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**Literature search results**

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**Search details**

Skin preparation prior to surgery. What is the latest research and best practice?

**Resources searched**

NICE Evidence; TRIP Database; Cochrane Library; BNI; CINAHL; EMBASE; MEDLINE; Google Scholar

**Database search terms:** skin adj2 prep*; SKIN PREPARATION, SURGICAL; skin adj1 (prep* OR cleans* OR swab*); theatre*; theatre*; “operating theat*”; OPERATING ROOMS; “operating room*”; surgery; “surgical procedure*”; “surgical operation*”; exp SURGERY; exp GENERAL SURGERY; preoperativ* OR pre-operativ* OR ((before OR "prior to" OR "in advance of") adj1 surg*); exp PEROPERATIVE PERIOD; PREOPERATIVE CARE; SKIN

**Evidence / Google Scholar search string(s):** ("skin preparation" OR "skin prep" OR "skin cleansing) surgery / skin (preparation OR prep OR scrubbing OR cleansing) ("before surgery" OR "prior to surgery" OR "in advance of surgery")

**Summary**

There’s no recent guidance on skin preparation, but there have been a few systematic reviews published which you may find useful. In terms of research there’s a lot, and for this reason I have limited the search to the last three years. If you want me to focus on a specific skin preparation solution versus another, all the rest, let me know and I’ll re-run the search for you.
Guidelines and Policy

NICE
Surgical site infection: Prevention and treatment of surgical site infection 2008
1. Prepare the skin at the surgical site immediately before incision using an antiseptic (aqueous or alcohol-based) preparation: povidoneiodine or chlorhexidine are most suitable.
2. If diathermy is to be used, ensure that antiseptic skin preparations are dried by evaporation and pooling of alcohol-based preparations is avoided.

World Health Organization
WHO guidelines for safe surgery 2009 : safe surgery saves lives
See Presurgical skin disinfection section on page 51.

Evidence Reviews

Australia and New Zealand Horizon Scanning Network
SonoPrep Ultrasonic Skin Permeation system for skin preparation prior to cutaneous penetration 2005
A randomised, controlled trial with the SonoPrep® comparing its use with EMLA cream alone in achieving local anaesthesia and in reducing pain associated with percutaneous interventions is currently being conducted. SonoPrep® has potential for use for diabetic patients

BestBETs
Safety of anti-infective agents for skin preparation in premature infants 2007
Extremely preterm infants are at risk of burns from the use of alcoholic skin preparations, but no comparative data are available to suggest the best preparation for this group of patients. (Grade C) Making sure there is no pooling seems to be the most effective method of avoiding problems related to skin burns in infants. (Grade C) Alcohol based preparations have good antibacterial activity in adults and have an excellent safety profile. (Grade C).

Canadian Agency for Drugs and Technologies in Health
CADTH Rapid Response Report: Chlorhexidine impregnated wipes for pre-operative skin preparation 2013
Overall, the included studies indicated that pre-hospital use of chlorhexidine impregnated cloths resulted in statistically lower incidence of surgical site infections compared with in-hospital perioperative skin preparation. No evidence-based guidelines on this subject were identified.

Pre-Operative Skin Preparation Solutions: A Review of the Evidence on Safety 2011
Two RCTs12,13 indicated low rates of allergic reaction to either CHG in alcohol or PI, and one systematic review11 found no statistically significant difference in allergic reaction rates when comparing CHG to placebo. One retrospective analysis14 found PI-related chemical burns to be responsible for 26% of patients with surgical burn accidents.

While safety issues with PI, CHG, and alcohol-base pre-surgical skin antiseptic agents appear rare, adverse safety outcomes do exist as demonstrated by six allergic reactions, five chemical burns, and three operating room fires identified in case reports.5,15-20 Larger, safety-oriented studies are necessary to determine the risk of these events.
Cochrane Database of Systematic Reviews

Preoperative bathing or showering with skin antiseptics to prevent surgical site infection 2015

This review provides no clear evidence of benefit for preoperative showering or bathing with chlorhexidine over other wash products, to reduce surgical site infection. Efforts to reduce the incidence of nosocomial surgical site infection should focus on interventions where effect has been demonstrated.

Skin preparation with alcohol versus alcohol followed by any antiseptic for preventing bacteraemia or contamination of blood for transfusion 2015

We did not identify any eligible studies for inclusion in this review. It is therefore unclear whether a two-step, alcohol followed by antiseptic skin cleansing process prior to blood donation confers any reduction in the risk of blood contamination or bacteraemia in blood recipients, or conversely whether a one-step process increases risk above that associated with a two-step process.

Skin preparation for preventing infection following caesarean section 2014

This review found that chlorhexidine gluconate compared with iodine alone was associated with lower rates of bacterial growth at 18 hours after caesarean section. However, this outcome was judged as very low quality of evidence. Little evidence is available from the included randomised controlled trials to evaluate different agent forms, concentrations and methods of skin preparation for preventing infection following caesarean section. Therefore, it is not yet clear what sort of skin preparation may be most efficient for preventing postcaesarean wound and surgical site infection.

Cyanoacrylate microbial sealants for skin preparation prior to surgery 2013

In this first update there is still insufficient evidence available to determine whether the use of microbial sealants reduces the risk of surgical site infection or not. Further rigorous, adequately-powered RCTs are required to investigate this properly.

Umbilical cord antiseptics for preventing sepsis and death among newborns 2013

There is significant evidence to suggest that topical application of chlorhexidine to umbilical cord reduces neonatal mortality and omphalitis in community and primary care settings in developing countries. It may increase cord separation time however, there is no evidence that it increases risk of subsequent morbidity or infection.

Preoperative hair removal to reduce surgical site infection 2011

Whilst this review found no statistically significant effect on SSI rates of hair removal insufficient numbers of people have been involved in this research to allow confidence in a conclusion. When it is necessary to remove hair, the existing evidence suggests that clippers are associated with fewer SSIs than razors. There was no significant difference in SSI rates between depilatory creams and shaving, or between shaving or clipping the day before surgery or on the day of surgery however studies were small and more research is needed.

Preoperative skin antiseptics for preventing surgical wound infections after clean surgery 2009

There is insufficient research examining the effects of preoperative skin antiseptics to allow conclusions to be drawn regarding their effects on post-operative surgical wound infections. Further research is needed.

Database of Abstracts of Reviews of Effects

The forgotten role of alcohol: a systematic review and meta-analysis of the clinical efficacy and perceived role of chlorhexidine in skin antisepsis 2013

There was good evidence that chlorhexidine gluconate combined with alcohol was superior to aqueous povidone iodine in skin antisepsis for blood culture collection, vascular catheter insertion or surgical skin preparation. However, the effect was often perceived to be due to chlorhexidine alone rather than to the combination with alcohol. This had implications for knowledge translation and patient safety.
Systematic review and meta-analysis of preoperative antisepsis with chlorhexidine versus povidone-iodine in clean-contaminated surgery 2012

Preoperative cleansing of the skin with chlorhexidine had significant benefits compared with povidone iodine in reducing postoperative surgical site infections after clean-contaminated surgery.

Published Research – Databases

1. Evidence update on prevention of surgical site infection.
Author(s) Leaper, David, Ousey, Karen
Citation: Current Opinion in Infectious Diseases, 01 April 2015, vol./is. 28/2(158-163), 09517375
Publication Date: 01 April 2015
Abstract: PURPOSE OF REVIEW: Surgical site infection (SSI) is a common healthcare-associated infection and complicates up to 10-20% of operations with considerable strain on healthcare resources. Apart from the widely adopted use of appropriate hair removal, antibiotic prophylaxis, avoidance of hypothermia and perioperative glycaemic control to reduce SSIs, this review has considered new research and systematic reviews, and whether their findings should be included in guidelines. RECENT FINDINGS: The efficacy of preoperative bathing/showering, antibiotic prophylaxis for clean surgery and perioperative oxygen supplementation to reduce the risk of SSI is still in doubt. By contrast, the use of 2% chlorhexidine in alcohol skin preparation, postoperative negative pressure wound therapy and antiseptic surgical dressings do show promise. Antimicrobial sutures in independent meta-analyses were found to reduce the risk of SSI after all classes of surgery (except dirty) whereas the use of wound guards, or diathermy skin incision (compared with scalpel incision), did not. SUMMARY: The incidence of SSI after surgery is not falling. Based on this review of published trials and evidence-based systematic reviews some advances might be included into these care bundles. More research is needed together with improved compliance with care bundles.
Source: CINAHL

2. Skin Preparation Before Surgery: Options and Evidence
Author(s) Sidhwa F., Itani K.M.F.
Citation: Surgical Infections, February 2015, vol./is. 16/1(14-23), 1096-2964;1557-8674 (01 Feb 2015)
Publication Date: February 2015
Abstract: Background: Despite many advances in surgical asepsis, surgical site infection (SSI) remains a challenging and costly problem. Decontamination of the skin with an antiseptic agent is standard practice before any trans-cutaneous invasive procedure, but the antiseptic agent of choice to best reduce the risk of SSI remains controversial. Methods: Review of relevant literature. Results: Many randomized controlled trials (RCTs) have evaluated chlorhexidine-based and iodine-based preparation solutions, with and without an alcohol component. Most of these trials are underpowered to detect differences in SSI rates. The largest modern RCT showed that a chlorhexidine-isopropyl alcohol preparation reduced the risk of SSI substantially compared with a povidone-iodine preparation without alcohol in clean-contaminated surgery. Many smaller RCTs have shown that chlorhexidine-isopropyl alcohol is superior to povidone-iodine plus isopropyl alcohol or iodine povacrylex plus isopropyl alcohol in pre-operative skin decontamination; whether or not this translates into lower SSI rates is unknown. A mixed treatment comparison of 10 RCTs concluded that alcohol-based preparations have a 98% probability of reducing the risk of SSI more effectively than aqueous-based preparations. Non-randomized observational studies have generally found no difference in SSI rates among various skin antiseptic preparations. Conclusions: Alcohol-based agents are likely superior to aqueous agents. Chlorhexidine may decrease SSI rates compared with povidone-iodine, and chlorhexidine-isopropyl alcohol likely offers better skin decontamination before clean
surgery than povidone-iodine plus isopropyl alcohol or iodine povacrylex plus isopropyl alcohol. The quality of the available data is moderate. Rigorous, well-powered RCTs with appropriate treatment comparisons are needed to establish the optimal and most cost-effective pre-operative skin preparation in various operations and wound classifications.

