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ARTICLE



Risk factors for peripherally inserted central catheter complications in neonates

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Que conocemos del tema?

Los CPC son de uso común en unidades Neonatales. Tomando en cuenta que hay numerosas complicaciones asociados a estos.

Cual es el objetivo del estudio?

Determinar los factores de riesgo de los CPC y sus posibles complicaciones.

Se colocaron 1234 CPC en < de 45s Enero 2012 a Junio 2015





Método.-

Seattle Childrens Hospital University Of Washington Medical Center

Revisión retrospectiva de ficha clínica < de 45s a quienes se les coloco un CPC durante su estadía.

- Unidad Neonatal
- Unidad Cardio-intensiva pediátrica
- UCI Pediátrica
- UCI quirúrgica Infantil

Se excluyeron:

RN que fueron trasladados con CPC colocado. CPC colocados en Cefálica-Yugular- Axilar.





Factores de Riesgo:

RN: (Enf. subyacentes- peso- cirugías- edad gestacional)

CPC: (Duración CPC, Material, Tamaño, lugar de inserción)

Complicaciones:

- 1.-Extravasación / Infiltración
- 2.-Oclusión o mal Funcionamiento
- 3.- Flebitis-Edema-Eritema- Mala Perfusión
- 4.- Trombos
- 5.- Falla de colocación
- 6.- Inserción fallida





Outcome estudiados.-

- Retiro no selectivo CPC (Retiro antes de terminar terapia)
- Complicaciones:
- 1.- Infección
- 2.- Trombos
- 3.- Mal posicionamiento
- 4.- Oclusión o fractura del mismo
- Raras: Extravasación pleural- Peritoneal- pericárdica Fractura de la línea con embolización



Table 1	Patient	demographics.
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N = 918 subjects	N (%)	Median (interquartile range)
Male gender	500 (54.5%)	
Hospital LOS (days)		36.1 (17.8-80.4)
Admitted to ICU	891 (97.1%)	
ICU LOS (days)		19.5 (7.3-63.6)
Estimated Gestational Age at birth (weeks)		36.1 (29.6–39.0)
Preterm (<37 weeks gestational age at birth)	498 (54%)	
Death	111 (12.1%)	
Mechanically ventilated	721 (78.5%)	
Surgery	569 (62.0%)	
Received PN	829 (90.3%)	
Diagnosis—Abdominal	321 (35.0%)	
Diagnosis—Cardiac	213 (23.2%)	
Diagnosis—Neither abdominal nor cardiac	400 (43.6%)	
Birth weight (kg)		2.4 (1.1-3.2)
Multiple PICC lines placed	206 (22.4%)	



Table 2 PICC line specific characteristics.				
N = 1234 lines	N (%)	Median (interquartile range)		
Estimated Gestational Age at PICC insertion		37.1 (31.6–39.8)		
Age at PICC insertion (days)		7.1 (2.3–21.6)		
Weight at PICC insertion (kg)		2.4 (1.3–3.2)		
Insertion site—Arm	524 (42.5%)			
Insertion Site—Leg	710 (57.5%)			
Material—Silicone	307 (26.7%)			
Material—Polyurethane	845 (73.4%)			
Gauge—1-1.2	376 (31.7%)			
Gauge—1.9-4	810 (68.3%)			
Days PICC in place (for successful insertions)		10.6 (5.7–18.9)		
Placed by interventional radiology	90 (7.3%)			
Placed by member of neonatal or pediatric PICC team	1119 (90.7%)			





Table 3 Summary of complications (N = 1234 lines).

	N	%
Nonelective line removal	351	28.4
Any complication	425	34.4
Associated with PICC clot	58	4.7
Malposition in 1st 72 h	50	4.1
Malposition over time	49	4.0
Dislodgement	37	3.0
Crack/Broken/Fracture	62	5.0
Extravasation/Infiltration	17	1.4
Phlebitis/Edema/Erythema/Perfusion changes	62	5.0
Malfunction/Occlusion	77	6.2
Failed insertion	60	4.9
Infection	18	1.4





Table 4 Comparison of upper and lower extremity PICC complications.

