Oncology Meeting Presentations Examine Patient Safety Role of IV Connectors

*Infection Control, Avoiding Blood Reflux into IV Catheter Are the Focus*

PRAGUE, Czech Republic - Medical devices known as IV connectors, through which intravenous medication and nutrition are provided to a patient, can play a crucial role in protecting patients from life-threatening infections and other complications. But some types of connectors are much more prone to dangerous complications, according to a recent poster presentation at an international meeting of oncology nurses, the 17th International Conference on Cancer Nursing, held Sept. 9-13 in Prague, Czech Republic.

The poster examined scientific literature on practices and needleless IV connector designs that affect the fluid pathway of an IV catheter and can keep the pathway free of bacteria. "Without this protection, there can be an increase in catheter-related bloodstream infections and occlusions," the authors stated.

The poster authors were Cynthia Chernecky, RN, Ph.D., AOCN, FAAN, and Denise Macklin, BSN, RNC. Their poster was titled "Protecting the Intraluminal Fluid Pathway to Prevent Catheter-Related Bloodstream Infection."

IV Connectors are generally divided into three types: positive displacement, negative displacement and neutral or "zero" displacement. Those that have reflux of blood immediately upon disconnection (blood flowing backwards into the catheter lumen) are called negative displacement or negative pressure connectors. Those that have reflux immediately upon connection are called positive displacement or positive pressure connectors. A neutral or "zero displacement" connector causes no blood reflux upon connection or disconnection.
The poster noted that aspects of septum disinfection are important influences in protecting the intraluminal fluid pathway.

The standard technique for disinfecting connector septums, a friction technique known as "scrub the hub," is most effective when used on a connector with a smooth septum surface and a tight seal between the septum and the connector housing.

Irregularities in the septum surface and an unsealed septum both provide areas where bacteria can "hide out" because scrubbing probably won't reach them. These factors can undermine the effectiveness of "scrub the hub" and increase the risk of a bloodstream infection.

Blood reflux is another factor to consider in reducing catheter related bloodstream infections. This backflow of blood into the vascular access catheter can lead to bacterial sepsis and/or a catheter occlusion, according to the poster. A neutral or zero displacement connector does not cause blood reflux and does not require a specific "clamping sequence" by nurses.

With both positive and negative displacement connectors, by comparison, blood reflux will occur if nurses do not properly execute a clamping sequence when disconnecting a syringe or tubing from the connector.

The poster authors concluded that "best practice" requires nurses to know which type of connector is being used with each of their patients. Without this knowledge, there can be an increased risk of sepsis, occlusion, and even death.

The authors also called for instituting their Healthcare and Technology Synergy (HATS) model, which emphasizes 1) individualized care based on the needs of each patient and 2) ensuring that the vascular access devices used with each patient are maintained correctly.

"Clinicians need to be aware that not every needleless IV connector is the same and can't be cared for the same way," Macklin said. "It's also helpful to know that a safer, zero displacement
connector design exists and should be used whenever possible."

A second poster at the same conference in Prague described a study in the literature that compared a zero displacement connector (InVision-Plus®, RyMed Technologies) to a split-septum connector, regarding the frequency of complications known as occlusions (blockages) in a cancer patient population.

The poster compared the InVision-Plus connector to a negative-pressure, split septum connector in both inpatient and outpatient, cancer-related settings.

Researchers observed a 53% overall drop in the incidence of occlusions with InVision-Plus. Lower occlusion rates are desirable because they help prevent delays in cancer treatment and their associated costs. Preventing treatment delays also helps improve the quality of life during treatment for patients and their families.

The study also noted average savings with the RyMed device of $4,200 per patient.

The authors of the second poster, which was titled "Clinical Oncology Comparative Evaluation of Split Septum and Zero Fluid Displacement Connectors on Occlusion," were Brenda L. Caillouet, MPH, BSN, RN, CRNI; Cynthia Chernecky PhD, RN, AOCN, FAAN; and Denise Macklin, BSN, RNC.

Resources:

* [IV Connector Virtual Tour](#)
* Description of a second study involving cancer patients that compares a zero displacement IV needleless connector to a negative-pressure, split-septum connector

* Q & A with poster author Brenda Caillouet MPH, BSN, RN, CRNI on the role of the IV connector in preventing occlusions with cancer patients

* Article by William Jarvis, M.D. on bloodstream infection risk associated with positive and negative pressure needleless connectors