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An Educational Program to Reduce Surgical Site Infection in Vascular Patients

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This is to certify that the doctoral study by

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has been found to be complete and satisfactory in all respects,
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Walden University
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Abstract

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MS, Walden University, 2015

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Project Submitted in Partial Fulfillment

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Doctor of Nursing Practice

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Abstract

Surgical site infections (SSIs) are a leading cause of morbidity and mortality in the United States. Researchers have demonstrated the impact that SSIs have on the healthcare system and the need to improve patient outcomes. The purpose of this project was to develop an educational program for the 8-member nursing staff of an outpatient vascular surgical office to help reduce the occurrence of SSI rates for patients seen pre and postoperatively after a noted increase in SSI rates at this clinical setting. Guided by the Fitzpatrick model, a group of 6 health care providers comprising 3 surgeons and 3 nurse practitioners served as content experts to conduct formative evaluation during development of the educational program. Members of the surgical office nursing staff completed a questionnaire; results were analyzed using descriptive analysis. Findings indicated that 100% of nursing staff had no on-site work training on basic signs and symptoms of infection and infection control; 100% of staff were not confident in assessment of the surgical site and addressing patient issues; and at least 50% reported that they lacked knowledge of proper wound care including bathing, dressing changes, and expected symptoms for healing and/or complications postoperatively. Educational materials were designed to address these gaps. This project might benefit the surgical center nursing staff by providing education to help reduce surgical site infection in vascular patients, and bring about positive social change by improving quality of life and patient outcomes for the vascular surgery patient through a reduction in the occurrence of SSIs.

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Section 1: Nature of the Project

Introduction

Surgical site infections (SSIs) are a leading cause of morbidity and mortality (Aicher, Curry, Croal-Abrahams, Hao, Kalsi, Menon..Rosenberger, 2017). The complications associated with SSIs are estimated to cost more than 10 billion dollars each year (Aicher et al., 2017). The negative consequences of SSIs are increased hospital cost, increased length of stay and readmissions to the hospital, delay healing and rehabilitation, and increased incidence of mortality (Aicher et al., 2017). Due to the underlying comorbidities associated with vascular surgery patients, the vascular surgery patients are at a higher risk for developing SSIs (Aicher et al., 2017). Preventive measures can be implemented to reduce the occurrence of SSIs. According to the Centers for Disease Control and Prevention, focus for prevention can address patient preparation, sterile techniques used, incision care, and hand disinfectant (as cited in Inui & Bandyk, 2015).

Surgical discussions address the risks and benefits of the surgery and what the surgeon will be doing. However, the surgeon often does not discuss with the patient what to do to avoid infection of the surgical site following surgery. The clinical site in this study was a vascular surgeon's office with 10 vascular surgeons rotating in the office and the hospitals. With this rotation, the patient does not see the same provider at each visit. The only consistent staff member within the clinical site is the nursing department. With the increase in SSIs that has been identified by the surgeons, the clinical practice must make a change to provide instructions to the patient during the surgical discussion on preoperative and postoperative care. The purpose of this project was to make a change in

the clinical practice that requires an educational program for preoperative and postoperative care of the surgical patient to help reduce the occurrence of SSIs. In this project, I discuss how the occurrence of SSIs affect the patient and health care system, the role the nursing staff plays in this change, and how the change can impact patient outcomes. The nursing staff plays an important role in implementation of this change, as they are the contact staff within the practice for the surgical patient.

Problem Statement

The issue identified at the clinical site was lack of preparation of the nursing staff to effectively engage in communication and teaching about infection prevention among surgical patients to prevent infections at the surgical site following the recognition of increased SSIs. With an increase in SSIs identified by leadership at the vascular surgeon's office, the staff at the clinical site identified the need to make changes that would incorporate better education and training to the patient by the nursing staff. Quality improvement studies and communication with the hospital administration regarding readmissions had brought the issue to light. The surgeons had already implemented changes during the surgery but would prefer the patient receive better instruction from at the clinical site to include the use of chlorhexidine gluconate (CHG) prior to surgery. If the nursing staff is trained and competent in infection control and safety, they will be able to comfortably address the questions and concerns of the vascular surgery patient. The current practice did not incorporate effective surgical care instructions to the patient. The final goal of this change was to decrease the occurrence of SSI of the vascular surgery patient.

Education has been identified as an important part of the strategy for infection control and prevention (Ward, 2011). Engaging the patient as well as health care providers to play an active role in reduction off SSIs is important in fighting the cause (Tartari et al., 2017). Various factors can influence the occurrence of SSIs, and preventive measures require all stakeholders to take part in the preoperative, intraoperative, and postoperative care (Tartari et al., 2017). Nurses have been identified as the health care providers with the most impact due to having the most direct patient care (Al-Husami & Darawad, 2013). The nursing staff is responsible for the evaluation of the postoperative incisions and wounds. They are the first staff members to assess the wound, take pictures, remove staples/sutures, take measurements, and document drainage of the wound in the electronic health records. They are also responsible for triage of the phone calls and formal education of the patient. The staff can have a direct impact on improving patient care by being competent and educated in infection control and safety. This will allow them to better prepare and educate the surgical patient. Researchers have revealed that there is an inadequate understanding of infection control and prevention by nurses, with certain gaps in knowledge during the clinical training process (Gould & Drey, 2013). In specific health care settings that have a higher rate of infection, it is imperative that the nurse has a complete understanding of infection control and prevention. Lack of knowledge by the nursing staff could lead to poor patient outcomes. Nurses are known to be educators and advocates for the patient. This project is significant in allowing the nursing staff to provide care that is within their designated scope of practice that includes patient education, wound care, and wound evaluation. After

acquiring this knowledge, the nursing staff can have a positive impact on the care provided to the surgical patient that could improve the patient outcome. In the past, the direct care staff has not been comfortable in the role of infection control at this clinical setting. It is of paramount relevance that nursing staff is knowledgeable about infection control and prevention to ensure the compliance of high standards that leads to positive patient outcomes, while promoting patient safety (Hinkin & Cutter, 2014). Hinkin and Cutter (2014) revealed that there is an insufficient knowledge of chains of infection by nursing staff following the completion of the nursing program. It is important for the nursing staff to fully understand the transmission of bacteria and organisms to be able to understand preventative measures (Hinkin & Cutter, 2014). The nursing staff is responsible for the evaluation of the surgical patient, both directly and indirectly. The nursing department not only evaluates the patient in the office, they also triage all phone calls to the office. They are responsible for asking the appropriate questions to determine if the patient needs to be seen immediately. The providers in the office rely on the nursing department for their expertise and understanding of the appropriate recommendations for these patients. This degree of authority requires specific training and education that allows the nursing staff to be competent in infection control and prevention. As previously discussed, education must be included in any infection control and safety initiatives (Ward, 2011).

Purpose Statement

The purpose of this project was to develop an educational program for the nursing staff that can provide the tools necessary to better educate and direct the vascular surgery

patient to reduce the occurrence of SSIs. The nursing staff plays a significant role in the implementation of the education to patients. Following the implementation of the educational program, continuous monitoring through discussion and observation can allow me to evaluate the effectiveness of the program. In addition, measurements of the SSIs and readmissions can shed light on the changes the program has on direct patient care.

Significance

The nursing staff was used to assist in the clinical practice change that included pre-and postoperative surgical care instructions to the patient that will eventually reduce the occurrence of SSIs. The change in the organization can provide patients with written and verbal instructions, while using the nursing staff as a contact resource for questions or concerns. The goal is for the nursing staff to provide the patient with the proper knowledge and tools to avoid complications associated with SSIs. I have observed the surgical discussion and education provided by the surgeons that only focuses on the technicality and surgical process, with no instruction on how the patient can help to reduce the occurrence of infection. Patients have voiced concern with the time off from work, hospital stay, improvement in symptoms, and the risks of the surgery. Infection at the surgical site and methods to avoid this from happening were not discussed in detail by the vascular surgeon with the patient.

The occurrence of SSIs is a serious threat to the surgical patient's health and well-being as well as an economic burden on society and the patient's family members (Cheng et al., 2015). SSIs lead to prolonged hospital stays, readmission, prolonged healing and

pain, prolonged exposure to antibiotics, and a significant increase in medical expenses (Cheng et al., 2015). Understanding risk factors that contribute to these infections is essential in the care of the surgical patient (Cheng et al., 2015). Thus, the nursing staff is responsible for knowing these risk factors and providing instructions to the patient at risk for a SSI. Critical elements for the patient to understand are proper hygiene, wound care, the nutritional role in promoting healing, and signs/symptoms of infection (Inui & Bandyk, 2015). In addition, the proper use of chlorhexidine gluconate is necessary to reduce the bacterial load at the surgical site (Aicher et al., 2017).

SSIs have been an issue of concern as far back as 1865, when antiseptics were introduced as a prevention method for infection (Aicher et al., 2017). Improvements in surgical techniques and prophylactic antibiotics have not been enough to reduce the rate of SSIs. SSIs continue to be a leading cause of morbidity and mortality in the United States (Aicher et al., 2017). Any direct care health provider can be a part of the clinical practice change. In the clinical setting, this can include the physician, advanced practitioner, the prosthetist, the surgical technician, the vascular technologist, the certified medical assistant, or the nurse. All direct care staff know to use the nursing staff as a resource to educate the surgical patient. SSIs are noted to be the second most common health care associated infection that often leads to readmission within 30 days (Kuy et al., 2014). Kaur, Stone, Travers, Cohen, and Herzig (2017) revealed that a specific and continuous training program for direct patient care staff is the best intervention for reducing these infections. The direct patient care staff has been identified as a crucial component, responsible for the identifying, assessing, and reporting infection (Kaur et al.,

2017). The nursing staff is the direct patient care staff at the clinical site that is responsible for providing care to patients who are at risk of poor outcomes. Although elective vascular surgery is performed to improve the patient's quality of life, SSIs have the opposite impact on the patient.

As previously discussed, SSIs for the vascular surgery patient had increased at the clinical setting. Postoperative wound infection is associated with additional surgery, early readmission following surgery, and the need for skilled nursing care following discharge (McGillicuddy et al., 2016). Researchers have stated that 30% of vascular surgery patients experience wound complications, which cost the health care system an estimated $10,500 per patient (McGillicuddy et al., 2016). This does not reflect the increased cost to the patient. The readmission rate following an elective vascular surgery is approximately 24%, which is higher than the average of 15% for other surgical interventions (Vogel & Kruse, 2013). Even with an increase in an endovascular approach to vascular intervention, the comorbidities seen with vascular disease continue to increase the risk of infection in these patients (Vogel & Kruse, 2013). SSIs are a serious threat to the patient's health and life (Cheng et al., 2015). If providers can reduce the rate of 30-day readmission, they have the potential to improve the quality of care and reduce health care costs (Melvin, Smith, Kruse, & Vogel, 2017).

With this information in mind, it is important to develop a process that can reduce the occurrence of SSIs in the vascular setting. The stakeholder is any person who is affected or involved in the change process. The stakeholders within this project are any health care provider who is consulted and who provides feedback. The knowledge the

nursing staff obtain can benefit them in their role as a patient educator and advocate. This is how the project can impact nursing practice. The nurses can be stronger health care providers with a higher level of understanding and expertise in infection control and safety. This knowledge can be applied at any setting with concern of infection, not just vascular surgery.

The mission at Walden University is to produce practitioners who can have a positive effect on social change. Positive social change is a result of changes that can better the patient, the staff, the provider, and the community. This project enforces positive social change by improving the quality of life and patient outcomes through educating the patient on infection control and prevention at the time of the surgical discussion. The nurse is the constant person of contact who typically has an established relationship and rapport with the patient. The educational program will enhance the skill level of the nurse and improve the care the nursing staff provides to the patient. The nursing staff can implement the change in practice that can help to reduce the occurrence of SSIs and improve the patient outcomes. Any improvement in patient care and outcomes can positively impact the community.

Nature of Doctoral Project

Evidence of the increased occurrence of SSIs is documented in many vascular surgery journals. The Journal of Vascular Nursing has recognized the importance of reduction of bacterial burden on the skin (Aicher et al., 2017). In addition, providing CHG to the patients to use prior to surgery removes transient skin microbes and provides prolonged antimicrobial activity (Aicher et al., 2017). Further research is necessary to

identify specific risk factors of the vascular patient, including the type of bypass used, comorbidities, personal hygiene, location of surgical incision, and patient base knowledge. Retrospective data were collected in a previous quality improvement study done at the clinical site that did reveal an increase in the occurrence of SSIs within the practice, with 33 readmissions within 30 days following discharge. These data were collected over a 6-month period. Knowledge of infection control and prevention by the nurses is important in understanding how much education is necessary. Questionnaires to the nursing staff can help to establish the level of current knowledge and areas of weakness. A questionnaire was used after the educational training of the nurses to evaluate the growth in knowledge. Patients scheduled for surgery would be followed and monitored closely. Once the program is implemented, the data will be collected again to see if there is any improvement in postoperative complications due to SSIs. This will be the main source of evidence to see if a proper educational program by the nurses can make a positive impact on the outcome for these vascular surgery patients. The program can ensure the surgical patient receives sufficient instructions for before and after surgery by the nursing department. This change can also provide the surgical patient with a resource to answer any questions or concerns during the entire process.

Summary

In summary, in the first section, I provided a description of the purpose and problem identified at the clinical site that established the basis for the doctoral project. Nursing staff plays a crucial role in direct patient care and must be well trained in infection control and safety to provide instruction to the vascular surgery patient. In the

following section, I provide the local background and context of the identified problem with additional information described in the following introduction.

Section 2: Background and Context

Introduction

As previously stated, the purpose of this project was to develop an educational program for the nursing staff that can provide the tools necessary to better educate and direct the vascular surgery patient to reduce the occurrence of SSIs. The nursing staff is not given proper education or training to discuss pre- and post-operative instructions to the surgical patient, despite being the main contact individual for the surgical candidate. The practice-focused question addressed whether a nurse driven educational program for vascular surgery patients regarding pre- and post-operative instructions would lead to a reduction in the occurrence of SSIs. In this section, I describe the model used for the project, the relevance to nursing practice, the local background and context, the role of the DNP student, the role of the project team, and a brief summary of this section.

Concept, Models, and Theories

For the change in practice to be effective, the responsible parties must be involved in the process and have guidelines to follow. The model used for the training process of the nursing department was Kirkpatrick's evaluation model. Evaluation of a project allows one to determine if the project is successful. Kirkpatrick's evaluation model provided me an organized, step-by-step process to analyze each level of success. Analyzing each level helped me understand the effectiveness and areas of necessary improvement.