Source: EMBASE

4. Efficacy of skin preparation in eradicating organisms before total knee arthroplasty.

Author(s) Boe, Eric, Sanchez, Hugo B, Kazenske, Faustino M, Wagner, Russell A

Citation: American journal of orthopedics (Belle Mead, N.J.), Dec 2014, vol. 43, no. 12, p. E309. (December 2014)

Publication Date: December 2014

Abstract: The solution of 2% chlorhexidine gluconate and 70% isopropyl alcohol (Chloraprep) is commonly used for antiseptic skin preparation before surgery. We conducted a study to evaluate the efficacy of this solution in eradicating organisms during skin preparation for total knee arthroplasty (TKA), to isolate the organism type, and to evaluate possible contributing factors leading to infection. Ninety-nine patients who were undergoing TKA were swabbed for cultures in the popliteal fossa before and after solution application. Swabs were collected, cultured, and read. Culture isolates grew in 20 (20%) of the 99 patients before solution application and in 5 (5%) of the 99 after application. Mean presolution body mass index (BMI) was 38 for patients with bacterial isolates and 34 for patients without isolates (P

Source: Medline

5. The right skin preparation technique: a literature review

Author(s) Silva, P

Citation: Journal of Perioperative Practice, Dec 2014, vol. 24, no. 12, p. 283-285, 1750-4589 (December 2014)

Publication Date: December 2014

Abstract: Recent debates and guidelines are suggesting back and forth motion to be the optimal preoperative technique for skin preparation. There is a lack of conclusive evidence showing this to be the case, but it may be reasonable to follow this technique, in preference to the widely used concentric circles motion, as the antiseptic agent will reach deeper cell layers of the skin where most of the microbes are found. [PUBLICATION] 27 references

Source: BNI

Available in fulltext from Journal of Perioperative Practice at EBSCOhost

6. Effect of 4% chlorhexidine gluconate predisinfection skin scrub prior to hepatectomy: a double-blinded, randomized control study.

Author(s) Hsieh, Ching-Shui, Cheng, Hsiu-Chi, Lin, Jen-Shiou, Kuo, Shou-Jen, Chen, Yao-Li

Citation: International surgery, Nov 2014, vol. 99, no. 6, p. 787-794, 0020-8868 (2014 Nov-Dec)

Publication Date: November 2014

Abstract: Abstract This trial was designed to compare the efficacy of 4% chlorhexidine gluconate (CHG) with normal saline (NS) as a predisinfection skin-scrub solution prior to standard presurgical skin preparation. Data was collected at a single transplantation center where patients electing resection of hepatic tumors were recruited between October 2011 and September 2012. In total, 100 patients were consecutively enrolled for random assignment to either 4% CHG or NS as a predisinfection skin-scrub solution prior to surgery. Our aim was to assess the comparative antiseptic efficacy of CHG in this setting, focusing on cutaneous microbial colonization (at baseline, preoperatively, and postoperatively) and postsurgical site infections as primary outcome measures. Positivity
rates of baseline, preoperative, and postoperative cultures were similar for both groups, showing significant declines (relative to baseline) after skin preparation and no significant postsurgical rebound. Rates of surgical site infection were also similar in both groups (CHG, 6.0%; NS, 4.1%; P = 1.0). For patients with hepatic tumors undergoing hepatectomy, the effect of 4% CHG as a presedisfection scrub solution was similar to that of NS in terms of skin decontamination and surgical site infections.

Source: Medline

7. Gynecology asepsis protocol

Author(s) Desai V.B., Chatterjee S., Fan L.

Citation: Journal of Minimally Invasive Gynecology, November 2014, vol./is. 21/6 SUPPL. 1(S216), 1553-4650 (November-December 2014)

Publication Date: November 2014

Abstract: Surgical site infections affect approximately 500,000 patients who undergo surgery in the United States, resulting in increased patient morbidity and mortality while costing hospitals $7.4 billion dollars annually. Many gynecological procedures are considered clean-contaminated as the sterile peritoneal cavity is exposed to endogenous microbial flora of the vagina. In addition to intravenous prophylactic antibiotic administration, surgical site antisepsis plays a major role in the prevention of SSIs. Several recent studies have established the benefits of chlorhexidine gluconate over povidone-iodine preparations; however there is limited data available regarding the optimal protocol for preoperative skin asepsis. Additionally, there is limited formalized teaching provided to trainees regarding the proper method of skin preparation. This educational video was produced for use in resident-training sessions, and will be a requirement for all attending gynecologists and OR staff who participate in gynecological procedures.

Source: EMBASE

8. Prevention of surgical site infections

Author(s) Phillips J., O’Grady H., Baker E.

Citation: Surgery (United Kingdom), September 2014, vol./is. 32/9(468-471), 0263-9319;1878-1764 (September 2014)

Publication Date: September 2014

Abstract: Surgical site infections (SSI) are commonly classified as superficial, deep or organ/space infections in wounds that may be clean, clean-contaminated or dirty. The development of an SSI depends on patient, procedure and pathogen factors. Their incidence varies depending on procedure and they have a significant impact upon patient morbidity and healthcare resources. National guidelines compromise of a care bundle, aimed at reducing their incidence with preoperative, intraoperative and postoperative factors. This includes optimizing patient co-morbidities, appropriate antibiotic use, skin preparation, theatre discipline, theatre ventilation, and surgical technique. Wound care may be simple for those healing by primary intention or require specialist techniques if healing by secondary intention. © 2014 Elsevier Ltd. All rights reserved.

Source: EMBASE

9. Propionibacterium persists in the skin despite standard surgical preparation

Author(s) Lee M.J., Pottinger P.S., Butler-Wu S., Bumgarner R.E., Russ S.M., Matsen 3rd. F.A.

Citation: The Journal of bone and joint surgery. American volume, September 2014, vol./is. 96/17(1447-1450), 1535-1386 (3 Sep 2014)

Publication Date: September 2014

Abstract: Propionibacterium acnes, which normally resides in the skin, is known to play a role in surgical site infection in orthopaedic surgery. Studies have suggested a persistence
of propionibacteria on the skin surface, with rates of positive cultures ranging from 7% to 29% after surgical preparation. However, as Propionibacterium organisms normally reside in the dermal layer, these studies may underestimate the true prevalence of propionibacteria after surgical skin preparation. We hypothesized that, after surgical skin preparation, viable Propionibacterium remains in the dermis at a much higher rate than previously reported. Ten healthy male volunteers underwent skin preparation of the upper back with ChloraPrep (2% chlorhexidine gluconate and 70% isopropyl alcohol). Two 3-mm dermal punch biopsy specimens were obtained through the prepared skin and specifically cultured for P. acnes. Seven volunteers had positive findings for Propionibacterium on dermal cultures after ChloraPrep skin preparation. The average time to positive cultures was 6.78 days. This study found that Propionibacterium persists in the dermal tissue even after surface skin preparation with ChloraPrep. The 70% rate of persistence of propionibacteria after skin preparation is substantially higher than previously reported. Propionibacteria are increasingly discussed as having an association with infection, implant failure, and degenerative disease. This study confirms the possibility that the dermal layer of skin may be the source of the bacteria. Copyright © 2014 by The Journal of Bone and Joint Surgery, Incorporated.

Source: EMBASE
Available in fulltext from Journal of Bone & Joint Surgery, American Volume at EBSCOhost
Available in fulltext from Journal of Bone and Joint Surgery - American at the ULHT Library and Knowledge Services' eJournal collection

10. Superiority of 5% NaHCO3 for preoperative hair removal in patients undergoing coronary artery bypass graft surgery with a limb vein: a randomized controlled trial+

Author(s) Xu X.-J.

Citation: European journal of cardio-thoracic surgery : official journal of the European Association for Cardio-thoracic Surgery, August 2014, vol./is. 46/2(e28-e32), 1873-734X (01 Aug 2014)

Publication Date: August 2014

Abstract: OBJECTIVES: Compared with a dry environment with talcum powder, a wet, alkaline environment with NaHCO3 solution is better for hair removal, as it can soften and expand the hair, decrease the friction and shear forces on the skin, and make hair removal easier and more efficient. The purpose of this study was to compare the effects of a preoperative skin preparation of 5% NaHCO3 with that of talcum powder for softening hair in patients undergoing coronary artery bypass graft (CABG) surgery with the saphenous vein.METHODS: A prospective randomized, single-blinded, controlled study was established. Between March 2012 and June 2013, 120 patients who met the inclusion and exclusion criteria underwent elective CABG surgery with the saphenous vein in our hospital. The same doctor obtained the saphenous vein of each patient by a uniform method. CABG surgery was performed through an open or endoscopic technique, according to each patient's condition. Patients were divided into two groups of 60 patients each, according to whether the preoperative skin preparation procedure was performed with a 5% solution of NaHCO3 at 45-50degreeC (experimental group) or with talcum powder (control group). Main outcome measures were the incision inflammation rate, skin preparation time, presence of shaving-induced macroscopic haemorrhagic spots, verbal rating scale (VRS) pain score and satisfaction.RESULTS: Neither group had any evidence of incision inflammation. The average (mean +/- standard deviation) skin preparation time of the experimental group was shorter than that of the control group (5.58 +/- 1.52 vs 9.74 +/- 1.23 min, P < 0.001). Three patients in the experimental group and 17 in the control group had shaving-induced macroscopic haemorrhagic spots after skin preparation (P = 0.001). The VRS pain scores were different between the two groups (P < 0.001). In the control group, 40% of patients and 37% of nurses were satisfied with the skin preparation procedure, compared with 95 and 90%, respectively, in the experimental group (both P < 0.001).CONCLUSIONS: Hair softening with a 5% NaHCO3 solution protected the skin integrity, alleviated pain and improved patient satisfaction to a greater extent than talcum powder. Nurses found the 5% NaHCO3 solution to be more convenient and less time-consuming to use.
11. A 7s bundle approach to preventing surgical site infections

Author(s) Spencer M.P., Christie J.

Citation: American Journal of Infection Control, June 2014, vol./is. 42/6 SUPPL. 1(S103), 0196-6553 (June 2014)

Publication Date: June 2014

Abstract: ISSUE: The prevention of surgical site infections (SSI) involves the pre-operative, intra-operative and post-operative period. A 7 step systematic approach was developed in a large multi-hospital system to assist surgical, medical and nursing staff in the prevention of SSIs in surgical settings. The approach uses evidence based practices that have demonstrated a reduction in SSIs and are recommended by national organizations. PROJECT: In 2012 a corporate team, including the Value Analysis Manager, Surgical Director and Infection Preventionist Consultants, developed a bundled approach for the reduction of SSIs. The team collected research on prevention measures suggested by national organizations. A 7-step approach was designed and included: 1) Safe operating room 2) Screen for risk factors and MRSA/MSSA 3) Showers with chlorhexidine 4) Skin prep with alcohol based antiseptics 5) Sutures with an antimicrobial 6) Solution to irrigate with chlorhexidine 7) Skin adhesive or antimicrobial dressings to protect incision. The approach was trialed successfully in a few hospitals with high SSI rates. RESULTS: Since implementation, there has been a statistically significant reduction in SSIs documented by calculating the standardized infection ratio (SIR) for the hospital system. SIR in December 2012 was calculated for predicted Number of SSIs and all were <1, indicating the observed SSIs were fewer HAI's were observed than predicted for comparable groups. SIR Results were as follows: total hip:0.85, total knee:0.57, CBGB:0.32, Colon:0.28 and Hyst:0.69. Facilities demonstrated further reductions in SSIs in 2013 in total knee, colon, abdominal hysterectomy and coronary artery bypass graft surgery between Jan-June 2013 as they implemented steps in the bundle. LESSON LEARNED: A reduction in SSIs leads to improved patient quality and safety, lower costs, less readmissions, improved patient satisfaction and reduced isolation precautions during the surgical experience. Teamwork with support from leadership and surgeons is necessary to implement the 7-S Bundle. In our system, implementing an evidence-based systematic approach has resulted in a reduction in SSIs.

