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Original Research Article

Assessment of Risk Factors for Retinopathy of Prematurity: A Prospective Study

Dr. Divya P.[1], Dr. Saraswathy E.[2], Dr. M. Sivasubramaniyam[3], Dr. Rohini A.[4*], Dr. Monica V.K.[5]

[1]Assistant Professor, Department of Ophthalmology, Government Kilpauk Medical College and Hospital, Chennai, Tamil Nadu, India.
[2]Assistant Professor, Department of Ophthalmology, Government Peripheral Hospital, Periyar Nagar, Chennai, Tamil Nadu, India.
[3]Assistant Professor, Department of Ophthalmology, Regional Institute of Ophthalmology & Government Ophthalmic Hospital, Egmore, Chennai, Tamil Nadu, India.
[4]Assistant Professor, Department of Ophthalmology, Government Kilpauk Medical College and Hospital, Chennai, Tamil Nadu, India.
[5]Junior Resident, Department of Ophthalmology, Government Kilpauk Medical College and Hospital, Chennai, Tamil Nadu, India.

Corresponding author:
Dr. Rohini A., Assistant professor, Department of Ophthalmology, Government Kilpauk medical college and hospital, Chennai, Tamil Nadu.

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ABSTRACT

Background
Retinopathy of prematurity (ROP) is a vasoproliferative vitreoretinopathy affecting the developing retina of premature infants. The incidence of ROP is 24 - 47% worldwide among preterm and high-risk neonates. ROP is a leading cause of preventable childhood blindness.
Aim: The aim of this study is to assess the prevalence of ROP and potential risk factors associated with the development of ROP.
Methods
A prospective screening was performed on 120 preterm and low birth weight neonates admitted in NICU in a tertiary care hospital. All neonates with birth weight of less than 2500 grams and gestational age of less than 37 weeks were included in the study. Neonates with lethal congenital anomalies were excluded from the study. Fundus examination was done from 2nd week of life using an indirect ophthalmoscope with +20D lens. Detailed neonatal and antenatal history were documented. All babies with ROP were identified and classified according to ICROP classification. Follow up were recommended based on retinal findings till the complete vascularization of retina or regression of ROP. Statistical analysis was performed using a statistical software package (SPSS

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for Windows, version 25). Univariate analysis of qualitative data was done using chi- square test. Results with p value < 0.05 were considered statistically significant with 95% confidence interval.

Results

In this study, a total of 120 neonates were screened, of which 26 babies were found to have ROP. The prevalence of ROP was found to be 21.7% and there was male preponderance in our study. Univariate analysis showed significant relationship between male gender, respiratory distress syndrome, oxygen therapy, neonatal sepsis, maternal hypertension and ROP. No significant association was observed with low gestational age, neonatal blood transfusion, antenatal corticosteroids, maternal diabetes and ROP.

Conclusion

Low birth weight, male gender, respiratory distress, oxygen therapy, neonatal sepsis and maternal hypertension are significant risk factors for development of ROP. Screening all preterm neonates with possible risk factors helps in identifying all cases of ROP.

Keywords: Retinopathy of prematurity, preterm babies, maternal hypertension, oxygen, respiratory distress, risk factors

INTRODUCTION

Retinopathy of prematurity (ROP) is a vasoproliferative vitreoretinopathy affecting the developing retina of premature infants[1]. The incidence of ROP is 24 - 47% worldwide among preterm and high risk neonates[2]. ROP is a leading cause of preventable childhood blindness and is a multifactorial disease. International Classification of Retinopathy of Prematurity (ICROP) classifies ROP into 3 zones, 5 stages and additionally as aggressive posterior ROP (AP-ROP)[3]. The aim of this study is to assess the prevalence of ROP and potential risk factors associated with the development of ROP.

MATERIALS AND METHODS

A prospective screening was performed on 120 preterm and low birth weight neonates admitted in NICU from January 2022 to August 2022 in a tertiary care hospital. All neonates with birth weight of less than 2500 grams and gestational age of less than 37 weeks were included in the study. Neonates with lethal congenital anomalies were excluded from the study. Retinal examination was done from 2nd week of life. Detailed neonatal and antenatal history were documented. Fundus examination was done under topical anesthesia using an indirect ophthalmoscope with +20D lens. All babies with ROP were identified and classified according to ICROP classification. Follow up were recommended based on retinal findings till the complete vascularization of retina or regression of ROP.

