700 patients with an open fracture were included in the trial. In the closed-fracture population, surgical-site infection occurred in 77 patients (2.4%) in the iodine group and in 108 patients (3.3%) in the chlorhexidine group (odds ratio, 0.74; 95% confidence interval





[CI], 0.55 to 1.00; $P=0.049$). In the open-fracture population, surgical-site infection occurred in 54 patients (6.5%) in the iodine group and in 60 patients (7.3%) in the chlorhexidine group (odds ratio, 0.86; 95% CI, 0.58 to 1.27; $P=0.45$). The frequencies of unplanned reoperation, 1-year outcomes, and serious adverse events were similar in the two groups. Conclusions Among patients with closed extremity fractures, skin antisepsis with iodine povidone-iodine in alcohol resulted in fewer surgical-site infections than antisepsis with chlorhexidine gluconate in alcohol. In patients with open fractures, the results were similar in the two groups. (Funded by the Patient-Centered Outcomes Research Institute and the Canadian Institutes of Health Research; PREPARE ClinicalTrials.gov number, NCT03523962.)

[Pre-Admission Use of Chlorhexidine-Impregnated Gauze for Skin Preparation Reduces the Incidence of Peri-Prosthetic Joint Infection after Primary Total Knee Arthroplasty: A Prospective Cohort with Retrospective Controls](#)

Authors: Dai, Wei and Fang, Fang

Publication Date: 2022

Journal: Surgical Infections 23(8), pp. 717–721

Abstract: Background: Peri-prosthetic joint infection (PJI) has long been a devastating complication after total knee arthroplasty (TKA), with native skin flora always identified as the causative agents. The aim of this study was to investigate the efficacy of pre-admission use of chlorhexidine-impregnated gauze for pre-operative skin preparation on infection rates after primary TKA surgeries. Patients and Methods: Patients undergoing TKAs performed from January 2017 until January 2021 were prospectively recruited. The experimental group included patients who used chlorhexidine-impregnated gauze the evening before surgery for skin preparation. These patients were compared with a retrospective cohort of TKAs performed during the previous four years without this step as control group. During a one-year follow-up, complications including PJI and superficial infections were collected as the primary outcomes for analysis. Results: A total of 1,218 TKAs in the experimental group and 1,033 TKAs in the control group were included in the study. A total of seven (0.6%) cases of PJI were identified in the experimental group, whereas 16 (1.5%) cases were diagnosed in the control group; a significant difference was detected ($\chi^2 = 5.245$; $p = 0.022$). Eighteen (1.5%) cases of superficial infection were identified in the experimental group, and 28 (2.7%) cases were observed in the control group; a significant difference was found between groups ($\chi^2 = 4.243$; $p = 0.039$). No significant differences were found on other wound-related complications. Conclusions: Pre-admission use of chlorhexidine-impregnated gauze for skin preparation was found to be an effective practice in reducing the incidence of PJI after TKA procedures, which has the potential of being utilized for patients undergoing TKA surgeries.

[The Effectiveness of Pre-operative Bath with 4% Chlorhexidine Gluconate for Prevention of Surgical Site Infection at the Universitas Sumatera Utara Hospital.](#)

Authors: Prayugo B.;Siregar A.;Hutahaean L. and Hasibuan, M.

Publication Date: 2022

Journal: Open Access Macedonian Journal of Medical Sciences 10(G) (pp 233-237), pp. Date of Publication: 01 Jan 2022

Abstract: Background: Elective surgery is a type of surgery that can be postponed or planned without endangering the patient's life. Every operation, the slightest, can pose a risk of infection. Surgical site infection (SSI) is still a global problem that can increase morbidity and mortality rates, prolong the time and cost of hospitalization. chlorhexidine gluconate (CHG) 4% is an antiseptic with broad-spectrum antimicrobial ability that can be used as an effort to prevent SSI. AIM: This study aims to analyze the effectiveness of preoperative antimicrobial baths using 4% CHG in an effort to prevent the incidence of SSI in Universitas Sumatera Utara hospitals.

Method(s): The design used in this study was a quasi-experimental method with a non equivalent control group post test only design method. The total sample in this study was 60 respondents according to the inclusion criteria. Bivariate analysis using Chi-square statistical test.

Result(s): A total of 60 samples that met the research criteria were then divided into the pre-operative bath intervention group with 4% CHG ($n = 30$) and the control group was not given any treatment ($n =$





30). In the pre-operative bath intervention group with 4% CHG, there was no incidence of SSI, while in the control group, 5 (n = 8.3%) respondents experienced SSI. Pre-operative bath with 4% CHG was statistically more effective than not given pre-operative bath with 4% CHG in preventing the incidence of SSI ($p = 0.02$).

Conclusion(s): Pre-operative bath with 4% CHG is effective in preventing SSI because 4% CHG is bactericidal, bacteriostatic, lasts a long time on the skin thereby reducing the number of bacterial colonies 9 times and increasing the skin's ability to be antiseptic for longer.

Preoperative Prevention of Surgical-Site Infection in Spine Surgery

Authors: Franker, Lauren M.;Pretet, Molly;Douglas, Barbara;Simmons, Kristin;Wilson, Amber;Roche, Ariel and Milano, Rose

Publication Date: Sep ,2021

Journal: Orthopaedic Nursing 40(5), pp. 276–280

Abstract: Surgical-site infections (SSI) contribute to increased hospital length of stay, readmission rates, cost, and morbidity and mortality rates. The spine service line at a suburban Level II trauma center encountered 2 SSIs among the spine fusion population within a 6-month period. This did not meet the organization's internal benchmark of zero. A pilot quasi-experimental design was used to determine whether preoperative cleansing with 2% chlorhexidine gluconate (CHG)-impregnated cloths versus current practice of bathing with 4% CHG solution would reduce SSIs. Infection rates were measured using simple percentages. Level of significance was $p < .05$. Outcome data showed a reduction in SSIs from 3.9% to 1.9% with use of 2% CHG-impregnated cloths. There was no significant difference found between the use of 2% CHG-impregnated cloths and 4% CHG solution ($p = .524$). This quality improvement change, combined with a strengthened preoperative bundle approach, has permanently been adopted within the spine service line. From October 2017 to March 2021, the spine service line has had zero SSIs within the spine fusion population.