	Upper extremity n/total (%)	Lower extremity n (%)	OR of complication with UE compared with LE PICC (95% CI) p value
Any complications	210/524 (40.1%)	215/710 (30.3%)	1.54 (1.22–1.94) <0.001
Nonelective line removal	183/524 (34.9%)	168/710 (23.7%)	1.73 (1.35-2.21) < 0.001
Associated with PICC clot	18/524 (3.4%)	40/710 (5.6%)	0.6 (0.33-1.06) NS
Malposition in 1st 72 h	33/524 (6.3%)	17/710 (2.4%)	2.74 (1.51-4.97) < 0.001
Malposition over time	35/524 (6.7%)	14/710 (2.0%)	3.56 (1.89-6.71) < 0.001
Dislodgement	20/524 (3.8%)	17/710 (2.4%)	1.62 (0.83-3.16) NS
Crack/Broken/Fracture	23/524 (4.4%)	39/710 (5.4%)	0.79 (0.47-1.34) NS
Extravasation/Infiltration	13/524 (2.5%)	4/710 (0.6%)	4.49 (1.44-13.96) 0.001
Phlebitis/Edema/ Erythema/Perfusion changes	18/524 (3.4%)	44/710 (6.2%)	0.54 (0.31–0.93) 0.03
Malfunction/Occlusion	37/524 (7.1%)	40/710 (5.6%)	1.27 (0.8-2.01) NS
Failed insertion	35/524 (6.7%)	25/710 (2.3%)	1.96 (1.19-3.24) 0.009
Infection	11/524 (2.0%)	7/710 (1.0%)	2.15 (0.8-5.79) NS





Table 5 Multivariate analysis for any complication and nonelective line removal.

	Any complications		Nonelective line removal			
	OR	95% CI	p value	OR	95% CI	p value
Abdominal DX	1.58	1.19-2.12	0.002	1.45	1.08-1.95	0.013
PICC in place >10.6 days ^a	0.52	0.40-0.67	< 0.001			
Surgery	2.02	1.49-2.74	< 0.001	1.75	1.27-2.43	0.001
Received PN	2.41	1.36-4.29	0.003	3.43	1.49-7.89	0.004
Upper extremity PICC	1.41	1.10-1.80	0.006	1.70	1.33-2.19	< 0.001

^aDuration PICC in place not included in multivariate analysis for nonelective line removal because PICCs that were in place for >10.6 days were less likely to be removed nonelectively because early complications necessitated removal





Conclusiones.-

- ✓ EL acceso venoso central es esencial en muchos recien nacidos enfermos.
- √ 1/3 de los CPC presentan complicaciones.
- ✓ Cuando sea factible, tratar de colocar CPC en EEII, ya que parece estar asociado amenos complicaciones que los CPC en EESS.







Umbilical catheter-associated complications in a level IV neonatal intensive care unit

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Que conocemos del tema?

El cateterismo de los vasos umbilicales es la opción principal para acceso vascular central en los primeros dias d vida d los RN, procedimiento realizado en en UCI neonatales.

Cual es el objetivo del estudio?

Evaluar las tasa de complicaciones y los riesgos asociados a catéteres umbilicales.

Se colocaron 2035 CAU y 2017 CVU Junio 2008 a Mayo 2018





Método.-

Hospital del Niño de Yale (Connecticut) Cuenta con 54 camas que respaldan ARO

Se realizo un estudio observacional de cohorte en una UCI Neonatal durante 11 años.

Se incluyeron:

Todo RN al que se le coloco un catéter umbilical en este periodo.

Se recopilaron datos dirigidos a: Colocación- Utilización- Duración de los cateteres.