Source: EMBASE

12. Comparative effectiveness of skin antiseptic agents in reducing surgical site infections: A report from the Washington state surgical care and outcomes assessment program

Author(s) Hakkarainen T.W., Delling er E.P., Evans H.L., Farjah F., Farrokhi E., Steele S.R., Thirlby R., Flum D.R.

Citation: Journal of the American College of Surgeons, March 2014, vol./is. 218/3(336-344), 1072-7515;1879-1190 (March 2014)

Publication Date: March 2014

Abstract: Background Surgical site infections (SSI) are an important source of morbidity and mortality. Chlorhexidine in isopropyl alcohol is effective in preventing central venous catheter associated infections, but its effectiveness in reducing SSI in clean-contaminated procedures is uncertain. Surgical studies to date have had contradictory results. We aimed to further evaluate the relationship of commonly used antiseptic agents and SSI, and to determine if isopropyl alcohol has a unique effect. Study Design We performed a prospective cohort analysis to evaluate the relationship of commonly used skin antiseptic agents and SSI for patients undergoing mostly clean-contaminated surgery from January 2011 through June 2012. Multivariate regression modeling predicted expected rates of SSI. Risk adjusted event rates (RAERs) of SSI were compared across groups using proportionality testing. Results Among 7,669 patients, the rate of SSI was 4.6%. The
RAERs were 0.85 (p = 0.28) for chlorhexidine (CHG), 1.10 (p = 0.06) for chlorhexidine in isopropyl alcohol (CHG+IPA), 0.98 (p = 0.96) for povidone-iodine (PVI), and 0.93 (p = 0.51) for iodine-povacrylex in isopropyl alcohol (IPC+IPA). The RAERs were 0.91 (p = 0.39) for the non-IPA group and 1.10 (p = 0.07) for the IPA group. Among elective colorectal patients, the RAERs were 0.90 (p = 0.48) for CHG, 1.04 (p = 0.67) for CHG+IPA, 1.04 (p = 0.85) for PVI, and 1.00 (p = 0.99) for IPC+IPA. Conclusions For clean-contaminated surgical cases, this large-scale state cohort study did not demonstrate superiority of any commonly used skin antiseptic agent in reducing the risk of SSI, nor did it find any unique effect of isopropyl alcohol. These results do not support the use of more expensive skin preparation agents. © 2014 by the American College of Surgeons Published by Elsevier Inc.

Source: EMBASE
Abstract: In 1867, Joseph Lister wrote this account of how to prepare the skin for surgery: "A solution of one part crystallised carbolic acid in four parts of boiled linseed oil having been prepared, a piece of rag from four to six inches square is dipped in the oily mixture, and laid upon the skin where the incision is to be made." Nearly 150 years later, the science of preoperative skin preparation has grown more sophisticated, but continues to be the cornerstone of evidence-based practices to prevent surgical site infections (SSIs) and promote positive surgical outcomes. [PUBLICATION] 5 references

Source: BNI

17. Preoperative antiseptic skin preparations and reducing SSI.

Author(s) Al Maqbali, Mohammed Abdullah

Citation: British Journal of Nursing, 28 November 2013, vol./is. 22/21(1227-1233), 09660461

Publication Date: 28 November 2013

Abstract: Surgical site infection (SSI) can affect the quality of care and increase the morbidity and mortality rate in after-surgical procedure. The use of an antiseptic skin preparation agent before the procedure can reduce the pathogens in the skin surface around the incision. Indicating the type of skin antiseptic preparation could prevent the infection and contamination of the wound. The most commonly used types of skin preparations are chlorhexidine and povidone iodine. However, the antiseptic solutions of both agents are strengthened with alcohol to prevent postoperative wound infection. The aim of this paper is to identify the best antiseptic agent in terms of skin preparation by evaluating the evidence in the literature. The factors associated with choosing the antiseptic skin agent, such as patients’ allergies, skin condition and environmental risk, are also taken into account. This review suggests that chlorohexdine with alcohol may be the most effective in terms of reducing SSI.

Source: CINAHL

Available in print at Grantham Hospital Staff Library
Available in fulltext from British Journal of Nursing at EBSCOhost
Available in print at Pilgrim Hospital Staff Library
Available in print at Lincoln County Hospital Professional Library

18. Effects of food colouring added to 2% chlorhexidine gluconate and 70% alcohol for surgical site antisepsis

Author(s) Chow J., Ng J., Pun A.

Citation: Journal of perioperative practice, November 2013, vol./is. 23/11(255-257), 1750-4589 (01 Nov 2013)

Publication Date: November 2013

Abstract: Preoperative cleansing of a patient's skin with chlorhexidine gluconate (CHG) in alcohol is superior to cleansing with povidone-iodine for preventing surgical site infection (SSI) after clean-contaminated surgery (Darouilche et al 2010). However, 2% CHG in 70% alcohol, tinted pink, is colourless when applied to limbs for surgery and complete coverage cannot be assured. The purpose of the study was to evaluate the efficacy of food colouring added to CHG in preoperative skin preparation. Two hundred and eight subjects were randomly selected from a population of healthy young adults and were given a questionnaire. They were excluded if they had a known allergy to CHG or food dye, a current infection at the preparation site, or previous preparation with CHG at the site. CHG with food dye additive was applied on the subject's left foot while CHD without the additive
was applied on the right. Skin swabs were then taken of both feet and plated on blood agar plates and incubated for 48 hours. Assessment of growth was compared. Patients treated with tinted CHG had around 3.4 times (95% CI: 1.5, 7.8) the risk of a positive bacterial swab compared with those treated with untinted CHG. The efficacy of CHG significantly decreased with food colouring additive. This is consistent with previous studies conducted on similar incompatible substances. In order to have the full efficacy of CHG as a preparation, much thought and care needs to be taken to prevent contamination of the site and substance.

**Source:** EMBASE

Available in fulltext from Journal of Perioperative Practice, The at ProQuest

Available in fulltext from Journal of Perioperative Practice at EBSCOhost

19. Skin preparation for Caesarean section

**Author(s)** Newsom C.T.

**Citation:** Nursing times, November 2013, vol./is. 109/46(29), 0954-7762 (2013 Nov 20-26)

**Publication Date:** November 2013

**Source:** EMBASE

Available in fulltext from Nursing Times; NT at ProQuest

20. Skin preparation before hip replacement in emergency setting versus elective scheduled arthroplasty: Bacteriological comparative analysis

**Author(s)** Bonnevialle N., Geiss L., Cavalie L., Ibnoulkhatib A., Verdeil X., Bonnevialle P.

**Citation:** Orthopaedics and Traumatology: Surgery and Research, October 2013, vol./is. 99/6(659-665), 1877-0568 (October 2013)

**Publication Date:** October 2013

**Abstract:** Introduction: Hip arthroplasty needs to be performed in an emergency setting after intracapsular femur neck fracture, whereas pain makes preoperative skin preparation of the limb difficult and it may therefore be incomplete. To date no study has analyzed the patient's skin bacteriological status in these surgical conditions. Hypothesis: The skin's bacterial flora is quantitatively and qualitatively different in the trauma context compared to an elective scheduled arthroplasty for chronic hip disease. Materials and methods: Two groups of patients, undergoing hip arthroplasty and having the same preparation at the time of surgery but different skin preparation procedures the day before and the day of surgery, were prospectively compared: 30 patients operated on in an emergency setting for fracture (group A) had no skin preparation and 32 patients operated on in scheduled surgery (group B). Group A had no skin disinfection before going into surgery, whereas group B followed a predefined protocol the day before surgery. Skin samples were taken on gelose at three different stages of skin preparation at the time of surgery (before and after detersive cleaning, and at the end of the surgery) and on two sites (inguinal and greater trochanter). The bacteriological analysis took place after 48 hours of incubation. Results: Before detersive cleaning, group A had 3.6 times more bacteria than group B in the trochanter region and 2.7 times more in the inguinal area. After detersive cleaning, the contamination rate in the trochanter area was similar in both groups (group A: 10%; group B: 12.5%), but different in the inguinal region (group A: 33%; group B: 3%; P = 0.002). At the end of the surgery, no difference was identified. Coagulase-negative Staphylococcus and Bacillus cereus accounted for 44% and 37%, respectively, of the bacteria isolated. In addition, the frequency of pathogenic non-saprotrophic bacteria was higher in group A (38%) compared to group B (6%). At a mean follow-up of 9.7 months (range: 8-11 months), no infection of the surgical site was identified. Conclusion: The dermal flora is more abundant and different when the patient is managed in an emergency context. Although effective in the trochanter area, cutaneous detersive cleaning in the operating room is insufficient in the inguinal area and the frequency of pathogenic bacteria warrants identical rigor in preoperative preparation in all situations. Level of evidence: III. Prospective case-control study. &xDi Am 2013 Elsevier Masson SAS.
21. An update on modifiable factors to reduce the risk of surgical site infections.

Author(s) Savage, Jason W, Anderson, Paul A

Citation: The spine journal : official journal of the North American Spine Society, Sep 2013, vol. 13, no. 9, p. 1017-1029 (September 2013)

Publication Date: September 2013

Abstract: Despite an increase in physician and public awareness and advances in infection control practices, surgical site infection (SSI) remains to be one of the most common complications after an operation. Surgical site infections have been shown to decrease health-related quality of life, double the risk of readmission, prolong the length of hospital stay, and increase hospital costs. To critically evaluate the literature and identify modifiable factors to reduce the risk of SSI. Systematic review of the literature. A critical review of the literature was performed using OVID, Pubmed, and the Cochrane database and focused on eight identifiable factors: preoperative screening and decolonization of methicillin-sensitive Staphylococcus aureus and methicillin-resistant S. aureus protocols, antiseptic showers, antiseptic cloths, perioperative skin preparation, surgeon hand hygiene, antibiotic irrigation and/or use of vancomycin powder, closed suction drains, and antibiotic suture. Screening protocols have shown that 18% to 25% of patients undergoing elective orthopedic surgery are nasal carriers of S. aureus and that carriers are more likely to have a nosocomial infection and SSI. The evidence suggests that an institutionalized prescreening program, followed by an appropriate eradication using mupirocin ointment and chlorhexidine soap/shower, will lower the rate of nosocomial S. aureus infections. Based on the current literature, definitive conclusions cannot be made on whether preoperative antiseptic showers effectively reduce the incidence of postoperative infection. The use of a chlorhexidine bathing cloth before surgery may decrease the risk of SSI. There is no definitive clinical evidence that one skin preparation solution effectively lowers the rate of postoperative infection compared with another. The use of dilute betadine irrigation or vancomycin powder in the wound before closure likely decreases the incidence of SSI. There is strong evidence in the literature that optimizing specific preoperative, intraoperative, and postoperative variables can significantly lower the risk of developing an SSI. Copyright © 2013 Elsevier Inc. All rights reserved.