Kirkpatrick's evaluation model is based on four levels that need to be achieved: reaction, learning, behavior, and results (Kirkpatrick & Kirkpatrick, 2009). Kirkpatrick's

model is known as a benchmark in the field of training courses (Vizeshfar, Momennasab, Yektatalab, & Iman, 2018). The concept of this model is that accomplishing one level will lead to the next level, while increasing the valuable information at each level of evaluation (Reio, Rocco, Smith, & Chang, 2017).

The first level evaluates the reaction to the proposed program by the participant (Reio et al., 2017). Positive and negative reactions can be used to ensure the success of the program. Positive reactions can encourage employees, and negative reactions can be used to modify the program (Reio et al., 2017). Negative reactions can also be discouraging and should be addressed immediately (Reio et al., 2017). This can be achieved through open discussion with the nursing staff. Reactions can be evaluated by asking the participants if they felt the training was worth their time, if they thought the program was a success, and the strengths or weaknesses (Reio et al., 2017). It is also important to understand if the training program was viewed as appropriate and accommodating to the participants' learning style.

The second level is the learning level. This level allows evaluation and measurement of the knowledge or skills obtained from the program (DeSilets, 2018). Kirkpatrick defined learning as a method to change participants' attitudes, improve knowledge, and increase skills from the program presented (as cited in Reio et al., 2017). The only method to justify the educational program is through the learning evaluation process (Reio et al., 2017). If the participant is learning from the program, it is identified at this level. This is the most popular level to evaluate in any program (Reio et al., 2017). I aimed to discover if the program was successful and the goals were being obtained. It is

also helpful to measure the knowledge or skill base before and after the training session. This would be done using the pre- and post-training questionnaires.

The third level is critical in the transfer of gained knowledge and skills on the job (Reio et al., 2017). I had little control over this level, as behavior influences performance. If the participant does not have a positive change in behavior, the participant cannot process to Level 4. Evaluation of behavior is difficult to assess but is often evident in the employee's performance and application of new skills (Reio et al., 2017).

The fourth level is the most important level and the most difficult to evaluate (Reio et al., 2017). The data obtained at this level can directly impact decision making within a clinical setting. This level measures organizational changes that occur as a result of the training process (Reio et al., 2017). To effectively use this model, the target must be evaluated in terms of results (Reio et al., 2017). The target result of reduction in SSIs can be measured through data collection. The improvement and application of new skills by the nursing department can be measured through questionnaires and surveys.

A set of terms were used to guide the discussion of this DNP staff education development project. The terms *participant*, *learner*, *nursing department*, and *nursing staff* relate to the person who will be educated on infection control and safety and who will be using this educational program to implement a change in practice and improve patient outcomes at the clinical site. The nursing staff includes the registered nurse, the licensed practical nurse, and the certified medical assistant at this practice. The patient is the surgical candidate who has the potential to benefit from proper education from the nursing staff. The educator is the person responsible for proper education to the nursing

staff and is the person who follows the progress of the education and training. In this project, the educator is me. An additional term that needs clarification is *endovascular approach*. An endovascular approach to surgery does not require open incisions and is a surgical intervention that can be completed through a small puncture site. In this project, I focused on those open surgical interventions that require large incisions within the skin, especially the groin, that pose a risk of SSIs. Finally, the term *direct care staff* describes any medical staff member who comes in direct contact with the patient during the treatment process, whether in-person or on the telephone.

Relevance to Nursing Practice

The relevance to nursing provides insight on how the project can impact nursing staff. The nursing program and clinical setting placement aim to prepare the nurse with confidence and competence for independent thinking and practice (McDonald, Boulton, & Davis, 2018). However, there continues to be criticism regarding the programs failing to adequately educate and prepare students with sufficient clinical skills (McDonald et al., 2018). This is why it is important for nursing staff to continue to learn and expand their skills during their career as a health care provider. During the training process, a student may not be exposed to the necessary skills needed to educate and train a specific patient population. If a student was not assigned to a postoperative vascular patient during their clinical training, the student may not be well educated for this population. Specialty offices have specific expectations of their staff and the care they provide to that patient population. Therefore, it is essential that the nursing staff understand the vascular disease process and the impact of physiology on patient outcomes. Nursing staff may be

expected to perform tasks for which they are not educationally prepared. If the nursing staff is not educated or trained in a certain area, they should not be making medical decisions on behalf of the patient. In the clinical setting, the nursing staff triages phone calls, assesses the patient following surgery, and provides the patient with instructions on surgical care. The nursing staff must be current on evidence-based research related to pre- and postoperative care of the vascular surgery patient. It is the responsibility of the clinical practice office to ensure they are qualified to provide the necessary care and direction to this patient population.

As previously stated, Hinkin and Cutter (2014) evaluated the knowledge of graduate nurses and revealed insufficient knowledge of chains of infection by nursing staff. It is important for the nursing staff to fully understand infection control and safety to provide the necessary education and direction to the patient. Nursing staff plays an important in role in prevention and control of infections and must have proper educational training to properly teach the patient (Ward, 2011). The clinical practice depends on the nursing staff to educate and evaluate these patients appropriately. The nursing staff cannot be expected to do so without the proper training. Data support the increased risk of infection with vascular surgery patients and the need to proceed with caution to reduce the risk of infection with this population (Aicher et al., 2017). There is a gap in knowledge of the nursing staff regarding infection control and prevention; however, minimal data were found to resolving this issue specific to vascular surgery patients.

Local Background and Context

SSIs continue to rise in all aspects of surgical interventions. The local hospitals are concerned with the infections that occur following surgery, that lead to readmission or longer periods of stay. This not only increases the health care cost to the patient and hospital, it affects the availability of the hospital to provide care to additional patients. The patients seen at the clinical setting become very frustrated with the multiple office visits, copays, testing, and antibiotic use that is necessary with treatment of SSIs. In addition, poor healing and postoperative infections often lead to pain, discomfort, and complications that can affect their life in a negative manner. Sometimes the patients are not able to return to work as expected or care for their families. Postoperative infections not only lead to poor outcomes and readmission, but they can also lead to death. Extra precautions have been taken during the surgery itself to cleanse the implants or incision area better, but further precautions needed to be made for when the patient is not in the hospital.

Although infection was one of the risk factors with surgery, the patient was not made aware of the importance of prevention at the time of the pre-operative surgical discussion. The vascular surgeons were more concerned with the amount postoperative infections that had been seen at the office and were interested in improving the process to include proper education and training to the surgical candidate pre-operatively. The nursing staff was acknowledged as the direct contact staff who could make a positive impact on the outcomes of these patients. The patients seen in this clinical setting are typically of a lower socioeconomic status. They have multiple comorbidities that can

impact the outcome following surgery. In specific health care settings that have a higher rate of infection, it is imperative that the nurse have a complete understanding of infection control and prevention. Lack of knowledge by the nursing staff could lead to poor patient outcomes. Nurses are known to be educators, as well as advocates, for the patient. This project is significant in allowing the nursing staff to provide care within a scope of practice that they will be trained for. Qualified nurses have been identified by students as important role models for education on infection control and prevention (Gould & Drey, 2013). The lack of knowledge at this clinical site was noted from observations of the multiple questions by the nursing staff and the phone calls and questions are directed to the health care providers that deterred their ability to evaluate patients and interrupted the patient flow. The patients complained that they had not been given any direction, especially at the time of discharge. Without a full understanding of infection control, the surgical patient is at a higher risk of developing SSIs. The vascular surgeons engaged in a surgical discussion and often with the focus on the surgery itself. The nursing staff could spend more time with the patient to discuss the precautions that should be taken before and after surgery. The vascular surgeons agreed that the nursing staff would be better suited as the primary contact person within the clinical setting, as they are always available in the office.

Role of the DNP Student

In this project as a DNP student, I was responsible for the completion and dissemination of an educational program developed for the nursing staff at a vascular surgeon's office. With different educational backgrounds of the staff in need of

education, it is important to implement a full educational program that begins with the basic infection control and prevention to the advanced knowledge of vascular surgery. Evaluation of patient outcomes is one way to ensure the patients are receiving the proper education from the nursing staff. For this project, it would be imperative to see that the change in practice leads to reduction in SSIs. Being present to observe the nursing staff as they implemented the proposed changes in current practice allowed for providing them direction as needed to ensure the surgical patient was being taught appropriately.

Role of the Project Team

The project team included the DNP student and the stakeholders. The stakeholders of the clinical site included the vascular surgeons and advanced practitioners. This doctoral project will include the nursing staff, the vascular surgeons, the advanced practitioners, and the DNP student. As the project progressed, it was noted that it would be beneficial to encourage feedback from the nursing staff during the development of the education program. Feedback can be described as a motivational resource to improve performance (Giesbers, Schouteten, Poutsma, Van Der Heijden, & Achterberg, 2016). This feedback would be given to me for analysis and, possibly, to implement changes to the educational program and process of delivering information to the patient. The final program would be made available to the providers who perform the surgical interventions. It was deemed important that the health care providers would also feel confident in the knowledge base of the clinic nursing staff with a crucial role in providing patient care.

As the DNP student, I was also responsible for treatment of the vascular patient and responsible for the initial postoperative care. During the postoperative period, the advanced practitioners are the providers who see the patient in the office. Advanced practitioners are also the only constant provider in the office, as the vascular surgeons rotate through the offices and hospitals. This means the advanced practitioner is often the first to evaluate the SSIs that occur. I am committed to improving the patient outcomes for the vascular patient. As an advanced practice nurse, I had a solid relationship with the nursing staff and was very familiar with the patient population. The motivation for this project stems from observing the poor outcomes for surgical patients due to SSIs. There were no potential ethical issues to consider in this project when educating the nurses on infection control and prevention to reduce the occurrence of SSIs. These instructions and recommendations were only provided by the nursing department who would conduct patient education; the final decision to follow any patent instructions is made by the patient. Patients are made aware upon arrival that the practice is a teaching facility and they have the option to not participate in teaching opportunities. There was no personal benefit of the change in practice to me as the DNP student. The main person who could benefit potentially from the program would be the surgical patient who could avoid postoperative infection when following through on the instruction and education.

Summary

In summary, the Kirkpatrick evaluation model was used to ensure compliance and success of the educational program to the nursing staff. The DNP student worked closely with the project team to keep all parties apprised of the progress. The review of the local

background led to a decision to address the need to provide better instruction to the patient, which could easily be completed by the nursing staff in this setting. Any improvement in nursing practice is relevant and important to the nursing profession. The following section will review of the practice-focused question and describe sources of evidence to support the project.

Section 3: Collection and Analysis of Evidence

Introduction

The purpose of this project was to develop an educational program for the nursing staff that can provide the tools necessary to better educate and direct the vascular surgery patient to reduce the occurrence of SSIs. In the previous section, I revealed the severity of the problem at the identified clinical site by describing the background and context as well as the roles of the people involved in this project. In this section, I describe the practice-focused question and the sources of evidence used to obtain the educational information

Practice-Focused Question

The practice-focused question addressed whether a nurse driven educational program for vascular surgery patients regarding pre- and post-operative instructions would lead to a reduction in the occurrence of SSIs. In this doctoral project, I aimed to introduce a new approach to care by developing and planning for a future quality improvement project that can help to improve outcomes among vascular surgery patients. The context for this doctoral project was to develop an educational program for the nursing staff on infection control and prevention to improve outcomes for the surgical patient by reducing SSIs. The nursing staff were guided to make a change in practice that could help to reduce the occurrence of SSIs. The nursing staff were well-educated to provide the necessary pre- and post-operative instructions to the surgical patient. Understanding risk factors that contribute to these infections is essential in the care of the surgical patient (Cheng et al., 2015). The focus was an in-depth education and training of

the nursing department to provide the tools necessary to properly evaluate and educate the surgical patient. Early diagnosis and treatment of infection is crucial in improving patient outcome. The nursing staff must be qualified to address this issue with the patient and make valid decisions on the patient's care. This approach can help reduce SSIs from occurring and provide better education to the patient. Nursing staff would have the time to thoroughly discuss and evaluate the risk of infection following surgical intervention with the vascular patient.

Sources of Evidence Analysis and Synthesis

For the educational program to be effective, several topics of evidence-based research were evaluated and implemented. It was important to understand the issue of SSIs and why one must focus on reducing the occurrence. Next, it was imperative to understand the best tool to implement the educational program to patients. In this project, that tool was the nursing department. The literature was review to find support for the effectiveness of this chosen method of dissemination and impact on patient outcomes. Many evidence-based articles were identified as sources of information to discuss the impact of SSIs, risk factors of SSIs, and preventive measures that can change the outcome.

Impact of SSIs

It is important to understand the impact that SSIs have on the patient, their family, and the healthcare system. It is also important to understand that the vascular surgery population is at higher risk for developing SSIs. Thirty percent of vascular surgery patients experience wound complications, which increases health care cost and decreases

the quality of life for the patient (McGillicuddy et al., 2016). According to McGullicuddy et al. (2016), wound-related complications cost the health care system over $10,000 per patient, in addition to the expected patient and provider costs. Many of these procedures are elective and are disputed by health care carriers (McGillicuddy et al., 2016). These procedures are performed to improve the quality of life of the vascular patient; however, the complications associated with SSIs have a negative effect on the process. McGullicuddy et al. described the patient outcome as being improved from the baseline, even with those experiencing wound complications. Although the healing process took longer than expected, the patients who were in the study eventually felt an improvement in the quality of life following surgery (McGillicuddy et al., 2016). These results reinforced that even the patients who are at risk for SSIs can possibly benefit from the surgery but that the risk of SSIs should be emphasized during the preoperative period (McGillicuddy et al., 2016). McGullicuddy et al. stated that at 1 month postoperatively, even those with poor healing reported an increase in quality of life. It is important to know that the surgery is still helping with patient, despite the complications. However, if the nursing staff can do more to prevent these complications through sharing the knowledge gained, the patient can possibly avoid complications.