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OCTENIDINE

Review

Clinical Evidence for the Use of Octenidine Dihydrochloride to Prevent Healthcare-Associated Infections and Decrease *Staphylococcus aureus* Carriage or Transmission-A Review

Authors: Kock, Robin;Denkel, Luisa;Fesler, Andrea T.;Eicker, Rudolf;Mellmann, Alexander;Schwarz, Stefan;Geffers, Christine;Hubner, Nils-Olaf and Leistner, Rasmus

Publication Date: Apr 18 ,2023

Journal: Pathogens 12(4)

Abstract: Background: The antiseptic agent octenidine dihydrochloride (OCT) is used for skin preparation, for *Staphylococcus aureus* decolonization, and within bundles for the prevention of catheter-related or surgical site infections (SSIs). Here, we review the evidence for the effects of OCT from clinical studies. Methods: Review of studies published in the Medline, Scopus, and Cochrane databases until August 2022, performed in clinical settings and reporting on effects of OCT on *S. aureus* carriage/transmission, SSI prevention, and prevention of intensive care unit (ICU)-related or catheter-related bloodstream and insertion site infections. Results: We included 31 articles. The success of *S. aureus* decolonization with OCT-containing therapies ranged between 6 and 87%. Single studies demonstrated that OCT application led to a reduction in *S. aureus* infections, acquisition, and carriage. No study compared OCT for skin preparation before surgical interventions to other antiseptics. Weak evidence for the use of OCT for pre-operative washing was found in orthopedic and cardiac surgery, if combined with other topical measures. Mostly, studies did not demonstrate that daily OCT bathing reduced ICU-/catheter-related bloodstream infections with one exception. Conclusions: There is a need to perform studies assessing the clinical use of OCT compared with other antiseptics with respect to its effectiveness to prevent nosocomial infections.





Study

[Comparison of two different antiseptics regarding intracutaneous microbial load after preoperative skin cleansing in total knee and hip arthroplasties.](#)

Authors: Bohle, Sabrina;Vogel, Anna-Maria;Matziolis, Georg;Strube, Patrick;Rohe, Sebastian;Brodth, Steffen;Mastrocola, Mario;Eijer, Henk;Rodel, Jurgen and Lindemann, Chris

Publication Date: 10 29 ,2022

Journal: Scientific Reports 12(1), pp. 18246

Abstract: Periprosthetic infections (PPIs) are a serious concern in total knee and hip arthroplasty, and they have an increasing incidence. To prevent PPI, preoperative skin disinfection, as a key element of antisepsis, represents an important part of infection prevention. However, no specific antiseptic agent is endorsed by the relevant guidelines. The purpose of this retrospective, not randomized study was to investigate the difference in the residual bacteria load between an approved antiseptic with an alcohol-based solution with additional benzalkonium chloride (BAC) and an alcohol-based solution with additional octenidine dihydrochloride (OCT) at two different time periods. In 200 consecutive patients with total knee or hip arthroplasty, skin samples from the surgical sites were collected after skin disinfection with BAC (100 g solution contain: propan-2-ol 63.0 g, benzalkonium chloride 0.025 g) or OCT (100 g solution contain: octenidine dihydrochloride 0.1 g, propan-1-ol, 30.0 g, propan-2-ol 45.0 g) (100 patients per group). Following the separation of cutis and subcutis and its processing, culture was performed on different agar plates in aerobic and anaerobic environments. In the case of bacteria detection, the microbial identification was determined by matrix-assisted laser desorption ionization-time of flight mass spectrometry (MALDI-TOF MS), and the number of contaminated samples was compared between the groups. Additionally, multiple regression analysis was performed to examine the effect of the type of disinfectant, BMI, age, sex, rheumatoid arthritis, diabetes mellitus, skin disorders, smoking status, and localization of skin samples on positive bacteria detection. A total of 34 samples were positive for bacteria in the BAC group, while only 17 samples were positive in the OCT group ($p = 0.005$). Disinfectant type was the only significant parameter in the multiple regression analysis ($p = 0.006$). A significantly higher contamination rate of the subcutis was shown in the BAC group compared to the OCT group (19 vs. 9, $p = 0,003$). After the change from BAC to OCT in preoperative skin cleansing in the hip and knee areas, the number of positive cultures decreased by 50%, which might have been caused by a higher microbicidal activity of OCT. Therefore, the use of OCT in preoperative cleansing may reduce the risk of PPI in hip and knee surgery. Randomized controlled trials are required to confirm the effect and to evaluate if it reduces the risk of PPI.

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ARTICLE

[Standardized comparison of antiseptic efficacy of triclosan, PVP-iodine, octenidine dihydrochloride, polyhexanide and chlorhexidine digluconate](#)

Authors: Koburger, T.;Hübner, N. -O;Braun, M.;Siebert, J. and Kramer, A.

Publication Date: -08th ,2010

Journal: The Journal of Antimicrobial Chemotherapy 65(8), pp. 1712–1719

Abstract: Background: This study presents a comparative investigation of the antimicrobial efficacy of the antiseptics PVP-iodine, triclosan, chlorhexidine, octenidine and polyhexanide used for pre-surgical antisepsis and antiseptic treatment of skin, wounds and mucous membranes based on internationally accepted standards. Methods: MICs and MBCs were determined in accordance with DIN 58940-7



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and 58940-8 using *Staphylococcus aureus* (including methicillin-resistant *Staphylococcus aureus*), *Enterococcus faecalis* (including vancomycin-resistant *Enterococcus*), *Streptococcus pneumoniae*, *Escherichia coli*, *Pseudomonas aeruginosa*, *Clostridium perfringens*, *Haemophilus influenzae* and *Candida albicans*. The microbicidal efficacy was determined in accordance with DIN EN 1040 and 1275 using *S. aureus*, *P. aeruginosa* and *C. albicans*.

