

MEDICAL SCHOOL

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INCIDENCE AND MAIN RISK FACTORS FOR SEVERE RETINOPATHY OF PREMATURITY IN INFANTS BORN UNDER 1,000 GRAMS IN BRAZIL

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BACKGROUND **WHAT DO WE KNOW ABOUT ?**

- Neonatal intensive care have improved during the past decade resulting in a worldwide increase in survival population of preterm babies born with birth weight (BW) <1,000 grams.
- These preterm neonates are a highly vulnerable group of patients needing special attention from the Neonatal Intensive Care Unit (NICU) staff in order to detect postnatal morbidities and to minimize avoidable consequences such as sepsis, meningitis, broncho-pulmonary dysplasia, intraventricular hemorrhage, leukomalacia, persistent ductus-arteriosus, and retinopathy of prematurity (ROP).
- ROP is the major cause of preventable childhood blindness among preterm infants.

PURPOSES

- This study aims to evaluate the incidence and main risk factors for severe ROP among preterm babies born under BW <1,000g in Southern Brazil.

SETTING / VENUE

- The study was carried out in the NICU of the Hospital de Clínicas de Porto Alegre (HCPA), a tertiary university hospital in an urban area with a population estimated at 3 million inhabitants in Southern Brazil.



HCPA in PORTO ALEGRE / BRAZIL



STUDY DESIGN

- A prospective cohort study was conducted from October 2002 to December 2012.

PATIENTS

- All preterm infants with BW $\leq 1,000$ g were included, except for those that died during hospitalization before the first ophthalmological examination.

OPHTHALMOLOGICAL EXAMINATION

- The ophthalmological examination consisted of indirect ophthalmoscopy after the dilation of pupils. Infants were first examined between the 4th and the 6th week of life and were followed up every two weeks until the 42nd week of post-conceptual age (PCA).
- Staging of the disease was according to the International Classification of ROP from 1984/1987 revisited in 2005.



OUTCOMES

- **The main clinical outcome was the occurrence of severe ROP (defined as ROP stage 3 plus, ROP stages 4 or 5) in either eye during the entire observational period.**

VARIABLES

- **BW**
- **GA**
- **gender**
- **being appropriate or small for GA (SGA; <10th percentile for GA)**
- **gemelarity (born from single or multiple gestation)**
- **patient's weight measured at completed 6th week of life**
- **use of oxygen-therapy on mechanical ventilation or nasal continuous positive airway pressure (CPAP)**
- **number of days on mechanical ventilation**
- **use of surfactant, indomethacin, blood transfusions and erythropoietin therapies**
- **occurrence of sepsis, meningitis, all stages of intraventricular hemorrhage (IVH), and persistent ductus arteriosus (PDA)**



STATISTICAL

- The chi-square test was used to compare no-ROP patients with severe ROP patients.
- Student's unpaired *t*-test was used to compare continuous data.
- Logistic regression was performed to the variables with significance after univariate analysis.
- Confidence interval 95% and significance levels of $P < 0.05$ were recorded.
- All data were processed in the software SPSS 15.0[®] (Statistical Package for Social Sciences, SPSS Inc., Chicago, IL, USA).

ETHICS

- The study protocol was approved by the ethics committee of the HCPA.

A total of 157 infants were included.

- **Mean BW for the entire cohort: 844.04 ± 116.03 grams (range 505-1000g)**
- **Mean GA for the entire cohort: 28.3 ± 2.0 weeks (range 24-32 weeks)**

Table 1. Incidence of ROP in patients with BW ≤1,000g.

	Number of patients (%)
No-ROP/Mild ROP patients	137 (87.3%)
ROP 0	99 (63.1%)
ROP 1	17 (10.8%)
ROP 2	21 (13.4%)
Severe ROP patients	20 (12.7%)
ROP 3	18 (11.5%)
ROP 4	1 (0.6%)
ROP 5	1 (0.6%)
Total of screened patients	157 (100%)



Table 2. Univariate analysis of the recorded risk factors for severe ROP

	No-ROP patients n = 137	Severe ROP patients n = 20	P
Birth weight *	849.2 ± 115.6	808.7 ± 115.5	0.146
Gestational age *	28.4 ± 1.9	27.4 ± 2.0	0.029
Weight at 6 th week of life *	1,376.6 ± 275.4	1,120.0 ± 189.1	<0.001
Small for gestational age	65 (47.4%)	7 (35.0%)	0.422
Female gender	80 (58.8%)	12 (60.0%)	1.000
Gemelarity	28 (20.4%)	4 (20.0%)	1.000
Oxygen-therapy in nasal CPAP	97 (84.3%)	17 (89.5%)	0.738
Oxygen-therapy in mechanical ventilation	75 (64.1%)	16 (80.0%)	0.256
Days in mechanical ventilation *	25.4 ± 21.6	49.9 ± 17.2	<0.001
Use of Indomethacine	50 (43.1%)	8 (42.1%)	1.000
Use of Surfactant	76 (64.4%)	13 (65.0%)	1.000
Use of Erythropoietin	73 (67.6%)	15 (83.3%)	0.285
Sepsis	85 (72.6%)	14 (73.7%)	1.000
Meningitis	6 (5.1%)	1 (5.3%)	1.000
Intraventricular hemorrhage	41 (29.9%)	8 (40.0%)	0.516
Persistent ductus-arteriosus	21 (17.9%)	2 (10.5%)	0.529
Blood transfusions	105 (76.6%)	19 (95.0%)	0.077

*: Data in mean ± standard deviation; nasal CPAP: nasal Continuous Positive Airway Pressure

**After univariate analysis the main risk factors for severe ROP were:
GA at birth, patient's weight at 6th week of life, and number of days of oxygen-therapy under mechanical ventilation.**

Table 3. Logistic regression

	OR	95% CI	P	
Gestational age	1.087	0.787 - 1.501	0.614	NS
Weight at the 6 th week of life	0.997	0.994 - 0.999	0.018	S
Number of days in mechanical ventilation	1.053	1.019 -1.088	0.002	S

OR: Odds ratio; CI: confidence interval, NS: not significance, S: significance

After logistic regression the infant's weight measured at completed 6th week of life and number of days in mechanical ventilation were associated with severe ROP.



- **The incidence of severe ROP needing treatment among babies born under 1,000g at our institution was 12.5%.**
- **After logistic regression the infant's weight measured at completed 6th week of life and number of days in mechanical ventilation were associated with severe ROP.**
- **Patients were treated when ROP reached threshold disease at a mean PCA of 37.4 ± 1.8 weeks and around 1 week after diagnosis.**
- **Laser photocoagulation was effective to stabilize the natural progression of ROP among 19 treated patients.**
- **These results are in agreement with other published studies.**
- **No patient achieved ROP in zone I or AP-ROP in our cohort during the entire period of the study.**