> With an increase for the need of prosthetic device implantation in the vascular population, SSIs have become a leading cause of morbidity and mortality in modern day health care practice (Aicher et al., 2017). Many of the patients seen at the clinical site require implantation of such devices, and the SSIs can lead to infection of these devices. The patient then requires readmission and removal of

the device, which is an extensive procedure. The literature reviewed supports the need to reduce the 30-day admissions for vascular surgery patients to reduce healthcare costs and improve healthcare quality (Melvin et al., 2017). Melvin et al. (2017) evaluated both open and endovascular surgical interventions with 37% of the 10% readmitted having infections. They described vascular surgery patients as posing a significant risk for readmission, with difficulty identifying the specific risk factors (Melvin et al., 2017). These are complicated patients, with multiple comorbidities, so the risk factors are of each patient vary and can be lengthy.

The vascular surgeons at the clinical site of the doctoral project receive reports from the hospital that inform them of the occurrence of readmissions within 30 days. This information was the foundation of a quality improvement study done at the clinical site that evaluated infection rates the previous year. There was not a common risk factor identified or investigated at the clinical site. It is important to understand the total number of patients with SSIs, not only those who are readmitted. The quality improvement study done at the clinical site of this doctoral project encompassed patients who were readmitted and as well as those treated as outpatients to understand the true impact and occurrence of SSIs. This patient population was at risk for SSIs due to multiple comorbidities and risky behaviors that impact wound healing, such as diabetes and smoking.

Risk Factors

It is evident that further steps need to be taken to reduce the burden on the patient and society. Identifying potential risk factors can help reduce the readmission rate. A previous study done on readmission after vascular surgery revealed common risk factors of chronic anemia, hematoma after surgery, increased number of comorbidities, infection during index stay, longer hospital stay, and low hemoglobin (Melvin et al., 2017). Melvin et al. (2017) described these risk factors as the common ones seen with the readmissions but stated that many factors can influence the healing process, such as the comorbidities. Comorbidities seen in these patients include diabetes, chronic kidney disease, and obesity (Melvin et al., 2017). Melvin et al. (2017) described a high occurrence of infection with diabetes and poor glucose control. They suggested better glycemic control during index hospitalization to reduce readmissions (Melvin et al., 2017). This glycemic control should be carried on after discharge as well. In addition, it should be noted that Melvin et al. revealed that 40% of the SSIs were gram negative bacteria. The groin is the common site for the infection seen at the clinical site of the project. This area is close to the perineum, has many lymph nodes, and is difficult to access due to the pannus of many patients. Although the hygiene instructions and CHG wash helps reduce this bacterial burden in the groin, obese patients need additional reinforcement in cleaning the area after surgery (Aicher et al., 2017). Many SSIs were seen in the groin area at the project clinical site as well.

As previously stated, SSIs pose a serious threat to the life of the surgical patient (Cheng et al., 2015). Cheng et al. (2015) revealed that 75% of the deaths associated with

SSIs have been attributed to the SSIs. This percentage signifies the importance of preventing SSIs, as many of these deaths were avoidable. The risk factors identified by this study were cancer, diabetes mellitus, white blood count prior to surgery, loss of blood during procedure, type of surgery, operative duration, risk index, wound classification, and postoperative drainage (Cheng et al., 2015). The nursing staff at the clinical site could not make changes for many of the risk factors identified above, but they could better understand the procedures and the risks associated with the surgical procedures. This could help them to guide the patient in what to expect and educate the patient accordingly. For example, Diabetes continues to be a common factor with poor healing and adverse outcomes, therefore it would be important for the nursing staff to stress the importance of diet and medication regimen before and after surgery.

Evaluation of SSIs in unnamed United States hospitals has revealed several factors affecting the development of SSIs in vascular surgery patients (Inui & Bandyk, 2015). These factors include colonization of methicillin-resistant staph aureus, groin incision, prosthetic grafting or patch angioplasty, lower limb arterial bypass grafting, and end-stage renal disease (Inui & Bandyk, 2015). In addition, Inui and Bandyk (2105) described characteristics that can be risk factors, such as obesity, smoking, diabetes, and advanced age. They further separated the risk factors in categories: patient-related, procedure-related, and environmental risk factors (Inui & Bandyk, 2015). Although all these factors have an impact on the surgical outcome, for purposes of this project, I only addressed the patient related risk factors. Additional factors that have not yet been discussed are malnutrition, autoimmune disease/corticosteroid use, and chemotherapy

(Inui & Bandyk, 2015). Surgery is often not recommended unless critical, with those patients who are immune compromised (Inui & Bandyk, 2015). The recommendations of the study done by Inui and Bandyk align with the educational program to the nursing students. Incision care, using CHG, hand washing, and patient and family education of SSI symptoms are all treatment strategies discussed. These are areas the nursing staff can make an impact with the patient. These topics were the focus of the educational program.

Preventative Measures

Early intervention is important when discussing treatment of SSIs. According to Aicher et al. (2017), as advancement in surgical technology occurs, it introduces new infection risks. It is important to identify where the health care providers can make an impact on these new risks. The article describes how most SSIs occur after discharge and are easily identifiable within three weeks of the surgical intervention (Aicher et al., 2017). In the clinical setting of this project, the surgical patient does not have the first postoperative appointment for fourteen days after discharge in most circumstances. The patient does not return until the staples are to be removed and the infection process has already begun at that point. Early intervention may be the key to avoiding the readmission and further surgical debridement. The literature supports the use of CHG for skin decontamination and hair removal in the areas of the incision. These are two preventative measures that can be implemented as part of the educational program so the nurses can direct the patient.

Despite the strategies and initiatives implemented to reduce the occurrence of infections during surgery, the healthcare workers continue to lack the knowledge and

understanding to reduce these infections (Jackson, Lowton, & Griffiths, 2014). Nurses are responsible for leading and managing the care environment through education of the patients in which they care for. The literature states it is important for a self-assessment to occur by the nurse to better understand their confidence and role in patient care (Jackson et al., 2014). The study done revealed that the nurses interviewed would rationalize their behavior and felt their own practice was correct. The article describes the nursing staff making their own judgement on what was necessary regarding infection control. It states the participants implied that certain patients were treated differently based on the level of risk, as if some were more infected than others. This evidence provided the rationale for why I chose to first evaluate the nursing department through a questionnaire. This type of information is important when understanding what barriers might be introduced in the training process. Assessment of the nurses was needed to obtain the necessary information about the nurses' professional strengths, weaknesses, and educational needs (Numminen, Laine, Isoaho, Hupli, Leino-Kilpi, & Meretoja, 2014).

There is an evidence gap between nursing education and clinical practice that needs to be addressed (Numminen et al., 2014). The study revealed the lack of confidence and need for support or guidance for the professional development of the nurses. The study enforces the need to build confidence through further education of the nursing department. Furthermore, there needs to be better collaboration between education and practice, with nursing using evidence-based practice as the foundation of improving their professional skills (Numminen et al., 2014).

It is important to understand how competent the nursing staff is in infection control and prevention. Additional literature review reveals that nurses do not have the necessary knowledge on controlling infections and need further training on infection prevention (Ghadamgahi, Zighaimat, Ebadi, & Houshmnd, 2011). This article concluded that the nursing staff play an important role in infection control and that was necessary to implement training to increase the nurses' knowledge (Ghadamgahi et al., 2011). This particular article describes the infections that occur within 72 hours of admission and are not limited to the hospital setting. Ghadamgahi et al.describes the prevention of infection as needing to address three concepts; nursing staff: knowledge, attitude, and self-efficacy (2011). These same concepts were noted to be important in the educational program for the nursing staff in a clinical setting as well.

Self-efficacy is defined as the confidence of an individual in his/her ability to perform a behavior (Ghadamgahi et al., 2011). The educational program is based on improving the confidence the nursing staff has in their ability to provide knowledge to the patient. The article describes the lack of training courses and in-services by management. Of note there was no relationship between age, marital status, and job experience. This is important, as even the experienced nurse must have the specific training to succeed in a specific area of medicine. The literature also supports the nursing staff in the role of disseminating the educational program and playing an integral part of the transformational healthcare delivery (Ghadamgahi et al., 2011).

The nurse is identified in the literature as a leader and member of the transformational healthcare team that can provide affordable, quality care to patients

(Salmond & Echevarria, 2017). The article describes the factors driving the healthcare transformation as cost, fragmentation, accessibility, and suboptimal outcomes (Salmond & Echevarria, 2017). The nursing staff have established rapport with the patient and are realistic in the role of patient educator. Nurses can play a vital role in improving care to patients, advancing the health care provided, and decreasing health care cost (Salmond & Echevarria, 2017). The literature supports the nurse as a key player in the quest to managing post-surgical care to surgical patients (Verononovici, Lasiuk, Rempel, & Norris, 2014). In this project, the nursing staff play an important and key role in the team based, patient-centered care provided to these patients as the vascular surgeons have more limited time to spend with the patient or to answer phone calls and questions.

The literature review done reveals a decrease in anxiety and depression of the surgical patient as well as the cost effectiveness of utilizing the nursing staff to provide education to the patient. Effective patient teaching can improve the quality of life after surgery and decrease the anxiety associated with surgery (Verononovici, et al., 2014). The literature also supports face-to-face, individualized patient education to achieve improved outcomes following surgery ((Verononovici, et al., 2014). Self-management care following surgery is not natural and these skills require proper education to acquire the knowledge to manage their care after surgery (Verononovici et al., 2014). In addition, providing written educational material alone does not produce optimal results, although it spares more time. The educational material will be discussed and provided to the learner during this project. It is important to discuss the material and to allow time for additional questions that may not be answered within the written material. As previously stated, the

nursing staff are the ideal candidates to provide the education and direction to the surgical patient. At the clinical site it is easy to contact the nursing staff, however; it is difficult to speak with a surgeon.

Gouge notes that patients are given basic discharge instructions that are not individualized and do not address the specific diagnosis or surgery (2017). In addition, the average time spent on discharging a patient following surgery is three minutes (Gouge, 2017). This does not allow ample time to be thorough in discharge instructions. Patients are often anxious, unsure, and lack understanding of discharge instructions, which can lead to multiple phone calls and readmissions (Waniga, Gerke, Shoemaker, Bourgoine, & Eamranond, 2016).

Nurses and physicians actively helping to provide well-defined discharge directions improve the care of patients (Waniga et al., 2019). Improving provider-patient communication will improve the experience for the patient by allowing better comprehension of the instructions (Waniga et al., 2019). While this study discussed the lack of communication in the hospital, it also emphasized the need for posthospitalization care that leads to improved patient satisfaction. The study enforces the need to maximize the discharge process. Majority of the calls taken by the nursing department at the clinical site are related lack of knowledge following discharge. Patients are unsure how to take care of the incision or wound, when to follow up, and the expected symptoms following surgery. The literature states that further research is necessary to seek a method for dissemination of the education (Verononovici et al., 2014). This project provides the

solution by utilizing the nursing staff in dissemination of the education obtained through the educational program to the surgical patient.

Evidence Generated for Doctoral Project

In order to provide the surgical patient with the necessary pre- and post-operative instructions, the nursing staff must be thoroughly educated on infection control and prevention. The educational program for this project includes content on signs and symptoms of infection, risk factors of SSIs, how to identify those patients at higher risk of SSIs, how to avoid infection, hand washing, wound care, use of CHG prior to surgery, and expected symptoms following surgery. The program also includes a slide show presentation that includes the questionnaire answers with rationale for the correct answer. The nursing staff needs to differentiate the redness of the suture site versus redness from infection; expected serous drainage versus purulent exudate that indicates infection; and identification of expected scabbing of the incision line versus formation of eschar. Importantly, the program must prepare the nurses to instruct the surgical patient on the expected outcomes that indicate healing and those outcomes that are a concern.

The nursing staff was evaluated before and after the educational program through questionnaires and discussions. The initial questionnaire evaluated the staff's base knowledge and where improvements were necessary. This helped to develop the educational program with a focus on weaknesses identified. The nursing staff was allowed to reveal their strengths and voice their concerns, as it was important to know their confidence levels. To be effective in the change process, the initial questionnaire included questions that addressed the readiness to change, reaction to change, and the

usefulness of the change (Andre, Aune, & Braend, 2016). The aim was to avoid the perception by the nursing staff that the program was more work and to help them understand the importance of the program. If the nursing staff could not see the relevance of the program and how they could make an impact, they may not have been engaged in the change.

Prior to the questionnaire, I had a meeting with the nursing staff to discuss expectations of the educational program. It was important to review the issue and how we proposed to make improvements. The educational program was presented by me to the nursing staff at the office, who would use the knowledge to make an organizational change that allowed for better education and training to the patient. At the time of this project, the nursing department consisted of two registered nurses, two licensed practical nurses, and five certified medical assistants. Although they have different educational backgrounds, they perform the same tasks within the clinical setting.

The educational program took place during the lunch hour, as all in-services were done during this time. The lunch hour was extended during the training session to allow adequate time to properly train the staff. The setting for the educational program was held in the vascular surgeon's office. The office is where the surgical discussions take place and where the patient will follow up after surgery. The nursing staff needs to understand that this will benefit them and the patient. They will become experts in the office, who can address patient concerns and improve patient outcomes. There must be a commitment on behalf of the nursing staff, to ensure the program is successful. Negative attitude or resistance will not provide the proper environment to learn and grow as an expert in

infection prevention. The nursing staff are required to perform the tasks described in the educational program as part of their job requirements currently, however; they have not been given the tools to successfully do so. The seasoned registered nurses at the practice are more confident in evaluation of the patient and triage of the phone calls but the remaining nursing staff lack the confidence and background to make clinical decisions. The nursing staff must understand they will be qualified at the end of the educational program to make clinical decisions on the vascular surgery patient and provide necessary instructions to prevent SSIs. This will be evident by the support and encouragement they receive from the physicians at the practice and the feedback from patients. The patients are given a satisfaction survey at their postoperative visit as part of the office quality improvement initiatives at this clinical setting. The feedback the nursing staff receive will empower them in the office and encourage them to participate in the program. There is a delay in patient care now when the nursing staff waits to speak with a provider, as the provider is often tied up with patients for long periods of time. They should be able to make the clinical decisions to bring them into the office or schedule an office visit, with no delay. If there is concern for infection, they must be seen immediately, and the nursing staff will have the authority to do make that decision. The educational program was provided to the nursing department online and in paper form, as there is an age difference that requires different learning techniques. I performed an in-service to the nursing staff but also allowed them to review and learn independently before taking the post-educational program questionnaire. The nursing staff were allowed to ask questions during that time.

