

Incidence of Retinopathy of Prematurity and its associated factors: A cross-sectional Study in a tertiary care hospital

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Abstract

Background: Retinopathy of Prematurity (ROP) is a vision-threatening condition affecting premature infants. Understanding its incidence and associated factors is essential for effective management. **Material and Methodology: Study Design:** This cross-sectional study was conducted in a tertiary care hospital. **Participants:** Preterm infants admitted to the neonatal intensive care unit (NICU). **Data Collection:** Demographic and clinical data, including gestational age, birth weight, oxygen therapy duration, and maternal factors, were collected. **ROP Assessment:** ROP was assessed by ophthalmologists following standard protocols. **Results:** The incidence of ROP was determined among preterm infants. Associations between gestational age and ROP were analyzed. The relationship between birth weight and ROP incidence was examined. The duration of oxygen therapy and its impact on ROP were investigated. Maternal factors such as prenatal care and maternal health were assessed for their influence on ROP. **Conclusion:** the incidence of Retinopathy of Prematurity (ROP) was 34.17%. Highly significant correlations were found between ROP and factors such as prematurity, low birth weight, supplemental oxygen, RDS, and maternal Dexamethasone use. However, numerous other potential ROP-related factors, including cyanosis, apnea, and maternal hypertension, did not exhibit significant correlations in our analysis.

Keywords: Retinopathy of Prematurity, Incidence, Preterm Infants.

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Introduction

Retinopathy of prematurity (ROP) is a complex disorder of the developing retinal vascular in the immature retina of prematurely born infants. It is a relatively harmless and spontaneously resolving disease. But in some of the affected infants; it unfortunately can lead to blindness despite the best medical care. It is a disease related to low birth weight, prematurity, oxygen administration, and other unidentified factors.

Retinopathy of prematurity (ROP), or retrolental fibroplasia as it was originally named, has had a most curious life span as a twentieth-century disease. The enigmatic findings of the disease, with scar tissue behind the neonate lens associated with retinal detachment, have been responsible for the two largest “epidemics” of blindness in neonates that occurred approximately 25 years apart in the mid-1950s and late 1970s¹.

The incidence of retinopathy of prematurity is on the wane in the West, thanks to the improvement in neonatal care and screening. In India, we are just beginning to face the storm mainly due to increased awareness. The most important determinant of any retinopathy of prematurity management program is an effective screening strategy. Screening aims to identify those infants who have reached or have the potential to reach threshold ROP, which if untreated may cause blindness or visual impairment.

Hence this study intends to ascertain the incidence, outcome and factors associated with ROP in all neonates born between 28-34 weeks of gestation admitted to NICU of Basaveshwar Teaching & General Hospital and Sangameshwar Teaching Hospital attached to M.R. Medical College, Gulbarga.

Objectives

1. To know the incidence of Retinopathy of Prematurity among the neonates.
2. To know the factors associated with Retinopathy of Prematurity among the neonates.

Methodology

Study Design: Observational Study

Study Setting and Population: This study was conducted at Basaveshwar Teaching and General Hospital, Gulbarga and Sangameshwar Hospital, Gulbarga attached to M.R. Medical College, Gulbarga. Neonates admitted to Basaveshwar Teaching and General Hospital, Gulbarga and Sangameshwar Hospital, Gulbarga were included in the study.

Inclusion and Exclusion Criteria: Neonates with a gestational age less than 36 weeks and or a birth weight of less than 2000 gms were included in the study. Neonates with gestational age more than 35 weeks were excluded from the study.

Study duration: The study was carried out from January 2011 to December 2011.

Data collection: Based on the inclusion criteria 120 neonates were screened in NICU for the presence of ROP. The anterior segment was first evaluated with torch light and pupillary reactions were noted. The neonates were examined without sedation. They were immobilized by wrapping them in sterile linen. The pupils were adequately dilated with tropicamide 0.5% instilled thrice every 5 minutes in both eyes followed by phenylephrine 2.5% twice in both eyes. Excess drops were wiped away each time. A sterile infant eye speculum was used during the examination. A complete fundus diagram was drawn, the risk factors were noted and the neonates were followed up as required. The findings were entered in a pre-designed pretested proforma.

