

The evaluation of the implementation of the vascular preventative bundle and development of suggested interventions for improvement and sustainability

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Postoperative infections can complicate patient care and increase health care costs. A vascular preventative bundle was implemented at a large teaching/research intensive hospital to decrease surgical site infections (SSIs) with vascular surgery patients. The aim of this study was to measure fidelity to the bundle and determine if implementation of the vascular SSI bundle reduced the rate of SSIs. Three periods of data were collected, and they are identified as preimplementation (period 1), early implementation (period 2), and postimplementation (period 3). There were 711 patients for all three periods, approximately equally distributed in the periods. The use of preoperative hair clippings, chlorhexidine (CHG) wipes, and appropriate antibiotics showed the greatest improvement from preimplementation to early implementation. All three measures showed significant improvements in fidelity. For appropriate antibiotics, the fidelity was the highest and showed the largest improvement compared to the other measures. The performance of clippings preoperatively and using CHG wipes improved significantly. Evidence-based interventions have been recommended to support the implementation and sustainability of the bundle. The infection rate between preop and postperiod was not statistically different. (J Vasc Nurs 2017; ■:1-4)

Enhancing patient quality and safety is the driver in improving the health care market. Surgical site infections (SSIs) are the culprit of many health care-associated infections.¹ Many organizations are measuring compliance to control the increasing infection rates, this quality improvement project focused on compliance of the vascular preventative bundle implemented in the preoperative department to reduce vascular SSIs. This bundle consists of hair clippings, chlorhexidine (CHG) wipes, and administration of appropriate antibiotics. Readmission rates, length of hospital stay, morbidity, and health care costs increase with SSIs.² According to Compoginis and Katz (2011),³ the most common nosocomial infections are SSIs, and they account for 14%-16% of SSIs.⁴ SSIs are being identified as a top national priority in

the United States Department of Health and Human Services.⁵ Studying the success of compliance with care bundles and the effect they have in lowering SSIs is important for the advancement of health care quality. Many quality improvement projects throughout the country are concentrating on tactics to reduce SSIs.⁶ Past research has solely focused on type of antibiotic and timely administration of antibiotic; albeit, studies are including additional measures to reduce SSIs.⁷

Annually in the United States, there are approximately one million SSIs that cost hospitals over \$1.6 billion dollars and add 3.7 million extra hospital days.⁸ A single SSI can result in \$12,000–\$35,000 in hospital-related costs.⁹ Thus, the prevention of SSIs is crucial for optimal patient outcomes and decreased hospital costs.

An evolving concept in hospital-based care is implementation of bundled care. The definition of a bundle is defined as interventions applied for specific patient populations implemented to improve patient outcomes.¹⁰ Each institution can have a unique bundle for a defined patient population that is comprised of a different number of elements. The bundle elements varied in each of the studies. The majority of the studies used four core bundle items: glycemic control, antibiotic management, appropriate hair removal, and maintenance of normothermia.¹¹ Each bundle item implemented in isolation is not successful; thus, it is important that all four core items constitute the bundle to impact SSI rates.¹¹ Furthermore, the greater compliance with a larger number of bundle items had better results. Tanner et al¹¹ note that implementation of preventative bundles and interventions are a multidisciplinary, evidence-based practice approach to improving patient outcomes.

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Vascular preventative bundle

Beginning of July 2016, a new three-part vascular SSI preventative bundle was implemented in the preoperative (preop), operating room (OR), and postoperative (postop) areas (Figure 1). This specific bundle was developed by the study organization. The preop bundle consists of hair clippings, CHG wipes, and administration of appropriate antibiotics. The OR items are normothermia, euglycemia, use of closure tray, limited operative room traffic, and sterile technique. The postop bundle consists of removal sterile dressing after 48 hours, daily washing of wound with CHG wipes and euglycemia.

This study focused on the preop bundle. The items are completed before surgery in the preoperative department. The staff at the hospital met and reviewed the evidence prior to selecting items in the preop bundle. They decided that for their practices, the three items were considered to be the critical ones, although these items have not been tested and published for impact on SSIs. The aim of this study is to measure fidelity to the bundle protocol and determine if implementation of the vascular SSI bundle reduced the rate of SSIs. It concentrates on evaluating the implementation of the vascular preoperative SSI bundle for vascular surgery, identifies areas of improvement, and explores evidence-based interventions that would improve compliance.

METHODS

Setting and sample

Patients having surgery at a large teaching/research intensive hospital were included. The sample in this project included vascular surgery patients of all ages who must visit the preoperative department at the hospital prior to their procedure. Those excluded were patients who did not visit the preop department prior to surgery such as emergent cases.

Study design

This study is a retrospective study. The intervention included the implementation of a vascular services SSI bundle. Fidelity and infection rates were compared for three periods: preimplementation, early implementation, and postimplementation. The fidelity in this study is defined as the adherence and competent delivery of the SSI bundle.¹²

Key stakeholders of this leadership initiative began to meet in October 2015. The monthly vascular SSI meeting is a multidisciplinary

team that is composed of vascular surgeons, compliance nurse, preoperative/OR unit champions, performance services, infection control, administrators, and management from departments. The team offered expertise, evidence, structure, and data evaluation to provide guidance for optimal patient outcomes in regard to SSI in the vascular patient population. The SSI multidisciplinary team led the adoption of the identified bundle.

Data collection plan

Data for the project were collected from the electronic health record using a vascular surgery report to identify patients having vascular surgery at the university medical center. The data were collated on a data collection spreadsheet that included the MRN number, procedure, date of surgery, surgeon, and four dichotomous variables (yes/no) representing the completion of the three bundle items and presence of a postop SSI.

Privacy, data storage, and confidentiality

Data are secured on password-protected computers on a secure server. All recorded data were destroyed at the conclusion of the data analysis. Patient identity and health care providers were not revealed in any publication, presentation, or discussion that resulted from this study. Results were presented in aggregate form to assure no provider or patient could be identified.

Timeline

Three periods for 3 months each have been compared: preimplementation of 2016 (period 1), early implementation of 2016 (period 2), and postimplementation of 2017 (period 3). Pre-early implementation is defined as January to March 2016. Early implementation data were collected on July through September 2016, and the postimplementation was collected early 2017 that includes February through April 2017. Data were collected by a compliance nurse and provided to the researcher. The three periods were analyzed for trends and significant changes overtime.

Statistical analysis

Descriptive statistics were used to describe the samples. Chi square testing was used to compare the outcome measures for all three periods. All analyses were performed in IBM SPSS Statistics 24. Figure 2 describes the data source, collection plan, and analysis.

The Vascular Preventative Bundle		
Preop	Operating Room	Postop
Chlorohexidine wipes (CHG)	Normothermia	Sterile dressing after 48 hours
Hair clippings	Euglycemia	Daily washing of wound with CHG wipes
Administer of appropriate antibiotics	Use of closure tray	Euglycemia
	Limited operative room traffic	
	Sterile technique	

Figure 1. Vascular preventative bundle.

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