Reducing central line associated bloodstream infections in oncology patients

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**Problem Identification**

Lack of standardization, variations in practice, and nonadherence to the guidelines for the prevention of intravascular catheter-related infections are the leading causes of central line associated bloodstream infections (CLABSIs). Oncology patients are more vulnerable to acquiring CLABSIs because of bone marrow suppression and neutropenia from chemotherapy. This decrease in their immune system paves the way for opportunistic organisms which can use the central venous catheters (CVCs) as vectors for infection (Weingart, Hsieh, Lane, & Cleary, 2014). Contrary to other populations, oncology patients discharge home with their CVCs and line care is provided in the clinic and at home which can lead to variations in practice when dealing with CVCs. Standardization of practice would decrease the variations and involve adopting prevention guidelines into practice. Weingart et al. (2014) reported greater than 50% reduction in CLABSIs among oncology patients who received care from nurses with standardized practice. Standardization of practice represents an opportunity to improve the safety of patients with cancer.

**Background**

According to the Center for Disease Control and Prevention (CDC) (2011), about 41,000 bloodstream infections strike hospital patients with central lines each year and of those, 1 in 4 patients die. 18,000 central line associated bloodstream infections (CLABSIs) occurred in the intensive care unit (ICU) while 23,000 occurred in non-ICU wards. The CDC (2016) states a 50% decrease in CLABSIs between 2008 and 2014 after implementation of prevention guidelines which equals about 27,000 lives saved and a savings of $1.8B in excess medical bills. CLABSIs are positive blood cultures in patients with central lines where the infections are attributed to the central lines and not a secondary source (Rinke et al., 2013). CLABSIs can cause significant avoidable mortality and morbidity.

Although an established body of research exists on the prevention of CLABSIs in ICUs, less data is reported about measures to prevent CLABSIs in oncology patients (Weingart, Hsieh, Lane, & Cleary, 2014). Oncology patients are more vulnerable to CLABSIs and other opportunistic organisms because they often experience bone marrow suppression from chemotherapy. Line care in oncology patients is usually provided in the clinic and at home, creating shared responsibility for the use of safe practices and monitoring for infections (Weingart et al., 2014). Because multiple rounds of chemotherapy can take months, oncology patients are encouraged to have long-term central venous catheters (CVCs) which are placed in the operating room or in interventional radiology. Standardizing practice by removing variation and adhering to existing guidelines for the prevention of intravascular catheter-related infections will result in a reduction of CLABSIs and an improvement in patient outcomes.

**Literature Review**

The CDC (2011) describes CLABSIs as a “preventable and costly threat to patient safety” (p. 2) that affected more than 41,000 hospitalized Americans and caused 1 of 4 deaths in patients with central lines. According to Zavotsky, Malast, Festus, & Riskie (2015), oncology patients averaged a CLABSI rate of 6 infections per 1,000 patient days compared to the overall hospital rate of 2 infections per 1,000 patient days in the general population. Because of their decreased immune system and neutropenia from chemotherapy, oncology patients are at a higher risk for opportunistic organisms that use CVCs as vectors for infections.

The CDC (2016) have implemented strict guidelines introduced by O’Grady et al. (2011) that include several prevention initiatives, surveillance and mandatory reporting guidelines, and an emphasis on the need for educating, training, and standardizing the practice of nurses who insert and maintain central line catheters. Weingart et al. (2014) describes how nurses working in the same organization, in the same unit, and treating patients with similar conditions performed central line care in different ways. Those differences in care may reflect “inconsistent training and oversight, a lack of consensus in the profession about the components of appropriate care, practice drift, individual style, or a combination of factors” (Weingart et al., 2014, p. 325). Weingart (2014) reported a greater than 50% reduction in the CLABSI rate among oncology patients who received care from nurses with standardized practice. Zavotsky et al. (2015) describes how staff education is vital to the reduction of CLABSIs and how using a checklist can help standardize care by providing staff with specific step-by-step processes to ensure safety when caring for patients with CVCs. These standardizations in practice are vital when oncology patients are discharged home with their CVCs and line care is given by either outpatient or home health nurses.

