

# Caring for Patients With Cancer Through Nursing Knowledge of IV Connectors

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Knowledge about the three different types of IV connectors (negative, positive, and neutral) is imperative to cancer care as specific and distinct interventions can help prevent occlusions and catheter-related bloodstream infections that can lead to increased morbidity with infections and loss of treatment time and mortality. Nurses have responsibilities associated with nursing research, education, and evidence-based practice that should support the outcomes of best patient care when using IV connectors.

Most patients with cancer have IV lines (including some with connectors) associated with cancer treatments. Immunosuppression in patients with cancer increases their risk for infection. Nursing knowledge of IV connectors is necessary to avoid infection and decrease the risk of thrombus formation. IV connectors are devices that connect a fluid source to an IV catheter hub and have a terminal access called a septum. Many clinical names have been used for these products; some common names are *hep-locks*, *male adaptors*, *Luer-locks*, *split-septums*, and *connectors*. A gap exists in the scientific literature regarding the care and maintenance of these connectors. Most literature is manufacturer developed or driven.

This article will disseminate nursing knowledge about types of IV connectors, occlusions, and catheter-related bloodstream infections (CRBSIs). The knowledge may increase adherence through ease of use regarding care and maintenance of IV connectors and reduce infections and occlusions, which positively impacts patient outcomes.

## Literature Review

Three types of IV connectors exist: negative, positive, and neutral (see Figure 1 and Table 1). Several issues can develop

based on connectors, including total or partial occlusion and bloodstream infections. The issues are important to patients and clinicians because tragic patient care errors, such as tubing misconnections, have occurred (Moore, 2003; Simmons, Phillips, Grissinger, & Becker, 2008). With knowledge of the issues, different device types, and associated interventions, oncology nurses can identify and assess for complications related to IV connectors.

## Occlusions

Occlusions are a known complication of central venous access devices in patients, and about 50% are directly related to thrombus formation (Rummel, Donnelly, & Fortenbaugh, 2001). Catheter-related thrombi may develop extraluminally (outside) and intraluminally (inside). Connector usage is related to intraluminal thrombus formation (Garland et al., 2008). Occlusion is more prevalent with a negative-pressure system (Casella

& Jarvis, 2007b; Jacobs et al., 2004) with reflux occurring with disconnection. Split septum (Q-Syte™ and Interlink® B-D Interlink Access System) and Luer-activated (Clearlink®, V-Link®, CLC2000®, Clave®) are IV connectors that allow a negative backflow of blood (reflux) to occur with disconnection of a syringe or tubing from the connector.

Occlusion incidence is lower with a neutral connector (Caillouet, 2008). Catheter patency can be maintained with a combination of nursing care, maintenance, and appropriate flushing and clamping associated with connectors.

Flushing is the primary nursing practice designed to remove fibrin build-up within the intraluminal fluid pathway (Dougherty, 2000). Flushing, however, does not remove build-up in the connector deadspace (e.g., the area not within the direct fluid pathway of the connector). Holding pressure on the syringe plunger and closing the clamp prior to disconnection may prevent this reflux

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