Source: Medline

22. Cyanoacrylate microbial sealants for skin preparation prior to surgery.

Author(s) Lipp A, Phillips C, Harris P, Dowie I

Citation: Cochrane Database of Systematic Reviews, 01 August 2013, vol./is. /8(0-), 1469493X

Publication Date: 01 August 2013

Abstract: BACKGROUND: Surgical site infections (i.e. incisions that become infected) are a continuing concern in health care. Microbial sealant is a liquid that can be applied to the skin immediately before surgery and is thought to help reduce the incidence of surgical site infections (SSIs) by sealing in the skin flora, thus preventing contamination and infection of the surgical site. OBJECTIVES: To assess the effects of the preoperative application of microbial sealants (compared with no microbial sealant) on rates of SSI in people undergoing clean surgery. SEARCH METHODS: For this first update we searched the following electronic databases in July 2013: the Cochrane Wounds Group Specialised Register, the Cochrane Central Register of Controlled Trials (CENTRAL), Ovid MEDLINE, Ovid MEDLINE - In-Process & Other Non-Indexed Citations, Ovid EMBASE and EBSCO CINAHL. SELECTION CRITERIA: Randomised controlled trials (RCTs) were eligible for inclusion if they involved people undergoing 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) in an operating theatre and compared the use of preoperative microbial sealants with no microbial sealant. DATA COLLECTION AND ANALYSIS: All review authors independently extracted data on the characteristics, risk of bias and outcomes of the eligible trials. MAIN RESULTS: Three trials (524 participants undergoing clean surgery)
met the inclusion criteria. The trials all compared cyanoacrylate microbial sealant with no sealant, and, when pooled, we found there were fewer SSIs with the use of microbial sealant (10/261 participants) than with the control comparison (29/274 participants). The difference between the two groups was statistically significant (risk ratio (RR) 0.36, 95% CI 0.18 to 0.72) but given the number of participants and quality of the studies, they should be treated with caution. There were some adverse events in one study, but these were not judged to be a result of the use of microbial sealant. AUTHORS’ CONCLUSIONS: In this first update there is still insufficient evidence available to determine whether the use of microbial sealants reduces the risk of surgical site infection or not. Further rigorous, adequately-powered RCTs are required to investigate this properly.

Source: CINAHL
Available in fulltext from Cochrane Library, The at Wiley

23. Chlorhexidine is a better antiseptic than povidone iodine and sodium hypochlorite because of its substantive effect.

Author(s) Macias, Juan H., Arreguin, Virginia, Munoz, Juan M., Alvarez, Jose A., Mosqueda, Juan L., Macias, Alejandro E.

Citation: American Journal of Infection Control, 01 July 2013, vol./is. 41/7(634-637), 01966553

Publication Date: 01 July 2013

Abstract: Background: The present study compared both the antiseptic efficacy of sodium hypochlorite against that of chlorhexidine gluconate in isopropyl alcohol and the substantive effect of chlorhexidine, povidone iodine, and sodium hypochlorite. Methods: This was a 2-step study that included volunteers. In step 1, 4 skin areas were tested for bacteria in colony-forming units (CFU): 2 were controls to determine baseline bacteria or the effect of scrubbing, and 2 were treated with 10% hypochlorite or 2% chlorhexidine in isopropyl alcohol. Every subject was tested 4 times. The second step tested the substantive effect of 10% povidone-iodine and the aforementioned antiseptics. Results: For the first step, 30 volunteers were studied, resulting in 120 determinations for each control and antiseptic. No differences between chlorhexidine gluconate (median 115 CFU/cm²) and sodium hypochlorite (median 115 CFU/cm²) were found. Both antiseptics were significantly different from rubbing control (317 CFU/cm²) and basal control (606 CFU/cm²). Only chlorhexidine showed a substantive effect. Conclusion: We consider that chlorhexidine gluconate in isopropyl alcohol, sodium hypochlorite, and povidone-iodine is equally effective for procedures that do not require a long action. However, chlorhexidine is desirable for procedures such as catheter insertion, skin preparation for surgery, or handwashing prior to surgery.

Source: CINAHL

24. Effectiveness of cyanoacrylate microbial sealant (CMS) in the reduction of surgical site infection in gynecologic oncology procedures: A single-center randomized study: Interim analysis

Author(s) Thomas E., Nugent E., McMeekin D., Walker J., Landrum L., Moxley K., Bishop E., Mathews C., Moore K.

Citation: Gynecologic Oncology, July 2013, vol./is. 130/1(e58-e59), 0090-8258 (July 2013)

Publication Date: July 2013

Abstract: Objective: Despite continued advances in aseptic technique, surgical site infections/disruptions occur in 20% of patients (pts) undergoing surgery for gynecologic malignancy. Consequences of wound infections include escalating cost, delayed adjuvant treatment, and increases in morbidity/mortality. The purpose of this study was to evaluate the effectiveness of CMS in reducing bacterial contamination and subsequent wound infection after exploratory laparotomy for gynecologic oncology procedure. Methods: Pts were randomized using a 1:1 allocation to receive a standard skin preparation vs standard preparation+CMS stratified by body mass index (BMI) N or b30. Pts were prospectively followed for 6 weeks for wound complications and adverse surgical outcomes. Data on
Clinicopathologic factors, surgical procedures, and postoperative care were collected through the in- and outpatient medical records. Associations between wound infections/disruptions, use of CMS, and multiple factors were explored using descriptive statistics and chi-square analysis. Per protocol, an interim analysis evaluating incidence of surgical site infections/disruptions was specified after 75 pts were randomized. Results: Of 80 pts enrolled, median age was 58 years (range, 20-81 years), and mean BMI was 38.8 in pt cohort with BMI N30, and 26.3 for pt cohort with BMI b30. Presence of significant medical comorbidities included: 45% cardiovascular disease, 25% diabetes mellitus, 15% pulmonary disease, 45% current/history of tobacco use, and they were comparable between CMS and non-CMS groups. All pts received preoperative antibiotics, 54% had malignancy, 84% of procedures were classified as clean-contaminated or contaminated, 20% of pts underwent bowel surgery, 26% received transfusion, and mean estimated blood loss was 500 mL. Overall wound infection rate was 13.3%, with a wound disruption rate of 29.5%. The CMS cohort underwent significantly more bowel surgery (P=0.029), but no difference in wound infection or separation rates was noted (P=0.27, P=0.58, respectively). Univariate analysis demonstrated that clean procedures showed a trend toward reduced wound infection (P=0.08). Conclusions: Pts undergoing open abdominal surgery with gynecologic oncologists have frequent wound complications secondary to modifiable and non-modifiable risk factors. Adding CMS to preoperative skin preparation in patients undergoing surgery for known or suspected gynecologic malignancy may contribute to the reduction of surgical site infection. Study enrollment continues with 90/300 patients and study likely completed in 12-18 months.

Source: EMBASE

25. C-section infections: Taking preoperative skin prep one step further

Author(s) Dalton C.M., Fabrizio M., Vukelich V., Bridge C., Ferrelli J., Yassin M.H.

Citation: American Journal of Infection Control, June 2013, vol./is. 41/6 SUPPL. 1(S41-S42), 0196-6553 (June 2013)

Publication Date: June 2013

Abstract: BACKGROUND/OBJECTIVES: The prevention of surgical site infections (SSI) is heavily dependent on preoperative preparation and disinfection. Single disinfection is less effective than repeated disinfection efforts preoperatively. Caesarean section (CS) incisions are in the lower abdominal wall, an area that is usually moist and heavily colonized. Colonization can be denser in populations of morbidly obese females requiring CS. Chart review of 8 months of CS SSI patients revealed morbid obesity to be a risk factor in all 8 cases of SSIs. An intervention was planned to decrease SSIs in CS patients by adding pre-op bathing with CHG to the operative protocol. METHODS: Our hospital is a tertiary medical center performing over 500 CSs per year. On March 1, 2012, after education, preoperative bathing with 2% chlorhexidine gluconate (CHG) impregnated wipes was started for scheduled CS patients. The wipes were used on the patient's abdominal operative area as well as the arms and hands in order to prevent recontamination. Documentation was completed on the pre-op checklist in the electronic health record. CS infections were captured by physicians completing a monthly questionnaire to report all CS infections that occurred within 30 days of the procedure. RESULTS: In the prior eight months we had 8 infections in 393 procedures (rate 2.0). In the eight months after the intervention we had 2 infections in 375 procedures (rate 0.53) p= 0.06. Compliance with the preoperative bathing protocol was 85%. CONCLUSIONS: The use of 2% CHG pre-op bathing was effective in reducing the CS infection rate in this limited time period. Using the CHG wipes removed gross contamination and also provided prolonged antibacterial effect which further reduced the level of the patient's own skin flora. Due to the success in decreasing infection rates this protocol was extended to the unscheduled CS patients as well.

Source: EMBASE

26. Advance pre-operative chlorhexidine preparation reduces periprosthetic infections following total joint arthroplasty

Author(s) Kapadia B.H., Issa K., McElroy M.J., Pivec R., Daley J.A., Mont M.A.
27. Chlorhexidine reduces infections in knee arthroplasty

**Author(s)** Johnson A.J., Kapadia B.H., Daley J.A., Molina C.B., Mont M.A.

**Citation:** The journal of knee surgery, June 2013, vol./is. 26/3(213-218), 1538-8506 (Jun 2013)

**Publication Date:** June 2013

**Abstract:** The purpose of this study was to evaluate the incidence of surgical site infections in total knee arthroplasty patients using a preadmission cutaneous skin preparation protocol compared with a cohort of patients undergoing standard in-hospital perioperative preparation only. Records between 2007 and 2010 were reviewed to identify deep incisional and periprosthetic infections among patients using the chlorhexidine protocol (478 patients) and patients who did not use the protocol (1,735 patients). Patients using the chlorhexidine cloths were given two packets of six chlorhexidine gluconate-impregnated cloths, with instructions for use, the evening before and morning of surgery. A statistically lower incidence of surgical site infection was found in patients using the chlorhexidine cloths (0.6%) compared with patients undergoing in-hospital perioperative skin preparation only (2.2%). On the basis of the results of this study, a preadmission chlorhexidine protocol seems to be an effective method to prevent surgical site infections in total knee arthroplasty procedures. Thieme Medical Publishers 333 Seventh Avenue, New York, NY 10001, USA.

**Source:** EMBASE

28. Reducing the risk of surgical site infections: Does chlorhexidine gluconate provide a risk reduction benefit?

**Author(s)** Edmiston, Charles E., Bruden, Benjamin, Rucinski, Maria C., Henen, Cindy, Graham, Mary Beth, Lewis, Brian L.

