

Scientific Poster Contest for Clinical Research

# Occlusion Reduction and Heparin Elimination Trial using an Anti-Reflux Device on Peripheral and Central Intravenous Lines

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## Introduction

Central venous catheters and peripheral intravenous catheters (IVs) are widely used in the hospital for the delivery of intravenous fluids, medications and hemodynamic monitoring.

Common problems associated with Intravenous catheters include occlusion, thrombosis, phlebitis, and infiltration.

In an effort to improve patient care, safety and satisfaction, plus decrease nursing time related to malfunctioning IVs, the NexusTKO® (Nexus Medical, LLC) device was evaluated and trialed via a nursing research study.

The purpose of this study was to determine if the pressure activated valve with anti-reflux device (NexusTKO®) would reduce frequency of occlusions in peripheral lines, central lines, and peripherally inserted central catheters (PICCs). An additional piece of this study was to determine if heparin flushes could be eliminated in central lines and PICCs when the NexusTKO® device was in place.

## Methods

### Three month prospective observational study conducted Fall 2006 in community hospital

A convenience sample of patients aged 18 and older who had a peripheral line, central intravenous line or a PICC and were patients on three nursing units (a medical-surgical floor, an ICU, and an ICU stepdown) were included in study. Total patients enrolled included 189 PICCs/central lines and 188 peripheral lines.

**Month One:** Data collected on current rate and type of complications with standard IV equipment (CLAVE® from ICU Medical, an IV access port, used)

**Month Two:** Data collected on rate and type of complications while NexusTKO® device utilized. 100u Heparin flush used on central lines and PICCs (CLAVE® attached to NexusTKO® device)

**Month Three:** Data collected on rate and type of complications while Nexus TKO device utilized and Heparin flush eliminated for Central Lines and PICCs. Ten cc normal saline flush used instead. (CLAVE® attached to NexusTKO® device)

Peripheral line complications were documented on a tracking form and included phlebitis, extravasation, dislodgement, leaking, occlusion and infiltration. Data collected on the central lines and PICCs included type of occlusion (partial or complete) and action taken such as use of Alteplase to de-clot line or line replacement. Partial occlusions were defined as inability to withdraw blood (fibrin tail or sheath present), while complete occlusions were defined as inability to infuse or withdraw blood. Patients on systemic anticoagulation were also identified

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## Results

Peripheral lines showed little change in occlusion rates and complications between the first and third month, however there was an increase in the number of days the IV lasted. During the first month, 24% (21 of 86) of peripheral IVs lasted 3 days, while the third month showed that 51% (26 of 51) of the peripheral IVs lasted 3 days when the Nexus TKO device used (Table 1)

Results of the study did show a decrease in occlusion rates in central lines and PICCs with the use of the NexusTKO device. Occlusions rates (partial and complete combined) decreased from 30% (18 of 59) to 12.5% (8 of 64) from the first to the third month (Table 2)

Phlebitis rates for peripheral lines also showed a decrease when Nexus TKO utilized. Initial phlebitis rates were 10% (7 of 69 patients) in first month, while the 2nd month decreased to 6% (3 of 50), and the 3rd month dropped to a rate of 4% (2 out of 55). Phlebitis was defined as redness, pain or tenderness along the vein. (Table 3)

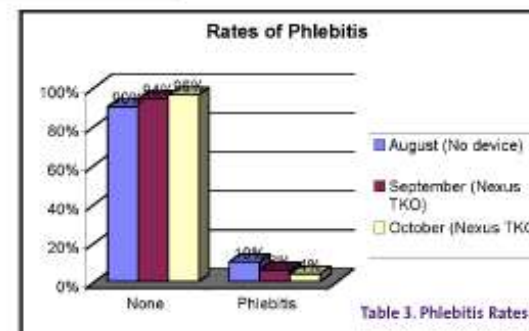
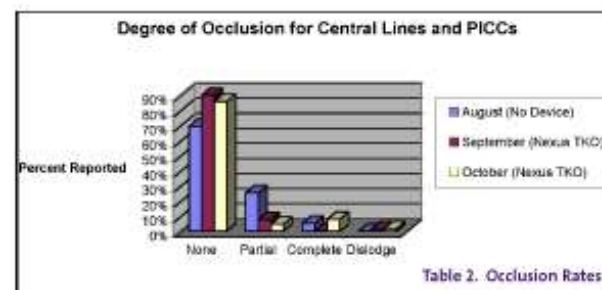
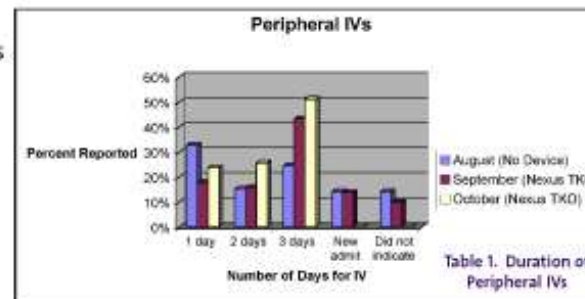


Figure A: Nexus TKO Central lines & PICCs



Figure B: Nexus TKO Peripheral Device

## Conclusion/Discussion

Use of the NexusTKO® device resulted in decrease occlusion rates in PICCs and central lines, additionally heparin flushes were safely eliminated in these lines. Flushing protocols were adjusted to support saline flushes only. While peripheral IVs did not show a decrease in occlusion rates, they did show an increase in the number of days they lasted when the NexusTKO® device was used. An unexpected result of this study was the decline in phlebitis rates with NexusTKO®.

Outcomes of this study could ultimately result in improved patient satisfaction, decreased costs, decreased nursing time devoted to IV's and improved patient safety due to elimination of Heparin flushes and decreased phlebitis rates.

Limitations of this study include one geographical site, short study time and inclusion of anticoagulated patients.

## References

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