

Risk of Development of ROP in Premature Infants Born at Different Heights in Latin America and Its Consequences with their Gestational age

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ABSTRACT: Retinopathy of prematurity (ROP) is a visual disorder caused by abnormal growth of blood vessels in the highly-sensitive part of the eyes (retina) of premature babies. The most important risk factors are the gestational age with newborns before the 31st week of gestation and their weight (less than 1250 grams) so their diagnosis requires timely screening. In most cases, these cases resolve without treatment, however, they can cause permanent vision problems or blindness. In the Americas, characterized by different heights above sea level (a.s.l), there are no reports in the medical literature if this variable is a risk factor, so the present study will be useful as a new reference.

MATERIAL AND METHOD: A retrospective analytical cross-sectional study, was done into account all preterm newborns with ophthalmological examination registered in the Epic Latino databas in the different Neonatal units in the period 2015-2020. In order to determine the risk of retinopathy, a mixed binary risk model was produced to relate risk factors to height

RESULTS: A total of 2945 premature infants were found, 374 patients had a diagnosis of ROP, 51.8% were women and 48.2% were men, with a higher frequency at 27-28 weeks of gestation (with 35%). It was observed that the most important factor that determines the risk of Retinopathy is gestational age, where the neonatal units play an important role in developing ROP and that height has no effect (it does not increase the risk of ROP).

CONCLUSIONS: We concluded that gestational at birth continues to be the most important risk factor for the development of ROP, regardless of the height (a.s.l) at which newborns are born.

KEYWORDS: ROP: retinopathy; premature newborn; low birth weight newborn; eye fundus; blindness; visual acuity; meters above sea level (m.a.s.l)

INTRODUCTION

Retinopathy has a multifactorial pathology, one of the risk factors is the supplementary oxygen that de patient receives. To understand its pathophysiology, it is necessary to know its embryological development where the formation of the retina begins at week 14 to 16 from the papilla to its periphery, at week 36 it reaches the nasal retina and at week 40 the temporal one, so prematurity leads to incomplete vascularization, which is why there are areas of poor vascularity or avascular areas. (7)

Retinopathy develops in two phases: An ischemic and proliferative. The ischemic phase is characterized by the interruption of the progression of the retinal capillary bed, in this phase is where exogenous factors play an important role. The proliferative phase is given by an increase in angiogenic factors such as VEGF that seek ineffective neovascularization, which can result in retinal detachments or hemorrhages that compromise the visual prognosis of the newborn. (7)

There is not studies that correlate the risk of ROP with the height in children's, so this paper analyzes the risk of developing ROP associated with the height at which newborns are born and how the unit who receive them influences it.

OBJETIVES

Determine if the risk of developing ROP is associated with the height and gestational age of the database of Epic Latino units in the period 2015-2020.

METHODOLOGY

Retrospective analytical cross-sectional study, considering all preterm newborns with ophthalmological examination registered in the Epic Latino software in the different Neonatology units.

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The inclusion criteria were all premature newborns with ophthalmological examination from Epic Latino units in the period 2015 to 2020 were taken. The exclusion criteria were records with incomplete data in the Epic Latino software, lack of ophthalmological examination and premature infants with congenital malformations or chromosome syndromes.

