

CADTH RAPID RESPONSE REPORT: SUMMARY OF ABSTRACTS

Chlorhexidine Gluconate for Skin Preparation during Minor Procedures: Clinical Effectiveness and Guidelines

Service Line: Rapid Response Service
Version: 1.0
Publication Date: June 3, 2019
Report Length: 8 Pages

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Cite As: *Chlorhexidine Gluconate for Skin Preparation During Minor Procedures: Clinical Effectiveness and Guidelines*. Ottawa: CADTH; 2019 June. (CADTH rapid response report: summary of abstracts).

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Funding: CADTH receives funding from Canada's federal, provincial, and territorial governments, with the exception of Quebec.

Research Questions

1. What is the clinical effectiveness of chlorhexidine gluconate wipes for adults undergoing skin preparation for minor procedures?
2. What are the evidence-based guidelines associated with skin preparation during minor procedures?

Key Findings

Two systematic reviews with meta-analyses, one systematic review, one non-randomized trial, and three evidence-based guidelines were identified regarding chlorhexidine gluconate for skin preparation during minor procedures.

Methods

A limited literature search was conducted by an information specialist on key resources including PubMed, the Cumulative Index to Nursing and Allied Health Literature (CINAHL), the Cochrane Library, University of York Centre for Reviews and Dissemination (CRD), Canadian and major international health technology agencies, as well as a focused Internet search. The search strategy was comprised of both controlled vocabulary, such as the National Library of Medicine's MeSH (Medical Subject Headings), and keywords. The main search concepts were chlorhexidine and skin preparation for minor procedures. Search filters were applied to limit retrieval to guidelines for Q2 only. The search was also limited to English language documents published between January 1, 2009 and May 15, 2019. Internet links were provided, where available.

Selection Criteria

One reviewer screened citations and selected studies based on the inclusion criteria presented in Table 1.

Table 1: Selection Criteria

Population	Adults undergoing skin preparation for minor procedures (e.g., intravenous insertion, drawing blood, core biopsies, other procedures performed outside of the operating room)
Intervention	Chlorhexidine gluconate swabs/wipes
Comparator	Q1: Alcohol; Other swab preparations (e.g., povidone-iodine); No treatment Q2: No comparator
Outcomes	Q1: Clinical effectiveness (e.g., prevention of skin infections, ease or speed of drying) and safety (e.g., clinical benefit or harm [e.g., skin irritation]) Q2: Guidelines
Study Designs	Health technology assessments, systematic reviews, meta-analyses, randomized controlled trials, non-randomized trials, evidence-based guidelines

Results

Rapid Response reports are organized so that the higher quality evidence is presented first. Therefore, health technology assessment reports, systematic reviews, and meta-analyses are presented first. These are followed by randomized controlled trials, non-randomized studies, and evidence-based guidelines.

Two systematic reviews with meta-analyses, one systematic review and one non-randomized trial were identified regarding chlorhexidine gluconate for skin preparation during minor procedures. In addition, three evidence-based guidelines were identified. No health technology assessment reports or randomized controlled trials were identified.

Additional references of potential interest are provided in the appendix.

Overall Summary of Findings

Three systematic reviews¹⁻³ (two with meta-analyses,^{1,3} and one non-randomized trial⁴ were identified regarding chlorhexidine gluconate for skin preparation during minor procedures. A wide range of health outcomes were reported and the conclusions were inconsistent.¹⁻⁴ Detailed study characteristics are provided in Table 2.

Three evidence-based guidelines⁵⁻⁷ were identified regarding chlorhexidine gluconate for skin preparation during minor procedures. The 2017 American College of Radiology (ACR) guideline⁵ recommended that prior to central venous catheters insertion and during dressing changes, concentrations greater than 0.5% chlorhexidine preparation with alcohol should be used for antiseptic skin preparation. The 2017 National Institute for Health Care and Excellence (NICE) guideline⁶ recommended that before inserting a peripheral vascular access device or a peripherally inserted central catheter, the skin at the insertion site should be cleaned with chlorhexidine gluconate in 70% alcohol.⁶ The 2017 guideline by American Society of Anesthesiologists (ASA) Task Force on Infectious Complications Associated with Neuraxial Techniques and the American Society of Regional Anesthesia and Pain Medicine⁷ reported that the ASA members had no preference for povidone-iodine with or without alcohol, or chlorhexidine with or without alcohol, while the consultants indicate a preference for chlorhexidine with alcohol as a skin preparation solution.