**Citation:** American Journal of Infection Control, 02 May 2013, vol./is. 41/5(0-), 01966553

**Publication Date:** 02 May 2013

**Abstract:** Chlorhexidine gluconate (CHG) has been available as a topical antiseptic for over 50 years, having broad clinical application throughout the health care environment. Evidence-based clinical studies have shown chlorhexidine gluconate to be a safe and effective perioperative skin-prepping agent. Renewed interest has emerged for use of the antiseptic bath/shower to reduce the microbial skin burden prior to hospital admission. Recent clinical studies have documented that multiple applications of 2% or 4% CHG using a standardized protocol results in high skin surface concentrations sufficient to inhibit/kill skin colonizing flora, including methicillin-resistant Staphylococcus aureus. A new focus for the use of CHG in surgical patients involves irrigation of the wound prior to closure with 0.05% CHG followed by saline rinse. Recent laboratory studies suggest that, following a 1-minute exposure, 0.05% CHG produces a >5-log reduction against selective health care-associated pathogens and reduces microbial adherence to the surface of implantable biomedical devices. General, orthopedic, cardiothoracic, and obstetrical surgical studies have documented the safety of selective CHG formulations in elective surgical procedures. The following discussion will address both the evidence-based literature and preliminary
findings suggesting that CHG has a broad and safe range of applications when used as an 
adjunctive interventional strategy for reducing the risk of postoperative surgical site 
infections (SSI).

Source: CINAHL

29. Efficacy of preparation solutions and cleansing techniques on contamination of the skin 
in foot and ankle surgery: A systematic review and meta-analysis.

Author(s) Yammine, K, Harvey, A

Citation: The bone & joint journal, Apr 2013, vol. 95-B, no. 4, p. 498-503 (April 2013)

Publication Date: April 2013

Abstract: We report a systematic review and meta-analysis of published randomised and 
quasi-randomised trials evaluating the efficacy of pre-operative skin antisepsis and 
cleansing techniques in reducing foot and ankle skin flora. The post-preparation culture 
number (Post-PCN) was the primary outcome. The data were evaluated using a modified 
version of the Cochrane Collaboration’s tool. We identified eight trials (560 participants, 716 
feet) that met the inclusion criteria. There was a significant difference in the proportions of 
Post-PCN between hallux nailfold (HNF) and toe web spaces (TWS) sites: 0.47 vs 0.22, 
respectively (95% confidence interval (CI) 0.182937 to 0.304097; p

Source: Medline

30. An evidence based protocol for preoperative skin preparation

Author(s) Silva, Pedro

Citation: Journal of Perioperative Practice, Apr 2013, vol. 23, no. 4, p. 87-90, 1750-4589 
(April 2013)

Publication Date: April 2013

Abstract: Surgical site infections (SSIs) represent a major source of morbidity and 
mortality among surgical patients (Swenson et al 2009). The most common source of SSIs 
is the patient's own skin flora (Zinn et al 2010). A literature review was performed on the 
impact of the different intraoperative skin preparation solutions in reducing the risk of SSIs, 
concluding that 2% chlorhexidine in spirit is the most effective. [PUBLICATION] 20 
references

Source: BNI

Available in fulltext from Journal of Perioperative Practice, The at ProQuest
Available in fulltext from Journal of Perioperative Practice at EBSCOhost

31. Infection prevention methodologies for lower extremity total joint arthroplasty

Author(s) Kapadia B.H., Pivec R., Johnson A.J., Issa K., Naziri Q., Daley J.A., Mont M.A.

Citation: Expert Review of Medical Devices, March 2013, vol./is. 10/2(215-224), 1743-
4440;1745-2422 (March 2013)

Publication Date: March 2013

Abstract: Despite advances in our understanding of surgical site infections following total 
joint arthroplasty, this serious surgical complication continues to represent a substantial 
economic burden for the patient, the treating institution and the healthcare system. After 
increasing for the past decade, infection rates have stabilized at 1.6%; however, the total 
cost is projected to increase with the total number of revision procedures performed. A 
systematic review of the literature was performed to identify studies that assess the efficacy 
of pre-, peri- and post-operative infection prevention strategies in the setting of total hip or 

close-up arthroplasty. Preference was given to randomized-controlled trials, data from national 
registries and meta-analyses within the past 5 years; however, all relevant articles were 
included in this analysis. The results of the literature search returned 549 articles that 
dressed infection in total joint arthroplasty, of which 71 specifically addressed infection
prevention. Topics that were addressed included the CDC recommendations, skin preparation techniques, hair removal techniques, surgical draping techniques, operative dress, operating room ventilation, operating room traffic and antibiotic utilization. Newer infection prevention techniques, such as preoperative antiseptic scrubbing, are affected and may help reduce the infection rate, while traditionally accepted methods of prophylaxis such as laminar-flow operating rooms and body exhaust suits may raise the infection rate.

Source: EMBASE

Available in fulltext from Expert Review of Medical Devices at ProQuest

32. A comparison of chlorhexidine-alcohol versus povidone-iodine for eliminating skin flora before genitourinary prosthetic surgery: a randomized controlled trial.

Author(s) Yeung, Lawrence L, Grewal, Shaun, Bullock, Arnold, Lai, H Henry, Brandes, Steven B

Citation: The Journal of urology, Jan 2013, vol. 189, no. 1, p. 136-140 (January 2013)

Publication Date: January 2013

Abstract: We defined the relevant skin flora during genitourinary prosthetic surgery, evaluated the safety of chlorhexidine-alcohol for use on the male genitalia and compared chlorhexidine-alcohol to povidone-iodine in decreasing the rate of positive bacterial skin cultures at the surgical skin site before prosthetic device implantation. In this single institution, prospective, randomized, controlled study we evaluated 100 consecutive patients undergoing initial genitourinary prosthetic implantation. Patients were randomized to a standard skin preparation with povidone-iodine or chlorhexidine-alcohol. Skin cultures were obtained from the surgical site before and after skin preparation. A total of 100 patients were randomized, with 50 in each arm. Pre-preparation cultures were positive in 79% of the patients. Post-preparation cultures were positive in 8% in the chlorhexidine-alcohol group compared to 32% in the povidone-iodine group (p = 0.0091). Coagulase-negative staphylococci were the most commonly isolated organisms in post-preparation cultures in the povidone-iodine group (13 of 16 patients) as opposed to propionibacterium in the chlorhexidine-alcohol group (3 of 4 patients). Clinical complications requiring additional operations or device removal occurred in 6 patients (6%) with no significant difference between the 2 groups. No urethral or genital skin complications occurred in either group. Chlorhexidine-alcohol was superior to povidone-iodine in eradicating skin flora at the surgical skin site before genitourinary prosthetic implantation. There does not appear to be any increased risk of urethral or genital skin irritation with the use of chlorhexidine compared to povidone-iodine. Chlorhexidine-alcohol appears to be the optimal agent for skin preparation before genitourinary prosthetic procedures. Copyright © 2013 American Urological Association Education and Research, Inc. Published by Elsevier Inc. All rights reserved.

Source: Medline

33. Bacterial Colonization of the Skin Following Aseptic Preoperative Preparation and Impact of the Use of Plastic Adhesive Drapes

Author(s) Falk-Brynhildsen K., Friberg O., Soderquist B., Nilsson U.G.

Citation: Biological Research for Nursing, 2013, vol./is. 15/2(242-248), 1099-8004;1552-4175 (2013)

Publication Date: 2013

Abstract: Surgical site contamination, for example, with coagulase-negative staphylococci, probably derives from both the patient's own skin flora and those of the surgical team. Despite preoperative antiseptic preparation with chlorhexidine solution, complete sterilization of the skin is not possible and gradual recolonization will occur. Plastic adhesive drape is an established method used to prevent direct wound contamination from adjacent skin. In this study, the time to skin recolonization after antiseptic preparation was measured and the impact of using plastic adhesive drape on this recolonization was evaluated. Repeated bacterial sampling using three different methods over 6 hr was
conducted after antiseptic preparation in 10 volunteers. Recolonization of skin was observed after 30 min with plastic drape and after 60 min without plastic drape; there were significantly more positive cultures with the plastic drape than without (31% vs. 7.5%, respectively, p < .001). Sampling with a rayon swab was the most sensitive sampling method. In conclusion, covering the skin with a plastic adhesive drape seems to hasten recolonization of the skin after antiseptic preparation. However, clinical trials to confirm this finding are warranted. © The Author(s) 2012.

Source: EMBASE

34. Preoperative skin antiseptics for preventing surgical wound infections after clean surgery

Author(s) Dumville J.C., McFarlane E., Edwards P., Lipp A., Holmes A.

Citation: The Cochrane database of systematic reviews, 2013, vol./is. 3/(CD003949), 1469-493X (2013)

Publication Date: 2013

Abstract: Surgical site infection rates in the month following clean surgery vary from 0.6% (knee prosthesis) to 5% (limb amputation). Due to the large number of clean surgical procedures conducted annually the costs of these surgical site infections (SSIs) can be considerable in financial and social terms. Preoperative skin antisepsis using antiseptics is performed to reduce the risk of SSIs by removing soil and transient organisms from the skin where a surgical incision will be made. Antiseptics are thought to be toxic to bacteria and therefore aid their mechanical removal. The effectiveness of preoperative skin preparation is thought to be dependent on both the antiseptic used and the method of application, however, it is unclear whether preoperative skin antisepsis actually reduces postoperative wound infection, and, if so, which antiseptic is most effective. To determine whether preoperative skin antisepsis immediately prior to surgical incision for clean surgery prevents SSI and to determine the comparative effectiveness of alternative antiseptics. For this second update we searched the The Cochrane Wounds Group Specialised Register (searched 7 August 2012), The Cochrane Central Register of Controlled Trials (CENTRAL) (The Cochrane Library 2012, Issue 7), Ovid MEDLINE (1950 to July Week 4 2012), Ovid MEDLINE (In-Process & Other Non-Indexed Citations August 06, 2012), Ovid EMBASE (1980 to 2012 Week 31), EBSCO CINAHL (2007 to 3 August 2012). Randomised controlled trials evaluating the use of preoperative skin antiseptics applied immediately prior to incision in clean surgery. There was no restriction on the inclusion of reports based on language of publication, date or publication status. Data extraction and assessment of risk of bias were undertaken independently by two review authors. Thirteen studies were included in this review (2,623 participants). These evaluated several different types of skin antiseptics - leading to 11 different comparisons being made. Although the antiseptics evaluated differed between studies, all trials involved some form of iodine. Iodine in alcohol was compared to alcohol alone in one trial; one trial compared povidone iodine paint (solution type not reported) with soap and alcohol. Six studies compared different types of iodine-containing products with each other and five compared iodine-containing products with chlorhexidine-containing products. There was evidence from one study suggesting that preoperative skin preparation with 0.5% chlorhexidine in methylated spirits led to a reduced risk of SSI compared with an alcohol based povidone iodine solution: RR 0.47 (95% CI 0.27 to 0.82). However, it is important to note that the trial does not report important details regarding the interventions (such as the concentration of povidone iodine paint used) and trial conduct, such that risk of bias was unclear. There were no other statistically significant differences in SSI rates in the other comparisons of skin antisepsis. Overall the risk of bias in included studies was unclear. A mixed treatment comparison meta-analysis was conducted and this suggested that alcohol-containing products had the highest probability of being effective - however, again the quality of this evidence was low. A comprehensive review of current evidence found some evidence that preoperative skin preparation with 0.5% chlorhexidine in methylated spirits was associated with lower rates of SSIs following clean surgery than alcohol-based povidone iodine paint. However this single study was poorly reported. Practitioners may therefore elect to consider other characteristics such as costs and potential side effects when choosing between alternatives. The design of future trials should be driven by the questions of high priority to decision makers. It may be that investment in at least one large trial (in terms of participants) is warranted in order to add definitive and hopefully conclusive data to the current evidence base. Ideally any future trial...
would evaluate the iodine-containing and chlorhexidine-containing solutions relevant to current practice as well as the type of solution used (alcohol vs. aqueous).

