Clinical Effect of the Neutron™ Needlefree Neutral Displacement Connector in Reducing PICC Line Occlusions and Cathflo® Activase® Usage in a Teaching Hospital

Star Watts, BSN, RN, CRNI VA-BC
IV Team Nurse Manager, Lancaster General Hospital, Lancaster, Pennsylvania

Objective

Catheter occlusion is a common complication in the use of central venous access devices, with as much as 25% of all central venous catheter usage ending in occlusion.[1,2] The majority of occlusions occur as a direct result of thrombosis,[3] which is linked to increased risk of catheter-related bloodstream infections (CRBSIs) for patients. At the time of the study, approximately 250,000 incidents of CRBSIs occur annually in the United States,[4] each adding an estimated $34,508 to $56,000[5,6,7] cost per case.

Purpose

Lancaster General Hospital (LGH), a 623-licensed bed teaching facility in Lancaster, Pennsylvania, has adopted various strategies to address catheter occlusion, including standardization of flush requirements (amount, solution, and frequency) for vascular access devices and the use of a positive displacement device, CLC2000™ (ICU Medical, Inc.).

In fiscal year (FY) 2012, the LGH IV team placed, on average, 120 peripherally inserted central catheters (PICCs) per month (FY 2012 = 1,432 total). Each month, an average of 30 interventions was required to restore patency to occluded catheters. This was accomplished through the use of the Pharmacy and Therapeutics Committee policy on Cathflo Activase (Genentech USA Inc.) administration. Seeking to avoid the need for this declotting agent and its associated costs, LGH investigated the use of the Neutron needlefree neutral displacement connector (ICU Medical Inc.) to prolong catheter patency and reduce the average monthly intervention rate for Cathflo administration.

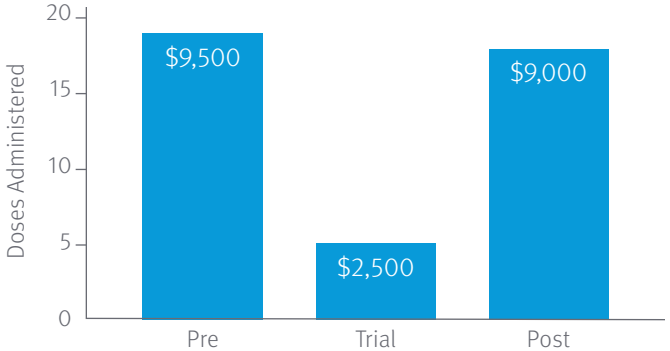
Methods

Data was collected on Cathflo administration rates for 3 separate 3-week periods, documenting its use pre-, during- and post-trial of the Neutron device. The facility used 200 Neutron connectors during the intervention period. On the first day of the trial, all inpatient PICCs received new Neutron devices.

Results

In the pre-trial period, 19 doses of Cathflo were administered to restore patency to occluded catheters. During the 3-week Neutron trial period, the number of Cathflo doses administered—including 1 given for a non-occlusion issue—dropped to 5 doses. When the Neutron devices were removed, the number of Cathflo administrations increased to 18 during the 3-week post-trial period. Assigning a $500 cost to each of the Cathflo administrations, the LGH results indicated a potential to reduce costs by 74%, savings in excess of $6,500 per month (Figure 1).

Figure 1: Estimated tPA costs* pre-, during-, and post-Neutron trial



* $500 nurse charge used by facility as a benchmark figure to determine costs. Not necessarily indicative of actual charge of drug and administration costs.

Conclusion

From this simple trial evaluation, the data suggests that the Neutron needlefree catheter patency device provided superior performance when compared to a positive displacement valve, resulting in a 74% reduction in Cathflo interventions.

In the 2 months subsequent to the completion of the trial, LGH documented 58 Cathflo interventions: 27 in November and 31 in December with costs of $13,500 and $15,500, respectively.

Figure 2: Patency Restoration and Device Replacement Cost Savings Comparison*

	CLC 2000	Neutron
Cost of tPA Administration	$74,160.00	$37,080.00
Device Cost @ 7 per Line (21 days)	$7.91	$24.50
Total Device Cost	$10,170.00	$31,500.00
Total Cost	$84,330.00	$68,580.00
tPA Cost Savings/Year Using Neutron		$15,750.00

* Based on $206 per Cathflo dose — $360 per year intervention rate and 50% reduction using Neutron.

Extrapolating for estimated annual performance and comparing costs with and without Neutron, based on the trial data, suggests that LGH would realize a $15,750 (19%) reduction in costs (Figure 2). Cost avoidance beneft may be significantly greater assuming that the reduced incidence of occlusions lowers the risk of costly CRBSIs.

References

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