Results: For chlorhexidine, octenidine and polyhexanide, MIC(48) and MBC(24) ranged from 16 to 32 mg/L. Maximum values for triclosan ranged from 256 to 512 mg/L, with an efficacy gap against *P. aeruginosa*, while the maximum values of PVP-iodine were 1024 mg/L, with a gap against *S. pneumoniae*. Comparing the minimal effective concentrations, octenidine was most effective. After 1 min, only octenidine and PVP-iodine fulfil the requirements for antiseptics.

Conclusions: Tests under standardized and harmonized conditions help to choose the most efficacious agent. When a prolonged contact time is feasible, ranking of agents would be polyhexanide = octenidine > chlorhexidine > triclosan > PVP-iodine. This is consistent with the recommendations for antiseptics of acute wounds. Polyhexanide seems to be preferable for chronic wounds due to its higher tolerability. If an immediate effect is required, ranking would be octenidine = PVP-iodine >> polyhexanide > chlorhexidine > triclosan.

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SELECTION SYSTEMATIC REVIEWS, META-ANALYSIS, REVIEWS AND STUDIES BETWEEN 2015-2020

Systematic reviews, meta-analysis, reviews

[Surgical Skin Prep: Systematic Review and Meta-Analysis of Chlorhexidine Versus Povidone-Iodine](#)

Authors: Allen, George

Publication Date: 2020

Journal: AORN Journal 112(4), pp. 421–424

Vaginal preparation with antiseptic solution before cesarean section for preventing postoperative infections

Authors: Haas, D. M.;Morgan, S.;Contreras, K. and Kimball, S.

Publication Date: 2020

Journal: Cochrane Database of Systematic Reviews (4)

Abstract: Abstract - Background Cesarean delivery is one of the most common surgical procedures performed by obstetricians. Infectious morbidity after cesarean delivery can have a tremendous impact on the postpartum woman's return to normal function and her ability to care for her baby. Despite the widespread use of prophylactic antibiotics, postoperative infectious morbidity still complicates cesarean deliveries. This is an update of a Cochrane Review first published in 2010 and subsequently updated in 2012, twice in 2014, in 2017 and 2018. Objectives To determine if cleansing the vagina with an antiseptic solution before a cesarean delivery decreases the risk of maternal infectious morbidities, including endometritis and wound complications. We also assessed the side effects of vaginal cleansing solutions to determine adverse events associated with the intervention. Search methods We searched the Cochrane Pregnancy and Childbirth's Trials Register, ClinicalTrials.gov, the World Health Organization (WHO) International Clinical Trials Registry Platform (ICTRP) (7 July 2019), and reference lists of retrieved studies. Selection criteria We included randomized controlled trials (RCTs) and quasi-RCTs assessing the impact of vaginal cleansing immediately before cesarean delivery with any type of antiseptic solution versus a placebo solution/standard of care on post-cesarean infectious morbidity. Cluster-RCTs were eligible for inclusion, but we did not identify any. We excluded trials that utilized vaginal preparation during labor or that did not use antibiotic surgical prophylaxis. We also excluded any trials using a cross-over design. We included trials published in abstract form only if sufficient information was present in the



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abstract on methods and outcomes to analyze. Data collection and analysis At least three of the review authors independently assessed eligibility of the studies. Two review authors were assigned to extract study characteristics, quality assessments, and data from eligible studies. What does this mean? Cleansing the vagina with povidone-iodine or chlorhexidine solution (compared to saline or not cleansing) immediately before cesarean delivery probably reduces the risk of infection of the uterus, fever, and infection of the surgical wound. Further analysis found that these benefits were typically present whether iodine-based or chlorhexidine-based solutions were used and when women were in labor before the cesarean. Vaginal preparation is a simple and well-tolerated way to lower the chances of developing an infection after having a baby by cesarean.

[Skin preparation for preventing infection following caesarean section](#) [please note article contains two retracted citations: Evaluation of the risk of postcesarean endometritis with preoperative vaginal preparation with povidone–iodine: A randomized controlled study *Middle East Fertility Society Journal* Abdallah, Ameer Ahamed AND Vaginal cleansing prior to caesarian section: To do or not to do?: A randomized trial *Journal of Gynecology Obstetrics and Human Reproduction*. Aref, Nisreen Khaled]

Authors: Hadiati, D. R.;Hakimi, M.;Nurdiati, D. S.;Masuzawa, Y.;da Silva Lopes, K. and Ota, E.

Publication Date: 2020

Journal: Cochrane Database of Systematic Reviews (6)