Statistical analysis: Data was collected, compiled, and entered in Microsoft Excel software and analyzed using SPSS. All the categorical variables were presented as frequencies and percentages, and test of significance like the Chi-square test was used to assess the level of significance of variables and ' p ' < 0.05 was considered statistically significant

Results

Out of the 120 neonates screened, 63(52.5%) were males and 57(47.5%) were females. A total of 77 neonates developed ROP, among which 38(49.35%) were males and 39(50.64%) were females and ROP -ve cases are 43(35.8%). Out of the 52 neonates who fell in the 28-32 weeks GA group, 17(32.69%) had ROP and 35(67.3%) were negative for screening for ROP. The remaining 68 neonates were born in the GA of 32- 36 weeks. A total of 60(88.23%) were screened positive for ROP and the remaining 8(11.77%) were screened negative. The incidence of ROP with respect to the various birth weight groups is as follows: 751-1000 gm, 1; 1001-1250 gm, 3; 1251-1500 gm, 22; and in 1501-2000 gms, 51 birth weight group. In ROP +ve and ROP -ve cases Supplemental Oxygen was given to 29 and 28 neonates respectively. Exchange transfusion was given to 5 ROP +ve and 7 ROP -ve cases.

Respiratory Distress Syndrome RDS was found among 19 ROP +ve and 33 ROP -ve cases. Almost 68 mothers of neonates with ROP +ve and all 43 ROP-ve cases had not taken Injection Dexamethasone. Among ROP +ve cases Surfactant was given to 35 and not given to 42 neonates while in ROP -ve cases Surfactant was given to 9 and not given to 34 neonates. (Table 1)

Several other factors associated with ROP like apnoea, exchange transfusions, blood culture, phototherapy, RDS, inj dopamine and surfactant administration were considered in this study. None of the above factors showed any statistically significant correlation with the development of ROP.

Of the 42 neonates who were found to have ROP, 15 neonates were in stage 1 (35.7%), 21 in stage 2 (50%) and 3 in APROP (12.19%) of the disease. (Table 3) In the Final diagnosis distribution of cases, Among ROP +ve cases 77 neonates were resolved. Among ROP -ve cases 5 has got Regressed and 38 got resolved. (Table 4)

Table 1: Association Between Retinopathy of Prematurity and Neonates related Factors.(n=120)

Study variables		ROP +ve	ROP -ve	χ^2	P value
Gender	Male	38(60.3%)	25(39.7%)	0.814	0.07
	Female	39(68.4%)	18(31.6%)		
Gestation Age	28-32 weeks	17(32.7%)	35(67.3 %)	39.53	0.001
	32-36 weeks	60(77.9%)	8(18.6%)		
Birth Weight (in gms)	751-1000	1	5	15.1467	0.001
	1001-1250	3	13		
	1251-1500	22	16		
	1501-1750	23	5		
	1751-2000	28	4		

Table 2: Association Between Retinopathy of Prematurity and Treatment related Factors Among the Neonates. (n=120)

Study variables		ROP +ve	ROP -ve	χ^2	P value
Supplemental Oxygen	Oxygen given	29	28	8.34	0.001
	Oxygen not given	48	15		
Apnoea	Apnoea present	8	5	0.04	0.08
	Apnoea absent	69	38		
Exchange Transfusion	Exchange transfusion given	5	7	4.38	0.02
	Exchange transfusion not given	72	36		
Blood culture	Blood culture +ve	13	5	0.59	0.35
	Blood culture -ve	64	38		
Phototherapy	Phototherapy given	9	10	2.91	0.5
	Phototherapy not given	68	33		
RDS	Present	19	33	30.4	0.001
	Absent	58	10		
Injection Dexamethasone to	Injection dexa given	9	0	5.43	0.045
	Injection dexa not given	68	43		

Mother					
Surfactant	Surfactant Given	35	9	7.14	0.01
	Surfactant Not given	42	34		

Table 3: Incidence of ROP (n= 120)

Stage	Number of neonates with ROP	Incidence (%)
1	15	35.7
2	21	57.2
Stage 2 pre plus disease	1	
Stage 2 plus disease	2	
APROP	3	7.1
Total	42	100.0

Table 4: Final diagnosis-wise distribution of cases (n=120)

	Progressed	Regressed	Resolved	χ^2	P value
ROP +ve	0	0	77	9.34	0.01
ROP -ve	0	5	38		

Discussion

Of the 120 neonates screened, 63 were males (53.33%) and 57 were females (47.5%). Among the neonates who developed ROP, 38 were males (60.3%) and 39 were females (68.4%). No statistically significant correlation could be found.