Statistical Analysis

The collected data was compiled in Microsoft excel and statistical analysis was performed using a statistical software package (SPSS for Windows, version 25). Results of the analyzed data are presented in the form of table, pie charts and bar diagram. Univariate analysis of qualitative data was done using chi- square test. Results with p value < 0.05 were considered statistically significant with 95% confidence interval.

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RESULTS

In this study, a total of 120 neonates were screened, of which 26 babies were found to have ROP. Among them, 20 were male (28.1%) and 6 were female (12.2%) babies (Figure 1). This signifies male preponderance. Of the total 240 eyes screened, 52 eyes were found to have ROP. This shows the prevalence of ROP was found to be 21.7%.

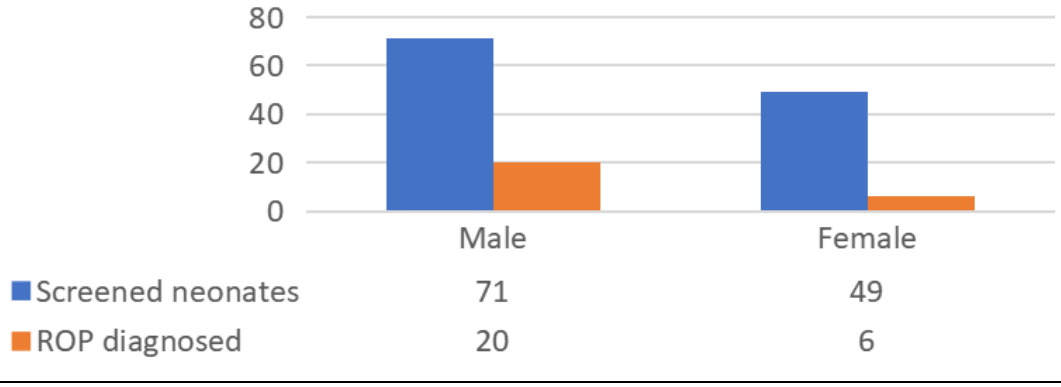

Figure 1. Gender distribution

Out of the 52 eyes with ROP, 26 eyes were in Stage 1, 14 eyes were in stage 2, 10 eyes in stage 3 and 2 eyes had aggressive posterior ROP (Figure 2). Gestational age ranged from 28-36 weeks. The birth weight ranged from 920-2440 grams. The mean birth weight was 1600 ± 342.09 grams among the screened neonates. Mean gestational age was 33 ± 1.42 weeks among the screened neonates. On follow up, 28 eyes with ROP regressed without any intervention and 24 eyes regressed after treatment with laser indirect ophthalmoscope.

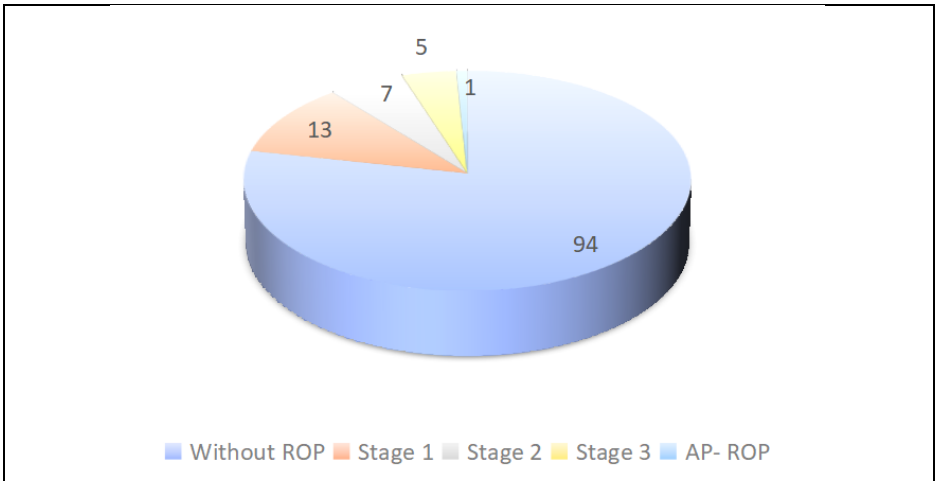

Figure 2: Distribution of ROP

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Univariate analysis showed significant relationship between male gender, respiratory distress syndrome (RDS), oxygen therapy, neonatal sepsis, maternal hypertension and ROP. No significant association was observed with low gestational age, neonatal blood transfusion, antenatal corticosteroids, maternal diabetes and ROP (Table 1).