Abstract: Abstract - Background The risk of maternal mortality and morbidity is higher after caesarean section than for vaginal birth. With increasing rates of caesarean section, it is important to minimise risks to the mother as much as possible. This review focused on different skin preparations to prevent infection. This is an update of a review last published in 2018. Objectives To compare the effects of different antiseptic agents, different methods of application, or different forms of antiseptic used for preoperative skin preparation for preventing post caesarean infection. Search methods For this update, we searched Cochrane Pregnancy and Childbirth's Trials Register, ClinicalTrials.gov , the WHO International Clinical Trials Registry Platform (ICTRP) (9 July 2019), and reference lists of retrieved studies. Selection criteria Randomised and quasi-randomised trials, evaluating any type of preoperative skin preparation (agents, methods or forms). We included studies presented only as abstracts, if there was enough information to assess risk of bias. Comparisons of interest in this review were between: different antiseptic agents (e.g. alcohol, povidone iodine), different methods of antiseptic application (e.g. scrub, paint, drape), different forms of antiseptic (e.g. powder, liquid), and also between different packages of skin preparation including a mix of agents and methods, such as a plastic incisional drape, which may or may not be impregnated with antiseptic agents. We mainly focused on the comparison between different agents, with and without the use of drapes. Only studies involving the preparation of the incision area were included. This review did not cover studies of preoperative handwashing by the surgical team or preoperative bathing. Data collection and analysis Three review authors independently assessed all potential studies for inclusion, assessed risk of bias, extracted the data and checked data for accuracy. We assessed the certainty of the evidence using the GRADE approach. Authors' conclusions: Moderate-certainty evidence suggests that preparing the skin with chlorhexidine gluconate before caesarean section is probably slightly more effective at reducing the incidence of surgical site infection in comparison to povidone iodine. For other outcomes examined there was insufficient evidence available from the included RCTs. Most of the evidence in this review was deemed to be very low or low certainty. This means that for most findings, our confidence in any evidence of an intervention effect is limited, and indicates the need for more high-quality research. Therefore, it is not yet clear what sort of skin preparation may be most effective for preventing postcaesarean surgical site infection, or for reducing other undesirable outcomes for mother and baby. Well-designed RCTs, with larger sample sizes are needed. High-priority questions include comparing types of antiseptic (especially iodine versus chlorhexidine), and application methods (scrubbing, swabbing, or draping). We found two studies that are ongoing; we will incorporate the results of these studies in future updates of this review. Plain language summary Skin preparation for preventing infection following caesarean section This review is an update of a review that was first published in 2012, and updated in 2014 and 2018. What is the issue? The aim of this Cochrane Review was to find out what methods of skin preparation before caesarean section were





most effective in preventing infection after the operation. We collected and analysed all studies that assessed the effectiveness of antiseptics used to prepare the skin before making an incision (or cut) for the caesarean section. We only included analysis of preparations that were used to prepare the surgical site on the abdomen before caesarean section; we did not look at handwashing by the surgical team, or bathing the mother. Why is this important? Infections of surgical incisions are the third most frequently reported hospital-acquired infections. Women who give birth by caesarean section are exposed to infection from germs already present on the mother's own skin, or from external sources. The risk of infection following a caesarean section can be 10 times that of vaginal birth. Therefore, preventing infection by properly preparing the skin before the incision is made is an important part of the overall care given to women prior to caesarean birth. An antiseptic is a substance applied to remove bacteria that can cause harm to the mother or baby when they multiply. Antiseptics include iodine or povidone iodine, alcohol, chlorhexidine, and parachlorometaxyleneol. They can be applied as liquids or powders, scrubs, paints, swabs, or on impregnated 'drapes' that stick to the skin, which the surgeon then cuts through. Non-impregnated drapes can also be applied, once the skin has been scrubbed or swabbed, with the aim of reducing the spread of any remaining bacteria during surgery. It is important to know if some of these antiseptics or methods work better than others. What evidence did we find? This updated review included 13 trials with 6938 women. Six trials were conducted in the USA; the remaining trials were in Nigeria, South Africa, France, Denmark, Indonesia, India and Egypt. The review looked at what was best for women and babies when it came to important outcomes including: infection of the site where the surgeon cut the woman to perform the caesarean section; inflammation of the lining of the womb (metritis and endometritis); how long the woman stayed in hospital; and any other adverse effects, such as irritation of the woman's skin, or any reported impact on the baby. Not all of the 13 trials explored all of these outcomes, and the evidence for each outcome was usually based on results from far fewer than 6938 women. Much of the evidence we found was of relatively poor quality, due to limits in the ways that the studies were conducted. This means that we could not be certain about most of the findings. The evidence suggested that in women who had their skin prepared using the agent chlorhexidine gluconate, there is probably a slight reduction in the incidence of surgical site infection compared to women who had their skin prepared using povidone iodine. For other outcomes there was little or no difference between the various antiseptic agents and methods of application in terms of endometritis, skin irritation, or allergic skin reaction in the mother. In one study, there was a reduction in bacterial growth on the skin at 18 hours after caesarean section for women who received a skin preparation with chlorhexidine gluconate compared with women who received the skin preparation with povidone iodine, but more data are needed to see if this actually reduces infections for women. What does this mean? The available evidence from the trials that have been conducted was insufficient to tell us the best type of skin preparation for preventing surgical site infection following caesarean section. More high-quality research is needed. We found two studies that are still ongoing. We will incorporate the results of these studies into this review in future updates.

[Pre-operative Decolonization as a Strategy to Reduce Surgical Site Infection](#)

Authors: Pop-Vicas, Aurora and Safdar, Nasia

Publication Date: Aug 31 ,2019

Journal: Current Infectious Disease Reports 21(10), pp. 35

Abstract: Purpose of review: To identify the most common strategies currently used for *S. aureus* decolonization and surgical site infection (SSI) prevention. Recent findings: Pre-operative colonization with *Staphylococcus aureus* increases SSI risk. Screening and decolonization with intra-nasal mupirocin and pre-operative chlorhexidine bathing remains the most common and effective strategy, especially for orthopedic and cardiovascular surgery. Intra-nasal povidone-iodine immediately before surgery appears effective in preliminary studies, is less expensive, and may be easier to implement in the clinical setting. Future well-designed clinical research studies are needed to confirm its effectiveness in SSI prevention. Intra-nasal alcohol-based antisepsis and photodynamic therapy are promising strategies that deserve further study before they can be clinically applied to SSI prevention. Decolonization with intra-nasal mupirocin or povidone-iodine, in addition to pre-operative chlorhexidine bathing, is an important SSI prevention strategy. Future studies should address optimal





dosing, timing, and number of applications for each regimen.