Table 2: Characteristics of Included Literature

First Author, Publication Year, Country	Study Designs, Number of Studies Included and Population Characteristics	Intervention and Comparator(s)	Outcomes	Conclusions
Systematic Reviews and Meta-analyses				
Fasugba, 2017¹ Australia	14 studies included N = NR Age: NR MA performed	Antiseptic vs. non-antiseptic agents Povidone-iodine vs. routine care Povidone-iodine vs. soap and water	<ul style="list-style-type: none"> CAUTI rate 	“There were no differences in CAUTI rates, although methodological issues hamper generalizability of this finding. Antibacterial agents may prove to be significant in a well-conducted study. The present results provide good evidence to inform infection control guidelines in catheter management.” ¹

First Author, Publication Year, Country	Study Designs, Number of Studies Included and Population Characteristics	Intervention and Comparator(s)	Outcomes	Conclusions
		Chlorhexidine vs. water Povidone-iodine vs. saline Povidone-iodine vs. water Green soap and water ^a vs. routine care Antibacterial agent vs. routine care		
Cooper, 2016² UK	3 RCTs included N = 107 Age: NR	Water vs. chlorhexidine solution	<ul style="list-style-type: none"> • Incidence of asymptomatic bacteriuria • Symptomatic CAUTI 	“(T)here was no statistically significant difference in the incidence of asymptomatic bacteriuria at 7 days (RR 0.80, 95% CI 0.42 to 1.52) between people receiving water or chlorhexidine solution for periurethral cleansing at the time of catheter replacement. However, none of the 16 participants developed a symptomatic CAUTI at day 14.” ²
Lai, 2016³ Malaysia	13 studies included 12 studies contributed data N = 3446 central venous catheters Age: NR MA performed	Chlorhexidine solution vs. povidone-iodine solution	<ul style="list-style-type: none"> • Catheter-related BSI • Mortality 	“It is not clear whether cleaning the skin around CVC insertion sites with antiseptic reduces catheter related blood stream infection compared with no skin cleansing. Skin cleansing with chlorhexidine solution may reduce rates of CRBSI and catheter colonisation compared with cleaning with povidone iodine. These results are based on very low quality evidence, which means the true effects may be very different. Moreover these results may be influenced by the nature of the antiseptic solution (i.e. aqueous or alcohol-based). Further RCTs are needed to assess the effectiveness and safety of different skin antiseptic regimens in CVC care; these should measure and report critical clinical outcomes such as sepsis, catheter-related BSI and mortality.” ³

First Author, Publication Year, Country	Study Designs, Number of Studies Included and Population Characteristics	Intervention and Comparator(s)	Outcomes	Conclusions
Non-Randomized Studies				
Kao, 2014⁴ Taiwan	N = 893 n = 396 iodine n = 497 chlorhexidine Age: NR	Standard catheter vs. silver-alloy hydrogel catheter	<ul style="list-style-type: none"> PABSI 	“Chlorhexidine topical skin disinfection may prevent PABSI caused by Gram-positive bacteria in patients with solid cancers. The nonsignificant effect on preventing overall PABSI may be attributed to the high incidence of Gram-negative bacteria related PABSI.” ⁴

BSI = blood stream infection; CAUTI = catheter-associated urinary tract infection; CI = confidence interval; CRBSI = catheter-related blood stream infection; CSD = caesarean section deliveries; CVC = central venous catheter; MA = meta-analysis; NR = not reported; PABSI = Port-A associated blood stream infection; RCT = randomized controlled trial; RR = risk ratio; UK = United Kingdom; vs. = versus.

^a Composition of green soap not reported in abstract

References Summarized

Health Technology Assessments

No literature identified.

Systematic Reviews and Meta-analyses

1. Fasugba O, Koerner J, Mitchell BG, Gardner A. Systematic review and meta-analysis of the effectiveness of antiseptic agents for meatal cleaning in the prevention of catheter-associated urinary tract infections. *J Hosp Infect.* 2017 Mar;95(3):233-242.
[PubMed: PM27986361](#)
2. Cooper FP, Alexander CE, Sinha S, Omar MI. Policies for replacing long-term indwelling urinary catheters in adults. *Cochrane Database Syst Rev.* 2016 Jul 26;7:Cd011115.
[PubMed: PM27457774](#)
3. Lai NM, Lai NA, O'Riordan E, Chaiyakunapruk N, Taylor JE, Tan K. Skin antisepsis for reducing central venous catheter-related infections. *Cochrane Database Syst Rev.* 2016 Jul 13;7:Cd010140.
[PubMed: PM27410189](#)

Randomized Controlled Trials

No literature identified.

