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Non-Inferiority of a Novel Silver-Plated Dressing for Central Venous Catheters: A Retrospective Cohort Evaluating Rates of Central Line-Associated Bloodstream Infections in Adult Intensive Care Patients

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ABSTRACT

BACKGROUND: Every year in ICUs there are over 80,000 central line associated bloodstream infections (CLABSIs) [1, 2]. The cost of a single CLABSI is estimated at greater than $30,000 and at least 9 additional days of hospital care [2-4]. Use of chlorhexidine gluconate-impregnated sponge (CHGIS) dressings for central venous catheters (CVC) has been associated with reduced rate of CLABSIs [1, 2, 4]. However, there are few studies evaluating non-CHGIS dressings for CVCs.

OBJECTIVE: The objective of this cohort study is to assess the non-inferiority of novel silver-plated (SD) CVC dressings in comparison to chlorhexidine gluconate-impregnated dressings in preventing CLABSIs in adult ICU patients.

METHODS: Approximately 3,500 patient charts were reviewed in this retrospective cohort study of all adult patients receiving a CVC in seven different ICUs from 01/2009 - 12/2010. All patients receiving a CVC before June 1, 2009 received a CHGIS. All lines inserted after June 1, 2009 were dressed with the novel SD. All CVC dressings were covered by a transparent dressing. The outcome measures were rates of CLABSI per 1,000 catheter-days and length of stay in the ICU.

RESULTS: There were 44,465 catheter-days with CHGIS dressings and 45,981 catheter-days with SD dressings. There was no interaction between the interventions. Initial basic demographic data has been equal between the groups. There was a statistically significant decrease in the rate of CLABSI in the SD group, see Table 1. The absolute risk reduction realized from SD was 0.77. The relative risk (RR) of CLABSI in the SD group was 0.53 (95% CI 0.36-0.78, p = 0.001). The length of stay was not significantly different between the groups.

CONCLUSIONS: The novel silver-plated disk dressings are not inferior to chlorhexidine gluconate-impregnated sponge dressings for prevention of CLABSIs. If SD are used on all catheters, the decreased rate of CLABSI observed would calculate to a cost savings of $23,100 per 1000 catheter-days.

INTRODUCTION

- 80,000 CLABSI per year in the ICU alone [2]
- Average infection rate = 3-7 % of catheterizations or 1.8 to 5.2 per 1000 Catheter days [3]
- Attributable mortality = up to 11% of CLABSIs [2]
- Annual cost of CLABSI in the US $2.3 billion [2 - 4]

	CHGIS	SID	
Rate of CLABSI per 1,000 catheter days	1.64 (n = 73/44,465)	0.87 (n = 40/45,981)	95% CI 0.36-0.78 p = 0.001
Mean Length of Stay ± SD Days in ICU	13.1 ± 29.5	12.6 ± 15.8	p = 0.848

T1. **RESULTS** for the main outcome measures in each group. CHGIS: chlorhexidne-gluconate impregnated sponge. SD: silver –plated dressing

Silverlon Lifesaver brand of silver-plated disks designed as dressings for central venous catheters. These are the novel silver-plated dressings which were compared to BioPatch® CHGIS.

CONCLUSIONS

1. The silver-plated disk dressings are not inferior to chlorhexidine gluconate-impregnated sponge dressings for prevention of CLABSIs.
2. The rate of CLABSIs with SD dressings was only 0.87 per 1000 catheter-days.
3. If SD were used, the decreased rate of CLABSI observed would calculate to a cost savings of $23,100 per 1000 catheter-days as compared to CHGIS.

IMPLICATIONS

This study opens the door for additional questions which deserve to be studied in a more rigorous, randomized controlled trial:

- There was a trend toward superiority, will this hold in a RCT?
- Will SD be effective in reducing CLABSI in non-ICU patients?
- Will using SD prove cost-effective in a RCT against CHGIS?
- Will SD be cost-effective in reducing PICC line infections or in pediatric populations as well?

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