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## Device comparison trial achieves 0% CR-BSI rate with neutral-pressure connector

Bette Weinstein Kaplan

A neutral-pressure IV needle-less connector (InVision-Plus; RyMed Technologies)<sup>1</sup> may be the key to eliminating catheter-related bloodstream infections (CR-BSIs) in cancer patients, according to a recent study conducted at the University of Texas M.D. Anderson Cancer Center in Houston, Texas. Brenda Caillouet, BSN, MPH, CRNI, reported on the device trial conducted at the comprehensive cancer center.<sup>2</sup>

The infusion therapy team compared the neutral-pressure connector with the IV connector device previously used at the cancer center, a split-septum (SS) negative-pressure device. Over a 6-month period a complete elimination of catheter-related bloodstream infections was noted. The researchers commented that their study shows how important the design of the IV connector is in preventing bloodstream infections, a factor not previously addressed. Caillouet noted, “Many institutions continue to use connector designs that are associated with high rates of CR-BSI. I hope this study will make a difference in hospitals’ choices of IV connectors.”

### CRUCIAL FOR CANCER PATIENTS

The mortality rate for catheter-related bloodstream infections is 12% to 25% among hospitalized patients.<sup>2</sup> Prevention is especially crucial in cancer patients because infection rates are often higher

in this patient group. Cancer patients are more susceptible to infections and to more serious postinfection sequelae because their immune systems are often compromised as a result of their cancer treatment regimens.

According to Caillouet, this study demonstrates that bloodstream infections can be practically eliminated, even among immunocompromised patients, despite the belief among experts that

**This means “a zero infection rate could be achievable ... in most hospitals.”**

preventing bloodstream infections in this patient group is impossible. She noted that this also means that “a zero infection rate could be achievable with the patient populations seen in most hospitals—especially if the best evidence-based technologies are used.”<sup>3,4</sup>

Split-septum negative-pressure connectors, such as those replaced by the new device, are prone to blood reflux or backflow when disconnected from the syringe or tubing to which they were connected. The problem arises because completely flushing the connection is difficult. Residual blood

remains in the device, thus providing a medium for bacterial growth that leads to bloodstream infections. The device trial demonstrated no apparent blood reflux with the neutral-pressure connector, thereby reducing the risk of bloodstream infections.

Although the infection rates at M.D. Anderson Cancer Center were already well below the nation’s average, the staff decided to investigate switching to the new connectors to determine if using the neutral-pressure connector could further reduce their CR-BSI rates. The investigators obtained their study results by comparing retrospective data of SS negative-pressure device use with prospective data of neutral-pressure connector use.

The current study was a follow-up to an initial clinical trial of the neutral-pressure connector. In that study, the catheter-related bloodstream infection rate was 90% lower than the infection rate from a negative-pressure device.

### SIGNIFICANT IMPROVEMENT

Once the comparison trial concluded with such positive results, use of the neutral-pressure connector was implemented throughout all inpatient and outpatient departments at the institution. Researchers then compared data from the first 6 months of using

the neutral-pressure connector with data from the previous 6 months, during which the split-septum negative-pressure device was used. The catheter-related bloodstream infection rate for the split-septum negative-pressure connector was 2.24 per 1,000 catheter days; the CR-BSI rate for the neutral-pressure connector was 0.<sup>2</sup>

The success seen with use of the new connector can be attributed to several factors, according to Caillouet. She notes that the device is designed with a smooth, gap-free septum; a straight fluid pathway; a second independent microbial barrier; and no dead space or blood reflux.

Caillouet explained in her report of the study results that these features help prevent bacterial contamination of the intraluminal pathway inside the catheter. She also explained that the design eliminated clamping and priming sequences, thus lessening the possibility of clinician error when handling the device. ■

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#### REFERENCES

1. InVision-Plus [package insert]. Franklin, TN: RyMed Technologies; 2011.
2. Caillouet B. Protection of intraluminal pathway with zero fluid displacement connector reduces catheter-related bloodstream infections in a comprehensive cancer center. *J Assoc Vasc Access.* 2012;17(2):86-89.
3. O'Grady NP, Alexander M, Dellinger EP, et al. Guidelines for the Prevention of Intravascular Catheter-related Infections. Centers for Disease Control and Prevention. *MMWR Recomm Rep.* 2002;51(RR-10):1-29.
4. DeLa Cruz RF, Caillouet B, Guerrero SS. Strategic patient education program to prevent catheter-related bloodstream infection. *Clin J Oncol Nurs.* 2012;16(1):E12-E17.

The image shows a screenshot of the OncologyNurseAdvisor website. At the top, there is a banner for 'FACT SHEETS for patients' with the CancerCare logo. Below the banner, the text reads: 'Written by experts, these easy-to-read fact sheets from CancerCare provide reliable information for patients with cancer. Look for these new Fact Sheet titles on www.OncologyNurseAdvisor.com.' Below this text is a list of four fact sheet titles: 'Caregiving During Holidays and Special Occasions', 'Combating Chemobrain: Keeping Your Memory Sharp', 'Cognitive Problems After Chemotherapy', and 'Coping with Cancer-Related Weight Changes and Muscle Loss'. The screenshot also shows the website's navigation menu, including 'Home', 'News', 'Topics', 'Departments', 'CE', 'Focus on', 'Chemotherapy Regimens', 'Resources', 'Clinical Trials', 'Online Only', and 'For'. There are also links for 'ClinicalJobAdvisor' and 'Start looking for your new job in healthcare now!'. The fact sheet titles are listed under the 'CancerCare Fact Sheets' section.