Parameters		ROP N=26	No ROP N=94	Total N=120	X^2 value	P value
1. Gender	Male	20	51	71	4.332	**0.037***
	Female	6	43	49		
2. Gestational age	<33 weeks	15	38	53	2.462	0.117
	>33 weeks	11	56	67		
3. Birth weight	<1600g	19	37	56	9.302	**0.002***
	1600-2500g	7	57	64		
4. Respiratory distress syndrome	Present	24	46	70	15.76	**0.000***
	Absent	2	48	50		
5. Oxygen support	Given	26	55	81		
	Not given	0	39	39	15.981	**0.000***
6. Neonatal sepsis	Present	7	2	9	18.049	**0.000***
	Absent	19	92	111		
7. Neonatal blood transfusion	Present	0	6	6		
	Absent	26	88	114	1.747	0.186
8. Antenatal corticosteroids	Present	10	44	54		
	Absent	16	50	66	0.573	0.449
9. Maternal hypertension	Present	17	14	31	27.099	**0.000***
	Absent	9	80	89		
10. Maternal diabetes	Present	3	14	17	0.189	0.664
	Absent	23	80	103		

Table 1: Risk factors associated with ROP

X^2-chi square test, *-statistically significant

DISCUSSION

In this study, we screened 240 eyes of 120 neonates. Their gestational age ranged from 28 – 36 weeks and birth weight ranged from 920 -2440 grams. In India, the prevalence of ROP was reported between 19.2 – 31.2% in previous studies[2]. The prevalence of ROP in our study was 21.7%. Our study documented male preponderance and gender as significant risk factor (p value=0.037) which was comparable to Ying et al study[4]. Univariate analysis of the various risk factors showed statistically significant association of ROP with birth weight (p value=0.002), RDS (p value=0.000), oxygen with ventilator support (p value=0.000), neonatal sepsis (p value=0.000) and maternal hypertension (p value=0.000). These results are similar to the results of various studies[5-8]. The mean birth weight was 1600 ± 342.09 g among the screened neonates. Mean gestational age was 33 ± 1.42 weeks among the screened neonates. In this study, 12 eyes of 6 cases with ROP had gestational age > 34 weeks. Low gestational age was an important risk factor for ROP in many studies which was not present in our study[5,9]. This could be probably due to

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judicious use of oxygen and advanced NICU care at our hospital. Continuous use of supplemental oxygen was found to be a major cause of ROP. Akkoyun et al reported RDS as a significant risk factor of stage 1 and 2 ROP[10]. Similarly, our study also showed RDS and supplemental oxygen as significant risk factors of ROP (p value=0.000). According to Al Essa et al, the incidence of ROP with sepsis was 3.5 times more than neonates without sepsis[11]. This is consistent with the finding in our study where neonatal sepsis was found to be significantly related to ROP (p value=0.000). Maternal hypertension had a significant impact on occurrence of ROP (p value=0.000) similar to Shah et al study which reported that maternal pre-eclampsia was predictive of ROP[8]. Slidsborg et al reported neonatal blood transfusion as a risk factor for ROP, but it did not have significant association in our study[12]. According to Higgins et al, antenatal corticosteroids had protective effect against ROP development[13] but no such effect was found in our study.

LIMITATIONS

Although this study shows significant association of various risk factors with ROP, the sample size was relatively small.

CONCLUSION

Low birth weight, male gender, respiratory distress, oxygen therapy, neonatal sepsis and maternal hypertension are significant risk factors for development of ROP. Screening all preterm neonates with possible risk factors helps in identifying all cases of ROP. Adequate screening, diagnosis and timely treatment will help in the prevention of blindness due to ROP.

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