**Source:** EMBASE

Available in fulltext from Cochrane Library, The at Wiley

35. Evaluation with a focus on both the antimicrobial efficacy and cumulative skin irritation potential of chlorhexidine gluconate alcohol-containing preoperative skin preparations

**Author(s)** Nishihara Y., Kajiura T., Yokota K., Kobayashi H., Okubo T.

**Citation:** American Journal of Infection Control, December 2012, vol./is. 40/10(973-978), 0196-6553;1527-3296 (December 2012)

**Publication Date:** December 2012

**Abstract:** Background: Important characteristics for ideal skin preparations include long-lasting antimicrobial efficacy and low potential for skin irritation. Methods: A total of 55 healthy adult subjects were enrolled to evaluate the antimicrobial effects of 3 test formulations applied to inguinal, abdominal, and antecubital sites at post-treatment time points of 30 seconds, 72 hours, and 7 days. To investigate skin irritation potential, the 3 formulations were tested in a 21-day repeat-insult patch test conducted on the skin of the backs of 23 healthy subjects. Results: The mean log<sub>10</sub> reduction (MLR) at 7 days post-treatment produced by a 79% vol/vol ethanol containing 1% wt/vol chlorhexidine gluconate (1% CHG-EtOH) applied to abdominal sites was significantly superior to that produced by a 10% povidone-iodine solution (2.45 MLR vs 0.90 MLR; P < .05). The 1% CHG-EtOH and a 70% vol/vol isopropanol containing 2% wt/vol CHG (2% CHG-IPA) provided statistically equivalent persistence at 72 hours and 7 days post-treatment. The 1% CHG-EtOH had less skin irritation potential than the 2% CHG-IPA and the 10% povidone-iodine solution, although the differences were not statistically significant (P > .05). Conclusion: Considering its persistent effect and low skin irritation potential, the 1% CHG-EtOH preparation is expected to perform well in surgical site preparation to reduce the risk of surgery- and catheter-related bloodstream infection. Copyright © 2012 by the Association for Professionals in Infection Control and Epidemiology, Inc. Published by Elsevier Inc. All rights reserved.

**Source:** EMBASE

36. Reduction of surgical site infections in low transverse cesarean section at a university hospital

**Author(s)** Riley M.M.-S., Suda D., Tabsh K., Flood A., Pegues D.A.

**Citation:** American Journal of Infection Control, November 2012, vol./is. 40/9(820-825), 0196-6553;1527-3296 (November 2012)

**Publication Date:** November 2012

**Abstract:** Background: We implemented evidence-based interventions to reduce risk of surgical site infection (SSI) following low transverse cesarean section (LTCS). Methods: An observational study was conducted to determine LTCS SSI rates and the impact of infection control interventions at an academic teaching hospital during the period October 2005 to December 2008, including the use of 2% chlorhexidine gluconate (CHG) for surgical skin preparation before LTCS and no-rinse CHG cloths for preoperative skin cleansing. We compared overall and risk strata specific SSI rates and standardized incidence ratios during 4 study periods and estimated cost savings. Results: Of 1,844 LTCSs performed, 99 patients were identified with SSI. SSI rates per 100 LTCS declined from 6.27 at baseline and 10.84 during the outbreak period to 5.92 in intervention 1 period and 2.29 in intervention 2 period. Overall, a 63.5% reduction in SSI rate from baseline was achieved by ensuring compliance with SSI prevention guidelines and improving skin antisepsis (P =.003). In intervention 2 period, the standardized incidence ratio was 0.99 compared with 2.64 at baseline and 4.50 during the outbreak period. Conclusion: A multidisciplinary approach including evidence-based SSI prevention practices, effective infection prevention products, and staff and patient engagement substantially reduced infection risk and improved patient safety following LTCS. Copyright &© 2012 by the
37. Preoperative topical antimicrobial decolonization in head and neck surgery

**Author(s)** Shuman A.G., Shuman E.K., Hauff S.J., Fernandes L.L., Light E., Chenoweth C.E., Bradford C.R.

**Citation:** Laryngoscope, November 2012, vol./is. 122/11(2454-2460), 0023-852X;15 31 4995 (November 2012)

**Publication Date:** November 2012

**Abstract:** Objectives/Hypothesis: Surgical site infections (SSIs) are an important cause of morbidity and mortality after head and neck surgery. Our primary objective was to determine the efficacy of preoperative topical antimicrobial decolonization before head and neck surgery. Study Design: Prospective, randomized controlled trial. Methods: This study was conducted among 84 patients presenting for head and neck surgery requiring admission to an academic medical center. Preoperative cultures were performed to identify Staphylococcus aureus carriers. Patients were randomized to preoperative topical antimicrobial decolonization with a 5-day regimen of chlorhexidine skin rinses and intranasal mupirocin coupled with standard perioperative systemic antimicrobial prophylaxis, versus standard prophylaxis alone. The main outcome was the incidence of SSIs. Results: Despite a trend suggesting a decrease in SSIs with perioperative topical antimicrobial decolonization (24% vs. 10%), there was no significant difference (odds ratio, 0.34; 95% confidence interval, 0.10-1.18; P =.079). Patients with a higher American Society of Anesthesiologists score (3 vs. 1; P =.02), with more operative blood loss (P =.05), and who required operative takeback (P =.04) had a higher rate of SSIs; there was a trend suggesting a higher rate of SSIs among patients undergoing clean-contaminated surgery compared to clean cases (P =.08) and among those having received prior radiation (P =.07) or chemotherapy (P =.06). Conclusions: Preoperative antimicrobial decolonization did not significantly decrease the incidence of SSIs after head and neck surgery, but might be considered for high-risk groups despite the lack of conclusive evidence confirming efficacy. Risk factors for SSIs after head and neck surgery are identified for the first time in a prospective study. Laryngoscope, 2012 Copyright &© The American Laryngological, Rhinological, and Otological Society, Inc.

**Source:** EMBASE

38. Efficacy of integuseal for surgical skin preparation in children and adolescents undergoing scoliosis correction.

**Author(s)** Dromzee, Eric, Tribot-Laspière, Quentin, Bachy, Manon, Zakine, Serge, Mary, Pierre, Vialle, Raphaël

**Citation:** Spine, Oct 2012, vol. 37, no. 21, p. E1331. (October 1, 2012)

**Publication Date:** October 2012

**Abstract:** Prospective randomized trial. To explore the use of a microbial sealant applied before the surgical incision to reduce surgical site infection in patients with scoliosis. The incidence of superficial or deep infections is reported in 2 groups of patients treated for neuromuscular or adolescent idiopathic scoliosis. Statistical analysis aimed to compare the effect of the use of a cyanoacrylate microbial sealant on infection rate. From June 2010 to June 2011, 56 patients were prospectively enrolled in the study. Using a random number table, patients were assigned either to receive or not a sterile, film-forming cyanoacrylate liquid application (Integuseal). Epidemiological data and infection occurrence were compared in both groups. Statistical analysis comparing patients with neuromuscular scoliosis and adolescent idiopathic scoliosis showed that patients with neuromuscular scoliosis had more fused levels, increased intraoperative bleeding, and longer intraoperative time. Six patients had early postoperative infections of the posterior approach, which included 3 deep and 3 superficial infections. Five infections occurred in...
patients treated with Integuseal. Outcome was favorable in 6 cases after local wound debridement and antibiotics. Nonparametric statistical tests (Fisher exact test) showed no significant correlation (P = 0.096) between early postoperative infection occurrence and the use of Integuseal. Although microbial sealant may be a useful addition to a multimodal approach to minimize surgical site infection, there is currently insufficient evidence as to whether the use of microbial sealants reduces the risk of surgical site infection in patients undergoing scoliosis surgery.

Source: Medline
Available in fulltext from Spine at the ULHT Library and Knowledge Services' eJournal collection

39. The Forgotten Role of Alcohol: A Systematic Review and Meta-Analysis of the Clinical Efficacy and Perceived Role of Chlorhexidine in Skin Antisepsis

Author(s) Maiwald M., Chan E.S.-Y.
Citation: PLoS ONE, September 2012, vol./is. 7/9, 1932-6203 (05 Sep 2012)
Publication Date: September 2012
Abstract: Background: Skin antisepsis is a simple and effective measure to prevent infections. The efficacy of chlorhexidine is actively discussed in the literature on skin antisepsis. However, study outcomes due to chlorhexidine-alcohol combinations are often attributed to chlorhexidine alone. Thus, we sought to review the efficacy of chlorhexidine for skin antisepsis and the extent of a possible misinterpretation of evidence. Methods: We performed a systematic literature review of clinical trials and systematic reviews investigating chlorhexidine compounds for blood culture collection, vascular catheter insertion and surgical skin preparation. We searched PubMed, CINAHL, the Cochrane Library, the Agency for Healthcare Research and Quality website, several clinical trials registries and a manufacturer website. We extracted data on study design, antiseptic composition, and the following outcomes blood culture contamination, catheter colonisation, catheter-related bloodstream infection and surgical site infection. We conducted meta-analyses of the clinical efficacy of chlorhexidine compounds and reviewed the appropriateness of the authors' attribution. Results: In all three application areas and for all outcomes, we found good evidence favouring chlorhexidine-alcohol over aqueous competitors, but not over competitors combined with alcohols. For blood cultures and surgery, we found no evidence supporting chlorhexidine alone. For catheters, we found evidence in support of chlorhexidine alone for preventing catheter colonisation, but not for preventing bloodstream infection. A range of 29 to 43% of articles attributed outcomes solely to chlorhexidine when the combination with alcohol was in fact used. Articles with ambiguous attribution were common (8-35%). Unsubstantiated recommendations for chlorhexidine alone instead of chlorhexidine-alcohol were identified in several practice recommendations and evidence-based guidelines. Conclusions: Perceived efficacy of chlorhexidine is often in fact based on evidence for the efficacy of the chlorhexidine-alcohol combination. The role of alcohol has frequently been overlooked in evidence assessments. This has broader implications for knowledge translation as well as potential implications for patient safety. © 2012 Maiwald, Chan.