The nursing staff is responsible for providing instructions to the surgical patient, as well as triage of patient calls and appointments. The nursing staff are viewed as a resource by front desk staff and other departments in relation to patient care. They need to become experts in infection control and safety to provide solid answers to the questions they receive from support staff, as well as the patients. Every change within the practice must be approved by the governing body as part of the accreditation requirements. The governing body includes all full-time vascular surgeons who are considered partners within the practice. They are very active and supportive of the quality improvement initiatives, as well as the educational program to improve the knowledge of the nursing staff. The progress will be reviewed with the governing body at a staff meeting. The nursing staff meets with each patient who is signing consent for surgery in the office. At that time the nursing staff provides written and oral instructions for use of CHG before surgery. They review the signs and symptoms of infection, the importance of hand washing when changing the dressing, proper wound care and cleaning, expected drainage, and what to expect after surgery. The patient is given the direct number to the nursing department for any questions or concerns that arise. The nursing staff have a checklist to ensure they do not miss any important steps of the above information. All surgical patients are given a copy of preoperative and postoperative instructions, which are pre-printed pamphlets. The patient will sign the instructions and will be given a copy. The original will be part of the surgical packet that is scanned into the patient's chart. This packet includes the consent forms for surgery and required narcotic contract. I observed the nursing staff providing direct care to the patient to ensure they are

effectively utilizing the knowledge they gained through training. A checklist was used by me during the observation process to make sure the nursing staff meet all requirements of the educational program. This checklist includes if the staff discussed signs and symptoms of infection, the importance of hand washing when changing the dressing, proper wound care and cleaning, expected drainage, pain control and if they gave the patient CHG with instructions. Also, the checklist includes if the staff provided the patient with the signed copy of the instructions. I will continue to review all instructions signed by patient and the nursing staff checklist for accuracy and completeness. I will speak directly to the staff responsible if issues arise. The change in practice will be evident by the reduction in SSIs and reduction of readmission after surgery. The improvement in the nursing staff's knowledge will be evident in the discussions they have with the patient and how they handle the phone calls. There will not be a delay in decision making for these patients, as the nursing staff will be confident and educated in their decisions so they will not need to wait for the physician's direction. Early intervention will prevent SSIs and readmission after surgery.

Summary

In summary, the literature reviewed provided reassurance in many areas of the educational project. Previous studies recognize the need for further education of both the nursing staff and the patient who is having surgery. This project will reveal the nursing staff as the ideal individual to improve their own education on infection prevention and control, so they are able to make an impact on patient outcomes. The next sections will

discuss the findings from the questionnaires and what recommendations were made from the answers.

Section 4: Findings and Recommendations

Introduction

The basis for this doctoral project was to educate the nursing department on infection prevention so they are able to provide better guidance and instructions to the vascular surgery patient. The nursing department staff is the primary contact for the patient, their family members, and the support staff at this clinical site. A thorough educational or training program has never been established at this clinical site for the nursing staff who are responsible for assessing and educating the surgical patients. As previously discussed, the evidence used for the basis of the project was obtained through questionnaires, observation, role playing, and discussions.

Findings and Implications

The initial observational process and questionnaire confirmed a lack of confidence in addressing patient concerns. The comments made by the staff revealed they were worried to instruct patients incorrectly, and they felt the providers would not approve of their decisions. They were not comfortable deciding if a patient needed an appointment without asking a provider, and they did not want to remove staples or sutures without the provider's consent. This was an unanticipated finding, as the nursing department has been responsible for these decisions since the office opened over 50 years ago. Even with specific protocols in place for these decisions, the staff was not comfortable making these decisions. They stated that they would be more confident with better direction from the providers. The following is a report of the answers to questions provided by the 8-member nursing staff:

1. Did you receive formal training on infection prevention in relation to vascular surgery patients?

   One-hundred percent of the nursing staff stated that they did not receive formal training.

2. Are you confident in evaluation and assessment of surgical sites?

   Fifty percent of the nursing staff stated that they were confident.

3. Would you benefit from additional training on the surgeries performed?

   One-hundred percent of the nursing staff stated that they would like additional training, as procedures have changed.

4. Are you comfortable triaging calls to determine if patient needs an urgent appointment? (without guidance from a provider)

   One-hundred percent of the nursing staff stated that they wanted the provider's approval.

5. Are you comfortable following the protocols established for staple removal without provider input?

   Thirty-eight percent of the nursing staff stated that they were comfortable following protocol without asking the provider.

6. The first postoperative appointment is a "nurse visit" only with many surgeries; do you think a provider should evaluate patient?

   Seventy-five percent of the nursing staff state that they do not need to see a provider.

7. On a scale of 1 to 10, (10 being the most) how comfortable are you answering patient questions regarding preoperative and postoperative care?

   Fifty percent stated *4*.

   Fifty percent stated *7*.

8. Does redness of incision site mean infection is present?

   One-hundred percent said yes.

9. Is handwashing necessary before and after dressing changes?

   One-hundred percent said yes.

10. Does any drainage from incision means infection is present?

    One-hundred percent said yes.

11. Does smoking affect wound healing?

    One-hundred percent said yes

12. Should HIBICLENS be used only morning of surgery?

    Fifty percent said yes.

13. Does diabetes affect wound healing?

    One-hundred percent said yes.

14. Does the original dressing following surgery remain intact for 3 days?

    Fifty percent said yes.

15. Is pain is expected and does not mean infection?

    One-hundred percent said yes.

16. Is nutrition important for healing?

    Fifty percent said yes.

17. Can the patient shower with staples present?

Fifty percent said yes.

The staff was asked why they answered *yes* or *no*, without prompting them on the actual answer. They felt that they were told the answer at some point but could not state the reasoning behind the answer. Teaching them the why may help retain the answer in the future. In addition, all of the nursing staff stated that they did not receive specific training for infection prevention and would benefit from additional training. This training may improve the percentage of nursing staff not comfortable in making formal assessments or decisions without the provider present. The staff would like a physician's approval, but most did not think the provider needed to see the patient at the first postoperative visit. This is contradictory to the other answers, as the staples are removed the first visit.

The findings that indicated the need for better training was that the nurses thought redness at the incision site always meant infection. Many times, the skin becomes red and irritated from the staples and resolves when the staples are removed. The nurses in this study did not know how to address dressing changes, bathing instructions, drainage, and seromas that develop after vascular surgery. One of the findings was the lack of knowledge of the surgeries performed. The nurses understood the diagnosis of peripheral vascular disease, carotid disease, and abdominal aortic aneurysm, but they did not fully understand the surgeries performed to address the issue. The nursing staff felt that the patient did not trust the answers given by them and that the patient wanted to hear this from the provider. However, the nursing staff did feel that confidence in their instructions

would make an impact on the patient accepting the instructions. Most importantly, the staff did not know how they could truly make an impact in the SSIs occurring with the vascular surgery patient.

The nursing staff needs to understand the evidence-based wound care necessary post-operatively to reduce the occurrence of infections. Fifty percent of the staff thought that the patient could not shower until the staples were removed, and they thought the dressing should stay on for 48 hours after surgery. None of the nursing staff felt it was relevant to tell the patient to wash their hands with dressing changes, as this was believed to be a known action of the patient. However, this is not the case with the patients at this clinical site. Finally, the nursing staff were observed handing the patient the CHG solution without explaining the process. Staff noted that the written instructions given with the wash were sufficient directions for the patient. Patients were not given the opportunity to review the instructions and ask questions about the use. Of concern was they were not familiar with the written instructions, as many of the nurses thought it was to only be used the day of surgery. This is the result of a lack of training and assuming the nursing staff understands how to use the product without being trained.

The lack of knowledge or assumptions made by staff within the department are concerning. Half of the nursing staff assumed it was important to obtain nutrition following surgery, especially for diabetic patients, but they could not provide details on what to tell the patient to eat to promote healing. They knew that diabetic patients did heal poorly; however, they were not sure why this occurs. Pain is a symptom that is

evaluated after surgery. Although pain is expected, this could be a symptom of further complications.

As previously discussed, positive social change occurs when changes are made to improve outcomes in any setting. The nursing staff given the tools can contribute to making a positive impact on the outcomes of vascular surgery patients. With better understanding and guidance, nursing staff will be confident in the care they are providing to patients and staff. Those nursing staff who are unsure of the various aspects of infection prevention will benefit from knowing the content needing to be taught as well as the rationale, not only achieving the correct answers to the questionnaire, but having an understanding of the reasoning behind the answers.

Recommendations

The first issue to be addressed is the lack of knowledge of the surgeries performed. Increased knowledge of the surgery will help to improve the confidence necessary to discuss information with the patients. Understanding what occurs during these surgeries will help the nursing staff understand why certain outcomes occur. The nurses were given the written material provided to the patient and listened to the surgeons discuss the surgery with the patient. Multiple videos, vascular books, and articles with diagnoses are at their disposal and should be utilized when they are unsure of a surgery. A list of surgeries performed was provided to the nursing staff, along with the follow up protocols already established. The nursing staff will continue to review this information independently. In addition, expected symptoms with each surgery will be reviewed,

symptoms that should improve after surgery and those that may indicate complications if still present.

It is important for the nursing staff to understand why things occur so they can explain this to the patient. The nursing staff should understand what can be expected after surgery, such as redness from staples, edema, and serous drainage. These issues are often mistaken for infection. They need to know that some pain is expected at the incision site, but significant pain can indicate infection or occlusion. It is crucial that the nursing staff ask appropriate questions regarding the pain, i.e., location; intensity; and if pain is reproducible with movement, constant or controlled with pain medication.

The staff education would include information on seromas that can occur with graft placement and that having a seroma does not mean the patient has an infection. Seroma is a recognized complication where the vascular graft is surrounded by sterile fluid that is persistent (Ho, Walker, & Cavaye, 2013). It is common for serous drainage to be present with a seroma. It is important to know purulent, odorous drainage is not serous. Infection should be excluded by asking the patient to describe the drainage, redness, warmth, fever, and if it increases in size.

Increasing the confidence to discuss complications and outcomes after vascular surgery will provide the nursing staff with the knowledge to handle the patient questions in the same manner as the providers. Role playing with the nursing staff will show them the different scenarios and how they can be addressed. Telling a patient swelling or clear drainage can be expected and not to worry will not put the patient at ease. However,

explaining why there is redness at the incision site from staples or where the clear drainage is coming from will make the patient have a better understanding.

To address the issue of staple removal, the protocols were reviewed. The nursing staff will leave the staples in for the diabetic patient for three weeks. Patients who are not diabetic will have the staples removed at two weeks if minimal edema is present. Carotid surgeries only require staples for seven days on all patients. Staff should know that absorbable, subcuticular sutures are also used for wound closure. Clear guidelines will be provided but the nursing staff still need to evaluate the incision thoroughly before removing staples, as not all patients will fit within these guidelines. These unique situations should be addressed by a provider. These protocols and guidelines should be reviewed twice a year or as needed.

Clear guidelines will also be provided that directs the staff on how to answer the patient phone calls regarding bathing and dressing changes. Role playing patient phone calls and how they are interpreted by the patient helps the nursing staff understand the need for thorough direction to the patient. The nursing staff cannot assume the patient knows any information on the process, including the importance of hand washing. Patients often need step-by-step detailed instructions to understand and follow the directions completely. Those patients working in medicine may understand the minor details better than those who are experiencing surgery for the first time. The nursing staff need to understand the more details provided, the more likely the patient is to comply. The nursing staff will be provided a checklist to make sure they do not skip any of these details during the surgical discussion. It is important for the nursing staff to understand

that wound healing occurs in four stages and can be altered at any step. These four stages include: hemostasis, inflammation, proliferation, and tissue remodeling (Ellis, 2017). Inflammation is seen with the expected edema and redness in many occasions. The questions given to the nursing staff regarding surgical sites and the rationales that coordinate with the answers are listed below.

1. *Does redness of incision site mean infection is present?* No, staples will cause redness at incision site. Redness alone does not necessarily indicate infection. However, redness with purulent drainage, warmth, or dehiscence needs to be evaluated. Most times the redness resolves when staples are removed; however, the patient needs to call if this does not resolve. Other seemingly basic questions can be addressed with patients
2. *Is handwashing necessary before and after dressing changes?* Yes, directly touching is the most common means of transmitting bacteria (Ford & Park, 2018). Microorganisms on the skin's surface can easily be transferred to other areas of the body or other people (Ford & Park, 2018). Washing hand prior will reduce what is transferred to the incision and washing hands after will reduce what is transferred from the wound.
3. *Does drainage from an incision indicate that an infection is present?* No, drainage is common and must be described by the patient. If the drainage is bloody or clear (yellow appearance) it would be expected. If the drainage is purulent, thick and/or odorous the patient needs to be seen. Seromas are seen

with graft placement and contains sterile serous drainage that may leak out of the staple sites or any opening in the incision (Ho, Walker, & Cavaye, 2013).

4. *Does smoking affects wound healing*?. Yes, delayed wound healing occurs due to poor tissue oxygenation with smoking (Ellis, 2017). It also affects the inflammatory process and cell functions (Ellis, 2017). Smoking can increase risk of infection, dehiscence, and wound necrosis.
5. *Should HIBICLENS be used only during the morning of surgery?* No, HIBICLENS is to be used daily for 3 days, including day of surgery. HIBICLENS will inhibit or kill gram-positive and gram-negative pathogens that cannot be corrected with regular bacterial soap (Cheng et al, 2015). The skin acts as a barrier to bacterial invasion and when it is disrupted by surgery, there is cause for concern (Aicher et al, 2017). HIBICLENS washing will cause friction and rinsing to remove microbes and it will provide a lingering antimicrobial effect that reduces the patient's own bacterial load (Aicher et al, 2017). Hair removal in the groin should also be advised.
6. *Does Diabetes affect wound healing?* Yes, stress related to surgery and anesthesia trigger the release of catecholamines and cortisol that result in hyperglycemia (Leung & Ragbir-Toolsie, 2017). Hypergylcemia causes changes in cellular morphology and proliferation that alters immune function and delays healing.
7. *Should the original dressing remain intact for 3 days following surgery?* No, dressings need to be changed daily to allow proper evaluation of incision.

Dressing should also be changed if it becomes saturated, as it can increase the risk of infection when moist. Dressings can promote wound healing, prevent secondary infection, control exudate and moisture, and increase patient comfort (Weurz, Hanley, Shaw, Close, & Dow, 2011).