[Chlorhexidine-Alcohol Compared with Povidone-Iodine Preoperative Skin Antisepsis for Cesarean Delivery: A Systematic Review and Meta-Analysis](#)

Authors: Tolcher, Mary Catherine;Whitham, Megan D.;El-Nashar, Sherif A. and Clark, Steven L.

Publication Date: Jan ,2019

Journal: American Journal of Perinatology 36(2), pp. 118–123

Abstract: Objective: To compare chlorhexidine-alcohol with povidone-iodine solutions for skin antisepsis prior to cesarean delivery for the prevention of surgical site infection. Study design: Electronic databases MEDLINE, Embase, Scopus, and Clinicaltrials.gov were searched from inception to August 2017. Eligible studies included randomized controlled trials comparing chlorhexidine-alcohol with povidone-iodine skin preparation solutions for women undergoing cesarean delivery. The primary outcome was surgical site infection including superficial or deep wound infection. Meta-analysis was performed, and risk ratios (RRs) with 95% confidence interval (CI) were calculated using the Mantel-Haenszel random effects model. Statistical heterogeneity was assessed using Higgin's I (2). RESULTS: Of 61 abstracts identified in the primary search, four studies (3,059 women) met the eligibility criteria. The risk of surgical site infection was significantly reduced with chlorhexidine-alcohol (RR: 0.72; 95% CI: 0.52-0.98). No heterogeneity across studies was observed with I (2) = 0%. Subgroup analysis of superficial infection only or deep infection only showed no statistically significant difference (RR: 0.76, 95% CI: 0.54-1.08; and RR: 0.50, 95% CI: 0.23-1.10, respectively). Conclusion: Preoperative skin cleansing prior to cesarean delivery with chlorhexidine-alcohol reduces surgical site infection as compared with povidone-iodine solutions.

[Chlorhexidine-alcohol versus povidone-iodine as preoperative skin preparation to prevent surgical site infection: A meta-analysis.](#)

Authors: Anggrahita T.;Wardhana A. and Sudjatmiko, G.

Publication Date: 2017

Journal: Medical Journal of Indonesia 26(1), pp. 54–61

Abstract: Background: Surgical site infection remains substantial problems to surgeons and patients as it increases the morbidity, mortality, length of stay, hospital cost, rate of re-admission, and rate of re-surgery. This study aims to compare the use of chlorhexidine-alcohol versus povidone-iodine for preoperative skin preparation to prevent surgical site infection.

Method(s): The literature search was conducted through the PubMed database on November 2015. Included studies were RCTs with the year of publication up to 2015 which compared the use of chlorhexidine-alcohol versus povidone-iodine its effectiveness reducing surgical site infection in adult patients. The quality of the study was assessed using Jadad Score. A meta-analysis was conducted in the included study obtain a pooled estimate of the effect size. The evidence of heterogeneity and publication bias was also assessed.

Result(s): Six RCTs with a total of 2,080 patients were included the meta-analysis. It showed that the use of chlorhexidine-alcohol was associated significantly with fewer SSIs (pooled risk ratio=0.60 (95% CI=0.45-0.79)) and fewer positive skin culture results (pooled risk ratio, RR=0.38 (95% CI=0.28-0.51)) compared with povidone iodine.

Conclusion(s): Preoperative skin antisepsis with chlorhexidine is more effective than povidone-iodine in preventing surgical site infection.

[Preoperative chlorhexidine reduces the incidence of surgical site infections in total knee and hip arthroplasty: A systematic review and meta-analysis](#)

Authors: Cai, Yuanzhen;Xu, Ke;Hou, Weikun;Yang, Zhi and Xu, Peng

Publication Date: 2017

Journal: International Journal of Surgery 39, pp. 221–228

Abstract: Objective: This meta-analysis aims to assess the incidences of surgical site infection of patients who applied preadmission chlorhexidine skin preparation, versus those who applied the traditional skin preparation before undergoing total knee and hip arthroplasty.Methods: A systematic





search is carried out through Medline (1966-2016.11), PubMed (1966-2016.11), Embase (1980-2016.11), ScienceDirect (1985-2016.11) and the Cochrane Library. Only high quality studies are identified. Meta-analysis is conducted with the use of Stata 11.0 software. Results: One RCT and five retrospective studies, published between 2010 and 2016, are included in the present meta-analysis. The present meta-analysis indicates that there are significant differences in surgical site infection rate (RD = -0.02, 95% CI: -0.02 to -0.01, P < 0.00001), revision surgery rate (RD = -0.01, 95% CI: -0.01 to -0.01, P < 0.00001) and length of stay (MD = -0.29, 95% CI: -0.48 to -0.11, P = 0.002) between groups. Conclusion: Preoperative chlorhexidine skin preparation appears to reduce the risk of infection, the incidence of revision surgery, and the length of stay for patients undergoing total knee and hip arthroplasty. No adverse effects, such as DVT or PE, appear to be related to chlorhexidine preparation. Due to the limited quality of the evidence currently available, high quality RCTs with better study designs, larger sample sizes and longer follow-ups are needed.

[Should preoperative showering or cleansing with chlorhexidine gluconate \(CHG\) be part of the surgical care bundle to prevent surgical site infection?](#)

Authors: Edmiston, Charles E. and Leaper, David

Publication Date: 2017

Journal: Journal of Infection Prevention 18(6), pp. 311–314

Abstract: Showering preoperatively with chlorhexidine gluconate is an issue that continues to promote debate; however, many studies demonstrate evidence of surgical site infection risk reduction. Methodological issues have been present in many of the studies used to compile guidelines and there has been a lack of standardisation of processes for application of the active agents in papers pre-2009. This review and commentary paper highlights the potential for enhancing compliance with this low-risk and low-cost intervention and provides some guidance for enhancing implementation of preoperative showering with both chlorhexidine in solution and impregnated wipes.

