

SSI Bundle in Neonatal Surgery: A Look at the Closing Protocol

Alexis Lonjin¹, Cullen Woodley, M.D.¹, John Nida, M.D.², Katie Ward, M.D.², Diane Studzinski², Begum Akay, M.D.³

¹ Oakland University William Beaumont School of Medicine, Rochester, Michigan

² Corewell Health East William Beaumont University Hospital, Royal Oak, Michigan

³ Corewell Health Children's at William Beaumont University Hospital, Royal Oak, Michigan

Introduction

Surgical Site Infections (SSIs) are the most common complications seen with GI surgery contributing to significant patient morbidity and financial strain on healthcare systems. SSIs have prompted considerable efforts within the medical community, involving collaboration among surgeons and infectious disease specialists to curtail their occurrence. SSI reduction bundles in adult and pediatric populations have proven quite effective, however there is minimal research of their effectiveness in neonatal cases.

The goal of this project is to evaluate the effectiveness and potential barriers to compliance with the closing protocol portion of an SSI bundle developed in neonatal patients under a broader quality improvement initiative that analyzes how SSI rates from two years before implementation of an SSI bundle compare to two years after the implementation of the bundle (defined in our study as <6 months of age) and those patients still in the Neonatal Intensive Care Unit (NICU) who have undergone open gastrointestinal surgery.

Aims and Objectives

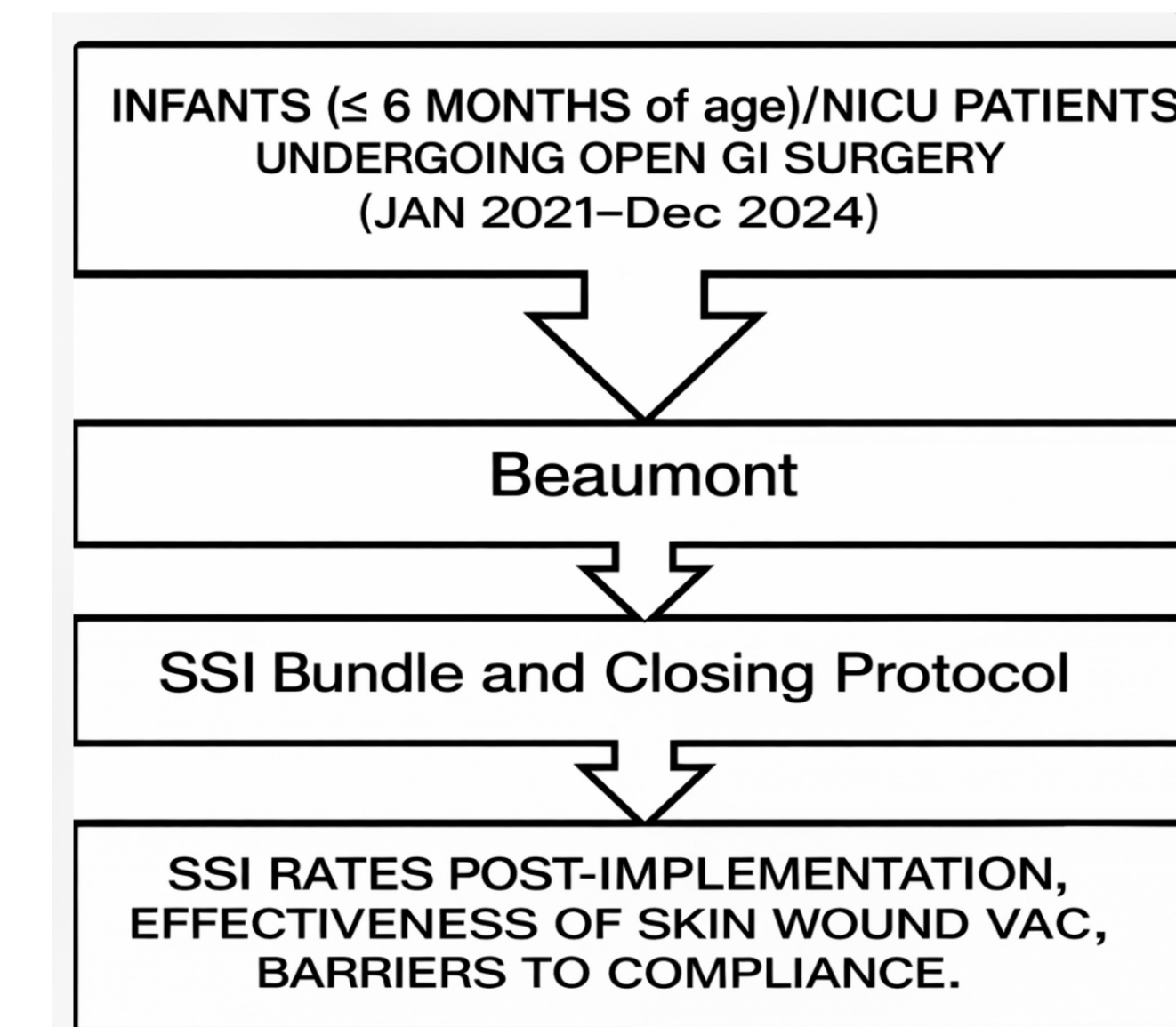
1. Describe the effects of a SSI closing protocol when used with a larger care bundle to try to reduce SSI in neonates undergoing open gastrointestinal surgery
2. Determine barriers to compliance with the SSI closing protocol
3. Describe any complications that may be related to use of the closing protocol and its components such as the skin wound vac