Complicaciones asociadas:

- 1.- Infección del Torrente Sanguíneo.
- 2.- Trombos, oclusión, mala perfusión, alt en la presión.
- 3.- Mal posicionamiento de la punta del catéter.
- 4.- Fractura o ruptura del catéter.
- 5.- Derrame pericardico-Pleural-peritoneal.

Análisis estadístico:

- Poisson y Cox (análisis de supervivencia).
- IC- TIR (tasa de incidencia)





Table 1 Data related to umbilical arterial and venous catheter utilization.

Variable	Umbilical arterial catheters (N = 2035)	Umbilical venous catheters (N = 2017)	
Lumensa			
Single	1982 (97.4)	1391 (69)	
Double	53 (2.6)	626 (31)	
Total dwell time (days) ^b	5.5 (1-22)	7.6 (1-21)	
Complication ^a	51 (2.5)	269 (13.3)	
Break/rupture	20 (1)	8 (0.4)	
Occlusion	10 (0.5)	5 (0.25)	
Catheter tip malposition	10 (0.5)	232 (11.5)	
Poor perfusion to lower extremity	6 (0.3)	О	
CLABSI	2 (0.1)	19 (0.9)	
Thrombus	2 (0.1)	3 (0.15)	
Effusion	O	2(0.1)	
Break/rupture and CLABSI	1 (0.05)	О	
Dwell time to the onset of any complication (days) ^b	4.4 (1–20)	6 (1–20)	
Dwell time to the onset of a complication, excluding catheter tip malposition (days) ^b	4.6 (1–16)	9 (7–11)	





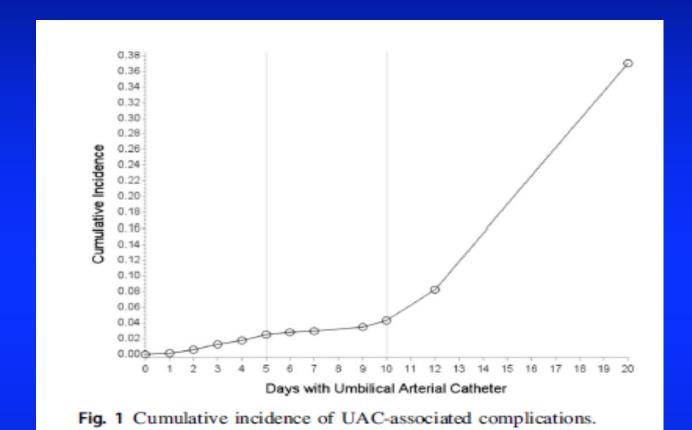


Table 2 Adjusted rates of umbilical catheter-associated complications per 1000 line days by gestational age and birth weight category.

	UVC-associated complications (rate, (95% CI))	UAC-associated complications (rate, (95% CI))	Incidence rate ratio (95% CI)
Gestational age category			
≤26 weeks	18.6 (12.9, 26.8)	1.8 (0.6, 5.2)	0.1 (0.05, 0.2)
27-29 weeks	25.8 (19.1, 34.8)	6.4 (3.0, 13.5)	0.2 (0.1, 0.4)
30-32 weeks	12.8 (8.8, 18.6)	4.2 (1.7, 10.4)	0.4 (0.2, 0.9)
33-36 weeks	12.2 (7.4, 20.1)	3.3 (1.1, 9.8)	0.4 (0.1, 0.9)
≥37 weeks	16.4 (8.8, 30.5)	8.0 (2.4, 26.3)	0.5 (0.3, 0.9)
Birth weight category			
≤750 g	20.0 (12.8, 31.2)	4.5 (1.2, 16.2)	0.1 (0.04, 0.3)
751–1000 g	23.6 (16.0, 35.0)	7.4 (2.8, 19.7)	0.2 (0.1, 0.4)
1001-1500 g	13.6 (9.5, 19.4)	1.9 (0.7, 5.5)	0.2 (0.1, 0.4)
1501-2500 g	14.9 (10.2, 21.5)	5.9 (2.8, 12.1)	0.5 (0.3, 0.9)
>2500 g	12.8 (7.3, 22.4)	3.3 (1.1, 9.5)	0.5 (0.3, 0.8)
All complications	17.6 (15.6, 19.8)	4.6 (3.5, 6.0)	0.3 (0.2, 0.4)
Complications excluding catheter tip malposition	2.4 (1.75, 3.3)	3.9 (2.8, 5.3)	1.6 (1.02, 2.5)