[Preoperative bathing of the surgical site with chlorhexidine for infection prevention: Systematic review with meta-analysis.](#)

Authors: Franco L.M.D.C.;Cota G.F.;Pinto T.S. and Ercole, F. F.

Publication Date: 2017

Journal: American Journal of Infection Control 45(4), pp. 343–349

Abstract: Background Preoperative bathing with 4% chlorhexidine is recommended as a measure to prevent surgical site infection (SSI) despite uncertainty regarding the effectiveness of the intervention. This review aimed to assess the effect of bathing with 4% chlorhexidine on the prevention of SSIs in clean surgeries compared with bathing with placebo solution or soap. Methods Preferred Reporting Items for Systematic Reviews and Meta-Analyses guidelines for systematic reviews and the Cochrane manual were followed. Sources were MEDLINE and Latin American and Caribbean Health Sciences Literature databases and manual search of references from evaluated studies. We included randomized studies evaluating clean surgical wounds and reporting SSIs after preoperative bathing with 4% chlorhexidine. Results A total of 243 primary studies were identified and 8 were considered methodologically appropriate based on the Jadad Scale. Data were gathered from 10,655 patients. The global SSI rate was 7.2%. The SSI rate for chlorhexidine bathing, placebo, and soap without antiseptic groups was 7.1%, 9.1%, and 5.1%, respectively. A significant reduction in the infection rates was not found in the comparison between patients subjected to preoperative bathing with 4% chlorhexidine versus placebo solution (relative risk, 0.91; 95% confidence interval, 0.76-1.09). The same absence of benefit was observed comparing chlorhexidine bathing with soap (relative risk, 1.06; 95% confidence interval, 0.68-1.66). Conclusions Controlled clinical trials are needed to assess the effect of preoperative chlorhexidine bathing on infection rates following clean surgery before the incorporation of this intervention in health care services.

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[Skin antisepsis with chlorhexidine versus iodine for the prevention of surgical site infection: A systematic review and meta-analysis](#)

Authors: Privitera, Gaetano Pierpaolo;Costa, Anna Laura;Brusaferro, Silvio;Chirletti, Piero;Crosasso,



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Paola;Massimetti, Gabriele;Nespoli, Angelo;Petrosillo, Nicola;Pittiruti, Mauro;Scoppettuolo, Giancarlo;Tumietto, Fabio and Viale, Pierluigi

Publication Date: 2017

Journal: American Journal of Infection Control 45(2), pp. 180–189

Abstract: Background Surgical site infection (SSI) is one of the most frequent health care–associated infections. One of the practices to reduce their incidence is preoperative skin antisepsis. Two of the most commonly active components used are chlorhexidine gluconate and povidone iodine. Of 3 reviews conducted between 2010 and 2012 comparing antiseptics, 2 were in favor of chlorhexidine; however, the latest was unable to draw conclusions. Purpose To verify whether recent evidence supports the hypothesis that chlorhexidine in preoperative antisepsis is more efficient than other antiseptics in reducing SSI rates. Procedures We conducted a systematic review from 2000-2014 in all languages. The primary end point was SSI incidence and secondary skin bacterial colonization. Results Nineteen studies were included. Meta-analysis were conducted for comparable studies for both outcomes. The results of the meta-analysis, including all of the studies in which chlorhexidine was compared with iodophor, were in favor of chlorhexidine for both SSI incidence (risk ratio [RR], 0.70; 95% confidence interval [CI], 0.52-0.92) and bacterial skin colonization (RR, 0.45; 95% CI, 0.36-0.55). Conclusions There is moderate-quality evidence supporting the use of chlorhexidine for preoperative skin antisepsis and high-quality evidence that the use of chlorhexidine is associated with fewer positive skin cultures. Further rigorous trials will be welcomed to attain stronger evidence as to the best antiseptic to be used before surgery.

Preoperative bathing with chlorhexidine reduces the incidence of surgical site infections after total knee arthroplasty: A meta-analysis

Authors: Wang, Zhen;Zheng, Jia;Zhao, Yongqiang;Xiang, Yungai;Chen, Xiao;Zhao, Fei;Jin, Yi;Wang, Zhen;Zheng, Jia;Zhao, Yongqiang;Xiang, Yungai;Chen, Xiao;Zhao, Fei and Jin, Yi

Publication Date: 2017

Journal: Medicine 96(47), pp. 1–7

Abstract: Background: Surgical site infection is a devastating postoperative complication, and the occurrence ranges from 1% to 2% after total knee arthroplasty (TKA). The efficacy of the preoperative use of chlorhexidine for reducing infection has been debated. This meta-analysis aimed to examine the efficacy of the use of chlorhexidine to prevent surgical site infections after TKA. Methods: In February 2017, a systematic literature review was conducted using the following electronic databases: PubMed, EMBASE, Web of Science, Cochrane Database of Systematic Reviews, and the Google database. Data from randomized controlled trials (RCTs) and retrospective comparative study (RCS) that compared the use of chlorhexidine versus control washes to prep patients for TKA were retrieved. The primary endpoint was to compare the total incidence of infection with and without the use of chlorhexidine. The secondary outcomes were the incidence of infection in low-risk category patients, moderate-risk category patients, and high-risk category patients. After testing for publication bias and heterogeneity between studies, data were aggregated for random-effects modeling when necessary. Results: Four clinical trials that included 8787 patients (chlorhexidine group: n=2615, control group: n=6172) were ultimately included in the meta-analysis. Chlorhexidine was associated with a reduced total incidence of infection, corresponding to a reduction of 1.69% risk ratio (RR)=0.22; 95% confidence interval (95% CI)=0.12-0.40; P=.000]. Similarly, chlorhexidine was associated with a reduction in the incidence of infection among patients in the moderate-risk category (RR, 0.18; 95% CI, 0.05-0.63; P=.007) and the high-risk category (RR, 0.13; 95% CI, 0.03-0.67; P=.014). There was no significant difference between the incidence of infection in low-risk category patients with chlorhexidine use compared with the use of control washes (RR, 0.60; 95% CI, 0.22-1.60; P=.330). Conclusion: The preoperative use of chlorhexidine could reduce the total incidence of infection and the incidence of infection in moderate-risk and high-risk category patients. The overall evidence and the number of included studies was limited; thus, a greater number of high-quality RCTs is still needed to further identify the effects of chlorhexidine on reducing the incidence of infection after TKA.