Methods

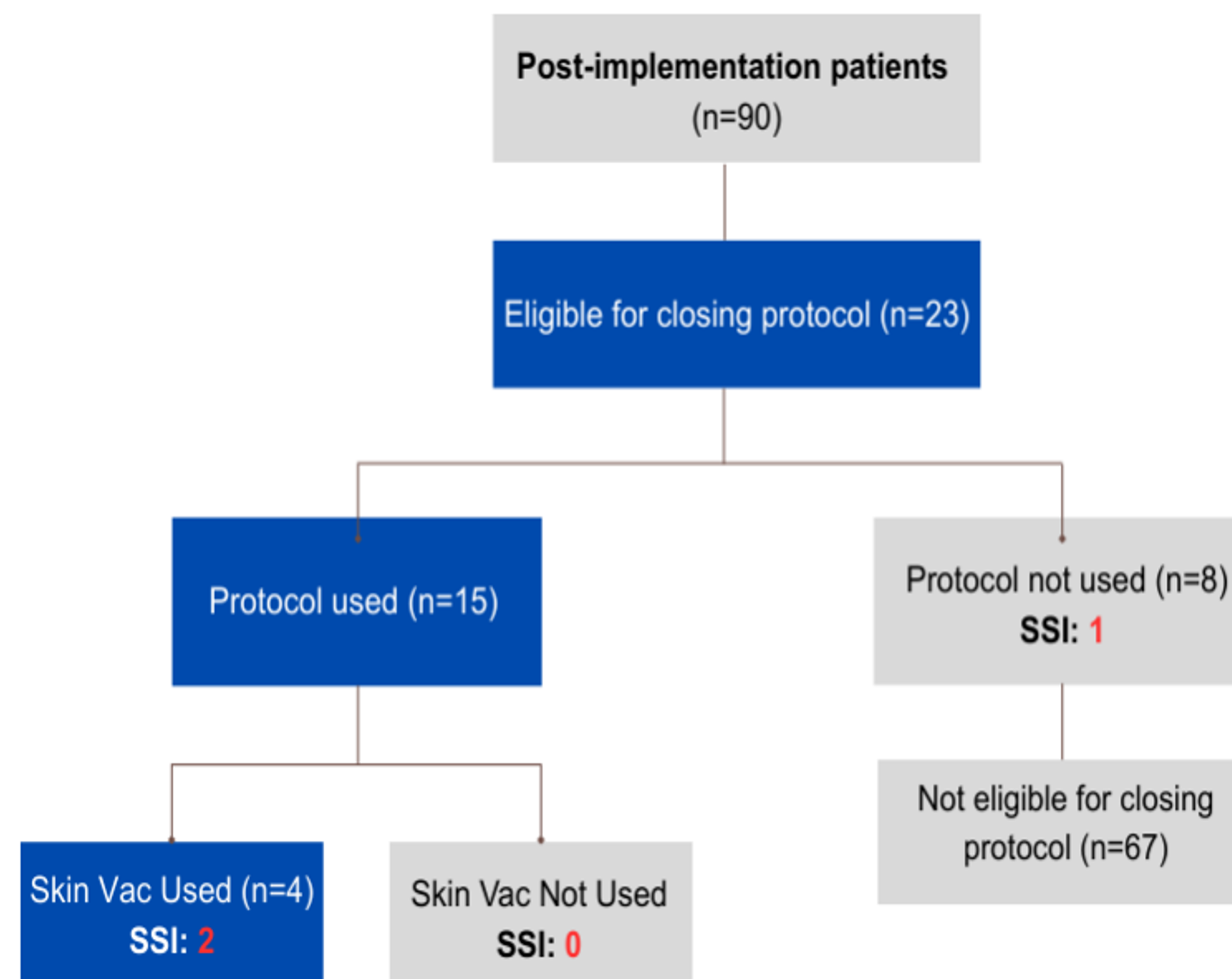
We evaluated two years of closing protocol outcomes within an infant SSI bundle.

