NEURODEVELOPMENTAL AND GROWTH IMPAIRMENT AMONG VERY LOW-BIRTH-WEIGHT INFANTS WITH NEONATAL SEPSIS

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INTRODUCTION AND OBJECTIVE

Neonatal infections are frequent complications and one of the major causes of mortality and morbidity in very low-birth-weight (VLBW) newborns receiving intensive care. There is evidence that perinatal and neonatal infections are associated with neurodevelopmental impairment and growth failure in preterm infants.

Objective: To determine if neonatal sepsis in VLBW newborns are associated with increased risks of adverse neurodevelopmental sequelae and growth failure in early childhood.

METHODS

We conducted a **observational, analytical and retrospective case-cohort study** of VLBW newborns admitted at the Neonatal Intensive Care Unit (NICU) between January/2005 and December/2015. Deaths and major malformations were excluded. **Infants with and without sepsis were compared for the main risk factors and complications of prematurity.**

Outcomes at 24 months included: anthropometric measurements, Griffiths Mental Development Scales and major neurosensory abnormality. WHO growth charts were used to determine growth status at follow-up.

- Definitions:**
- Sepsis:** clinical and analytical criteria, with or without positive blood culture
 - Severe neurodevelopmental impairment:** cerebral palsy, neurodevelopmental delay (developmental quotient <2sd), hearing impaired and/or blindness
 - Impairment growth:** < -2 sd for gender and age

RESULTS

CHARACTERIZATION OF SAMPLE OF NEWBORNS

18.3% had at least 1 sepsis during NICU		
	Early onset-sepsis	Late onset-sepsis
Total sepsis (n= 100/ 92 VLBW)	13	87
36 (39.1%) with clinical and analytical criteria but negative blood culture		
	Positive blood culture	
Coagulase-positive staphylococci	54	
E. coli	3	
Streptococcus agalactiae	3	
Enterococcus faecalis	2	
Pseudomona aeruginosa	1	
Candida	1	

COMPARATION OF VLBW WITH AND WITHOUT SEPSIS

	VLBW with sepsis (n=92)	VLBW without sepsis (n=411)	p	OR (CI 95%)
Male , n (%)	51 (55.4)	218 (53.0)	NS	-
Birth weight (g)	998.7 ± 238.9	1271.3 ± 297.6	< 0.001	.
Outborn, n (%)	20 (21.7)	38 (9.2)	0.001	2.7 (1.5-4.9)
Need for resuscitation, n (%)	68 (73.9)	175 (42.8)	< 0.001	3.8 (2.3-6.3)
Ventilation > 7 days, n (%)	23 (25.0)	229 (5.8)	< 0.001	5.4 (2.9-10.1)
Postnatal steroid, n (%)	31 (33.7)	24 (5.9)	< 0.001	8.2 (4.5-14.8)
Bronchopulmonary dysplasia,n (%)	14 (15.2)	21 (5.1)	0.001	3.4 (1.6-6.9)
Patent ductus arteriosus, n (%)	37 (40.2)	58 (14.1)	< 0.001	4.1 (2.5-6.7)
Intraventricular hemorrhage grade 3 or 4, n (%)	11 (11.9)	18 (4.4)	0.005	2.9 (1.3-6.5)
Cystic periventricular leukomalacia, n (%)	11 (11.9)	6 (1.5)	< 0.001	9.1 (3.3-25.2)
Cephalic perimeter <-2sd at discharge	9 (11.7)	17 (4.7)	0.023	2.7 (1.0-5.1)

We presented variables with statistical significance; n (%); Average ± standard deviation

OUTCOMES AT 24 MONTHS: NEURODEVELOPMENT AND GROWTH

		VLBW with sepsis (n=92)	VLBW without sepsis (n=411)	p	OR IC 95%	p	ORa IC 95%
NEURODEVELOPMENT	Developmental quotient < 2sd, n (%)	8 (9.2)	14 (3.8)	0.047	2.6 (1.1-6.4)	NS	-
	Cerebral Palsy, n (%)	8 (9.2)	13 (3.5)	0.029	2.8 (1.1-6.9)	0.044	3.2 (1.2-4.1)
	Hearing imparied, n (%)	2 (2.3)	1 (0.3)	NS	-	NS	-
	Blindness, n (%)	0	1 (0.3)	NS	-	NS	-
	Neurodevelopmental impairment, n (%)	15 (17.0)	20 (5.3)	<0.001	3.6 (1.8-7.4)	0.005	3.6 (1.3-8.1)
GROWTH	Z-score weight	-0.79 ± 1.21	-0.65 ± 1.21	NS	-	NS	-
	Z-score lenght	-0.89 ± 1.56	-0.76 ± 1.35	NS	-	NS	-
	Z-score cephalic perimeter	0.13 ± 1.20	0.25 ± 1.20	NS	-	NS	-
	Impairment head growth, n (%)	2 (2.4)	12 (3.2)	NS	-	0.05	3.7 (1.8-5.9)

OR after adjusting for: birth weight, gestational age, twinning, in/outborn, PDA, postnatal steroid and brain injury

CONCLUSION

This study suggests that neonatal infections among VLBW newborns are associated with poor neurodevelopmental and head growth outcomes in childhood. We believe that investing in prevention and early treatment of sepsis may improve the neurodevelopment of these newborns. However, theses findings need to be confirmed by larger trials.