

Discoveries of Distinction

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The Effect of Ultrasound Guidance and Vessel Transduction on Central Venous Catheter Placement Complications



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Based on recommendations from the National Institute of Health and Clinical Excellence, in 2011 Mayo Clinic Rochester instituted a policy mandating the use of ultrasounds for internal jugular central venous catheter placement in the operating room. In our study we compared rates of complications for central line insertion with and without ultrasound guidance between 2006 and 2012. During that time period a total of 27,933 CVC lines were placed in 22,816 patients resulting in 454 complications. Female gender ($p=.002$) and high ASA status ($p=.066$) are associated with an increased risk for complications, and a BMI > 25 is associated with lower rates of complications ($p<0.001$). Although the decreased rate of complications with the use of ultrasound guidance was not statistically significant, the overall rate of US use increased from 55.9 percent in 2006 to 91.4 percent in 2012 while the

rate of complications declined from 2.7 percent to 0.8 percent. Pressure transduction decreased the rate of severe complications ($p=0.009$); there were 20 cases where transduction prevented arterial dilation. Among patients with internal jugular CVC lines, the rate of thrombotic events was significantly higher ($p=0.008$) for those with multiple vs single lines on the same side. The trend shows improvement in patient safety with the implementation of the policy mandating ultrasound guidance and pressure transduction during central venous catheter placement in the OR at Mayo Clinic Rochester.

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