Peripherally Inserted Central Catheters: evaluation of diluted lipid emulsion as lubricant for improved guidewire removal in a neonatal population.

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Background

Medical management of neonates is often established upon safe and reliable vascular access. Peripherally inserted central catheters (PICC) are often used to provide vascular access.

Purpose

Difficult PICC guidewire removal is understood to cause catheter damage, causing luminal rupture or possible breakage of the catheter or guidewire itself. The aim of this study was to compare the incidence of therapy failures with use of a preflush fluid using normal saline versus a diluted lipid solution prior to device insertion, to assist with guidewire removal.

Method and Setting

This retrospective, observational study was performed in the Neonatal Intensive Care Unit of the Women's Wellness and Research Centre, Hamad Medical Corporation, Qatar. The study included 507 neonates who required intravenous therapy.

Results

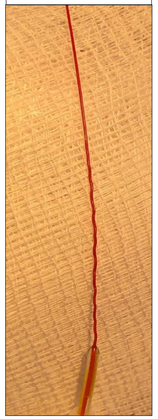
Results demonstrated the use of a diluted lipid solution preflush (DLS) resulted in significantly lesser failures, when compared with the control group (NSS). This highlights a clinical significance after adjusting for day of insertion, gestational age, birth weight and catheter type.

Conclusion

DLS preflush demonstrated a benefit over the use of a NSS preflush to enhance PICC guidewire removal. The risk for development of catheter-related complications leading to premature device removal decreased significantly if the DLS preflush was used. During the study period, no complications related to the use of a lipid preflush solution were identified.

Material

Malformation of the 1Fr PICC, after guidewire was removed using NSS.



Type of Flush	Total ($n=507$)		Normal Saline (NSS) ($n=202$)		Diluted Lipid (DLS) ($n=305$)	
	n	%	*n*	%	*n*	%
Reason for Removal						
Administrative censoring[a]	54	10.7%	21	10.4%	33	10.8%
Therapy success (elective removal)	401	88.5%	154	85.0%	247	90.8%
Therapy failure[b]	52	11.5%	27	15.0%	25	9.2%
Breakage/leakage of material	*5*	*1.1%*	*4*	*2.2%*	*1*	*0.4%*
Catheter-related complications[c]	*14*	*3.1%*	*9*	*5.0%*	*5*	*1.8%*
Extravasation/Infiltration	*2*	*0.4%*	*1*	*0.6%*	*1*	*0.4%*
Maintenance-related complications[d]	*13*	*2.9%*	*4*	*2.2%*	*9*	*3.3%*
Phlebitis	*3*	*0.7%*	*1*	*0.6%*	*2*	*0.7%*
Suspected sepsis	*15*	*3.3%*	*8*	*4.4%*	*7*	*2.6%*
Dwell Time (days) Mean, (SD)	12.97±8.1		12.53±8.2		13.26±8.0	

[a]Administrative censoring = death (other causes than CLABSI) and neonates transferred out. [b]For therapy failure administrative censoring is excluded. [c]Catheter related complications are defined as tip malposition, leaking, breakage of the catheter. [d]Maintenance related complications are defined as accidental removal and occlusion.