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40. Skin sealant InteguSeal has no impact on prevention of postoperative mediastinitis after cardiac surgery

**Author(s)** Waldow T., Szlapka M., Hensel J., Plotze K., Matschke K., Jatzwauk L.

**Citation:** Journal of Hospital Infection, August 2012, vol./is. 81/4(278-282), 0195-6701;1532-2939 (August 2012)

**Publication Date:** August 2012

**Abstract:** Background: Surgical site infections (SSIs) after median sternotomy represent a serious complication and a high potential risk for adverse clinical outcome after cardiac surgery. The antimicrobial skin sealant InteguSeal<sup></sup> was introduced as a novel tool in preventing development of SSI. Aim: This single-centre investigation used two prospective registries to evaluate the prophylactic effect of a cyanoacrylate-based antimicrobial skin sealant (InteguSeal<sup></sup>) on the incidence of postoperative mediastinitis or any other form of chest skin incision SSI after elective cardiac surgery. Methods: Between October 2010 and April 2011 a total of 998 patients underwent elective cardiac surgical procedures with median sternotomy in our centre. In 496 patients InteguSeal<sup></sup> was included in standard preoperative preparation procedures before chest skin incision (group 1). In 502 patients standard preoperative skin preparation procedures were used without InteguSeal<sup></sup> (group 2). Freedom from mediastinitis and from any other form of SSI within 30 postoperative days were the primary and secondary endpoints, respectively. Findings: A total of 983 patients were eligible for inclusion in per-protocol analysis (488 vs 495 patients). The incidence of postoperative mediastinitis was 2.3% in group 1 vs 3.2% in group 2 (not significant). The incidence of any form of SSI was 10.9% in group 1 vs 11.5% in group 2 (not significant). Perioperative patient characteristics, complexity of surgical procedures performed and length of hospitalization were similar in both groups. Conclusion: The use of InteguSeal<sup></sup> has no influence on the incidence of postoperative SSI and mediastinitis after cardiac surgery with median sternotomy. © 2012 The Healthcare Infection Society.

**Source:** EMBASE

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41. Rapid cycle process improvements to decrease surgical site infections in cardiothoracic and vascular surgery patients between 2008 and 2011

**Author(s)** Reed L., Sossoman L.B., Honeycutt N.

**Citation:** American Journal of Infection Control, June 2012, vol./is. 40/5(e192-e193), 0196-6553 (June 2012)

**Publication Date:** June 2012

**Abstract:** Issue: The Society of Thoracic Surgeons (STS) benchmark for coronary artery bypass graft (CABG) deep sternal wound postoperative surgical site infection was 0.2% in 2008. The rate of deep sternal wound surgical site infection in our CABG patients was 0.5% in 2008, and rose to 0.8% in 2009. An infection rate four times the national benchmark was considered an unacceptable result, and addressing this was made a priority. Project: A Multidisciplinary team was formed that included infection prevention, quality improvement, clinicians, anesthesiology, respiratory therapy, pharmacy, nursing administration, and perioperative staff. The team met weekly and made recommendations (Figure presented) in line with evidence-based practice. These recommendations were reviewed by the full cardiovascular best practice team and implemented at point of care. Since there were no commonalities easily identified in the infected patients, the infections were considered multifactorial, and numerous areas were targeted for change. Literature reviews were done to provide guidelines for preop identification and decolonization of patients colonized with MRSA. In addition, antibiotic dosing regimens were changed to reflect the recommendations in the literature, with particular attention on weight-based dosing, as well as timing of doses and antibiotic selection. Showers with chlorhexidine (CHG) the night before surgery were instituted; with a final bath using 2% impregnated CHG cloths the day of surgery. In addition, CHG was used both for the preoperative skin prep as well as
postoperative wound care. Dressing changes were treated as sterile procedures, requiring full gown, mask, and gloves. Other areas of focus improvement included rigid sternal fixation, perioperative education and planning, and early follow-up after discharge. Results: The deep sternal wound infection rate for isolated CABG decreased from 0.8% to zero, and has remained at zero since July 2009. The Cardiovascular Institute was awarded a three star rating for isolated CABG surgery by the Society of Thoracic Surgeons in 2009, which is the society’s highest rating for adult cardiac surgery. The program has received this rating for all reporting periods since 2009, including the most recent period from July 2010-June 2011. A three-star rating from the Society of Thoracic Surgeons is only achieved by approximately 14% of adult cardiac surgery programs in the country. The next reporting period, for the calendar year 2011, will be announced in early 2012. Lesson Learned: The success of this team was reliant on open communication between all members, and the willingness to be transparent with our outcomes data. The physician team buy-in was essential, as was the recognition that even small changes could result in large improvements in outcomes. Finally, the strength of objective data collection was demonstrated in its ability to influence practice change.

Source: EMBASE

42. Three interventions=zero infections

Author(s) Stewart C., Hurst D.

Citation: American Journal of Infection Control, June 2012, vol./is. 40/5(e124), 0196-6553 (June 2012)

Publication Date: June 2012

Abstract: Issue: The SSI rate for C Sections for 2008-2009 was 1.9 and 2.1, respectively (infections per 100 C Sections). When the rate for the first half of 2009 was 2.9, which put our C Section SSI rate almost at the 75th percentile when benchmarking with CDC, it was an indication we needed to make some changes in practice to see improvement in our outcomes. Perioperative patient care was not standardized across service lines, and there were separate surgical infection control policies in the OB Operating Room (OR), that differed from the Main OR and Heart Cath Lab areas. Examples of differences in practice included: * OB patients did not bathe with CHG cloths preoperatively * OB did not do preoperative MDRO screening * Variation in dress code requirements and patient surgical skin preps. Project: Infection Prevention & Control staff met with hospital and OB leadership to discuss the issue and to develop an action plan to reduce the C Section SSI rate. Variations in practice between service lines were included in the discussion and ways to bridge the gap that would standardize practice for perioperative patients. Three interventions were selected: * Use of CHG cloths for all patients admitted to Labor & Delivery (L&D) * MDRO Screening protocol for all patients * Perioperative Policies revised/standardized. Results: The first two interventions (CHG cleansing cloths and MDRO screening protocol) resulted in a C Section SSI rate decrease from 2.9 for the first half of 2009 to 1.3 in the second half. When the third intervention was added (standardized perioperative policies), the rate decreased further to 1.1. This rate placed us near the 50th percentile when benchmarking with CDC. The final rate for 2010 was 1.0; the rate for the first half of 2011 was Zero! While improved patient outcomes were the primary goal, a positive secondary outcome also became evident. The estimated cost avoidance for the 12-month period from July 2009 through July 2010 was estimated to be $100,000. Total C-Section infections 7/08-6/09 = 10 Total C-Section infections 7/09-6/10 = 5 Estimated cost per SSI: $20,000 Estimated Cost Avoidance for 12 months of CHG cloth use in L&D: $100,000 Lesson Learned: When the interventions were introduced to the OB clinicians and staff, we were met with the challenge of convincing them that OB perioperative patients had similar risks to the general surgical patient population. Key factors that gained their support included: * Supporting evidence that standardization can lead to improved patient outcomes * Organizational support to drive the sometimes unpopular changes * Organizational support to finance added expense of CHG cloths A key factor to the success of implementing these changes was engaging a physician champion to assist with buy-in from other OB physicians.

Source: EMBASE
43. Can surgical site infection after joint arthroplasty be reduced?

**Author(s)** Taneja M., Purtill J., Rothman R., Austin M., Parvizi J.

**Citation:** Surgical Infections, May 2012, vol./is. 13/(S10), 1096-2964 (May 2012)

**Publication Date:** May 2012

**Abstract:** Background: Surgical site infection (SSI) following total joint arthroplasty (TJA) is a devastating complication with immense psychological and economic burden for the patient and the healthcare provider. Due to the presence of foreign material (prosthesis), eradication of SSI in this patient population is challenging and numerous strategies have been adopted to prevent this complication. Hypothesis: We hypothesize that a majority of contaminations of the surgical site, leading to subsequent infection, occur during draping, and that repeat skin antisepsis prior to application of incise draping will reduce the incidence of SSI. Methods: This randomized, single-blind, prospective study recruited 600 patients undergoing TJA between March 2010 and November 2011 at a single center. 537 subjects qualified for analysis by completing the first postoperative visit. The control group had standard preparation of skin with chlorhexidine (preoperative shower), alcohol and povidone- iodine (intraoperative skin preparation). Incise draping (IobanTM) was applied once the skin was dry. The experimental group had the same skin preparation but after draping and prior to application of the incise drape, a combination of iodine povacrylex (iodophor)/alcohol (DuraPrepTM) was applied to the skin. All variables such as perioperative antibiotics, operating room environment, and postoperative wound management were the same in both groups. Results: The use of an additional skin preparation prior to application of incise draping significantly reduced the incidence of SSI in patients undergoing TJA. The cumulative incidence of superficial incisional SSI at 0.7%(2/269) in the experimental group was significantly lower than the incidence of superficial incisional SSI at 3.3% (9/268) in the control group (p < 0.036; relative risk, 0.21; 95% confidence interval, 0.02 to 1.05). Additionally, the observed incidence of skin blistering was lower in the experimental group at 3.3% (9/269) versus 5.9% (16/268) in the control group (p = 0.15). Conclusions: It appears that repeat skin antisepsis after draping and prior to application of incise draping does lead to a significant (nearly five-fold) reduction in superficial incisional SSI. We believe the beneficial effect of repeat skin antisepsis results in removing contaminating organisms that gain access to the surgical site during draping. The reduction in skin blistering that was observed could also be the result of a reduction of contaminating organisms remaining on the skin after draping.

**Source:** EMBASE

44. Skin flora: implications for nursing.

**Author(s)** Gould, Dinah

**Citation:** Nursing Standard, Apr 2012, vol. 26, no. 33, p. 48-56, 0029-6570 (April 18, 2012)

**Publication Date:** April 2012

**Abstract:** Continuing Professional Development, NS639. Description of the structure and function of the skin and the resident and transient flora that are present on it. The use of different types of skin antiseptics to reduce inpatients’ and day case patients’ exposure to healthcare-associated infections (HCAIs) during procedures is discussed. Procedures for skin preparation prior to surgery or insertion of intravenous devices, MRSA decolonisation, hand hygiene and surgical hand antisepsis are described. [Original] 52 references

**Source:** BNI

Available in fulltext from Nursing Standard at EBSCOhost

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45. Efficacy of surgical preparation solutions in lumbar spine surgery

**Author(s)** Savage J.W., Weatherford B.M., Sugrue P.A., Nolden M.T., Liu J.C., Song J.K., Haak M.H.

**Citation:** Journal of Bone and Joint Surgery - Series A, March 2012, vol./is. 94/6(490-494),
Abstract: Background: Postoperative spinal wound infections are relatively common and are often associated with increased morbidity and poor long-term patient outcomes. The purposes of this study were to identify the common bacterial flora on the skin overlying the lumbar spine and evaluate the efficacy of readily available skin-preparation solutions in the elimination of bacterial pathogens from the surgical site following skin preparation. Methods: A prospective randomized study was undertaken to evaluate 100 consecutive patients undergoing elective lumbar spine surgery. At the time of surgery, the patients were randomized to be treated with one of two widely used, and Food and Drug Administration (FDA)-approved, surgical skin-preparation solutions: ChloraPrep (2% chlorhexidine gluconate and 70% isopropyl alcohol) or DuraPrep (0.7% available iodine and 74% isopropyl alcohol). Specimens for aerobic and anaerobic cultures were obtained prior to skin preparation (pre-preparation), after skin preparation (post-preparation), and after wound closure (post-closure). A validated neutralization solution was used for each culture to ensure that the antimicrobial activity was stopped immediately after the sample was taken. Positive cultures and specific bacterial pathogens were recorded. Results: Coagulase-negative Staphylococcus, Propionibacterium acnes, and Corynebacterium were the most commonly isolated organisms prior to skin preparation. The overall rate of positive cultures prior to skin preparation was 82%. The overall rate of positive cultures after skin preparation was 0% (zero of fifty) in the ChloraPrep group and 6% (three of fifty) in the DuraPrep group (p = 0.24, 95% confidence interval [CI] = 0.006 to 0.085). There was an increase in positive cultures after wound closure, but there was no difference between the ChloraPrep group (34%, seventeen of fifty) and the DuraPrep group (32%, sixteen of fifty) (p = 0.22, 95% CI = 0.284 to 0.483). Body mass index (BMI), duration of surgery, and estimated blood loss did not show a significant association with post-closure positive culture results. Conclusions: ChloraPrep and DuraPrep are equally effective skin-preparation solutions for eradication of common bacterial pathogens on the skin overlying the lumbar spine. Level of Evidence: Therapeutic Level I. See Instructions for Authors for a complete description of levels of evidence. Copyright © 2012 by The Journal of Bone and Joint Surgery, Incorporated.

