Chlorhexidine and the Reduction of Ventilator Associated Pneumonia

Dan O Leary, Carolina Siliezar, Silvia Sidor, Tracy Tud, Fern Villarosa

Clinical Question

Would the addition of chlorhexidine oral swabs, to the VAP bundle, reduce the incidence of ventilator acquired pneumonia in the ventilated patient population?

Search Results

P= Ventilated patients all populations

I= Strength and frequency of Chlorhexidine with oral care

C= Epidemiology rates of VAP before and after intervention

O= Reduced rates of VAP in ventilated patients

FRS researched the SMU Library database, utilizing the PICO One Search, Cochrane Library, Cumulative Index to Nursing and Allied Health Literature, and Pub Med. Inquiries were made to librarian services, where we received additional tips to complete our search.

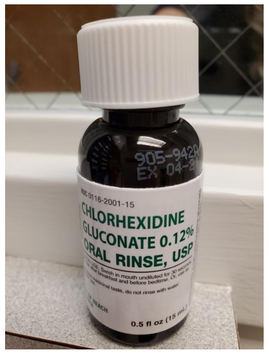
MeSH keywords: VAP, Chlorhexidine, Bundle Care, Reduction of VAP, CHG oral care.

Discussion

- Eighty-six percent of nosocomial pneumonias are associated with mechanical ventilation
- Between 250,000-300,000 patients are affected each year
- The mortality rate associated with VAP is between 33-50%
- Oral care with CHG is cost effective to the organization by reducing infections, decreasing the length of stay, and deaths.

Review of Literature

- VAP 2 is a meta-analysis of 18 RCT's. Setting various ICU's. Intervention testing the strength and frequency of chlorhexidine swabbing.
- VAP 3 is a RCT carried out in ICU settings in Brazil. Of the 716 patients, 219 fulfilled criteria, studying the effects of mechanical brushing on the reduction of VAP.
- VAP 5 is a well designed systematic review with meta-analysis. 211 articles identified with 13 articles utilized. Total of 1640 subjects with control group. Set in various ICU settings and emergency departments.
- VAP 6 is a meta-analysis of 4 random control trials. ICU settings differed. Sample size 833 participants.
- VAP 8 is a RCT 2x2 factorial experimental design. Setting was in 3 ICU's in Virginia. Patients were randomly assigned to 1 of 4 different treatment groups.



Synthesis of Findings

- **VAP #2** Meta-analysis / 18 RCT's reduced the incidence of **VAP** [RR= 0.59, 95% CI (0.50-0.69), p< 0.00001]. Nine studies showed 0.12% **CHG** to have a significant effect [RR=0.53, 95% CI (0.43-0.670, P< 0.00001]. Three studies with 2% **CHG** showed effects of [RR= 0.55, 95% CI (0.37-0.81), P =0.002].
- **VAP #3 VAP** occurrence of 21.1%, 28 from the control group and 17 from the intervention group. Intervention group demonstrated lower incidence, yet was statistically insignificant (p=0.084) with a risk ratio of 1.0. The duration of mechanical ventilation was significantly decreased with (p=0.018) mean ± SD of 8.7 = 5.0 for intervention group as compared to 11.1 = 7.6 for control group.
- **VAP #5** One meta-analysis demonstrated that the effectiveness of CHX on prevention of **VAP is dose and frequency dependent. 2% concentration of CHX** was the only dose that showed reduction in VAP development, RR 0.53. The study showed that **CHX is only effective on VAP reduction if applied** 4/day, RR 0.56.
- **VAP #6** Review concluded intra oral **CHG** 0.12% 2-4 x/ day reduces **VAP** in critically ill mechanically ventilated patients. However more research is needed. There was no effect shown on reduction in mechanical ventilation, length of **ICU** stay, and rate of mortality.
- **VAP #8** Among the four treatments that was tested on ventilated ICU patients, **CHG** use had a statistical significance in reducing pneumonia on day 3 on those patients who had a **CPIS** (Clinical Pulmonary Infection Score) <6 at baseline (*P* =.006). There's no significant effect in toothbrushing (*P*=.95) and **CHG** (*P* =.29) in the entire sample. According to the literature, the combination of **CHG** and toothbrushing did not make it to the final analysis because it was not significant.

Practice Recommendation

- Initiate VAP policy and procedure recommendations
- Practice change to CHG 2% applied 4 x/ day with a toothbrush or oral swab
- Document intervention on flowsheet under VAP protocol.
- Document CHG in the MAR
- Educate patient and family on importance of oral care and cooperation in prevention of VAP.

Implementation Strategy

1. Educate the nursing ICU staff and ICU intensivist to rationale supporting the new oral ~~care intervention using chlorhexidine gluconate~~ 2% solution and its potential benefit in reducing ventilator-associated pneumonia (VAP).
2. Develop and implement comprehensive oral care program.
   - Use **CHG** 2% solution to swab/toothbrush every 4 hours in all ventilated patients.
   - Train nurses how to properly swab the mouth around endotracheal tube using the oral kit provided.
   - Enlist super users to support the new intervention.
   - Schedule **CHG** as a medication on MAR to indicate reminder for the nurses.
3. Incorporate the oral care to the plan of care for ventilated patients.
4. Support an ongoing education for new nurses to practice and deliver an evidence-based oral care.

Evaluation

- Quality Control and Epidemiology will continue to monitor the VAP rates and we will reevaluate in 6 months.
- Nursing will audit nursing compliance with practice change via EHR with chart audits with monthly reports on VAP.
- Continuous evaluation and adjustments to frequency of application and strength based on adverse effects/ reactions.

References

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