

Research Article

Retinopathy of prematurity - Intersibling divergence of risk factors among twins

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Introduction

Retinopathy of prematurity (ROP) is a consequence of an arrest in normal retinal neural and vascular development, which determines the aberrant retinal regeneration [1,2].

ROP is a disease process mostly reported in preterm neonates ranging from mild, transient changes in the retina with regression to severe progressive vasoproliferation, scarring, detachment of retina and blindness and it is common blinding disease in children and a major cause of vision loss among preterm infants [3]. Today it is well known that oxygen therapy is not the single causative factor, but many other risk factors play a causative role in the pathogenesis of ROP [4,5].

The risk factors for ROP include oxygen administration, hypoxia, hypercapnia, blood transfusion exchange transfusion, apnea, sepsis and total parenteral nutrition. The incidence of ROP has been reported to be similar in multiple and singleton births [6-8]. Twin studies show that from 70% to 80% of the susceptibility to ROP is conditioned by genetic factors [9,10].

Hence this study is to find out the incidence of ROP in twins in a tertiary care centre in a developing country. It also attempts to identify the difference in risk factors among twins which predispose to ROP in Neonatal Intensive Care Unit.

Materials and Methods

All preterm twin neonates born between December 2017 to March 2019 and all preterm twins admitted to NICU with birth weight < 2000 grams and/or gestational age < 34 weeks were evaluated for ROP screening and recruited into the study.

Method of collection of data

Study was initiated after obtaining approval from the Institutional Ethics Committee. All preterm twin neonates were screened following the UK screening guideline using Retinal fundus camera for ROP under routine screening and will be examined weekly or biweekly until retinal vasculature reaches zone 3 and established ROP regression. After full

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pharmacological dilation using cyclopentolate 0.5% fundus examination and staging were done according to revised International Classification of ROP- including the extent, zone and presence or absence of plus disease. Treatment is laser implemented when the disease progressed to stage 3 above and stage 2 with plus disease.

Inclusion criteria: All twins (Both Homozygous and Heterozygous) whose birth weight less than 2000 grams and/or gestational age less than 34 weeks admitted to NICU.

Exclusion criteria: Neonates with incomplete data and twins with birth weight more than 2000 grams and gestational age More than 34 weeks.

Antenatal risk factors

Maternal diseases: Preeclampsia, gestational diabetes mellitus, Use of antenatal steroids, preterm premature rupture of membranes, Lower Segment Caesarean Section.

Neonatal risk factors

Oxygen administration, hypoxia, hypercapnia, blood transfusion, exchange transfusion, apnea, sepsis, intraventricular hemorrhage and total parenteral nutrition.

Study design: Prospective study.

Study period: Study conducted from December 2017 to March 2019.

Statistical analysis

Data were analysed using Epidata. Estimates are calculated independently by pregnancy order (Twin 1 or Twin 2).

Results

Among 32 pairs with Gestational Age (GA) < 34 weeks 22 pairs had ROP (68%).

Table 1 showing, among 44 infants: Stage 1 ROP developed in 28 (64%) infants [16 infants (58%) were twin 1 and 12 infants (42%) were twin 2].

Stage 2 ROP developed in 15(34%) infants [6 infants (40%) were twin 1 and 9 infants (60%) were twin 2] and

Stage 3 ROP developed in 1 infant (2%) which twin 2.

There were 30 male (68%) and 14 female (32%) subjects. The mean GA was 30.4 weeks and the mean Birth Weight (BW) was 1145 grams.

Table 1: Different stages of ROP In twin 1 and twin 2.

Stage of ROP	Twin 1	Twin 2	Total
Stage 1	16	12	28
Stage 2	6 (2A-5 & 2P-1)	9	15
Stage 3	0	1	1
Total	22	22	44

Table 2 showing, among 22 pairs, Significant risk factors for ROP found in twin1 were Preterm 22 infants(100%), Low BW 15 infants (68%), Respiratory distress syndrome 6 infants (27%), Lower Segment Caesarean Section (LSCS) 5 infants (22%), Pregnancy Induced Hypertension (PIH) 5 infants (22%), Neonatal jaundice 4 infants (18%) and Intra ventricular haemorrhage 2 infants (1%).

Significant risk factors for ROP found in twin 2 were preterm 22 infants (100%), LBW 10 infants (45%), LSCS 5 infants (22%) and PIH 5 infants (22%).

Table 2: Different risk factors for ROP in twin 1 and twin 2.

Risk factor	Twin 1	Twin 2	Total
Preterm	22	22	44
Low birth weight	15	10	25
Caesarean section	5	5	10
Neonatal jaundice	4	-	4
Respiratory distress syndrome	6	-	6
Pregnancy induced hypertension	5	5	10
Intraventricular hemorrhage	2	--	2

Discussion

In a twin pair study by Azad, et al. [10], it was shown that there were no significant differences in both GA and BW ($p = 1.00$ for GA, $= 0.39$ for BW) among the twins with severe ROP (mean GA of 29.3 weeks and mean BW of 1239) compared to those with less severe ROP (mean GA of 29.3 and mean BW of 1297). In our study showed that GA is more significant risk factors for ROP compared to BW.

Blumenfeld, et al [1] study showed that there is no significant difference in stage of ROP between infants of single vs multiple gestation pregnancies. Frilling, et al. [8], showed there was no significant difference in the incidence of ROP between the twins and the singletons and second-born twin seemed at higher risk for developing ROP, but logistic regression showed that the lower birth weight of the second twin, Our study showed incidence of getting ROP in multiple pregnancies is quite significant and more advanced stages of ROP found in twin 2 compared to twin 1.

There were discrepancies in the susceptibility of postnatal risk factors for ROP between the twins despite exposure to similar postnatal conditions. Twin 1 was more likely to develop ROP when exposed to the following factors that were found to be independent ROP risk factors in Twin 1 but not Twin 2: presence of Respiratory distress syndrome, Neonatal jaundice, Intra ventricular haemorrhage.

Conclusion

The incidence of ROP among twins with GA < 34 weeks is 68%.

Among twin1, antenatal risk factors like preterm (100%), LBW (68%), LSCS (22%), PIH (22%) & post natal risk factors like Respiratory distress syndrome (27%), Neonatal jaundice (18%), Intra ventricular haemorrhage (1%) were significant for ROP.

Among twin 2, only antenatal risk factors like preterm (100%), LBW (45%), LSCS (22%), PIH (22%) were significant & postnatal risk factors not found.

Advanced stages were seen more in twin 2 but it is statistically not significant.

Conflict of interests

The authors declared no potential conflict of interests with respect to the research, authorship, and/or publication of this paper.

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