RESULTS

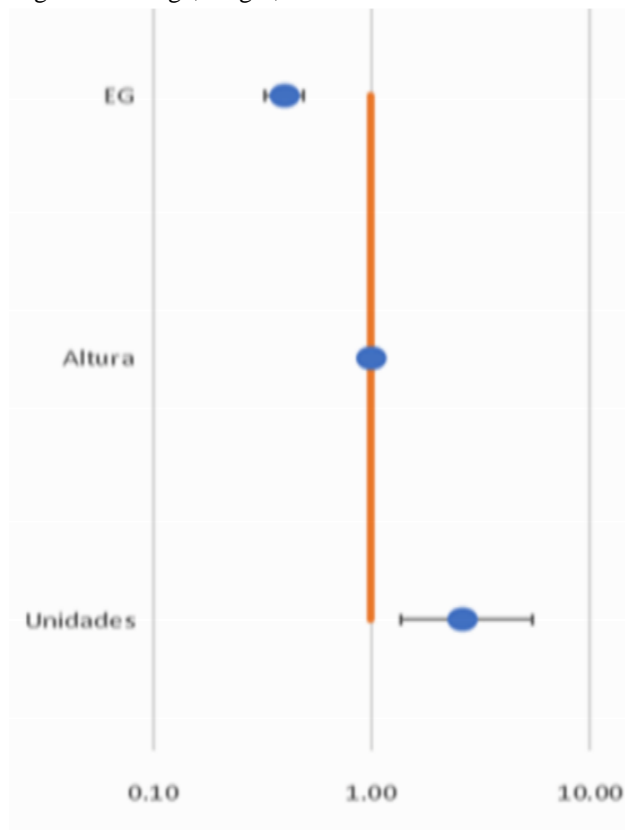
A total of 2945 premature infants were obtained, of which 374 patients were diagnosed with ROP, of which 51.8% were women and 48.2% were men (Table 1), grouped by gestational age the higher frequency was seen at week 27-28. with 35%, and 20% of frequency at 29-30 weeks. Boundary ranges of gestational age under 25 weeks and over 33 weeks has frequency ranges from 3% to 8% respectively. In order to determine the risk of retinopathy, a mixed binary risk model was used, including gestational age, height, and the unit in which the child was born. Figure 1 shows that the major factor that determines the risk of retinopathy is gestational age, the higher the gestational age significantly decreases the risk of ROP, if the variables height and hospitalization unit are added to this risk; It is observed that height has no effect (it does not increase the risk of ROP) and the hospitalization unit in which the newborns are born does increase the risk of developing ROP.

Figure 2 analyzes whether the same effect was observed in the most immature premature infants (<30 weeks) and shows that gestational age remains the major risk factor, but the effect of the hospitalization unit disappears. To verify what happens in premature infants ≥ 30 weeks, the model in Figure 3 was analyzed, evidencing that gestational age remains the principal risk factor, but height has no effect and here the hospitalization unit does increase the risk.

Table 1. Sex frequency of patients with retinopathy.

	Frequency	Percentage
Male	180	48.2%
Female	194	51.8%
Total	374	100%

Figure 1: Mixed binary risk model of gestational age, height, and the unit in which the child is born



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Figure 2: Mixed model of binary risk of preterm infants (<30 weeks) with height and the unit in which the child is born