The closing protocol was applicable to a subset of patients where bowel work was performed and fascia was closed.

When a wound was considered dirty/infected, a skin wound vacuum (skin vac) was recommended. Outcomes including SSI rates, closing protocol compliance, and associated complications were evaluated.



Results



Further results demonstrated a decrease in SSI rates from 15 (11.4%) to 7 (7.8%), p=0.380 post-implementation. Bundle adherence was lower in urgent/emergent cases and declined from 64.4% to 37.8% in year one versus two. Complications with the skin vac included need for replacement due to poor vacuum seals.

Conclusions

It is well established that any one section of an SSI bundle alone cannot lower infection rate, but rather it is the global attention to infection control that seems to reduce infections. There are several barriers to the closing protocol's use, including case urgency, time added to surgery and lack of routine. Based on our initial review, the skin vac may not add any benefit. Future efforts should focus on re-education to sustain compliance and address barriers in high-acuity cases to maximize bundle adherence and optimize patient outcomes. Based on initial results, the closing protocol may provide some benefit, but education and better compliance is critical to understand true effects.

Limitations

- Single hospital study
- Protocol adherence and monitoring
- Need for several PDSA cycles to identify areas in need of improvement that were not initially identified and related barriers to compliance

References

- 1)Surgical site infection (SSI). Centers for Disease Control and Prevention. <https://www.cdc.gov/hai/ssi/ssi.html>. Published November 24, 2010. Accessed September 23, 2022.
- 2)Sparling KW, Ryckman FC, Schoettker PJ, et al. Financial impact of failing to prevent surgical site infections. *Qual Manag Health Care*. 2007;16(3):219-225. doi:10.1097/01.QMH.0000281058.99929.ea
- 3)Rinke ML, Bundy DG, Heo M, et al. Pediatric surgical site infection (SSI) following ambulatory surgery: Incidence, risk factors and patient outcomes [published online ahead of print, 2021 Aug 11]. *Infect Control Hosp Epidemiol*. 2021;1-7. doi:10.1017/ice.2021.279
- 4)Keenan JE, Speicher PJ, Thacker JK, Walter M, Kuchibhatla M, Mantyh CR. The preventive surgical site infection bundle in colorectal surgery: an effective approach to surgical site infection reduction and health care cost savings. *JAMA Surg*. 2014;149(10):1045-1052.

Acknowledgements

We would like to thank all the nurses, nurse managers, unit coordinators, residents, and physicians for their input in creating the bundle and ensuring a smooth implementation. Thank you to the Oakland University William Beaumont School of Medicine Statisticians for their support in the analysis as well.