**Identified Community and Stakeholders**

The facility is a 327-bed hospital with a 15-bed oncology ward. The ward is recognized as a Leukemia and Lymphoma Specialized Center for northern California. The 15-bed oncology ward services the Santa Clara County with a population of 1,781,642; comprised of 53% White, 3% Black, 38% Asian, 26% Hispanic/Latino (US Census Bureau, 2010). Oncology patients are granted a 1:3 ratio (one nurse to three patients) when they are receiving at least two chemotherapy agents and a 1:4 ratio (one nurse to four patients) when receiving one chemotherapy agent. These specialized ratios have been set up so that the nursing teams are able to give more individualized care to our oncology patients who are usually immunocompromised after chemotherapy, who have central lines, and who have specialized needs related to their malignancies. These oncology patients range in age from 17 to 101 years of age, have a primary diagnosis of lymphoma or leukemia, and come from any of the northern California cities.

The cost of a single incident of CLABSI ranges from $30,000 to $56,000 which covers the cost of medication to treat the infection, laboratory tests, and possibly a day in the intensive care unit (Zavotsky, Malast, Festus, & Riskie, 2015). According to Zavotsky et al. (2015), it also adds an extra 5-20 days to the patient’s length of stay. CLABSIs can be fatal to our oncology patients who have no immune system from chemotherapy induced neutropenia. The reduction of CLABSIs are essential to our oncology patients and their families.

The patients and their families are not the only ones affected by the incidence of CLABSIs. Nurses, nurse managers, physicians, quality liaisons, hospital CNE, and risk management are all stakeholders in the reduction of CLABSIs. Nurses and nurse managers huddle before each shift to discuss the necessity of central lines and review guidelines prevent CLABSIs. Nurse managers are held accountable for ensuring that staff adhere to the guidelines and for measurable goals. These goals are directly tied to the staff and managers’ annual performance evaluations. Quality liaisons consist of nurses who help to initiate peer reviews and are tasked to audit and help educate the front-line staff towards adhering to the prevention guidelines. Peer reviews are necessary to “ensure the quality of nursing care through application of current standards of care and newly discovered evidence-based practice” (Zavotsky et al., 2015, p. 657). Physicians are questioned each day about the necessity of central lines and are asked to remove them when not medically necessary. Unfortunately, most oncology patients will need to keep their CVCs until the end of their treatment which could last months to years. The hospital CNE and risk management are tasked with improving and sustaining exemplary empirical outcomes for the entire hospital. If the hospital does not meet with national benchmarks, they are responsible for turning the tide towards a more favorable patient outcome.

**Data Metrics and Benchmarks**

According to Medicare.gov (2018), for 2018, the facility had 5 CLABSIs which is well below the national benchmark of 14.509. This was not always the case. In 2015, the facility faced challenges in reducing CLABSIs and was hovering above the national benchmark. In 2016, the facility adopted and implemented the CLABSI bundles and checklists that helped to standardize care of CVCs, ensure staff adherence to prevention guidelines, and ultimately pushed the numbers below the national benchmark. In 2017, there was a slight increase because the facility changed vendors for their central line dressing kits and there was a learning curve to utilizing the new CVC dressing kits. The data for these CLABSI rates were obtained from an interview with a quality liaison from the facility. As the graph shows, the CLABSI rates are trending down after the implementation of standardized practice and ensuring staff adherence to the prevention guidelines.

CLABSI bundle implementation

*Note:* Graph created by Ana Mcinerney from Kaiser Permanente. (2018). *IPC - Adult nonICU CLABSI SIR* [data file]. Oakland, CA: Nocal Statit.

**Caritas Process 5 and 7**

Caritas 5 (Watson Caring Science, 2010) is about promoting and accepting positive and negative feelings as one authentically listens to another’s story. Communication between the team members as well as with the patients and their families create caring relationship. It allows the team to acknowledge that healing relationships are personal inner journeys that enhances the communication of all parties involved. By listening to another person’s story, it can be the greatest healing act nurses can offer. Caritas 7 (Watson Caring Science, 2010) is about engaging in transpersonal teaching and learning within context of caring relationship to stay within the other’s frame of reference. It is about shared teaching and learning that addresses the individual needs, readiness, and learning styles of the patient as well as the nurse. Oncology patients are very involved in the care of their CVCs because they know the importance of these lines. Being able to include the patients’ preferences (as long as it keeps with the guidelines) creates a sense of control for patients and illustrates how nurses are able to engage patients in their own care.

