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Swiss Neonatal Network & Follow-up Group

Patent Ductus Arteriosus Ligation – What is the ideal rate?

WIC Fall Research Meeting
Oxford, October 2-4, 2019

Patent Ductus Arteriosus (PDA)

2 Options:

1. Medical: Indomethacin, Ibuprofen, Paracetamol
2. Surgical ligation

“Despite ... research and clinical experience ... over 6 decades, there is still uncertainty and controversy about the significance, evaluation and management of PDA in preterm infants.”

AAP Committee on Fetus and Newborn

Pediatrics Dec 2015. doi: 10.1542/peds.2015-3730

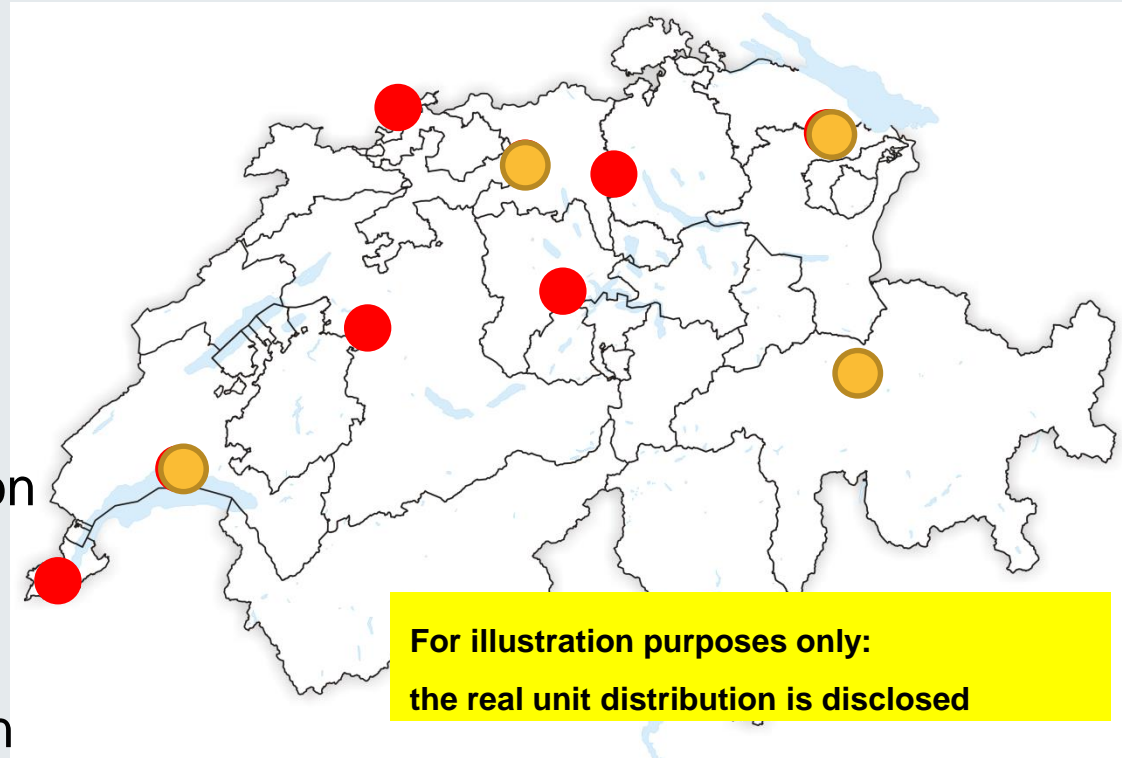
PDA Ligation in Swiss Neonatal Network

All 9 Swiss NICUs

- 2012 - 2016
- < 28 weeks gestation
- N = 1143

● A: 5 NICUs \leq 10% Ligation
(range: 0% – 9.8%)

● B: 4 NICUS > 10% Ligation
(range: 13.8% – 23%)



Compare outcome group A versus B:

Odds of group A for:

- mortality
- severe morbidity (NEC Bell's stage ≥ 2 , Moderate to severe BPD, ROP stage ≥ 3)
- moderate to severe NDI at 2 years of age
- Risk adjustment is made for:
 - Gestational age, birth weight z-score, male sex, outborn, early onset sepsis, severe IVH

Outcome comparison group A versus B:

Adjusted OR for adverse outcome in units with lower proportion of PDA ligation

Outcome	All infants			Infants with treated PDA only		
	OR	95% CI	AUC	OR	95% CI	AUC
Child died at any time	1.007	(0.711-1.425)	0.82	0.992	(0.628-1.568)	0.82
Death or major morbidity	0.737	(0.563-0.965)	0.78	0.659	(0.465-0.934)	0.75
Major morbidity	0.695	(0.517-0.936)	0.72	0.604	(0.416-0.877)	0.69
Moderate to severe NDI at 2 years	1.135	(0.708-1.818)	0.67	1.372	(0.732-2.574)	0.73

Association of outcome with PDA ligation?

- Did group B have sicker infants **requiring** PDA ligation?
- Did group B have sicker infants **because of** PDA ligation?

Outcome of infants with PDA ligation:

Adjusted OR for adverse outcome of infants with PDA ligation

Outcome	All infants			Infants with treated PDA only		
	OR	95% CI	AUC	OR	95% CI	AUC
Child died at any time	0.253	(0.133-0.48)	0.82	0.291	(0.15-0.563)	0.81
Death or major morbidity	2.075	(1.356-3.175)	0.78	1.824	(1.176-2.83)	0.75
Major morbidity	3.219	(2.088-4.962)	0.72	2.591	(1.652-4.065)	0.69
Moderate to severe NDI at 2 years	2.151	(1.186-3.899)	0.67	2.471	(1.268-4.816)	0.73

Association of outcome with PDA ligation?

- Are infants with PDA ligation sicker **requiring** PDA ligation?
- Are infants with PDA ligation sicker **because of** PDA ligation?

Outcome of infants with PDA ligation:

Adjusted OR for adverse outcome of infants with PDA ligation

Outcome	All infants			Infants with treated PDA only		
	OR	95% CI	AUC	OR	95% CI	AUC
Child died at any time	0.564	(0.265-1.201)	0.78	0.495	(0.227-1.076)	0.78
Death or major morbidity	2.69	(1.759-4.114)	0.74	2.175	(1.4-3.38)	0.71
Major morbidity	3.219	(2.088-4.962)	0.72	2.591	(1.652-4.065)	0.69
Moderate to severe NDI at 2 years	2.151	(1.186-3.899)	0.67	2.471	(1.268-4.816)	0.73

Subgroup analysis of all infants that survived until day 10 of life.

Summary

- Supply sensitive variation of PDA ligation (0% - 23%)
- Infants born in group A have lower odds for major morbidities (0.5, CI: 0.33 to 0.75)
- Infants with PDA ligation have higher odds for major morbidities (2.6, CI: 1.58 to 4.25)
- Possible lower mortality in infants with PDA ligation (0.49, CI: 0.23 to 1.07)

How to improve quality?

- Study of PDA ligation:
 - Current: differentiation into pre and post-ligation morbidities
 - Publication in peer-reviewed journal
- Raise awareness, discuss, monitor
 - First presentation of results in Spring meeting
 - In-depth analysis of procedures in Fall meeting:
 - Director of unit with lowest rate presents local approach
 - Director of unit with highest rate presents local approach modelling his/her presentation on that of unit with lowest rate
 - Local adjustment of SOP?
 - Long term monitoring in online evaluation and SwissNeoNet Annual Report

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Thank You!