Heparin Versus Normal Saline

Flushing effectiveness in managing central venous catheters in patients undergoing blood and marrow transplantation

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BACKGROUND: Patients undergoing blood and marrow transplantation (BMT) use a central venous catheter (CVC); heparin is often employed to maintain patency but may increase the risk of complications. Research has not provided conclusive differences in efficacy and safety regarding heparin flushing versus normal saline flushing in CVC maintenance. Minimal research is specific to this patient population.

OBJECTIVES: This study aimed to determine if differences exist in CVC patency, tissue plasminogen activator usage, and the incidence of central line–associated bloodstream infections when flushing with normal saline only versus heparin and normal saline among patients undergoing BMT.

METHODS: A convenience sample of 30 patients undergoing allogeneic or autologous transplantation with a new non-port/non–peripherally inserted CVC were evaluated.

FINDINGS: Elimination of routine heparin use could positively affect outcomes in this patient population.

KEYWORDS
blood and marrow transplantation; central venous catheter; saline flush; central line

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PATIENTS UNDERGOING BLOOD AND MARROW TRANSPLANTATION (BMT) have increased hematologic risks and a need for platelet transfusions because of thrombocytopenia (Keeler, 2014). Evidence-based guidelines suggest that routine flushing with normal saline can prevent fibrin buildup and that routine administration of anticoagulants for prophylaxis is not recommended for patients with cancer with central venous catheters (CVCs) (López-Briz et al., 2014; Schiffer et al., 2013). A paucity of research exists in the BMT literature regarding routine flushing of the CVC with normal saline only versus heparin and normal saline.

Background

Evidence-based guidelines published by the Centers for Disease Control and Prevention (O'Grady et al., 2011) and the Cochrane Database of Systematic Reviews (López-Briz et al., 2014) identify best practices for CVC maintenance and the prevention of central line–associated bloodstream infections (CLABSIs). The Centers for Disease Control and Prevention guidelines were developed by a working group consisting of members from multiple professional organizations (e.g., Oncology Nursing Society, Infusion Nurses Society); however, these guidelines did not specifically recommend best practices for flushing CVCs in patients undergoing BMT. The Cochrane systematic review (López-Briz et al., 2014) assessed the effectiveness of intermittent flushing with heparin versus normal saline in adults. Reviewed studies included randomized, controlled trials and meta-analyses. Results included the following:

- Adverse events may be reduced by using normal saline flushes.
- No conclusive evidence exists showing important differences in terms of efficacy and safety between heparin intermittent flushing and normal saline flushing in CVC maintenance.
- Heparin is more expensive than normal saline, challenging its continued use in CVC flushing outside of the context of clinical trials.

Similar results were found in other studies (Heidari Gorji, Rezaei, Jafari, & Yazdani Cherati, 2015; López-Briz et al., 2014; Mitchell, Anderson, Williams, & Umscheid, 2009). Research indicates that heparin flush does not decrease the potential for occlusions (Jonker, Osterby, Vermeulen, Kleppin, & Kudsk,