**Teamwork**

It takes a multidisciplinary approach from all departments for the CLABSI bundle to be successful. It takes knowledge and commitment from the various facilities, departments, and team members to ensure that protocols are followed, including using evidence-based bundles for the prevention of CLABSI. Focusing on nurse accountability and increased education of staff and patients alike will ensure safe patient care and positive outcomes.

The nurse scholar group functioned well but there was room for improvement. This scholar became the appointed group leader and was responsible for keeping each member accountable for their portion of the project. The group was able to divide the project using their respective strengths. If one member seemed stronger in the using the computer software, then they were designated with the task of making the presentation more aesthetically pleasing. Each member had a voice in the final product and all kept an open mind to others’ ideas. One lesson learned was to create more deadlines and do regular evaluation of the status of the presentation. There was a rush and a sense of urgency because the group did not finalize the presentation until the Monday before. The group could have managed their time better. Establishing more face-to-face meeting times, creating deadlines, and proportioning out the tasks needed at regular intervals would have made the group project less stressful to complete. Despite all of these, our group was able to create an informative and creative project.

*From this point on: begins the addition of QIP2 portion of the assignment. Title page & Problem identification were updated per assignment requirement.*

**Discovery Interview Findings**

After speaking with a quality nurse consultant (W.K., 2018), I found that our organization could definitely do better at educating our physicians and nurses about central lines. First, he described how they had done a survey a few years ago to find out about staff’s knowledge of what are central lines, indications for each type, and how to care for them. There was an apparent gap in knowledge! Some nurses would ask for central lines more for convenience instead of necessity. Physicians would order the wrong type of line for various antibiotics or drips (midlines vs PICC lines vs other CVCs vs infusaports vs hemodialysis catheters) and were confused about what to order to help decrease CLABSIs in different lines. This goes against the CDC (2016) guidelines that limit the use of CVCs for necessity. Follow up care was not set up and patients would be at a greater risk for infections.

Nurses also needed to standardize how they care for central lines. Dressing changes were done differently from nurse to nurse. Preparing the patient for CVC insertions and dressing changes were also different depending on who performed it. Different nurses had different processes. There was also a knowledge gap about what was already in place to help decrease CLABSIs while in the hospital. Patient education also differed from nurse to nurse when educating patients about their central lines. The need for consistency and standardization in practice was evident.

Within the last two years, the facility has changed vendors for central line dressings three times. Each time, the central line dressing kits have been slightly different and the nursing staff is left confused about the changes in the procedure or policy. After interviewing two bedside nurses (R.C., 2018 & J.E., 2018), there are also educational gaps between staff education. R.C. is a new nurse that transferred onto the unit within the last year while J.E. has been a nurse for over 10 years in the same unit. Each nurse was taught how to do the dressings differently and neither went through the central line dressing inservices that were offered during the year. Facilities need to make these inservices mandatory and offer annual competency refreshers for each nurse in order to standardize the process. If the processes are different for nurses within the same unit, it is not surprising that the process for is different for those nurses in a different setting (like home health nursing).

After speaking with a home health nurse (J.C., 2018), the process again changes because they are given an entirely different central line dressing kit. Home health nurses also face a greater challenge because they have to make sure to reinforce education with patients and their caregivers. Sometimes the information can differ from the education given by the bedside nurses because the bedside nurses might have a narrower view. The infusion clinic nurse (M.Z., 2018) I interviewed also described a different practice than the other inpatient and home health nurses. These variations in nursing practice and process must be standardized. The different processes confuse the patients and can lead to CLABSIs because they might not incorporate the CDC (2016) guidelines to prevent and reduce CLABSIs.