8. *Is pain expected and does pain mean infection?* Pain is expected after surgery and minimal narcotics are prescribed due to changes in the state laws. However, if pain is severe and constant, patient needs to be evaluated. Severe pain could be infection or occlusion of the artery and needs to be addressed immediately. In addition, patient must be seen and evaluated (per state law) to obtain a new prescription for pain medication if indicated.
9. *Is nutrition is important for healing?* Yes, poor nutrition during the healing process can delay healing and impair the strength of the wound. Protein is one of the most important nutrients needed for wound healing, as it is required for all stages of healing (Sajid, Miyan, Zaidi, Jaffri, & AbdeAli, 2018). Patients should also be instructed to stay hydrated to avoid dehydration.
10. *Should a patient avoid taking a shower with staples present?* No, postoperative showering does not increase risk of infection, it will increase patient's satisfaction and assist in wound care. Properly cleaning the wound will promote an environment for optimal healing (Hsieh et al, 2016). Staples will not be affected and must be pat dry.

Following the in-service to disseminate the educational program to the nursing staff, the questionnaire was taken again as a group with the answers discussed at that

time. This allowed reflection and role playing, as we discussed patient scenarios and the way the patient describes the drainage, pain, and dressing changes. Nursing staff were encouraged to continue to communicate with the DNP student when questions arise.

Contribution of the Doctoral Project Team

The project team assisted with obtaining the resources that were used for educational purposes. The surgical pamphlets and educational material for the patient were provided by the vascular surgeon's office. The project team established the protocols and guidelines for patient follow up. They approved the CHG wash and approved that it would be provided with instruction by the nursing staff. The project team allowed the nursing staff to observe the surgical discussions to understand the surgery and what the physician discussed with the patient. The project will be extended in a quality improvement study that re-evaluates the infection rate and readmissions at the clinical site. In addition, portions of the educational program will be used to educate new staff members working in other departments.

Strengths and Limitations

The strength of the educational program is that it will provide the nursing staff the tools and education to perform the necessary tasks they are responsible for in this clinical setting. This project shed light on the need for better education and training for the nursing staff, that may not have occurred otherwise. The project enhanced the educational training of the nursing staff and empower them as educators to the vascular surgery patient. Role playing will provide hands on teaching to better address real-life situations and patient concerns. The protocols, guidelines, and checklist will provide an organized

approach to the educational program. This educational program will reduce anxiety for the nursing department. This will decrease the phone calls and unnecessary appointments that interfere with patients needing to be seen in the office versus those who are experiencing expected symptoms.

Students learn and advance at different levels of learning, which can limit the success of the educational program. Not all students are motivated or inspired to succeed and make an impact on patient care. In addition, it was difficult to be present for every patient interaction to ensure the right information was being relayed to the patient. A reduction in SSIs will reveal whether the patient is receiving proper instruction, however; it is impossible to control patient compliance to the instructions given. Finally, the educational project may not be applicable in other vascular surgeon's office due to the different responsibilities and roles expected within different clinical settings. Not all nursing departments are expected to play such a crucial role in patient assessment and evaluation, however; knowledge is power and any person dealing with surgical sites should have this educational training.

Summary

In summary, the educational program will better prepare the nursing staff to care for the vascular patient. The initial questionnaire revealed areas that needed improvement and the discussions helped the staff understand the reasoning behind the questions. It will be important to keep the nursing staff engaged through further encouragement and discussions. The last section will describe the dissemination of the results and a self-analysis of the student.

Section 5: Dissemination Plan

Introduction

The clinical setting for this project has an issue with communication, as the same provider is rarely in the office within the same week and a rotational schedule is used. This clinical setting relies on the advanced practitioner to communicate the issues within the office, as she is the constant provider at the office. The providers meet on a weekly basis to review patient cases and upcoming surgeries. The providers also meet every other month for morbidity and mortality meetings, where poor outcomes are discussed. Finally, the providers rely on the advanced practitioner and seasoned staff to train and educate the new staff. The providers are not aware of the process and do not actively participate in the training. The providers within the office, which includes all physicians, physician assistants, nurse practitioners, and the prosthetist, will be present to discuss the educational program results and recommendations. It is important to have the input of all staff providing care to these patients. The dissemination of the information will occur at one of the provider's weekly meetings, along with follow-up discussions as needed. The core presentation will be useful in training the new front office staff, as they should have knowledge of the patients treated to schedule patients appropriately. Finally, the information will be presented to the quality improvement committee at the clinical site.

Self-Analysis

Self-analysis allows me to evaluate my own strengths and weaknesses during the process of this educational program. I am involved in many aspects of the clinical setting,

including managing the office and staff. As an advanced practitioner, my role has been extended to more than just a provider of patient care. However, managing a project and establishing a thorough educational program is a new task. I am present to answer questions from the front desk, nursing department, and billing department, but never have I provided a formal training program. I found strength in my previous experience as a patient. I have had several surgeries myself, following a serious car accident. This has allowed me to understand both sides of the spectrum and to provide insight to the nursing department. This process has shown me how important it is not to assume someone understands what you are saying. It is important to always ask if someone understands what you said or if they have any questions, whether it is the patient or the staff. I have found effective communication to be one of the most important tools in education. This project has attributed to my long-term professional goal of teaching, as it showed me the difficulties a professor may experience and how teaching needs to be adjusted to the learner. Not every person learns the same way, and the teacher needs to make adjustments that accommodate all levels of learning. This lesson can be applied in daily practice with patient education as a practitioner.

The challenge with the project is keeping the momentum alive. It is easy to implement a change to practice and lose site of the goal. This change will require constant monitoring and scheduled meetings to ensure compliance. As a new change is implemented, it is easy to lose focus of the previous change. The solution will be quarterly meetings to evaluate the program and make any necessary changes. In addition, the occurrence of SSIs will be followed closely by the nursing department. The nursing

department will be involved in the quality improvement initiatives for reduction of SSIs. If they are actively participating in the initiative, they will not lose sight of the end goal.

Summary

The nursing staff will play a crucial role in improving vascular surgery patient outcomes by providing them with pre- and post-instructions. The nursing staff has been identified as a vital component of the care provided to the surgical patient. To be effective in this role, the nursing staff must be properly trained in infection prevention to be able to instruct the patient. The nursing staff must realize their potential in this role to improve patient outcomes. The research demonstrates the need to better educate the patient to reduce the occurrence of SSIs, as SSIs lead to poor patient outcomes and increased health care costs. Education is the key to improving patient care and the outcome following surgery. The patient cannot change the outcome of the surgery itself, but they can avoid surgical site infections following surgery with the proper education.

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Appendix A: HIBICLENS Instructions and Log

The fight against POSTOPERATIVE infection begins at home.

HIBICLENS contains a fast-acting antiseptic, chlorhexidine gluconate, which kills most germs upon contact.

HIBICLENS is to be used DAILY for **3 days prior to surgery.**

When you bathe or shower:

* Use your regular shampoo and body soap to wash. Rinse thoroughly.

*Then use HIBICLENS foam to wash the surgical wound area, with special attention to area of planned incision.

Apply HIBICLENS directly to you skin or wet washcloth.

Wash and then rinse gently.

*DO NOT use regular soap after applying HIBICLENS

*DO NOT apply any lotions, deodorants, powders, or perfumes to the body areas that have been cleansed with HIBICLENS

HIBICLENS Log

Patient Name	Date given	Proper Usage	Post-op Infection

Appendix B: Surgical Discussion Checklist

Surgical Discussion Checklist

Directions: Use the checklist to review each item prior to discharge.

Reviewed Signs/symptoms of infection _____

Hand washing/hygiene/shower_____

Wound care/dressing changes_____

Provided HIBICLENS with instructions_____

Edema/drainage expectations_____

Pain Control_____

Importance of nutrition/healing_____

Smoking Cessation_____

Discharge instructions provided_____

Follow up _____

Appendix C: Patient Pamphlets: Carotid Artery Surgery

Carotid Artery Stenosis

Two vessels travel through the next to carry blood to the brain. These are the **carotid arteries.** One or both of your carotids has become narrowed. This is called stenosis. Stenosis of either carotid can reduce the brains blood supply and cause a **stroke**. A treatment can help open the carotid arteries and prevent stroke.

What is a stroke?

A stroke occurs when blood flow to a Portion of the brain is cut off. This damages brain tissue and can cause severe loss of function. Results of a stroke can include trouble with movement, speech, and reasoning. Some strokes are even deadly. One Warning sign of a stroke is a TIA (transient ischemic attack). This has the same symptoms as a stroke, but goes away within minutes or hours. Unlike a stroke, a TIA rarely causes long-term damage. But having a TIA is a sigh that you're at high risk for having stroke.

Symptoms of Stroke and TIA

Listed below are some common symptoms of stroke and TA. If you have any of these symptoms, get help right away. Prompt treatment for a stroke is vital! The longer you delay getting medical help, the more damage a stroke can do.

Call 911 right away if you have any of these symptoms:

- Sudden numbness or weakness of the face, arms, or legs, especially on one side.
- Sudden confusion, trouble speaking, or trouble understanding.
- Sudden trouble seeing in one of both eyes,
- Sudden trouble walking, dizziness, or loss of balance

Your Brain's Blood Supply

Blood carries oxygen and nutrients to wherever they're needed in the body. The brain needs a steady supply of blood to work. Problems with the vessels the supply blood to the brain can block blood flow. If this happens, parts of the brain can become starved of oxygen and nutrients. Damage results. This can cause problems throughout the body.

From the Heart to the Brain

The heart pumps blood through the body. Blood vessels called arteries carry blood to the limbs and to the organs, including the brain. The common carotid arteries are two of the main pathways for the blood to the brain. Each common carotid artery travels up one side of the neck and divides into two branches. The internal carotid artery carries blood into the brain. The external carotid artery carries blood to the face.

Healthy Carotid Arteries

Healthy artery walls are smooth and flexible. Blood flows freely so the brain gets all the blood it needs to function well.

Plaque in the Arteries

The carotid artery walls can become damaged due to things like high blood pressure, smoking, and diabetes. Then, particles of fat and cholesterol in the blood build up in the damaged artery wall. This forms a substance called plaque. A buildup of plaque narrows the artery and reduces blood flow. This can lead to symptoms of a TIA.

How a Stroke Can Occur

Plaque has a rough surface that can cause blood clots to form. Also, pieces of plaque can break off (rupture) and enter the bloodstream. Fragments of plaque and pieces of blood

clot (emboli) then travel in the blood to smaller arteries in the brain, blocking them completely. This is what cuts off blood flow to a portion of the brain and causes a stroke.

Getting Ready for Treatment

Once your procedure is scheduled, you will be told how to prepare for it. Be sure to follow all the instructions you are given. These are for your safety. They also help ensure the best outcome.

Before the Procedure

Tell your doctor what medications you take. This includes over-the-counter medications, herbal remedies, and supplements. Make medication changes as directed by your doctor. You may be told to stop taking some of the medications you normally take. You may also be told to start taking certain medications before the procedure. Tell your doctor about any allergies you have to things such as latex, iodine, or tape. Arrange for an adult family member or friend to give you a ride home after the procedure. Stop eating and drinking as directed before the procedure, ask whether you should continue to take any medications during this period.

On the Day of the Procedure

When you arrive at the hospital, staff prepare you for the procedure. An IV line is put into a vein in your arm or hand. This provides fluids and medications. During this time, you may be asked your name and what procedure you're having more than once. This is for your safety. When preparations for the procedure are complete, you are taken to the room where the treatment will be done.

Removing Carotid Plaque

Endarterectomy is the removal of plague from the carotid artery. It is done through an incision in the neck. This surgery has very low risk of stork or other complications. It typically involves a quick recovery with little pain.

The Procedure

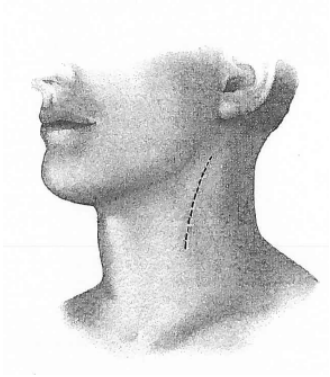
An incision is made in the skin over the artery. The artery is opened and plaque is removed. The incisions in the artery and the skin are then closed.

A note about Anesthesia

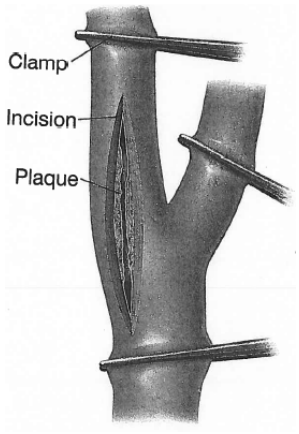
In most cases, general anesthesia is used to put you into a state like deep sleep through the surgery. In other cases, you are given medication to make you sleepy and relaxed, but you remain awake. The incision site is numbed so you don't feel pain.

Removing the plaque

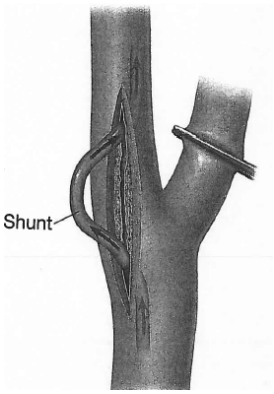
Make the skin incision. The surgeon makes an incision in the skin over the carotid artery. The image below shoes a common incision site and length.



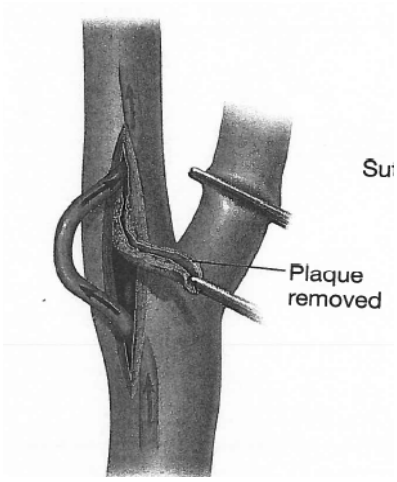
Opening the artery. The surgeon places clamps on the artery above and below the blockage. This temporarily stops blood flow. The surgeon then makes and incision in the artery itself.



Placing a shunt. If needed,a shunt is placed to keep blood flowing to the brain during the procedure. The clamps are then removed from the internal carotid artery.

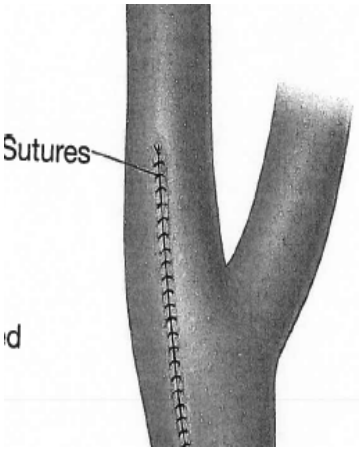


Removing plaque. The surgeon loosens the plaque and then it is removed carefully. The surgeon inspects the artery to confirm that all of the plaque is gone. He or she then closes the incision using either suture or patching.