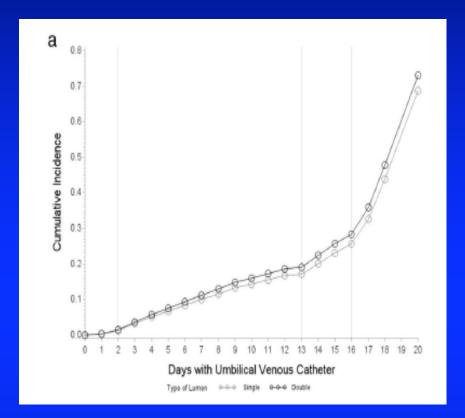












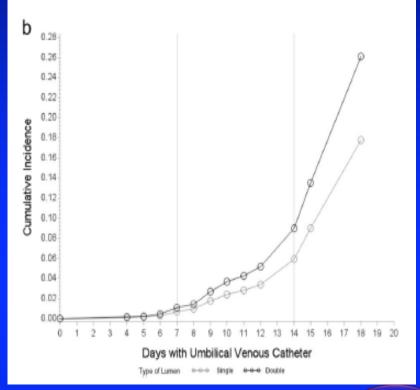


Fig. 2 a Cumulative incidence of UVC-associated complications.
b Cumulative incidence of UVC-associated complications after exclusion.







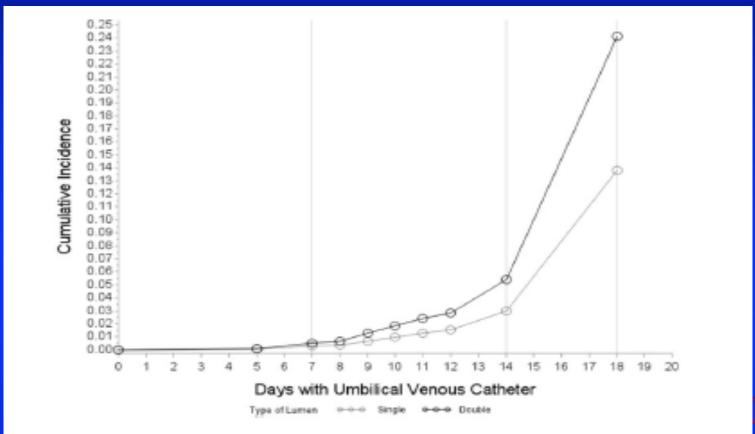


Fig. 3 Cumulative incidence of UVC-associated CLABSI.





Conclusiones.-

- ✓ Se vio complicaciones en: 51 CAU (2,5%) v/s 269 CVU (13,3%)
- ✓ Las complicaciones de CVU se deben mas al mal posicionamiento.
- ✓ Las complicaciones de CAU se deben más al quiebre de estos.



La incidencia aumenta después de: 10d en CAU v/s 16d en CVU











Comparison of Neonatal Intubation Practice and Outcomes between the Neonatal Intensive Care Unit and Delivery Room

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Lean Tissue Deficit in Preterm Infants Persists up to 4 Months of Age: Results from a Swedish Longitudinal Study

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An Overview of Systematic Reviews of Randomized-Controlled Trials for Preventing Necrotizing Enterocolitis in Preterm Infants

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Early versus Delayed Fortification of Human Milk in Preterm Infants: A Systematic Review

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