

INTRODUCTION

Insertions of intravascular catheters may be the most common procedure that is performed in neonatal intensive care units (NICUs). Central venous catheters (CVCs) are used in neonates for administration of intravenous fluids, medications, total parenteral nutrition (TPN), and blood products and for blood sampling. Umbilical venous catheters (UVCs) are recommended for newborns during the first days of life, as the insertion is relatively simple and carries a low risk of related complications. Traditionally, after 7–10 days, UVCs are usually replaced by peripherally inserted central catheters (PICCs). Next option is to insert a central venous line (CVL) in the femoral vein, the internal jugular vein or the subclavian vein. Ultrasonography is increasingly used in central catheter insertion and control of the tip position to decrease the time taken for insertion, increase the success of line placement on the first attempt and reduce manipulations and X-ray exposure and overall complication rates. Neonates have the highest risk for thrombosis among pediatric patients. The use of CVCs is the most common cause for thrombosis in neonates and infants.

AIM OF THE WORK

This study aimed to estimate the incidence of central venous catheter (CVC) related thrombosis among neonates in our neonatal intensive care unit (NICU) of Alexandria University Maternity Hospital and to determine its possible risk factors.

PATIENTS AND METHODS

This study was carried out on 134 neonates admitted to the Neonatal Intensive Care Unit (NICU) of Alexandria University Maternity Hospital and underwent the procedure of central venous catheterization in the period between July 2020 to July 2021.

All neonates had serial ultrasound examinations on the vein with CVC or portal vein Doppler for UVC within 24–48 hours of catheter insertion and 7-10 days after catheter insertion. For living neonates, Doppler ultrasound examination was performed weekly until catheter withdrawal and within 48–72 h after catheter withdrawal. If thrombosis was detected ultrasound examination was done weekly until thrombosis resolution..

RESULTS

The neonates in our study received 142 CVCs, including 95 (66.9%) UVCs, 39 (27.5%) femoral venous catheters, 6 (4.2%) jugular venous catheters, and 2 (1.4%) PICCs. One hundred twenty-seven neonates received 1 central venous catheter (CVC) and the remaining neonates received 2 (n= 6), or 3 (n=1) CVCs.

Table (1) Distribution of the studied cases according to thrombus development (n = 142)

		No.	%
Thrombus	No	125	88%
	Yes	17	12%
Thrombus on which exam	First	1	5.9%
	Second	9	52.9%
	Third	1	5.9%
	Fourth	3	17.6%
	After removal	3	17.6%
Thrombus on which catheter day			
Min. – Max.		3.0 –25.0	
Mean ± SD.		12.41 ±6.57	
Median (IQR)		10.0 (9.0 –16.5)	
Thrombus on which postnatal age (days)			
Min. – Max.		4.0 –61.0	
Mean ± SD.		23.47 ±14.28	
Median (IQR)		23.0 (11.0 –32.0)	
Fate of thrombus	Resolved	7	41.2%
	Progressed or Died	10	58.8%

IQR: Inter quartile range      SD: Standard deviation      LL: Lower limit      UL: Upper Limit

Table (2) Multivariate logistic regression analysis for the most independent factors affecting thrombus development (n= 142)

	P value	OR	Multivariate#	
			95% C.I. for OR	
			Lower	Upper
Catheter dwell time	0.395	1.047	0.942	1.162
Central line (femoral)	0.164	2.521	0.686	9.262
PRBCS (yes)	0.048	5.768	1.013	32.836
Sepsis (yes)	0.918	0.936	0.264	3.323
Platelets	0.073	0.995	0.989	1.000

OR: Odd’s ratio      C.I: Confidence interval      LL: Lower limit      UL: Upper Limit  
#: All clinical and investigational variables with p<0.05 in Univariate was included in the multivariate  
\*: Statistically significant at p ≤ 0.05

CONCLUSIONS

- Central venous catheters (CVCs) in neonates are commonly used for administration of intravenous fluids, medications and total parenteral nutrition (TPN).
- Ultrasound is an easy, cheap, and available tool present at most tertiary NICUs that should be utilized by trained personnel in central catheter insertion and control of the tip position.
- The incidence of CVC related thrombosis in our study was 12 %
- . Most cases of thrombosis were diagnosed after around 2 weeks of insertion of CVC.