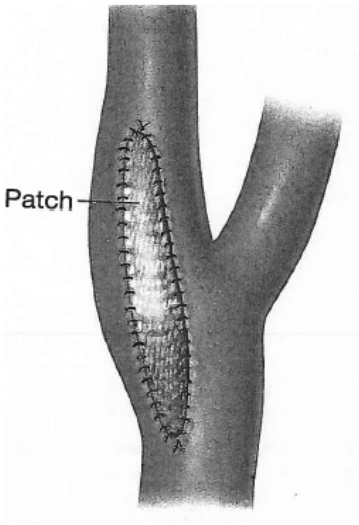


Closing the incision

Suturing. The surgeon may suture (stitch) the incision closed. Clamps are removed, and the skin incision is closed. A tube may be placed to drain fluid from the incision for a short time after the procedure.



Patching. The surgeon may close the artery with a patch of strong, flexible fabric or a piece of vein. The clamps are removed, and the skin incision is sutured as above.



After Treatment

After either procedure, you will most likely stay in the hospital for one or two nights. Your recovery at home will take a least a week. Be sure to follow directions for follow-up visits with your surgeon. Also follow the advice you're given to help make your arteries healthier and prevent future problems.

Recovery in the Hospital

While you recover after the procedure, you're watched closely. Medication help control any pain you have. If you have a drain in place, it will be removed before you leave the hospital. Before you go home, you'll be given instructions for caring for yourself.

Recovery at Home

Take it easy for a day or so. It will likely take a week or more to get back to your normal routine. While you recover:

- Take medication as prescribed.

- Care for the incision on puncture site as you are told. Don't get it wet until you're told you can do so.
- Avoid heavy lifting for a long as directed.
- Don't drive until your doctor says it is okay.
- If you had an endarterectomy, shave carefully around the incision. It may help to use an electric razor.
- If you had stenting, shower instead of taking tub baths for a few days.

Follow – Up

After the procedure, you'll have a follow-up exam and test. You may need ultrasound or other imaging tests regularly. This checks for renarrowing of the artery **(restenosis).** This is rare but can sometimes occur. If it does, a second procedure may be needed.

Controlling Artery Disease

The factors that put you at risk for stroke also put you at risk for other health problems. These include heart attack, kidney problems, and other artery disease. Medications may be prescribed. Certain lifestyle changes can also help lower your risk.

- **Take medications as directed**. You may be prescribed medications. These may control blood cholesterol, diabetes, and blood pressure. They may also help prevent blood clots
- **Exercise regularly**. Talk to your doctor about starting an exercise program. A good goal is to work up to getting 40 minutes or more of exercise a day, at least 3 to 4 days a week.

- **Make healthier food choices**. Includes more vegetables, fruits, whole grains, and low-fat dairy products. Meanwhile, cut back on saturated fats, sweets, and processed foods. A dietitian can help you learn more.
- **Quit smoking**. Smoking harms your heart and blood vessels. It makes blood clots more likely and raises blood pressure. Ask your doctor for help quitting for good.

Appendix D: Aortic Abdominal Aneurysm Surgery

Understanding AAA

You have been told you have an abdominal aortic aneurysm (AAA, or “triple A”). This is a balloon-like bulge in a major blood vessel, the aorta. If this bulge ruptures, it can cause serious, even fatal, problems. Now that you know you have AAA, steps can be taken to treat it and prevent a rupture.

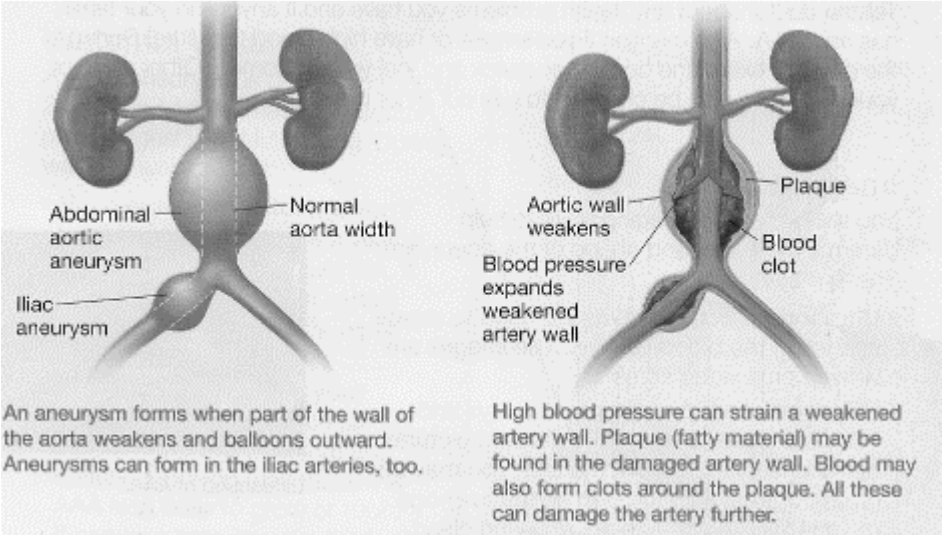
Blood vessels are tubes that carry blood throughout the body. Arteries are blood vessels that carry oxygen-rich blood from the heart to the rest of the body. (Blood vessels that carry blood back to the heart are called veins.) AAA affects the largest artery in the body, the aorta. It occurs when part of the aorta weakens and expands.

What is Aorta?

The aorta is the large artery that carries blood directly from the heart. Smaller arteries branch off the aorta. These carry blood to all parts of the body. The part of the aorta that travels through the abdomen (stomach area) is called the abdominal aorta. Arteries branch off the abdominal aorta to carry blood to organs in the abdomen. These include the renal arteries, which carry blood to the kidneys. At the bottom of the abdomen, the aorta splits into two branches. One branch runs down each leg. These are called the iliac arteries.

When AA Forms

If an artery is damaged or weakened, it can stretch outward, expanding like a balloon. The resulting bulge is called an aneurysm. As it expands, the artery wall thins and weakens even more. It may become so thin that it ruptures (leaks, bursts, or tears open). This is fatal if not treated right away.



An aneurysm forms when part of the wall of the aorta weakens and balloons outward. Aneurysms can form in the iliac arteries, too.

High blood pressure can strain a weakened artery wall. Plaque (fatty material) may be found in the damaged artery wall. Blood may also form clots around the plaque. All these can damage the artery further.

AAA Repair Techniques

AAA can be treated with endovascular repair or open surgery. Both methods involve placing an artificial graft inside the damaged artery. Each type of procedure has risks and benefits. Talk to your doctor about which might be best for you.

What is Endovascular Repair?

For this procedure, very small incisions (punctures) are made in the groin. The graft is inserted into tan artery through a puncture and guided to the aneurysm. The procedure often allows faster recovery than open surgery. After the procedure, though, close follow-up is needed to check for return of the AAA. In some cases, the size and shape of a person's blood vessels mean that this procedure cannot be done.

What is Open Surgery?

With this method, a single large incision is made in the abdomen. The graft is then put into the artery above the below the aneurysm. It takes longer to recover from open surgery than from an endovascular repair. For some people, though, this may be the only way to repair the aorta. Open surgery has been used for many years and has a good long-term track record. It may be the best choice for younger people because the graft is more likely to last over time.

Preparing for Either Procedure

- Have test as advised by your surgeon
- Tell your surgeon about all medications, herbs, or supplements you take. It's vital to mention if you take aspirin, ibuprofen, or medications to prevent blood clots. You may need to stop taking some or all of these before the procedure.

- Stop eating and drinking before the procedure as directed.

Risks and Complication of Surgery

- Infections, Bleeding, Blood clots in legs
- Pneumonia or other lung problems, kidney failure
- Injury to the colon or spinal cord
- Impaired sexual function (in men)
- Blood clot at the graft
- Injury to the ureters, Irregular heartbeat
- Heart attack or stroke

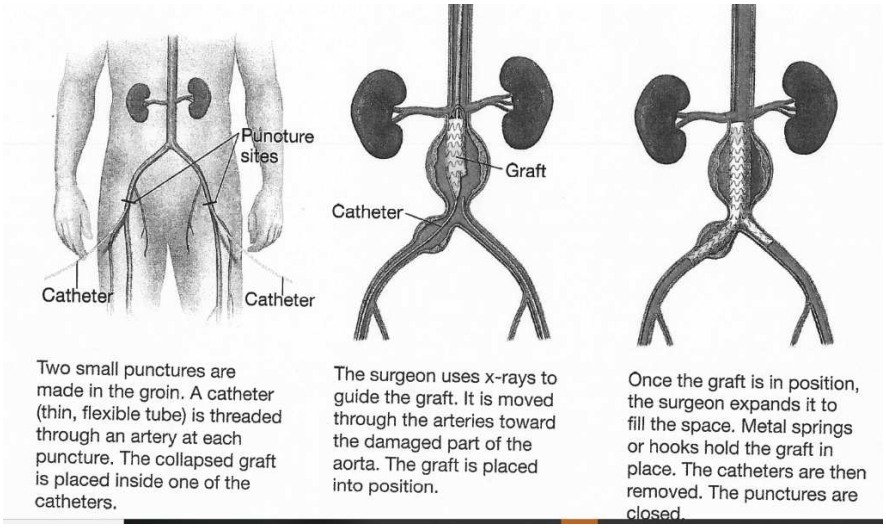
Endovascular Repair

A graft made of wire mesh and fabric is placed inside the aorta. This takes stress off the weakened artery wall. You will likely stay in the hospital for one or two nights after the procedure.

At the Hospital

- An IV line is put into your arm or hand to give you medication and fluids.
- You may be asked your name and what procedure you're having more than once. This is for your safety.
- You receive anesthesia (medication used to keep you pain free during surgery). This may make you relaxed and lightly asleep. Or it may put you into a state like deep sleep throughout the surgery.
- You are taken to the procedure room. You lie on a table beneath x-ray cameras. These cameras are used to help place the graft.

During Surgery



After the Procedure

You're taken to your hospital room. During this time, you are monitored closely. The IV and urinary catheter (tube to drain urine) may remain in place until shortly before you leave the hospital.

Going Home

When you are cleared to go home, have an adult family member or friend ready to drive you. Recovery can take several weeks. During this time, take medications as directed. Also, be active by taking walks and moving around. This can help promote healing.

Follow-Up Care

After this repair, you'll need follow-up tests often to check the graft. In most cases, imaging test are needed a few weeks after the procedure, then at least once a year after

that. If there is a problem with the graft, another repair or an open surgery may be needed to fix it.

When to call the Doctor

- Chest pain or trouble breathing
- Increasing pain, swelling, redness, warmth, bleeding, or drainage at the site
- Fever of 100.4*F (38*C) or higher
- A change in the temperature of color of the feet of legs
- Pain in the legs, side, abdomen, or back

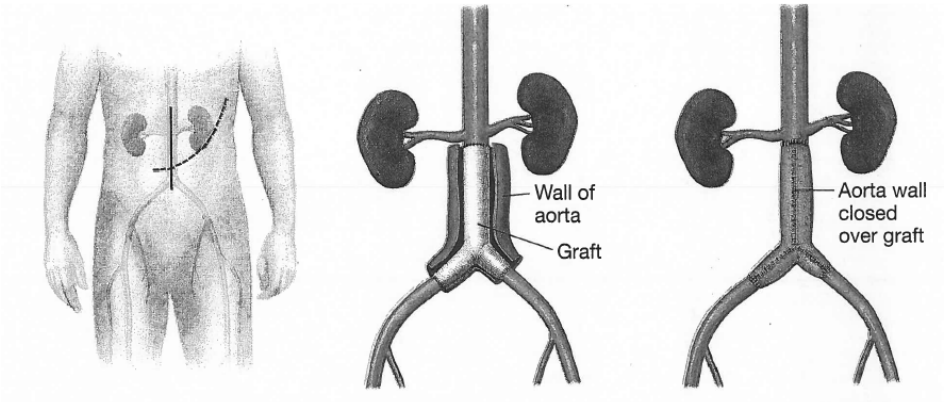
Open Surgery

A graft made of strong, flexible fabric is placed inside the weak aorta wall. This repairs and strengthens the aorta. You will likely stay in the hospital for a week or longer.

Before Surgery

- An IV line is put into your arm or hand to give you medication and fluids.
- You may be asked your name and what procedure you're having more than once. This is for your safety.
- You receive **anesthesia** (medication used to keep you pain free during surgery). This will likely be **general anesthesia**. This puts you into a state like deep sleep through the surgery. You may also be given pain medication through a thin, soft tube inserted into the spine (an epidural).
- You are taken to the operating room and the procedure begins.

During Surgery



An incision is made in your abdomen. Two possible positions for this incision are shown above. (The one shown here as a dotted line may continue around the side of the body.) The size and shape of your own incision may vary.

The surgeon gently moves aside the organs to reach the aorta. The aorta is clamped to stop blood flow. The surgeon then opens the aneurysm and cleans out the blood clot. The graft is then placed into the aorta at the aneurysm.

To protect the graft, the aorta is sewn closed around it. Some of the aorta wall may be removed to ensure a snug fit.

Right After Surgery

After surgery, you are taken to an intensive care unit (ICU). You are monitored and your vital signs checked. You are given pain medications as needed. If you had an epidural, it may remain in place for a time. At first, you'll have several tubes to help your body function. They will be removed when they're no longer needed. These may include:

- The IV line to give you fluids.
- A catheter to drain urine.
- A tube in your throat to help you breathe.

  (This may keep you from being able to talk).
- A tube passed through the nose into the stomach (nasogastric tube).

  This helps prevent nausea and other problems. It can also be used to give you food.

In the Hospital

You are moved from the ICU to a hospital room. There, you are checked often to be sure you're recovering well. During your hospital stay:

- You're helped to get up and walk soon after surgery. As you gain strength, you walk farther and are up for longer.
- Medication is given to control pain. This may be pills. Or you may have a PCA pump that lets you give yourself IV medication within limits set by your surgeon.
- You're taught breathing exercises. These help to prevent lung infection.

After Open Surgery

Recovery from open surgery can take a few months. Follow the instructions you have been given for taking care of yourself. If you have a question be sure to get it answered.

