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Effectiveness of a Central Line Bundle Protocol Including Ultrasonic Guidance in Reducing Operative Complications Associated with Central Venous Catheter Placement in a Community Emergency Department

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Objective: To assess the effects of a Central Line Bundle Protocol (CLBP) on the success and complication rates of central venous cannulization (CVC) in an emergency department (ED).

Methods: The design was a retrospective chart review of patients who received CVC in a community ED during a 30-month period. The two groups included: 1) patients who had CVC after implementation of the CLBP during a 15-month period after November 2005, and 2) a control group who had CVC during 15 months before November 2005. The CLBP included: 1) use of ultrasound in performing CVC, 2) documentation of CVC site, 3) use of antibiotic-coated catheters, 4) chlorhexidine prep, and 5) wide-field sterile barriers. Internal jugular (IJ) and subclavian (SC) lines were recommended over femoral. Patients were identified through the ED's electronic information system.

Results: Four hundred twenty-three central lines were placed in 399 patients, 195 women (49%) and 204 men, with average age of 65 years. CVC success for both women and men was 98.3% v. 97.9%, respectively. Femoral veins were used in 52.5% of the study group, and in 68.4% of the control group ($p=0.001$). IJ veins were used in 37.3% and 19.3% for study and control groups, respectively ($p=0.001$). SC veins were used in 10.2% of the study group and in 12.3% of the control. Complication rates were 3% and 4.8% for the study and control groups, respectively ($p=0.44$). Major (0.85% vs. 2.14%) and minor (2.11% vs. 2.67%) complication rates were similar between groups. Patients requiring multiple site attempts before successful CVC were 3.4% and 8.6% for the study and control groups, respectively ($p=0.033$).

Conclusion: No statistically significant changes in success or complication rates were found with the CLBP. We did see fewer patients requiring multiple site attempts before successful CVC. We also saw a change in site preference, with more IJs and less femoral veins used.