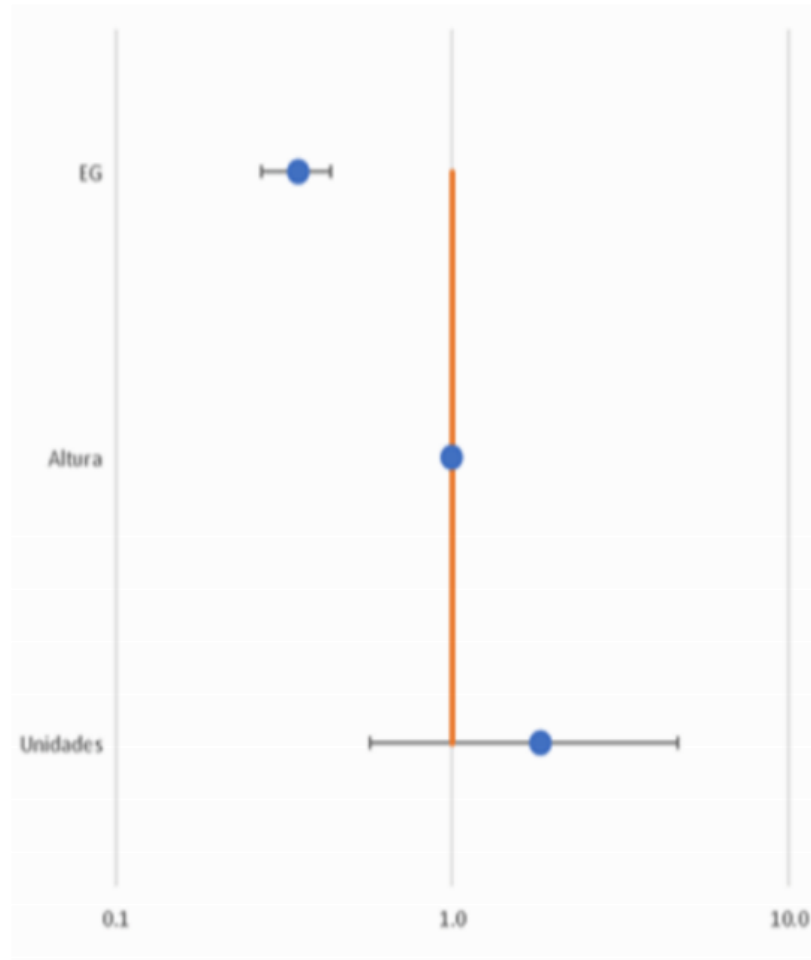
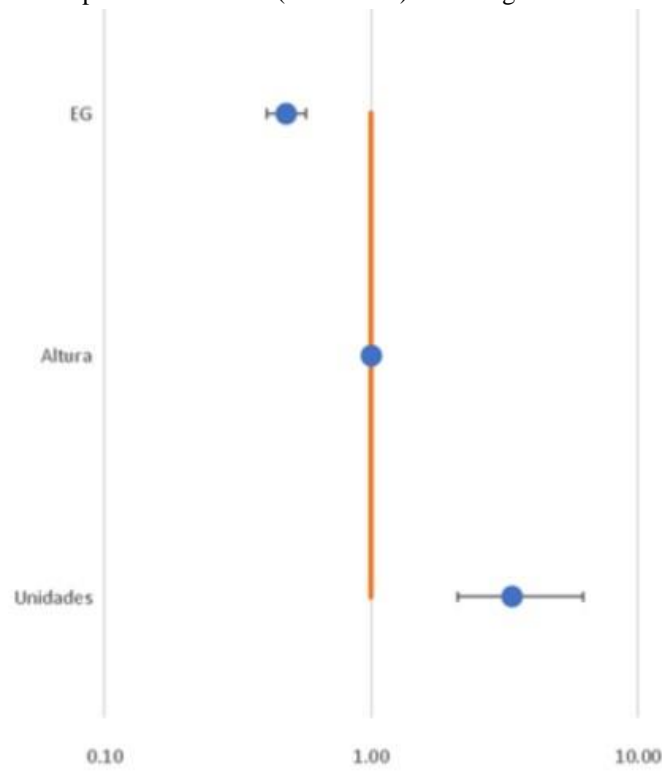


Figure 3: Mixed model of binary risk of premature infants (>30 weeks) with height and the unit in which the child is born



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Table 2. Frequency of age groups of premature infants with ROP

Frequency of age groups with ROP				
Gestational age	No	Yes	%	Total
< 25 weeks	6	11	3 %	17
25-26 weeks	62	66	18 %	128
27-28 weeks	287	131	35 %	418
29-30 weeks	481	73	20 %	554
31-32 weeks	617	56	15 %	673
33-34 weeks	742	30	8 %	772
35-36 weeks	376	7	2 %	383
Total	2571	374	14.5%	2945

ANALYSIS

We observe that gestational age still the major risk factor of retinopathy at all gestational ages. Height definitely has no effect by itself in any of the models, if gestational age is controlled. (Ten units increase the risk of ROP, independent of gestational age in infants ≥ 30 weeks). It is not possible with the data collected in the Epic Latino database to discover which part of the management in the units increases the risk of retinopathy in these premature infants. It is striking that 10% of ROP occur in patients older than 32 weeks at birth, different from published statistics.

CONCLUSIONS

It is concluded that gestational age continues to be the most important risk factor for the development of ROP, regardless of the height at which newborns are born. The hospital care unit will apply the necessary oxygen supplementation carried out at any height, but the management in the babies will may make a difference as a risk factor regardless of the height at which they are born. Finally, the results obtained with the presence of ROP in age groups older than 32 weeks would imply that in Latin America retinopathy should be screened in older children. However, the suggestion is maintained that all premature patients should be screened for ROP with fundus for timely management.

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