Your First Weeks at Home

Follow instructions for what to do at home. Be sure to:

- Take medications exactly as prescribed.
- Care for your incision as directed, do not bathe until your surgeon says it's okay.
- Avoid heavy lifting, strenuous exercise, and driving for as long as directed.
- Ask for family member or friend to help with shopping, cooking, and chores.
- Keep any follow-up appointments with your surgeon.

Long-Term Recovery

At first, you may have less energy than usual. This may last for 2 to 3 months, or even longer. Exercise can help you get back to your full strength. So be as active as you feel able. Don't overdo it, though. If something hurts, stop. If you have any concerns about being active, talk to your doctor.

Appendix E: Peripheral Vascular Disease Surgery

How Blood Circulates

With each beat, your heart pumps oxygen-rich blood throughout the body. Arteries carry this blood to your organs and muscles. Veins then return oxygen-poor blood to the heart.

When Blood Flow Changes

Arteries become stiffer and thicker with age. Artery linings can be damaged by smoking, high cholesterol, diabetes, and other factors. This allows plaque (a buildup of fat and other materials) to form within the artery walls, the plaque narrows the space inside the artery and can limit blood flow.

Bypass Surgery

Angioplasty and stenting may not always improve blood flow enough. In some cases, the best option may be bypass surgery. For this, a graft is used to create a new pathway for blood around the blockage, the graft may be a synthetic tube, a vein from your leg, or a donor vein.

Right After Surgery

Following surgery, you will be monitored closely. And you will receive medication to help control pain. You'll be able to go home when you can walk on your own, often within a few days.

Recovery at Home

No matter what procedure you have, these measures help your body heal more quickly:

- Take aspirin, blood thinners, and pain medications as directed.
- Care for incisions as instructed.
- Follow your doctor's instructions about protecting incisions while bathing.
- Have staples or sutures removed when your doctor recommends.
- Drink plenty of fluids
- Try to walk a little farther each day.

Risks and Complications

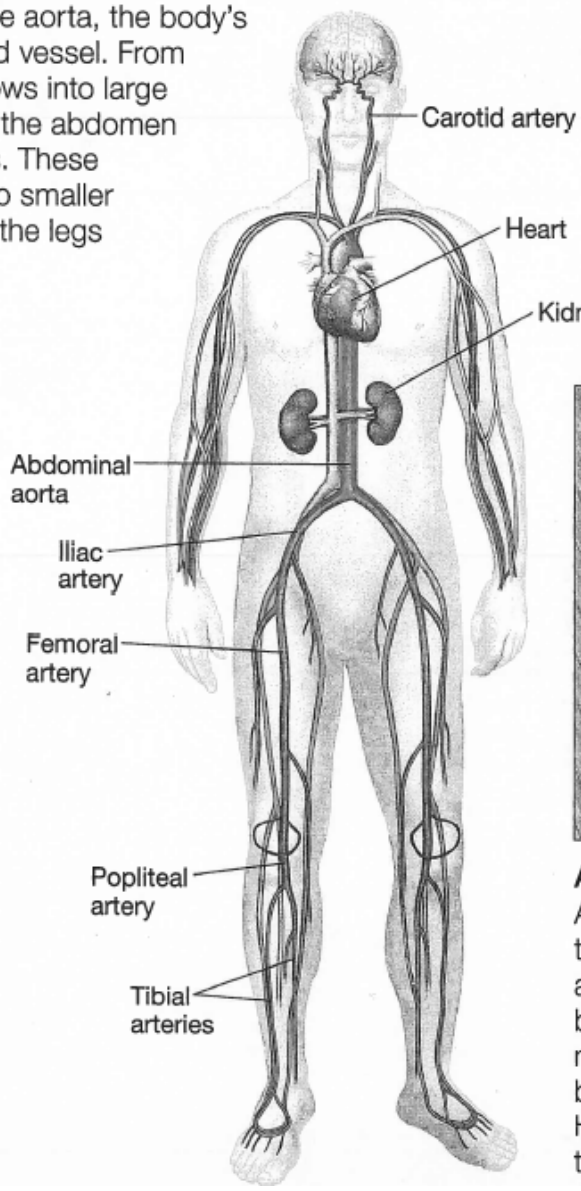
- Bleeding, Blood clots, Infection
- Heart or lung problems
- Loss of toe or foot (rare0
- Death (rare)

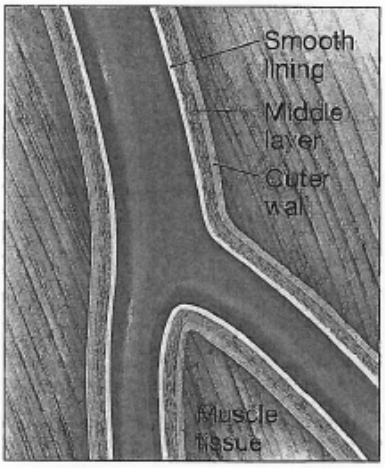
When to Call Your Doctor

- Bleeding or increased pain, swelling, redness, or warmth at the incision sites.
- Fever of 100.4*F (38*C) or higher
- Chest pain or trouble breathing
- A change in skin temperature of color below the bypass site.
- A return of symptoms similar to those you had before the bypass

Major Routes

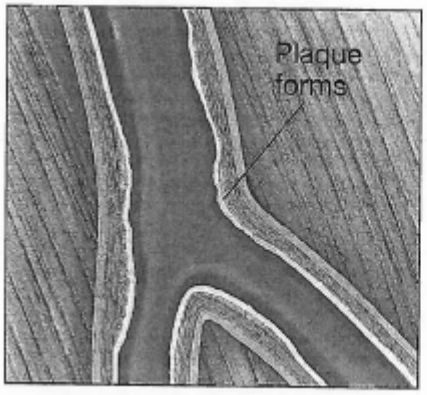
Blood leaves the heart through the aorta, the body's main blood vessel. From there, it flows into large arteries in the abdomen and thighs. These branch into smaller vessels in the legs and feet.



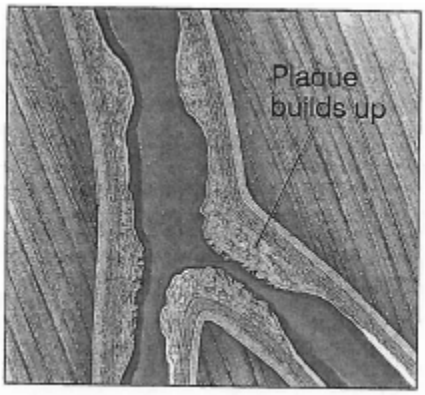


A Healthy Artery

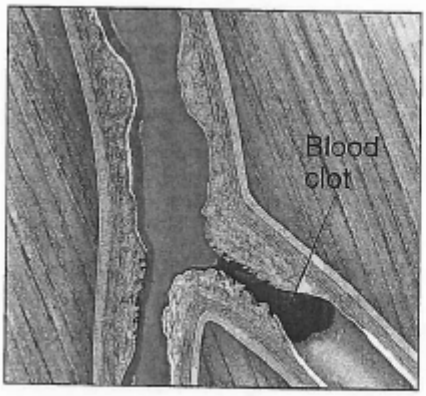
An artery is a muscular tube. It has a smooth lining and flexible walls that allow blood to flow freely. Active muscles need increased blood flow and oxygen. Healthy arteries can meet this need.



A Damaged Artery
PAD begins when the lining of an artery is damaged. Plaque then starts to form within the artery wall. At this stage, blood still flows normally, so you're not likely to have symptoms.



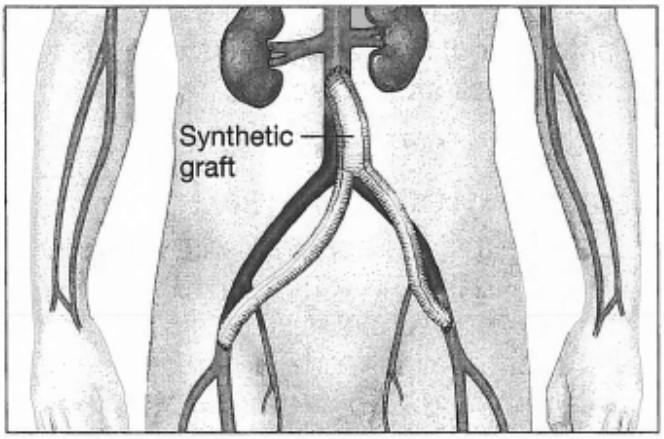
A Narrowed Artery
If plaque continues to build up, the space inside the artery narrows. The artery walls become less able to expand. The artery still provides enough blood and oxygen to your muscles during rest. But when you're active, the increased demand for blood can't be met. As a result, your leg may cramp or ache when you walk.



A Blocked Artery
An artery can become blocked by plaque or a blood clot. This prevents oxygen from reaching muscle below the blockage. Then you may feel pain when lying down. In time, the affected tissue can die. This can lead to the loss of a toe or a foot.

Abdominal Bypass

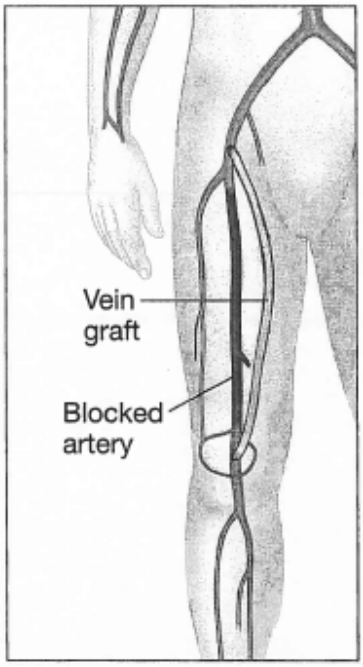
If the abdominal aorta (a large artery in the abdomen) becomes narrowed or blocked, bypass surgery may be needed. To reach the blockage, the surgeon makes incisions in the abdomen and groin. A graft is then sewn into the artery above and below the blocked section. Once blood flows freely through the graft, the incision is closed with sutures or staples.



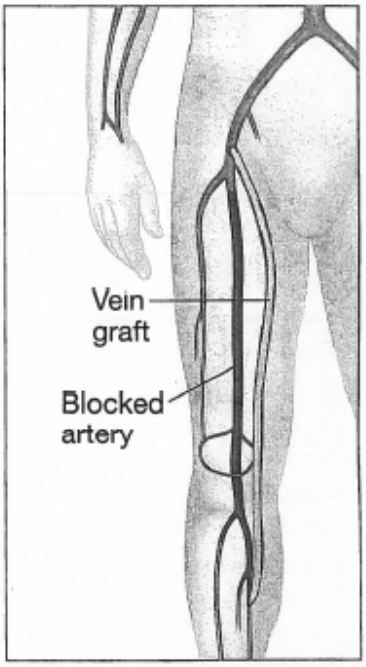
A synthetic graft reroutes blood around a blocked artery in the abdomen.

Leg Bypass

To bypass a narrowed or blocked leg artery, a healthy vein from that same leg is often used for the graft. In some cases, a synthetic graft or donated tissue is used. Once the graft is ready, the surgeon makes an incision near the damaged artery. The graft is sewn to the artery above and below the blockage. Once blood is flowing through the graft, the incision is closed with sutures or staples.



A femoral popliteal bypass ends near the knee.



In a distal bypass, the graft ends below the knee.

Appendix F: Living a Healthier Life

Maintaining a healthier lifestyle can help slow the disease, it can also improve the overall health of your arteries, reducing the chances of heart attack or stroke.

Go to Your Follow-Up Visits

Be sure to keep all of your follow-up appointments. During these visits your doctor will recheck your blood flow. If problems are found, they can be treated right away.

Exercise Daily

Frequent exercise is important for your health. It improves blood flow and helps reduce blood pressure. When you resume your walking program, start with short walks. Then increase your distance a little each day. Ask your doctor if you should enroll in an exercise program supervised by a healthcare provider.

Take Care of Your Feet

Even after treatment, your feet need extra care. Sores of blisters may take a long time to heal. This increases the risk of infection. To protect your feet:

- Have a podiatrist (foot specialist) trim your toenails.
- Wear supportive, well-fitting shoes. Avoid high heels and shoes with open toes.
- See a healthcare provider if you have cuts or wounds on your feet.

Eat Health Foods

Making healthy eating changes can improve cholesterol levels and lower blood pressure. This can make arteries healthier and help prevent plaque buildup. Eating well can also help you lose excess weight and manage blood sugar. To get started with health eating, try these tips:

*Eat more fruit, vegetables, and whole grains.

*Eat less fat. Also choose the right kinds of fat (vegetable oils, nuts, seeds, fish).

*Limit saturated fats (red meat, full-fat dairy products). And avoid trans fats (fried foods, fast foods, baked goods).

*Cut back on salt (sodium), if instructed. Too much salt can raise blood pressure in some people.

*Limit added sugars (soda, candy, pastries) and refined grains (white bread, white rice, or regular pasta).

Manage Health Problems

Managing other health problems is a big part of keeping your arteries healthy. Talk to your doctor about the best way to control diabetes, high blood pressure, high cholesterol, or heart disease. Here are some general guidelines:

*Take medication as directed. Don't skip days or stop taking them without your doctor's okay.

*Have a cholesterol and blood pressure checked as often as directed.

*Maintain a healthy weight.

*If you have diabetes, try to keep you blood sugar well controlled. Test your blood sugar as directed.

Appendix G: Staff Questionnaire

Did you receive formal training on infection prevention in relation to vascular surgery patients?

YES NO

Are you confident in evaluation and assessment of surgical sites?

YES NO

Would you benefit from additional training on the surgeries performed?

YES NO

Are you comfortable triaging calls to determine if patient needs an urgent appointment? (without guidance from a provider)

YES NO

Are you comfortable following the protocols established for staple removal without provider input?

YES NO

The first postoperative appointment is a "nurse visit" only with many surgeries, do you think a provider should evaluate patient?

