

Reduction of Erosion Risk in Adult Patients With Implanted Venous Access Ports

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One of the most common venous access devices used in patients with cancer is the implanted venous access port. Although incidences of infection and thrombosis are the most commonly reported complications, erosion rates of venous access ports are estimated at almost 1%. This article describes how evidence-based interdisciplinary interventions decreased port erosions for a regional health center from 3.2% to less than 1%.

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Medications (e.g., chemotherapeutic agents), IV fluids, blood products, and parenteral nutrition solutions are administered via the use of implanted venous access ports (VAPs) in the care of patients with cancer (Silas, Perrich, Hoffer, & McNulty, 2010). VAPs are also used for the injection of contrast media and withdrawal of blood samples. From a patient's perspective, a VAP is considered a lifeline with minimal impact on body image and interference with daily activities (Dougherty, 2011). The most commonly documented complications associated with VAPs include infection, venous thrombosis, and catheter occlusion (Zawacki et al., 2009). VAP erosion occurs when a portion or all of the port chamber or indwelling venous tubing protrudes through the skin. VAP erosion through the skin is an infrequently reported complication (less than 1%) and has been associated with cachexia and suboptimal device selection (i.e., high-profile ports in patients) (Zawacki et al., 2009). The authors sought to identify the actual organizational VAP erosion rate after the staff perceived an increase in device removal related to ero-

sion. A review of 498 inpatient and outpatient charts from a 20-month period at St. Cloud Hospital revealed a port erosion rate of 3.2%. Analysis of the literature showed erosion rates were uncommon, with rates of less than 1%, and were suspected to be underreported (Almhanna, Pelley, Thomas Budd, Davidson, & Moore, 2008; Camp-Sorrell, 2004; Cil et al., 2006; Fong, Erinjeri, Suncion, Kemeny, & Solomon, 2009; Zawacki et al., 2009). Given higher rates at St. Cloud Hospital, the authors decided that a need existed for multidisciplinary practice change to reduce the existing port erosion rates.

Review of the Evidence

A literature search was performed searching MEDLINE® and CINAHL® to establish what the causes of erosion were. The key search terms included *erosions*, *skin erosions*, *central venous ports*, *implanted venous access devices*, *chemotherapy*, *wound healing*, *corticosteroid therapy*, and *bevacizumab therapy*. Articles were written in the English language, dates ranged from January 2000 through

March 2011, and populations of adults aged 18 and older were included. Fourteen articles were retained for evaluation, and 11 were used based on the level of evidence (Armola et al., 2009). Protocols for VAPs must be established in accordance with manufacturer's directions for use (Infusion Nurses Society [INS], 2011). Two manufacturer recommendations were used as well as the INS, bringing the total references to 14.

Many contributing factors are associated with erosions. Research suggests a correlation between the timing of bevacizumab (a vascular endothelial growth factor-specific angiogenesis inhibitor) administration and the actual placement of the port (Almhanna et al., 2008; Erinjeri et al., 2011; Fong et al., 2009; Genetech, Inc., 2013; Grenader, Goldberg, Verstandig, & Shavit, 2010; Muslimani et al., 2010; Zawacki et al., 2009). A potential complication associated with the administration of bevacizumab is delayed or incomplete wound healing (Genetech, Inc., 2013). Angiogenesis likely plays a role in lack of wound healing in repetitive trauma from puncture site wounds and surgical incisions. Long-term corticosteroid use is known to cause thin skin and slower wound healing (Vallerand & Sanoski, 2012). Erosions were correlated with repeated access at the same location (Almhanna et al., 2008; Camp-Sorrell, 2004). VAP erosion has been associated with active patients who use repetitive movements (Almhanna et al., 2008; Camp-Sorrell, 2004). According to manufacturer recommendations, the depth of VAP placement should be from 0.5–2 cm. If the port is placed too shallow or if the tissue layer over the VAP is too thin, it may lead to tissue erosion (Bard Access Systems, 2014). In addition, the port pocket site selection should include an anatomic area that provides good port stability, does not create pressure points, and does not interfere