Source: EMBASE
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46. A critical review of the literature regarding the use of povidone iodine chlorhexidine gluconate for preoperative surgical skin preparation

Author(s) Scowcroft T.
Citation: Journal of perioperative practice, March 2012, vol./is. 22/3(95-99), 1750-4589 (Mar 2012)
Publication Date: March 2012
Abstract: This paper presents a critical analysis of studies regarding the effectiveness of preoperative skin preparation solutions. The aim was to allow evidence based practice at a local level.
Source: EMBASE
Available in fulltext from Journal of Perioperative Practice, The at ProQuest
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47. Visibility of surgical site marking: a prospective randomized trial of two skin preparation solutions.

Author(s) Thakkar SC, Mears SC
Citation: Journal of Bone & Joint Surgery, American Volume, 18 January 2012, vol./is.
**Publication Date:** 18 January 2012

**Abstract:** BACKGROUND: An important component of the surgical time-out is to confirm surgical site skin markings to prevent wrong-site surgery. Different skin preparation solutions may have variable effects on the visibility of site markings after application. We performed a prospective randomized clinical trial to quantitatively and qualitatively evaluate the visibility of surgical site markings after the use of two commonly available skin preparation solutions. METHODS: We enrolled twenty patients undergoing primary total hip arthroplasty at our institution. Preoperatively, a black permanent marker was used to mark the skin of each patient with a random combination of three letters, underlined by a single black line, and with the surgeon's initials. Patients were randomly selected to receive a chlorhexidine-based or an iodine-based skin preparation according to manufacturer guidelines. The skin markings were photographed digitally, before and after the application of solution. The photographs made after the application of solution were assessed quantitatively, by calculating the contrast (marker to skin) before and after the application of the solutions, and qualitatively by ten orthopaedic surgeons to identify the random initials and to recognize skin markings. RESULTS: The mean change in contrast level after application of the chlorhexidine-based solution was significantly greater than that after application of the iodine-based solution (mean and standard deviation, 59.8 ± 15.7 U versus 14.9 ± 11.4 U, respectively; p 0.0001). Surgeons were an average of twenty-two times less likely (95% confidence interval, eight to sixty-eight) to judge markings as acceptable for site identification after preparation with the chlorhexidine-based solution than after preparation with the iodine-based solution. When examining individual letters, the surgeons correctly identified 296 of 300 letters in the group prepared with the chlorhexidine-based solution than after preparation with the iodine-based solution. When examining individual letters, the surgeons correctly identified 296 of 300 letters in the group prepared with the chlorhexidine-based solution and 209 of 300 letters in the group prepared with the chlorhexidine-based solution; the difference was significant (p 0.0001). CONCLUSIONS: The use of the chlorhexidine-based solution for skin preparation resulted in significantly greater erasure of the surgical site marking than did the use of the iodine-based solution. LEVEL OF EVIDENCE: Therapeutic Level I. See Instructions for Authors for a complete description of levels of evidence.

**Source:** CINAHL

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48. Skin preparation for preventing infection following caesarean section

**Author(s)** Hadiati D.R., Hakimi M., Nurdiani D.S.

**Citation:** Cochrane database of systematic reviews (Online), 2012, vol./is. 9/(CD007462), 1469-493X (2012)

**Publication Date:** 2012

**Abstract:** The risk of maternal mortality and morbidity (particularly postoperative infection) is higher for caesarean section than for vaginal birth. With the increase in caesarean section, it is important that the risks to the mother are minimised as far as possible. This review focuses on different forms and methods for preoperative skin preparation to prevent infection. To compare the effects of different agent forms and methods of preoperative skin preparation for preventing postcaesarean infection. We searched the Cochrane Pregnancy and Childbirth Group's Trials Register (2 January 2012) and the reference lists of all included studies and review articles Randomised and quasi-randomised trials, including cluster-randomised trials, evaluating any type of preoperative skin preparation agents, forms and methods of application for caesarean section. Three review authors independently assessed all potential studies for inclusion, assessed risk of bias and extracted the data using a predesigned form. Data were checked for accuracy. We included five trials with a total of 1462 women. No difference was found in the primary outcomes of either wound infection or endometritis. Two trials of 1294 women, compared drape with no drape (one trial using iodine and the other using chlorhexidine) and found no significant difference in wound infection (risk ratio (RR) 1.29; 95% confidence interval (CI) 0.97 to 1.71). One trial of 79 women comparing alcohol scrub and iodophor drape with iodophor
scrub without drape reported no wound infection in either group. One trial of 50 women comparing parachlorometaxylenol plus iodine with iodine alone reported no significant difference in wound infection (RR 0.33; 95% CI 0.04 to 2.99). Two trials reported endometritis, one trial comparing alcohol scrub and iodophor drape with iodophor scrub only found no significant difference (RR 1.62; 95% CI 0.29 to 9.16). The other trial of 50 women comparing parachlorometaxylenol plus iodine with iodine alone reported no significant difference in endometritis (RR 0.88; 95% CI 0.56 to 1.38). No difference was found in the secondary outcome of either length of stay or reduction of skin bacteria colony count. No trial reported other maternal outcomes, i.e. maternal mortality, repeat surgery and re-admission resulting from infection. One trial, which was only available as an abstract, investigated the effect of skin preparation on neonatal adverse events and found cord blood iodine concentration to be significantly higher in the iodine group. Little evidence is available from the included randomised controlled trials to evaluate different agent forms, concentrations and methods of skin preparation for preventing infection following caesarean section. Therefore, it is not yet clear what sort of skin preparation may be most efficient for preventing postcaesarean wound and surgical site infection. There is a need for high-quality, properly designed randomised controlled trials with larger sample sizes in this field. High priority questions include comparing types of antiseptic (especially iodine versus chlorhexidine), the timing and duration of applying the antiseptic (especially previous night versus day of surgery, and application methods (scrubbing, swabbing and draping).

Source: EMBASE
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Other Published Research

Alcoholic Chlorhexidine or Alcoholic Iodine Skin Antisepsis (ACAISA): protocol for cluster randomised controlled trial of surgical skin preparation for the prevention of superficial wound complications in prosthetic hip and knee replacement surgery
BMJ open, 2014

Comparison of the efficacy of chlorhexidine gluconate versus povidone iodine as preoperative skin preparation for the prevention of surgical site infections in clean-contaminated upper abdominal surgeries.
Surgery today, 2014

A comparative clinical study focusing on the antimicrobial efficacies of chlorhexidine gluconate alcohol for patient skin preparations.
Journal of infusion nursing, 2012

Skin antisepsis for central neuraxial blockade
Association of Anaesthetists of GB and Ireland, 2014

Google Scholar

From the 1st fifty results:

Impact of non-rinse skin cleansing with chlorhexidine gluconate on prevention of healthcare-associated infections and colonization with multi-resistant organisms: a ---
S Karki, AC Cheng - Journal of Hospital Infection, 2012 - Elsevier
... 26, Randomized controlled study, Orthopaedic surgery, Whole-body cleansing with 2%
CHG ... 1 h of incision, use of antibiotic-impregnated barrier, intraoperative skin preparation using 2 ... 25, Before-and-after study, Caesarean section surgery, Preoperative skin disinfection prior to ... Cited by 45 Related articles All 9 versions Cite Save

**Chlorhexidine-alcohol compared with povidone-iodine for surgical-site antisepsis in cesarean deliveries**

G Menderes, NA Ali, K Aagaard… - Obstetrics & …, 2012 - journals.lww.com
... recommendation, 6 2% chlorhexidine-based preparations should be used to cleanse the insertion ... of 10% povidone-iodine was used exclusively as preoperative skin cleansing agent before ... Method of skin incision closure was significantly different, with 91% among povidone ...
Cited by 10 Related articles All 4 versions Cite Save

**Clinical practice guideline surgical site infection prevention**

MA Smith, NR Dahlen, A Bruemmer, S Davis… - Orthopaedic …. 2013 - journals.lww.com
... include, but are not limited to nasal swabbing, preoperative skin cleansing, preoperative hair ... are as follows: patient being an MRSA carrier; preoperative skin prep; ... include intravenous antibiotic administration, adherence to perioperative skin preparation, systematic assessment ...
Cited by 6 Related articles All 7 versions Cite Save

**Shaving versus depilation cream for pre-operative skin preparation**

JS Karegoudar, PJ Prabhakar, V Vijayanath… - Journal of Surgery, 2012 - Springer
... state that pre-operative skin preparation of surgical patients should include little or no hair removal, cleansing of the ... The skin should be cleansed before surgery. ... The wound infection rate not only depends on the skin preparation, but also on the interval between skin prepara ...
Cited by 1 Related articles All 8 versions Cite Save

**Zero surgical site infections: is it possible?**

CD Smith - Advances in surgery, 2012 - Elsevier
... Perform preoperative antiseptic skin cleansing. Mechanical preparation of the colon for colorectal surgery patients. ... Use an appropriate antiseptic agent for skin preparation. ... Optimize ventilation, environmental cleaning, and sterilization of surgical equipment. ...
Cited by 2 Related articles All 4 versions Cite Save

**Safety of chlorhexidine gluconate used for skin antisepsis in the preterm infant**

AK Chapman, SW Aucott, AM Milstone - Journal of Perinatology, 2012 - nature.com
... of the participants reported using chlorhexidine in their NICU, with the most common use being skin preparation during central ... A randomized controlled trial of the impact of chlorhexidine skin cleansing on bacterial colonization of hospital-born ... Textbook of Small Animal Surgery. ...
Cited by 26 Related articles All 6 versions Cite Save

**Published Research – Database Search Strategy**

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