[Effectiveness of Decolonization With Chlorhexidine and Mupirocin in Reducing Surgical Site Infections: A Systematic Review](#)

Authors: George, Susan;Leasure, A. R. and Horstmanshof, Douglas

Publication Date: Jul ,2016

Journal: Dimensions of Critical Care Nursing 35(4), pp. 204–222

Abstract: Background: Surgical site infections (SSI) are a serious complication of surgery. Staphylococcus aureus (S aureus) is 1 of the most common causative organisms responsible for SSI. Patients who are carriers of methicillin-resistant S aureus and methicillin-sensitive S aureus are at increased risk of developing S aureus--associated SSIs. Decolonization of skin with chlorhexidine and nares with mupirocin may reduce the risk of SSI. Objective: The primary object of this systematic review is to examine the effectiveness of preoperative universal decolonization of skin with chlorhexidine and nares with intranasal mupirocin in preventing SSIs. Methods: The following databases were searched: Ovid Medline (from 1946 to September week 3, 2015), Embase (1947 to 2015, week 38), EBSCO CINHAL (1980-2015), Cochrane Collaboration for Systematic Reviews, EBM Reviews, and Google Scholar. Study Selection: All experimental and nonexperimental studies that evaluated the effect of chlorhexidine in combination with intranasal mupirocin for decolonization were included. Inclusion was limited to published studies written in English. A total of 19 studies were included in this review. One study was deleted from final analysis as other agents were used for skin decolonization. Data Extraction: Data were extracted independently by 2 members of the study team. Discrepancies were resolved through discussion. Results: Decolonization with topical chlorhexidine and intranasal mupirocin resulted in reduction of S aureus SSI and methicillin-resistant S aureus nosocomial infection and eradication of S aureus nasal carriage. Incidence of SSIs was significantly reduced in 10 studies, which was the primary outcome. Four of the 10 studies used preoperative universal decolonization and significant reduction in SSI was observed in cardiac and orthopedic patients. Conclusion: The results of this review indicate the combination of topical chlorhexidine and intranasal mupirocin is effective in reducing S aureus--associated SSIs.

[Preoperative skin antiseptics for preventing surgical wound infections after clean surgery](#)

Authors: Dumville, J. C.;McFarlane, E.;Edwards, P.;Lipp, A.;Holmes, A. and Liu, Z.

Publication Date: 2015

Journal: Cochrane Database of Systematic Reviews (4)

Abstract: Abstract - Plain language summary Preoperative skin antiseptic for prevention of surgical wound infections after clean surgery Patients' skin at the operation site is routinely cleansed with antiseptic solutions in the operating theatre before surgical incisions are made. This skin cleansing with an antiseptic aims to reduce the microorganisms present on the skin and therefore reduce the risk that the surgical wound will become infected. It is not known whether one antiseptic treatment is better than any other(s) at preventing infection, so our team examined the evidence for antiseptic skin preparation prior to clean surgery (i.e. surgery that does not involve the breathing system, gut, genital or urinary tract or any part of the body with an existing infection) to see if there are differences between preoperative antiseptic treatments. Unfortunately there is very little good quality research around skin cleansing before surgery and we cannot say whether one antiseptic is better than another at preventing wound infections. More research is required to show whether one antiseptic is better than the others at preventing wound infection after clean surgery.

[Preoperative bathing or showering with skin antiseptics to prevent surgical site infection](#)

Authors: Webster, J. and Osborne, S.

Publication Date: 2015

Journal: Cochrane Database of Systematic Reviews (2)

Abstract: Abstract - Plain language summary Preoperative bathing or showering with skin antiseptics to prevent surgical site infection Surgical site infection is a serious complication of surgery and is usually associated with increased length of hospital stay for the patient, and also higher hospital costs. The use of an antiseptic solution for preoperative bathing or showering is widely practiced in the belief that it will help to prevent surgical site infections from developing. This review identified





seven trials, with over 10,000 patients, that tested skin antiseptics (chlorhexidine solution) against normal soap or no presurgical washing. The review of these trials did not show clear evidence that the use of chlorhexidine solution before surgery was better than other wash products at preventing surgical site infections from developing after surgery.

Studies

[Methicillin sensitive staphylococcus aureus screening and decolonisation in elective hip and knee arthroplasty.](#)

Authors: Jeans, Edward;Holleyman, Richard;Tate, David;Reed, Mike and Malviya, Ajay

Publication Date: 2018

Journal: Journal of Infection 77(5), pp. 405–409

Abstract: Aims: Periprosthetic joint infection (PJI) is a catastrophic and potentially life threatening complication following arthroplasty. In addition to the resulting impact on patient morbidity and mortality, PJI is associated with significant financial cost, which is estimated at 21,937 per case. Methicillin sensitive staphylococcus aureus (MSSA) is a common isolate in PJI and colonisation is a proven risk factor for subsequent infection. The aims of this study were: (1) to determine if MSSA screening and decolonisation reduced MSSA PJI rate in primary joint replacement and (2) to determine cost effectiveness of such a screening program. Methods: Pre-operative screening for MSSA was introduced in our institution in 2010. All MSSA positive patients attending for elective arthroplasty were prescribed Octenisan body wash and nasal Bactroban for use 5 days prior to procedure, and five days after. Infection data was collected prospectively and compared with a control group from before. Results: Between 2007 and 2014, 12,910 primary arthroplasties (5917 hip, 6993 knee) were performed. There were 3593 in the pre-screening group and 9318 in the post-screening group. Pre-screening PJI MSSA rate was 0.75% which reduced to 0.25% post screening introduction (p: Between 2007 and 2014, 12,910 primary arthroplasties (5917 hip, 6993 knee) were performed. There were 3593 in the pre-screening group and 9318 in the post-screening group. Pre-screening PJI MSSA rate was 0.75% which reduced to 0.25% post screening introduction conclusion: The MSSA screening and eradication protocol used in our institution was effective at reducing rates of MSSA PJI. Furthermore, it resulted in significant savings when compared to the cost of prevented infections.

