
Abstract:

OBJECTIVE: To compare heparin (3 mL, 10 units/mL) and 0.9% sodium chloride (NaCl, 10 mL) flush solutions with respect to central venous catheter lumen patency.

DESIGN: Single-center, randomized, open label trial.

SETTING: Medical intensive care unit and Surgical/Burn/Trauma intensive care unit at Barnes-Jewish Hospital, St. Louis, MO.

PATIENTS: Three hundred forty-one patients with multilumen central venous catheters. Patients with at least one lumen with a minimum of two flushes were included in the analysis.

INTERVENTIONS: Patients were randomly assigned within 12 hrs of central venous catheter insertion to receive either heparin or 0.9% sodium chloride flush.

MEASUREMENTS AND MAIN RESULTS: The primary outcome was lumen nonpatency. Secondary outcomes included the rates of loss of blood return, inability to infuse or flush through the lumen (flush failure), heparin-induced thrombocytopenia, and catheter-related
blood stream infection. Assessment for patency was performed every 8 hrs in lumens without continuous infusions for the duration of catheter placement or discharge from intensive care unit. Three hundred twenty-six central venous catheters were studied yielding 709 lumens for analysis. The nonpatency rate was 3.8% in the heparin group (n = 314) and 6.3% in the 0.9% sodium chloride group (n = 395) (relative risk 1.66, 95% confidence interval 0.86-3.22, p = .136). The Kaplan-Meier analysis for time to first patency loss was not significantly different (log rank = 0.093) between groups. The rates of loss of blood return and flush failure were similar between the heparin and 0.9% sodium chloride groups. Pressureinjectable central venous catheters had significantly greater rates of nonpatency (10.6% vs. 4.3%, p = .001) and loss of blood return (37.0% vs. 18.8%, p<.001) compared to nonpressure-injectable catheters. The frequencies of heparin-induced thrombocytopenia and catheter-related blood stream infection were similar between groups.

CONCLUSION: 0.9% sodium chloride and heparin flushing solutions have similar rates of lumen nonpatency. Given potential safety concerns with the use of heparin, 0.9% sodium chloride may be the preferred flushing solution for short-term use central venous catheter maintenance.