

IV Connector Study Eliminates Bloodstream Infection in High Risk Patients

Study Validates Recommended Use of IV Intraluminal Protection Connector

By CONSTANCE ADCOCK

Debra Lynch, RN, BSN, is a nurse on a mission. Her keen observation, perseverance and determination to wipe out CLABSIs among high risk patients has paid off. CLABSIs are central line associated bloodstream infections, also known as CRBSIs (catheter related bloodstream infections) and HA-BSIs (healthcare associated central venous bloodstream infections). They are a major cause of morbidity and mortality, causing more than 28,000 deaths annually according to the Institute for Healthcare Improvement (IHI). Lynch and her associates eliminated CLABSIs the last 10 months of a 2 1/2-year study following the Central Line Bundle protocol, which is advocated by the ICU Collaborative, and using an intraluminal protection (neutral) IV connector. "I didn't go about this with a study in mind. I just wanted to reduce the incidence of infection," said Lynch.

Lynch is the infection control lead at Methodist Extended Care Hospital (MECH), a 36 bed long-term acute care facility. She graduated from the Methodist Hospital School of Nursing and obtained her BSN from the University of Memphis. She has practiced nursing for 30 years as a clinical director in Medical/Surgical and OB-GYN areas. She presented her study at a poster presentation at the Association for Vascular Access (AVA) annual scientific meeting in September, 2010 in National Harbor, Md., entitled "Achieving Zero CLABSI: Connector Design Combined with Practice in the Long Term Acute Care Setting."

According to IHI, it can cost \$34-56,000 per incident to treat a CLABSI and up to 25 percent of the infections can be fatal. According to experts, central lines require scrupulous care but CLABSIs "are completely preventable." In ICUs, CDC estimates that more than 80,000 CLABSIs occur annually at a cost of \$29 billion.



CMS changed their reimbursement policy for hospital acquired infections in October 2008, no longer paying for the cost of treatment. With the pressure on for hospitals to eliminate nosocomial infection, Lynch was determined to achieve a zero rate at MECH.

The patients in the study were in MECH, which is located within the University campus. "A lot of the patients come to us with infections and many are elderly. Having the central line predisposes them to infection so they are really a higher risk population," Lynch added. "For people who have a lot of risk factors, this (CLABSI) can be fatal." Numerous host risk factors contribute to infection: age, severe illness, malnutrition, infection at another site and co-morbidities; also, catheter insertion practices, insertion site, duration, number of lumens, frequency of manipulations, and TPN are all risk factors.

In 2007 when Lynch became the infection prevention nurse, she noted problems with the split septum IV connector device being used, the BD Q-Syte™. The design allowed movement of the septum at disconnection. Lynch knew that this could allow bacterial contamination. They switched to the Alaris Smart-Site® IV connector and that did effect a decrease in the CLABSI rate. But by October, 2008, with new CMS reimbursement guidelines, though all measures were being taken to reduce the rate to zero, there were other factors in play. Lynch reviewed the literature and researched needleless connectors which can generate positive, negative or

neutral pressure when disconnected.

Reflux of blood or fluid can occur with positive and negative connectors. She believes that the neutral connector is responsible for the difference in results, used in conjunction with strict adherence to the Central Line Bundle protocol. Any time there is reflux of the blood into the central line catheter, proteins adhere to the inside of the catheter and create biofilm, creating the perfect environment for bacterial growth. "I sought out the RyMed neutral connector after researching it and we added Chlorascrub™, a CHG product (chlorhexidine gluconate) that kills more bacteria than alcohol swipes or iodine-based solutions." Chlorhexidine also dries faster which decreases the likelihood that the connector will be accessed before the bacteria die. Bacteria are killed *only* during a 15 second drying process.

Lynch consulted with her chief nursing officer and they decided to use the two floors at MECH where patients had the same diagnoses, co-morbidities and risk factors and were also cared for by the same physicians and staff. "The RyMed connector was used on one floor and the Alaris connector on the other during the fourth quarter of 2008. We could tell a difference in the infection rate in three months. We attributed a spike in the first quarter of 2009 to the inconsistent use of cleaning wipes; some were using alcohol wipes and others the CHG product. We removed the alcohol wipes and required everyone to use the CHG product. By January, 2009 we were using the RyMed connector on both floors. The only outliers were dialysis patients who had end stage renal disease, some with femoral lines. We also introduced the use of TEGO® catheters (a closed, needle free connection device that can be disinfected with a standard swabbing procedure) for dialysis patients. This has also reduced infections in this patient population.

Lynch's study included 25,000 cath-

eter days using three different connectors. The connector types were a Q-Syte (split septum) connector (SS); the Alaris Smart-Site negative pressure mechanical valve (NPMV), and the (neutral) intraluminal protection connector (IP) – the RyMed Invision-Plus®. The RyMed connector was the only connector used which achieved acceptable standards of 0.49/1,000 catheter days; a zero rate was achieved the final 10 months of the study, which ended June, 2010.

RyMed Technologies is located in Franklin, TN and has just received FDA approval for the new Invision-Plus® CS™. The Invision-Plus CS has a combination of chlorhexidine and silver impregnated into the septum and fluid pathway component. The claim is that the combination provides an additional barrier against bacterial growth and contamination.

Lynch said that the newer RyMed connector, the Invision-Plus CS is being discussed for possible use at Methodist beginning January, 2011. She indicated that the cost of the (former) RyMed connector used in the study was the same as the Alaris Smart-Site, the one it replaced; however, the cost of the newer RyMed Invision-Plus CS has not been determined. As for the cost of the cleaning wipes used in the study, a Chlorascrub is 10 cents as opposed to the 70 percent isopropyl alcohol prep pad, which is 2 cents. The elimination of CLABSIs would have a significant impact on cost savings in terms of care and saving lives.

"It's exciting to think that you can make such a difference for the patients, resulting in a shorter stay, with less medication administered and a decrease in risk factors," said Lynch. "I have to give all the credit to my associates who work diligently to attain the results we have achieved."

On a lighter note, Debra's 14 year old son, Austin, thinks his Mom has reached star status now that he can find her on Google and YouTube. Fame has its rewards.