

Prospective Observational Study in Surgical Trauma Intensive Care Unit Results in 41% Decrease in Surgical Site Infections

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Introduction

Surgical site infections (SSI) increase mortality and length of stay,¹ and incidence rates range from 0.22 for lower risk operations to 16.34 in high-risk operations such as bile duct surgery.² One study documented an additional \$20,842 per SSI.³

A Critical Care Clinical Nurse Specialist working in a surgical trauma intensive care unit (STICU) noted several articles and studies which documented concerns regarding waterborne illnesses and infections,⁴⁻⁷ and one small study which documented the presence of bacteria in patient bath basins.⁸ Although a SSI prevention bundle was in place, in an effort to ensure patients in the STICU were not exposed to tap water, she consulted her institutional review board to obtain permission for a prospective observational study using historical SSI rates as the control to assess the use of prepackaged baths and irrigation with sterile water or saline.



Methods

An IRB-approved protocol was implemented in the STICU from 02/01/08 through 08/01/08, which included comprehensive education on appropriate SSI prevention, and documented risks related to patient exposure to tap water for all unit caregivers, faculty from nursing schools, and resource team nurses. The protocol instructed caregivers to use prepackaged 8-cloth baths* for cleansing patients, and nurses were instructed to irrigate all nasogastric and feeding tubes with sterile water or sterile saline.

Furthermore, tap water was not used for oral care in the mouths of any STICU patient. Laminated cards were placed in each STICU room as a reminder of protocol requirements, bath basins were removed from the STICU stock room, and patient/family information sheets were distributed on the purpose of the study.

This intervention was adopted as standard of care and data collection on SSI incidence was extended through February 2009.

* ComfortBath - Sage Products, Cary, IL



References

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Results

A total of 451 patients were enrolled into the study by 8/1/08, and data collection continued through February 2009 for a total of 981 patients. The measures used for this intervention were baseline and post-intervention SSI incidence comparisons.

Primary hypothesis: The primary hypothesis was that SSI rates would be reduced in patients from the pre- to the post-intervention time periods. The time periods compared were January 2007 through January 2008 (historical control), and the post period from February 2008 through February 2009 (prospective data).

Sample size: With data from over 1,800 patients there was adequate statistical power to detect an absolute difference as small as 1% as statistically significant with an alpha level of 5% and a beta level of 20%. However, with a pre-intervention rate so small to begin with, it is difficult, statistically to provide evidence for significance, even if the rate is shown to decrease by a relevant magnitude.

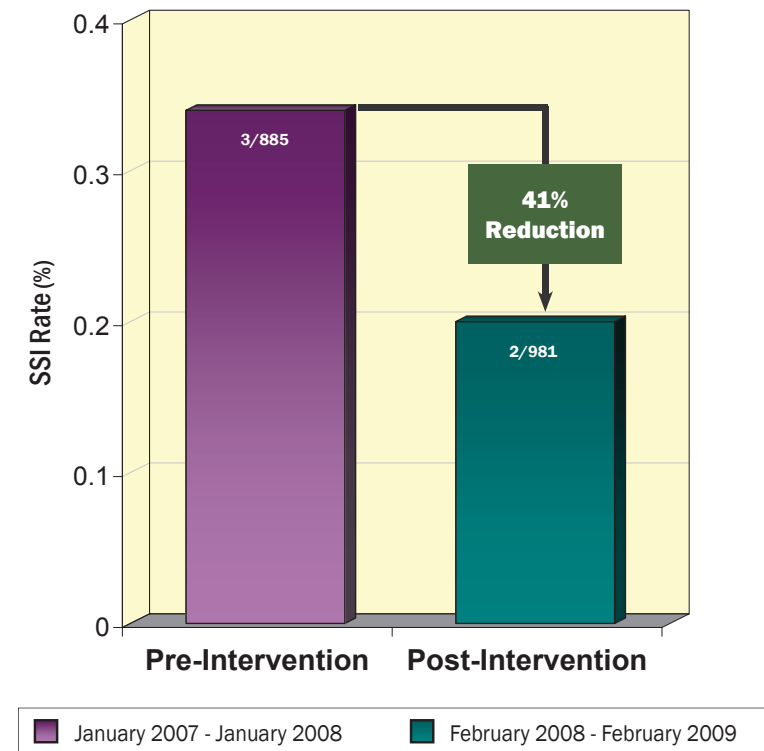
Statistical Methods: Fisher's exact test was used to assess the change in the SSI rate over time. Counts per patients were presented as the SSI rates. In addition, the test statistics and *P* values were reported. A *P* value less than or equal to an alpha-level of 0.05 was considered statistically significant.

The data revealed a reduction in the SSI rate from 0.34 (3/885) to 0.2 (2/981), the result was not statistically significant (test statistic = 0.32, *P* = .67); however, there was a 41% reduction in SSIs as a result of the quality improvement interventions.

See Figure 1.

There was a 41% reduction in SSIs as a result of the quality improvement interventions.

Figure 1. Surgical Site Infections Pre- and Post-Intervention



Clinical Implications

- IRB review of quality improvement interventions is essential for the successful implementation of large changes in practice
- Comprehensive staff education on the importance of SSI prevention, bathing practice changes, and study details was successful by utilizing staff meeting times and flyers
- Change management efforts included removal of bath basins from patient rooms and ensuring availability of prepackaged baths to maintain compliance
- Education of all new staff and nursing students working on the unit was vital for ensuring all staff remained compliant with the new patient bathing protocol
- Staff stayed enthusiastic about the project with posting of infection data each month for ongoing open communication on project outcomes and efforts
- Prevention of nosocomial infections requires elimination of risk for infection, and the use of irrigation with sterile water or saline and prepackaged baths was one additional effort used in combination with the existing SSI prevention bundle of care