

ANTISEPSIS IN THE NICU

This LOP is developed to guide safe clinical practice in Newborn Care Centre (NCC) at The Royal Hospital for Women. Individual patient circumstances may mean that practice diverges from this Local Operations Procedure (LOP).

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INTRODUCTION

It is necessary to identify effective and safe topical antiseptics to reduce nosocomial sepsis in infants. Neonates, particularly preterm and extremely low birth infants, in intensive care units are susceptible to sepsis. Central Line Associated Blood Stream infections (CLABSI) are among the most common nosocomial infections noted in the nursery.

1. AIM

- To provide safe and effective topical antiseptic preparations in neonates to reduce nosocomial sepsis.

NB. This policy covers antiseptic preparations prior to any non-surgical invasive intervention. Antiseptic preparations for invasive surgical procedures in NICU or operating theatres are beyond the scope of this guideline.

2. PATIENT

- Neonates

3. STAFF

- Medical and nursing staff

4. EQUIPMENT

- N/A

5. CLINICAL PRACTICE

1. Skin preparation for all procedures (includes intravenous cannulation, arterial lines, peripherally inserted central catheter insertion, blood culture collections, lumbar puncture, suprapubic taps, urinary catheter insertion, intercostal catheters, umbilical lines etc.):
 - Chlorhexidine 0.05% solution for all infants
2. For line connections (e.g. cleaning hubs or bungs prior to connecting fluids but not skin preparation):
 - For a fresh sterile connection (e.g. new PICC line): Chlorhexidine 0.05%
 - For cleaning hubs/bungs (eg. changing PICC line fluids): Soluprep (3M) Antiseptic Wipe containing 2% Chlorhexidine gluconate with 70% isopropyl alcohol
3. For cleaning cannula, catheter or surgical dressing sites:
 - Chlorhexidine 0.05% solution for all infants

6. DOCUMENTATION

- N/A

7. EDUCATIONAL NOTES

- Chlorhexidine (CHG) has a broad spectrum bactericidal activity and effective against some viruses and fungi. It is also effective against resistant organisms, including methicillin-resistant *S. aureus*, vancomycin-resistant enterococci, and various *Streptococcus* and *Pseudomonas* species.¹ The major advantage of chlorhexidine is a persistent antimicrobial effect that lasts as long as 6 hours after application.²

ANTISEPSIS IN THE NICU cont'd

- Three small RCTs have assessed short-term efficacy of skin antiseptics prior to peripheral cannulation or venepuncture. Comparing preantiseptic and postantiseptic skin swabs before peripheral venous cannulation, Lilley et al. presented preliminary data showing significantly better bacterial clearance with 0.5% CHG compared with 0.05% CHG aqueous solution (92 vs. 38%, $P=0.002$).³ Nuntnarumit and Sangsuksawang compared the efficacy of 1% CHG aqueous vs. 10% povidone-iodine prior to peripheral blood sampling, and reported fewer contaminated blood cultures with the 1% CHG (0 vs. 2.9%, $P=0.026$).⁴ Bredemeyer et al, in a small double-blinded RCT, tested the efficacy and safety of 0.015% versus 0.5% aqueous chlorhexidine solution in reducing infection rates in preterm neonates born before 29 weeks.⁵ There were no differences between groups for late onset sepsis (26% vs 29%, $p = 0.61$) or median skin integrity scores at 24 hours ($p = 0.96$). Secondary outcomes showed no difference except for mortality; more deaths occurred in the 0.5% arm (6% vs 19%, $p = 0.021$). There were no deaths due to late onset sepsis in the 0.015% arm and three in the 0.5% solution suggesting an association of 0.5% solution with higher mortality.
- While higher strength chlorhexidine may be efficacious safety is a concern. Chapman et al, in their review of the published data on the safety of chlorhexidine in neonates reported skin toxicity and systemic absorption in studies using 0.25% chlorhexidine or more.^{6,7} Bredemeyer's RCT suggested no benefit of 0.5% chlorhexidine in comparison to 0.015%, but noticed a higher mortality in 0.5% arm.⁵

8. RELATED POLICIES/PROCEDURES/CLINICAL PRACTICE LOP

- Blood Cultures – Blood Culture Collecting Technique
- Intravenous Cannula – Insertion of Intravenous Cannula in neonate
- PICC Line – Insertion of percutaneous intravenous central catheter

9. RISK RATING

- Medium

10. NATIONAL STANDARD

11. REFERENCES

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2. Adams-Chapman I, Stoll B. Prevention of nosocomial infections in the neonatal intensive care unit. *Curr Opin Pediatr* 2002, 14:157–164.
3. Lilley C, Powls A, Gray A. A prospective randomised double blind comparison of 0.5% versus 0.05% aqueous chlorhexidine for skin antiseptic prior to line insertion in neonates. *Arch Dis Child* 2006; 91:A18.
4. Nuntnarumit P, Sangsuksawang N. A randomized controlled trial of 1% aqueous chlorhexidine gluconate compared with 10% povidone-iodine for topical antiseptic in neonates: effects on blood culture contamination rates. *Infect Control Hosp Epidemiol* 2013; 34:430–432.
5. Bredemeyer SL, Reid S, Evans N, Gibbons E. Randomised controlled trial of two strengths of topical aqueous chlorhexidine for prevention of nosocomial infection in neonates born before 29 weeks. *Journal of Paediatrics and Child Health* 2011;47:64-5.
6. Chapman AK, Aucott SW, Milstone AM. Safety of chlorhexidine gluconate used for skin antiseptic in the preterm infant. *J Perinatol* 2012;32:4–9.
7. Chapman AK, Aucott SW, Gilmore MM, et al. Absorption and tolerability of aqueous chlorhexidine gluconate used for skin antiseptic prior to catheter insertion in preterm neonates. *J Perinatol* 2013; 33:768–771.

ROYAL HOSPITAL FOR WOMEN
 LOCAL OPERATING PROCEDURES
NEONATAL SERVICES DIVISION

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ANTISEPSIS IN THE NICU cont'd

12. ABBREVIATIONS AND DEFINITIONS OF TERMS

CHG	Chlorhexidine Gluconate	NICU	Neonatal Intensive Care Unit
CLABSI	Central Line Associated Blood Stream Infection	PICC	Peripherally Inserted Central Catheter
NCC	Newborn Care Centre	RCT	Randomised Controlled Trial

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