YES NO

On a scale of 1 to 10, (10 being the most) how comfortable are you answering patient questions regarding preoperative and postoperative care? _____

Redness of incision site means infection is present?	YES	NO
Is handwashing necessary before and after dressing changes?	YES	NO
Any drainage from incision means infection is present?	YES	NO
Smoking affects wound healing?	YES	NO
HIBICLENS should be used only morning of surgery?	YES	NO
Diabetes affects wound healing?	YES	NO
Original dressing following surgery remains intact for 3 days?	YES	NO
Pain is expected and does not mean infection?	YES	NO
Nutrition is important for healing?	YES	NO
Patient cannot shower with staples present?	YES	NO

Comments/Concerns:

_____

_____

_____

_____

_____

_____

_____

Appendix H: Vascular Protocol

VASCULAR PROTOCOL REGISTRY (Revised 3-15-17, 7-14-17,6-12-18)									
	5-10 days	14 days	4 weeks	6 weeks	3 mos	6 mos	12 mos (1yr)	18 mos	24mos(2yr)
CAROTID CEA/CAS	NURSE			RV,CAR DUP		RV,CAR DUP		RV,CAR DUP,THEN YEARLY	
AAA/EVAR		RV, BIL CFA DUP		RV,ABD/EVT DUP		RV, CT	RV,ABD/EVT DUP	RV, CT	RV,ABD/EVT DUP, THEN YEARLY
AAA/ST TUBE/ABI		RV,A/O w CFA WF		RV		RV,ABD DUP	RV,ABD DUP	RV,ABD DUP	RV,ABDDUP, THEN EVERY 2 YEARS
AFB/AIOD/AAA		RV,A/O		RV,AFB/GROINS DUP & A/O		RV,AFB/GROIN DUP & A/O	RV,AFB/GROINS DUP & A/O	RV,AFB/GROINS DUP & A/O	RV,AFB/GROINS DUP & A/O THEN YEARLY (PRX AFB EVERY 3 YRS)
COILING ANEURYSM	RV, THEN PRN								
RENAL STENT/PTA	RV					RV,REN DUP	RV, REN DUP, THEN YEARLY		
ILIAC ART STENT		RV	RV, DOPP			RV, DOPP	RV, DOPP, THEN YEARLY		
ALL INFRAINGUINAL STENT/ENDART/ ARTERIOPLASTY ATHERECTOMIES	RV, A/O WITH WAVFRMS		RV,SFA DUP&DOPP Endart= Limtd Dup		RV,SFA DUP&DOP Endart = Lmtd Dup	RV,SFA DUP&DOPP Endart = Limited Dup	RV,SFA DUP&DOPP Endart = Limited Dup	RV,SFA DUP&DOPP Endart = Limited Dup	RV,SFA DUP&DOPP, THEN YEARLY Endart = Limited Dup
AX-FEM/CROSS FEM ALL INFRA-ING BYP		RV,A/O		RV,BYP DUP& A/O		RV,BYP DUP& A/O	RV,BYP DUP&A/O	RV,BYP DUP& A/O	RV,BYP DUP& A/O THEN YEARLY
SUBCLAVIAN STENT	RV,BRACH WF						RV,UE DOPP,THEN YEARLY		
BKA, AKA, TMA			RV	AS DIRECTED					
TOE AMP		RV	AS DIRECTED						
GROIN WOUNDS		RV	AS DIRECTED						
TEMP ART BIOPSY	RV, THEN PRN								
THROMB INJECTION	3 DAYS,RV,GROIN/PSA DUP, THEN AS DIRECTED								
IVC FILTERS	RV		IF REMOVED = RV,BIL VEN DUP, THEN PRN						

Non-Surgical Carotid Registry - Bilateral	
% Stenosis	Follow-up
<50%	1 year
50-69% / 70-80%	6 months
80-99%	Per Drs Orders
Occluded on one side, min or less on the other	1 year

Non-Surgical AAA Follow-Up	
Aneurysm size	Follow-up
4.1 or >	6mos RV,DUP
Repeat all outside aorta duplexes unless they've had a CT W/ ILIACS	
PO visits for extremity fasciotomy or Mesenteric procedures are per individual case.	

Abbreviations:	
RV = Return visit	
A/O = Ankle Only Doppler	
Dopp = Full Doppler with exercise	
VS = Vein Solutions	
WF = Waveforms	
CEA = Carotid Endarterectomy	CAS = Carotid Stent

Appendix I: Smoking Cessation

Smoking: Ways to Quit

Know why you want to quit.

When you quit smoking, your body gets to work repairing damaged tissues. Here are some of the health benefits:

* You stop the destruction of your lungs.

* Your lungs are better able to fight colds, and other respiratory infections.

* You decrease your risk of cancer, heart disease, strokes, and circulation problems.

In addition, when you quit you will:

* Feel more in control of your life.

* Have better smelling hair, breath, clothes, home, and car.

* Have more stamina for activities.

* Save money.

* Protect your family and friends from the dangers of secondhand smoke.

Smoking is an addictive habit. Most former smokers make several attempts to quit before they finally succeed. So, never say, "I can't." Just keep trying.

Set a quit date.

Set a date for when you will stop smoking. Don't buy cigarettes to carry you beyond your last day. Tell your family and friends you plan to quit and ask for their support and encouragement. Ask them not to offer you cigarettes.

Make a plan.

5 Days Before Your Quit Date

* Think about your reasons for quitting.

* Tell your friends and family you are planning to quit.

* Stop buying cigarettes.

4 Days Before Your Quit Date

* Pay attention to when and why you smoke.

* Think of other things to hold in your hand instead of a cigarette.

* Think of habits or routines to change.

3 Days Before Your Quit Date

* Plan what you will do with the extra money when you stop buying cigarettes.

• Think of whom you can reach out to when you need help.

2 Days Before Your Quit Date

* Consider buying nonprescription nicotine patches or nicotine gum. Or see your health care provider to get a prescription for the nicotine inhaler, nasal spray, or other medicine that can help.

1 Day Before Your Quit Date

* Put away lighters and ashtrays.

* Throw away all cigarettes and matches - no emergency stashes are allowed!

* Clean your clothes to get rid of the smell of cigarette smoke.

Quit Day

* Keep very busy.

* Remind family and friends that this is your quit day.

* Stay away from alcohol.

* Stay away from places where you used to smoke and people you used to smoke with.

* Give yourself a treat or do something else special.

Commit to staying quit.

Make sure that all your cigarettes and ashtrays are thrown away.

If you keep cigarettes or ashtrays around, sooner or later you'll break down and smoke one, then another, then another, and so on. Throw them away. Make it hard to start again.

Because you are used to having something in your mouth, you may want to chew gum as a substitute for smoking. Or munch on carrots or celery.

Spend time with nonsmokers rather than with smokers.

Think of yourself as a nonsmoker. Tell other people that you are a nonsmoker (for example, in restaurants). Stay away from places where there are a lot of smokers, such as bars. Avoid spending time with smokers. You can't tell others not to smoke, but you don't have to sit with them while they do. Plan on walking away from cigarette smoke. Spend time with nonsmokers and sit in the nonsmoking section of restaurants.

Be prepared for relapse or difficult situations.

Most people who go back to smoking cigarettes do so within the first 3 months after quitting. Many people try 5 or more times before they successfully quit. Avoid drinking alcohol, because it lowers your chances of success. Don't be distracted by the weight you may gain after quitting. Smokers usually do not gain more than 10 pounds when they stop smoking. Learn new ways to improve your mood and overcome depression.

Start an exercise program.

As you become more fit, you will not want the nicotine effects in your body. Regular exercise will also help keep you from gaining weight.

Keep your hands busy.

You may not know what to do with your hands for a while. Try reading, knitting, needlework, pottery, drawing, making a plastic model or doing a puzzle. Take on new activities.

Change your routine. Take on new activities that don't include smoking. Join an exercise group and work out regularly. Sign up for an evening class or a join a study group at your place of worship. Go on more outings with your family or friends. Learn ways to relax and manage stress.

Join a quit-smoking program if it helps.

Some people do better in groups, or with a set of instructions to follow. That's fine, too. Remember, the goal is to quit smoking. It doesn't matter how you do it.

Consider using nicotine replacement therapy.

Nicotine is the drug that is in tobacco. You can use nicotine patches or gum, available without a prescription at your local pharmacy, to help you quit smoking. Quitting smoking is a two-step process. It includes breaking the physical addiction to nicotine and breaking the smoking habit. Nicotine replacement helps take care of the nicotine addiction so that you can focus on breaking the habit.

Your health care provider can prescribe nicotine substitutes that can almost double your chances of quitting for good. They are:

* Zyban (bupropion HCL)

* nicotine inhaler

* nicotine lozenge

* nicotine nasal spray

* nicotine patch.

None of these treatments is a miracle cure. Quitting can be hard work, but you can learn to live without cigarettes in your daily life.

Appendix J: Obesity Education

What is obesity?

Obesity is defined as the condition of being very overweight and having a body mass index, or BMI, of 30 or higher. The BMI is a measure of your weight relative to your height. You can find your BMI from a chart.

Your waist size is also important. It is a measure of your abdominal fat. Your health risks increase as your BMI and waist size get larger. A waist measurement greater than 40 inches for men or 35 inches for women indicates a significant increase in health risk.

What are the risks of obesity?

Nearly one third of adults are obese. Obesity increases as people age. It is a serious condition because it increases your risk of poor health and major illness, such as:

- high bloodpressure
- breathing problems
- stroke
- heart disease
- diabetes
- hyperlipidemia, or increased fats in the bloodstream, often associated with higher cholesterol levels
- gallbladder disease
- gout
- some types of cancer
- osteoarthritis (stiffness and soreness of joints, especially the knees, which may occur with aging).

Obesity may make it harder for your health care provider to give you a good physical exam. Looking at the inside of your body with x-rays and other types of scans, as well as surgery, may also be more difficult.

How does it occur?

The causes of obesity are not clear. Overeating is not always the cause. The amount of energy (calories) your *body* needs when you are at rest is also important. You get energy from the food you eat. The energy you do not use is stored as fat. Obese people may use less energy when they are at rest than people who are not obese. Also, they may burn fewer calories than people who are not obese because it is harder to be physically active.

The genes you inherit from your parents can affect your weight. Children of obese parents are 10 times more likely to become obese than children whose parents are not obese. Unhealthy family eating habits may also be a reason several members of a family are obese.

Emotional problems, such as depression, anger, and anxiety can sometimes be a cause. Emotional problems can both contribute to obesity and result from it. Rarely, hormone imbalance causes obesity.

How is it diagnosed?

BMI can be determined by looking up your height and weight on a BMI chart. A BMI of at least 25 indicates overweight. A BMI of 30 or more indicates you are obese. Measure your waist at the point below your ribcage but above your navel. Use your BMI and waist size to determine your risk from the "calculating Your Risk" table included with the BMI chart.

Note that there are some limits to the usefulness of the BMI score. It may overestimate

body fat in athletes and others who have a muscular build. It may underestimate body fat in older persons and others who have lost muscle mass. Your health care provider can give you a good sense of whether you have an increased risk of health problems because of your weight. Your provider can also help you find a weight-loss program that works for you.

The BMI chart is not for use in pregnancy. If you are pregnant and want a guide to normal pregnancy weight gain, ask your provider for a chart.

How is it treated?

Eating fewer calories while being more active is the key to lowering and controlling rour weight. Evaluation of your diet is an important first step. A dietitian may prescribe a diet for you. He or she wil make sure your new diet provides fewer calories but is healthy and allows you to lose weight safely. Your diet should allow you to lose 1 to 2 pounds a week. Do not fast or follow fad diets. You should not take drugs that curb your appetite without first checking with your doctor.

You will be taught to change patterns of behavior. For example, some people eat as a way to cope with emotional problems. If you have serious emotional problems, your health care provider may refer you to a counselor for therapy. You will need to deal with psychological and emotional problems if your weight-loss program is to be successful.

Physical activity is a very important part of a successful weight-loss program. Once you reach a lower weight, exercise also helps you stay at that weight. Having a total of at least 30 minutes of physical activity on most days of the week will lower your blood pressure, pulse, cholesterol, and blood sugar. Gradually building up to 1 hour or more of exercise a day, most days of the week, can significantly increase your metabolic rate. This means your body will burn more calories.

Physical activity alone may be the first step in your weight-loss or weight-maintenance program if you are not yet ready to make changes in your diet. The sense of well-being that you will get from exercise may motivate you to choose healthier foods.

Almost any activity that involves mild to moderate exertion is good. You may choose to walk, jog, swim, cycle, or do aerobics or a step aerobics program. Walking is a great way for almost everyone to start getting more exercise. Using a pedometer can be fun and motivating. A pedometer is a device that attaches to your clothing and tracks how many steps you take in a day. A good goal is to work up to 10,000 steps a day (5 miles). If your provider agrees, try increasing your steps each week by 500 a day until you reach 10,000 steps a day.

Exercise videos and DVDs are available for all levels of fitness, including people with disabilities. You can borrow them from your library or buy them at stores or on line.

Ask your health care provider what kinds and amounts of exercise might be right for you. If you have a physical disability, your provider will help you find exercise alternatives.

Support from other people can help motivate you. Your main support group can be your family and friends. Look also for weight-loss support groups in your community.

How can I take care of myself?

To help yourself, follow these guidelines:

- Stick to your diet and don't get discouraged.
- Learn how to prepare healthy meals. Take classes or look for health-conscious cookbooks. Check your public library or local county extension program. Also, there are many healthy recipe Web sites.
- Keep a daily record of the foods you eat and drink. Write everything down.

- Take vitamins and mineral supplements only if your health care provider recommends them. They may make you hungrier.
- Avoid alcohol.
- Join a weight-loss support group. Talk to people and stay in environments that keep you motivated.
- Read books and articles or watch lV shows that discuss losing weight.
- Get regular physical activity. To keep off the pounds you have lost, you may need to have moderate- intensity exercise 60 to 90 minutes most days of the **week.** Follow your health care provider's recommendations.
- Keep a daily record of your exercise.
- Find a friend to exercise with you.
- Keep your appointments with the dietitian or therapist.
- Learn to use relaxation techniques such as deep breathing to help you deal with stress.
- Discuss your feelings, challenges, and successes at a support group or with your health care provider.

Many obese people have trouble keeping weight off. Often this is caused by emotional problems that occur when they are trying to lose weight. Weight loss can trigger severe depression or even psychosis if you were obese as a child or if you have been depressed because of your obesity. If you feel compelled to eat excessively or raid the refrigerator late at night, you may be suffering emotional distress. If you are already under stress, your provider may decide that you should not try to lose weight until your life becomes more stable.

Be aware that after you lose weight, the ways you relate to other people may change because of your improved self-image.

How can I avoid obesity?

Gaining excess weight occurs over a long period. Losing that weight requires motivation and discipline. To maintain a healthy weight, you must balance the amount of food you eat and your physical activity. Try to stay as close to a healthy weight as possible.