Of the 42 neonates who were found to have ROP, 15 neonates were in stage 1 (35.7%), 21 in stage 2 (50%) and 3 in APROP (12.19%) of the disease. The total incidence of ROP in this study was found to be 34.17%. In studies conducted by Rekha S et al² and VA Shah et al³ the total incidence of ROP is 46% and 29.2% respectively.

The incidence of ROP showed a significant statistical correlation with prematurity on performing the chi-square test. Interestingly, out of the 52 neonates who fell in the 28-32 weeks GA group, 17(22.1%) had ROP while 60 out of the remaining 68 neonates (77.9%) who had ROP fell in the 32-36 weeks GA group. This showed that the percentage of neonates who had ROP was higher in the younger age group while the majority who did not have ROP was in the older age group. All the neonates with APROP disease were of 28 weeks GA showing a more severe form of disease in lower age groups.

One of the major ROP risk factors is birth weight. The lesser the birth weight, the greater the chances of developing ROP. Our study showed a statistically significant correlation between birth weight and ROP by Redit analysis.

According to our study, the incidence of ROP with respect to the various birth weight groups are as follows: 751-1000 gm,1; 1001-1250 gm, 3; 1251-1500 gm, 22; and in 1501- 2000 gms,51 birth weight group. This shows that there is a very high significant correlation between birth weight and ROP. This has been supported by the Multicenter Trial of Cryotherapy⁴ which showed that the lower the birth weight, the greater the risk of developing ROP, especially at birth weights less than 750 gms.

Oxygen and ROP: In our study, there is a very highly significant correlation between oxygen supplementation and ROP. This has been supported by studies done by Flynn et al⁵ and Chaudhari et al⁶.

RDS and ROP: In our study, there is a very highly significant correlation between RDS and ROP, the same has been supported by studies done by Ebrahim M et al⁷ and Alpay A et al⁸.

INJECTION DEXAMETHASONE TO MOTHER AND ROP: In our study, there exists a significant correlation between INJECTION DEXAMETHASONE TO MOTHER AND ROP, the same has been supported by Rosemary D. Higgins et al⁹ and Sobel DB et al¹⁰.

Out of 22 neonates in stage 2, 20 neonates resolved spontaneously. One of the neonates of stage 2 pre-plus disease also resolved spontaneously after frequent follow-ups. Two neonates of stage 2 plus disease after being followed they found to progress towards higher stages (increasing tortuosity and avascular retina). So, they have been treated with laser photocoagulation. Diode red (810-nanometer wavelength) laser is used at a strength of 250 milliwatts for 150 milliseconds and a number of shots given was 1900 for B/o Manjula (I.P.No.361120) and 1600 shots for B/o Nirmala (I.P.No.375578).

Three neonates of APROP were given laser photocoagulation as they have a high risk of going for stage 5. Here the number of shots given was 2700 (B/o Haleena bee, I.P No.350986), 3100 (B/o Supera begum, I.P.No.363883), 3400 (B/o Parvathi, I.P.No.367547). Here the strength of 250 milliwatts is used for 150 milliseconds.

These lasers photocoagulated babies are followed first after 2 weeks then at monthly intervals later every year to look for complications of ROP like refractive errors, amblyopia, glaucoma and retinal detachment which may develop later. As such none of the neonates has developed complications.

Conclusion

The incidence of ROP in our study was 34.17% for any stage. Factors like Prematurity, Low birth weight, Supplemental oxygen, RDS, and Dexamethasone to the mother showed a highly statistically significant correlation with the development of ROP. Several other factors associated with ROP like cyanosis, apnoea, exchange transfusions, septicemia, anemia, patent ductus arteriosus and other malformations, hyperbilirubinemia, phototherapy, dopamine administration, maternal risk factors like hypertension were also considered in this study. None of the above factors showed any statistically significant correlation with the development of ROP.

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