[Effect of pre-operative octenidine nasal ointment and showering on surgical site infections in patients undergoing cardiac surgery.](#)

Authors: Reiser, M.;Scherag, A.;Forstner, C.;Brunkhorst, F. M.;Harbarth, S.;Doenst, T.;Pletz, M. W. and Hagel, S.

Publication Date: Feb ,2017

Journal: Journal of Hospital Infection 95(2), pp. 137–143

Abstract: Objective: To evaluate the effect of pre-operative octenidine (OCT) decolonization on surgical site infection (SSI) rates. Design: Before-and-after cohort study. Patients: Patients undergoing an elective isolated coronary artery bypass graft (CABG) procedure: control group (1st January to 31st December 2013), N=475; intervention group (1st January to 31st December 2014), N=428. Interventions: The intervention consisted of nasal application of OCT ointment three times daily, beginning on the day before surgery, and showering the night before and on the day of surgery with OCT soap. Results: A median sternotomy was performed in 805 (89.1%) patients and a minimally invasive direct coronary artery bypass procedure was performed in 98 (10.9%) patients. Overall, there was no difference in SSI rates between the control and intervention groups (15.4% vs 13.3%, P=0.39). The rate of harvest site SSIs was significantly lower in patients in the intervention group (2.5% vs 0.5%, P=0.01). Patients who had undergone a median sternotomy in the intervention group had a significantly lower rate of organ/space sternal SSIs (1.9% vs 0.3%, P=0.04). However, there was a trend towards an increased rate of deep incisional sternal SSIs (1.2% vs 2.9%, P=0.08). Multi-variate analysis did not identify a significant protective effect of the intervention (odds ratio 0.79, 95% confidence interval 0.53-1.15, P=0.27). Conclusions: Pre-operative decolonization with OCT did not reduce overall SSI rates in patients undergoing an elective isolated CABG procedure, but significantly decreased harvest site and organ/space sternal SSIs. Randomized controlled trials,





including controlled patient adherence to the intervention, are required to confirm these observations and to determine the clinical utility of OCT in pre-operative decolonization.

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DATABASES AND INFORMATION SOURCES USED					
	Pubmed		HMIC	x	BMJ Best Practice UpToDate
x	Medline		Social Policy and Practice	x	Cochrane Library
x	Emcare	x	CINAHL	x	TRIP
x	Embase		PsycINFO		Grey Literature
	AMED		Psychology and Behavioral Sciences Collection		Other

PURPOSE OF SEARCH			
	Patient info/health & well being	x	Clinical decision making (inc. patient care)
	Executive Team support		Research/Education/Professional development
	Quality Improvement		Primary Care & Neighbourhoods Directorate support
	KM/Management decision making		Other: policy update

USER CATEGORY OF REQUESTOR			
	Medical students		Patients/public
x	Nursing/midwifery students		Physician Associates
	Junior doctors		Public Health (Somerset CC)
	Nurses/Midwives		Other
	Allied Health professionals		Future NHS

HAS PERMISSION TO SHARE THE RESULTS BEEN OBTAINED FROM THE REQUESTOR?			
X	YES - share		NO – do not share

KEY WORDS/SEARCH STRATEGY INCLUDING MESH HEADINGS	LIMITS USED
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<p>Embase <1974 to 2025 August 12></p> <p>1 exp chlorhexidine/ 25911 2 (Betasept or Hibiclens or Instillagel or "Nupro Chlorhexidine" or Oris or (Oro adj2 Clense)).tw. 3156 3 (Pareox or Peridex or Periochip or Periogard or Prevora or (X adj2 pur)).tw. 361 4 (Bactoshield or (Biopatch adj1 Protective) or (Dyna adj2 Hex) or (Antiseptic adj2 Skin adj2 Cleanser) or (Tegaderm adj2 Dressing)).tw. 394 5 Chlorhexidin*.tw. 18141 6 exp preoperative care/ 53949 7 ((pre adj2 operative) or ((pre or before) adj2 surg*)).tw. 206070 8 Octenisan.tw. 32 9 octenidine.tw. 565 10 ((wash or antisept*) adj1 lotion*).tw. 30 11 or/1-5 [Chlorhexidine] 34420 12 or/6-7 [preoperative] 253091 13 or/8-10 [Octenisan] 610 14 11 and 12 1274 15 limit 14 to "remove medline records" 606 16 limit 15 to conference abstract status 186 17 15 not 16 420 18 limit 17 to english language 409 19 limit 18 to yr="2015 -Current" 334 20 postoperative care/ 121213 21 ((post adj2 operative) or postoperative).tw. 1056748 22 or/20-21 [Postoperative] 1112929 23 19 not 22 126 24 exp infection control/ 132740 25 (infect* adj2 (control* or diseas* or prevent* or spread*)).tw. 338307 26 or/24-25 [Infection control] 432048 27 19 and 26 36 28 12 and 13 18 29 limit 28 to (english language and "remove medline records" and yr="2015 -Current") 5 30 11 and 12 and 13 7 31 limit 30 to (english language and yr="2015 -Current") [Chlorhexidine, Octenidine and preoperative] 5</p>	<p>English Adult From 2015</p>
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METADATA (TAGS)

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