Non-Randomized Studies

4. Kao HF, Chen IC, Hsu C, et al. Chlorhexidine for the prevention of bloodstream infection associated with totally implantable venous ports in patients with solid cancers. *Support Care Cancer.* 2014 May;22(5):1189-1197.
[PubMed: PM24384684](#)

Guidelines and Recommendations

5. ACR Appropriateness Criteria, Radiologic Management of Central Venous Access. Reston (VA): American College of Radiology. 2017;
<https://acsearch.acr.org/docs/3094281/Narrative> Accessed 2019 May 31
See: Insertion technique and maintenance
6. National Institute for Health Care and Excellence. Healthcare-associated infections: prevention and control in primary and community care. (NICE clinical guideline CG139). 2012, updated 2017;
<https://www.nice.org.uk/guidance/cg139> Accessed 2019 May 31
See 1.4.3 Vascular access device site care
7. Practice advisory for the prevention, diagnosis, and management of infectious complications associated with neuraxial techniques: An updated report by the American Society of Anesthesiologists Task Force on Infectious Complications Associated with Neuraxial Techniques and the American Society of Regional Anesthesia and Pain Medicine. *Anesthesiology*. 2017;126(4):585-601.
http://anesthesiology.pubs.asahq.org/article.aspx?articleid=2599857&_ga=2.94795028.965828330.1542314834-2719544.1542314834 Accessed 2019 May 31
See: Selection of antiseptic solution

Appendix — Further Information

Previous CADTH Reports

8. Chlorhexidine gluconate for skin preparation during stereotactic core biopsy of the breast: clinical effectiveness and guidelines. (CADTH Rapid response report: summary of abstracts). Ottawa (ON): CADTH; 2019: <https://www.cadth.ca/chlorhexidine-gluconate-skin-preparation-during-stereotactic-core-biopsy-breast-clinical-0>. Accessed 2019 May 31
9. Cleansing methods during the insertion and maintenance of indwelling urinary catheters: clinical effectiveness and guidelines. (CADTH Rapid response report: summary of abstracts). Ottawa (ON): CADTH; 2017: <https://www.cadth.ca/cleansing-methods-during-insertion-and-maintenance-indwelling-urinary-catheters-clinical>. Accessed 2019 May 31
10. Disinfection of urinary drainage bag ports: clinical effectiveness and guidelines. (CADTH Rapid response report: summary of abstracts). Ottawa (ON): CADTH; 2017; <https://www.cadth.ca/disinfection-urinary-drainage-bag-ports-clinical-effectiveness-and-guidelines-0>. Accessed 2019 May 31
11. Chlorhexidine gluconate wipes for infection prevention in acute and critical care: a review of clinical effectiveness and cost-effectiveness. (CADTH Rapid response report: summary with critical appraisal). Ottawa (ON): CADTH; 2016: <https://www.cadth.ca/chlorhexidine-gluconate-wipes-infection-prevention-acute-and-critical-care-review-clinical>. Accessed 2019 May 31
12. Use of chlorhexidine gluconate with alcohol for the prevention of peripheral intravenous device infections: a review of clinical and cost effectiveness, and guidelines. (CADTH Rapid response report: summary with critical appraisal). Ottawa (ON): CADTH; 2014: <https://www.cadth.ca/use-chlorhexidine-gluconate-alcohol-prevention-peripheral-intravenous-device-infections-review>. Accessed 2019 May 31
13. Chlorhexidine use at injection ports: clinical benefit and harm. (CADTH rapid response report). Ottawa (ON): CADTH; 2009: <https://www.cadth.ca/chlorhexidine-use-injection-ports-clinical-benefit-and-harm>. Accessed 2019 May 31

Guidelines and Recommendations – Alternative Population

14. M. Leung, et al. Appendices. Safe administration of systemic cancer therapy part 2: administration of systemic treatment and management of preventable adverse events. Toronto (ON): Cancer Care Ontario; 2018: <https://www.cancercareontario.ca/en/file/41406/download?token=8RWELuN4>
See: *Central line maintenance care bundle*.

Additional References

15. National Institute for Health Care and Excellence. Infection prevention and control. (Quality standard QS61). 2014; <https://www.nice.org.uk/guidance/qs61>. Accessed 2019 May 31