

AAP DISTRICT VIII SECTION ON NEONATAL PERINATAL MEDICINE

2021 ANNUAL CONFERENCE ORIGINAL RESEARCH (BASIC SCIENCE or CLINICAL) ABSTRACT SUBMISSION FORM

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DEADLINE FOR RECEIPT OF ABSTRACT IS FEBRUARY 19, 2021. Submissions will be accepted for either poster or oral presentation. Authors will be notified of acceptance and format for presentation (poster or poster symposium) by **March 12, 2021.**

Title: Neurodevelopmental Outcomes of Extremely Preterm Infants with Late Onset Bacterial Sepsis According to Type of Bacteria

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Background: Late onset sepsis (LOS) is associated with adverse neonatal outcome. There is limited data on the long term neurodevelopmental (ND) outcome of infants based on type of bacteria causing LOS. We hypothesize that the type of bacterial pathogen causing LOS influences the developmental outcome in extremely preterm infants.

Objective: To compare the ND outcomes at 18-24 months corrected age(CA) of infants born <29 weeks who had LOS caused by (1) gram positive bacteria, (2) gram negative bacteria, (3) mixed (both gram positive and gram negative bacteria) and (4) those with no sepsis (i.e. no sepsis or culture negative sepsis).

Methods: In this retrospective multicentre cohort study, we studied infants born at <29 weeks' gestational age (GA) between January 2010 and December 2017 and evaluated for neurodevelopmental assessment at 18–24 months' CA at 9 Canadian Neonatal Follow-up Network centers. Infants with early onset sepsis, major congenital anomalies, those who received palliative care at birth, those who died before 2 days of age, and those with non-bacterial infections and those lost to follow up were excluded. Exposure is LOS defined as the presence of a pathogenic organism in the blood or cerebrospinal fluid culture obtained from a neonate suspected of having sepsis after 2 days of age. The primary outcome was composite of death or ND impairment (NDI) defined as the presence of any one of the following: cerebral palsy, Bayley-III score of <85 on any one of the components (Cognitive, Language, Motor composite score), hearing loss, and visual impairment. Demographic factors and ND outcomes were compared among the 4 groups using univariate and multivariate analysis.

Results: Of the 3640 included infants, 823 (22.6%) had LOS. Of the 823 infants with LOS, 569 (69.1%) infants had gram +ve sepsis, 172 (20.9%) had gram -ve sepsis and 82 (10%) had mixed sepsis. Maternal and neonatal characteristics and outcome are reported in the Table 1. Outcome data after adjustment for GA, sex, antenatal steroids, SNAP-II score, SGA, maternal age and caesarian delivery are presented in Table 2.

Conclusion: Late onset bacterial sepsis, especially gram -ve sepsis and mixed infections were associated with increased risk of composite outcome of death or NDI, NDI alone at 18-24 months CA in infants <29 weeks' GA.

Table 1: Demographic characteristics and rates of outcomes

	No sepsis N = 2817	Gram +ve sepsis N =569	Gram –ve sepsis N =172	Mixed Sepsis N =82	p-value
Maternal characteristics					
Maternal age, yrs ^a	31.6 (5.6)	31.2 (5.8)	30.0 (5.5)	31.2 (5.2)	<0.01
Maternal education ≥college, n (%)	1356 (57.6)	253 (56.4)	66 (55.9)	30 (52.6)	0.84
Hypertension, n (%)	489 (17.6)	114 (20.5)	21 (12.4)	8 (10.0)	0.02
Antenatal steroid, n (%)	2618 (93.9)	531 (94.3)	158 (92.9)	77 (95.1)	0.89
Cesarean section, n (%)	1799 (64.0)	379 (66.7)	83 (48.3)	43 (53.1)	<0.01
Neonatal characteristics					
Birth weight (g) ^a	926 (244)	818 (216)	827 (210)	803 (190)	<0.01
Gestational age (weeks) ^a	26.4 (1.5)	25.7 (1.6)	25.4 (1.4)	25.3 (1.4)	<0.01
Male, n (%)	1502 (53.5)	300 (52.8)	97 (56.4)	51 (62.2)	0.37
Small for gestational age, n (%)	282 (10.0)	81 (14.3)	12 (7.0)	9 (11.0)	0.01
Multiple gestations, n (%)	809 (28.7)	177 (31.1)	57 (33.1)	23 (28.1)	0.45
SNAP-II score ^b	14 (9, 21)	14 (9, 25)	17 (14, 26)	19 (14, 25)	<0.01
Outcomes					
Death or NDI	1371 (48.7)	313 (55)	117(68)	62(75.6)	<0.01
NDI among survivors	1056 (42.2)	234 (47.8)	68 (55.3)	40 (66.7)	<0.01
Death	315 (9.3)	79 (11.8)	49 (25.3)	22 (25.8)	<0.01

^a Mean ± standard deviation; ^b Median ± Interquartile range

SNAP-II: Score for Neonatal Acute Physiology, version II

Table 2: Adjusted odds ratios for neurodevelopmental outcomes

Outcome	No sepsis	Gram +ve sepsis	Gram –ve sepsis	Mixed sepsis
		aOR, 95% CI	aOR, 95% CI	aOR, 95% CI
Primary outcome				
Death or NDI	ref	1.04 (0.85, 1.26)	1.80 (1.27, 2.54)	2.38 (1.41, 4.01)
Secondary outcome				
Death	ref	0.78 (0.58, 1.05)	2.06 (1.39, 3.03)	1.74 (1.00, 3.04)
NDI	ref	1.09 (0.89, 1.34)	1.49 (1.02, 2.18)	2.15 (1.24, 3.74)
Significant NDI [*]	ref	1.23 (0.94, 1.60)	1.58 (1.01, 2.48)	2.40 (1.37, 4.24)
Death or significant NDI	ref	1.04 (0.83, 1.29)	1.96 (1.40, 2.74)	2.37 (1.48, 3.79)
Cerebral palsy	ref	1.66 (1.10, 2.51)	1.80 (0.90, 3.61)	2.59 (1.13, 5.97)
Cognitive score < 85	ref	1.16 (0.88, 1.54)	1.83 (1.16, 2.87)	2.66 (1.50, 4.72)
Motor score < 85	ref	1.00 (0.77, 1.30)	1.44 (0.93, 2.22)	2.96 (1.71, 5.13)
Language score <85	ref	1.03 (0.82, 1.28)	1.26 (0.84, 1.88)	1.90 (1.09, 3.32)
Visual impairment	ref	1.48 (0.59, 3.67)	0.74 (0.10, 5.70)	1.47 (0.19, 11.5)
Hearing impairment	ref	1.29 (0.87, 1.91)	1.65 (0.87, 3.11)	1.37 (0.53, 3.55)

^{*}**Significant NDI:** defined as presence of any one or more of the following: cerebral palsy with GMFCS ≥ 3, Bayley-III score of < 70 on any of the components (cognitive, language or motor composite score), hearing impairment requiring hearing aids or cochlear implant, and bilateral visual impairment

^{*}Adjusted for gestational age, sex, antenatal steroids, SNAP-II score, Small for gestational age, mode of delivery, maternal age