After speaking with two patients with different types of central lines, the need for patient education was appalling. One patient (R.J., 2018) had a PICC line while another (S.J., 2018) had a hemodialysis (HD) catheter. The patient with the PICC line had the line for almost a year and described how nurses in different areas (home health nurse vs bedside nurse vs infusion clinic nurse) accessed and cared for his PICC line. The patient with the hemodialysis catheter also described the discrepancy in care for their HD catheter. The patients were also not told about how these lines could limit their lives. One patient was an avid swimmer and was not told that he could not go swimming because the PICC dressing should not become wet. The HD patient was not told that she had to get her dressings changed more frequently because she was more sweaty than normal during the summer months and going through menopause. They also had very limited knowledge on the signs and symptoms of infection.

These discovery interviews highlighted the need for standardization in practice related to central line care and dressing and the apparent need for both staff and patient education as it relates to central lines.

**Caritas Processes 6 and 8**

Caritas 6 is defined as “creatively using self and all ways of knowing as part of the caring processes; engaging in artistry of caring-healing practices” (Watson, 2010). This caritas revolves around using all of the ways of knowing (aesthetics, ethical, empirical, personal, and metaphysical) in order to use the nurse’s creativity and innovation to meet the needs of another. Nurses and physicians need to know about their patients needs and goals in order to make innovative decisions in their care. For example, I once had an oncology patient that was an avid swimmer and I helped to advocate for an implanted infusaport vs a PICC line because I knew how important swimming was for her. The patient still had the CVC needed to get their chemotherapy while still having the ability to swim. The goals of those in healthcare need to remember to incorporate the lifestyles and goals of the patient.

Caritas 8 is defined as “creating healing environment at all levels (physical, non-physical, subtle environment of energy and consciousness), whereby wholeness, beauty, comfort, dignity, and peace are potentiated” (Watson, 2010). Caritas 8 requires that we provide a safe environment that encourages physical and spiritual healing. This caritas requires that nurses provide patients with the cleanliness and safety needed to ensure that patients do not get CLABSIs. CLABSIs are preventable as long the CDC (2016) guidelines are followed. Incorporating caritas 8 in nursing care require that we develop a plan of care that is individualized but can also meet the requirements needed to keep the patient safe.

**Interprofessionalism Analysis**

“A team approach and peer-to-peer process can help reduce the rate of central line–associated bloodstream infections (CLABSI)” (Zavotsky et al., 2015, p. 655). In order to reduce CLABSIs, all members of the multidisciplinary team, including the patient, have to be educated. Physicians must be educated on the various types of CVCs, indications for each, necessity for the CVC, and order for the removal of CVCs as soon as the need for the line has passed. Physicians must adhere to the specific indications for a CVC and also order for the insertion of the right CVC for the individual patient. Physicians must take into account the patients’ goals of care, their lifestyles, and their ability to care for the CVC if they will be discharged home with them. Nurses must be educated to correctly change the CVC dressings, know the indications for the CVCs so that they can advocate for removal if and when the line is no longer needed, standardize the practice among the different types of nursing, and educate the patients in a consistent manner to decrease confusion for patients and their caregivers. Nurses must also hold fellow nurses accountable if we see that shortcuts are being taken that could place patients at harm, ie incorrect dressings could act as a vector for infections. Patients must also do their part and continue to adhere to treatment, ie keeping the site clean and dry, keeping the weekly appointments to have the dressings changed, and encouraging a healthy and safe environment.

Currently, physicians, nurses, and patients vary in degrees of knowledge related to CVCs. It is the responsibility of the individual healthcare professional to keep up this type of knowledge and it is the responsibility of the facilities and leadership to provide competencies and refreshers for this type of education. There has to be a shared accountability in order to reduce CLABSIs in the entire organization. It is not just the responsibility of physicians who order the lines to be placed or the responsibility of the nurses who manipulate and access the CVCs. It takes all of us to be able to speak up and prevent these healthcare-related infections.

Physicians must be open when nurses question the necessity of the lines. Nurses must have the courage to become patient advocates and question physicians. Leadership must encourage the right type of environment where the speak up culture is prevalent and encouraged. Organizations also need to standardize the dressing kits across all disciplines in order to decrease variation in practice. Adopting checklists in order to standardize practice and doing peer-to-peer reviews are great ways to keep everyone accountable and share the responsibility of reducing central line associated bloodstream infections.

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