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Original Research Article

A Hospital Based Study on Prevalence of Retinopathy of Prematurity and its Associated Risk Factors in Preterms Born in GGH, GMC, Ongole

Pottella Chandra Mohan[1], Yallapragada Siva Rama Krishna[2], R Chandra Sekhara Rao[3], Maram Padmavathi[4], Elizabeth Bandrapalli[5], Gade vaishnavi[6]

[1]Associate Professor, Department of Paediatrics, Government Medical College, Ongole, Andhra Pradesh
[2]Associate Professor, Department of Pediatrics, Government Medical College, Ongole, Andhra Pradesh
[3]Assistant Professor, Department of Paediatrics, Government Medical College, Ongole, Andhra Pradesh
[4]Assistant Professor, Department of Paediatrics, Government Medical College, Ongole, Andhra Pradesh
[5]Professor & HOD, Department of Paediatrics, Government Medical College, Ongole, Andhra Pradesh
[6]Senior Resident, Department of Paediatrics, Government Medical College, Ongole, Andhra Pradesh

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Corresponding Author: Dr. Maram Padmavathi
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Abstract:
Background: Approximately 10% of preterm births occur globally (before the 37th week of pregnancy). Research on ROP occurrence in populations is a difficult task due of the wide variation in research design, gestational age, and survival rates among those who participate in these studies. Therefore, our goal was to study the prevalence of retinopathy of prematurity & associated risk factors.
Objectives: To determine the prevalence of retinopathy of prematurity in preterm babies in Neonatal intensive care unit and to understand the link between ROP development and risk variables.
Methodology: preterm less than 35 weeks newborns delivered between April 2023 to March 2024 were included in the study. Preterm newborns who need cardiorespiratory assistance, extended oxygen treatment, apnea of prematurity, anaemia necessitating blood transfusions, and neonatal infection might be considered high-risk.
Results: Out of 100 patients, 58 were males and 42 were females. The prevalence of ROP in this research was found to be 27%.Stage 1 ROP was found in 8% of patients, stage 2 ROP was found in 19% of cases, and stage 3 ROP was found in 73% of cases. In the present study, risk factors for ROP are low APGAR score, HIE stage, capillary refilling time, NBS score, RDS, neonatal hyperbilirubinemia, and ionotrope usage.
Keywords: preterm, retinopathy of prmaturity , APGAR score, inotrope

Introduction

Approximately 10% of preterm births occur globally (before the 37th week of pregnancy)[1]. As a result of improvement in survival rates among extremely immature newborns even in locations where oxygen supply is tightly regulated and newborn care is more rigorous, the prevalence of ROP is higher than it would otherwise be[2,3]. ROP is a vasoproliferative disorder affecting premature infants. It is one of the most common cause of visual loss in children and can lead to lifelong vision impairment and blindness. The abnormal development of arteries in the developing retina caused by oxygen therapy has been linked to retinal detachment, macular folds, and other persistent retinal damage[4-6]. early detection by screening has improved visual results for individuals who have had early treatment with cryotherapy, laser photocoagulation, and anti-vascular endothelial growth factor (VEGF) therapy[7]. To prevent ROP, a multidisciplinary strategy must begin before the baby is born and continue throughout childhood. A total of 184,700 newborns and 14.9 million preterm infants globally were diagnosed with ROP in 2010[3]. It was estimated that 20,000 people were blinded or severely visually impaired, while another 12,000 had mild to moderate vision impairment .68 percent of newborns weighing less than 1251g had ROP at any stage.

Birth weight and gestational age (GA) are two of the greatest recognised risk factors for ROP (BW). A large study of over 4000 infants with birthweight ≤1251g found that for each 100g rise in BW, odds of developing limit ROP decreased by 27%, and for each extra week in GA, the odds of working to develop limit ROP decreased by 19%. Risk of ROP increases per 12 hours of transcutaneous $PO2 \geq 80mmHg$ use[8].Severe ROP is associated with long-term use of oxygen treatment[9]. Pregnancy hypertension problems, gestational diabetes, medication usage, advanced age, smoking, assisted conception, delivery outside of a research institution, and numerous births are all possible risk factors[8].

Materials and Methods

The study was carried out in a teaching hospital that provides tertiary care after receiving approval from the institutional ethics committee. This is a retrospective hospital based study. All the patients participated in the study with their free will and after informed written consent. The study comprised 100 preterm newborns in total. with a birth weight between 1500 and 2000 grammes and risk factors. Data was gathered using a data collection instrument, the medical records of a hospital a dilated fundus exam done at 4 weeks postnatal age or a corrected gestational age of 30 to 31 weeks., the International Classification of Retinopathy of Prematurity (ICRP) used for classifying the severity of disease.

Statistical Analysis: The data acquired was entered into Microsoft MS Excel sheet and analyzed using independent sample t test for quantitative variables and paired t test for paired data in SPSS software version 16. P value less than 0.05 was considered significance level and all the values measured below it was considered as statistically significant.

Results

In the present study the incidence of ROP was observed to be 27%.

In the present study stage 1 ROP was seen in 8% of the cases, stage 2 ROP was seen in 19% of the cases and it was normal in 73% of the cases.

Table 1: Incidence of ROP

	Frequency	Percentage
Present	27	27%
Absent	73	73%
Total	100	100%

Table 2: Stage of ROP

	Frequency	Percentage
Stage 1	8	8%
Stage 2	19	19%
Normal	73	73%
Total	100	100%

Table 3: Gender distribution and ROP

	Present	Absent	Total
Male	15 (55.6%)	43 (58.9%)	58
Female	12 (44.4%)	30 (41.1%)	42
Total	27 (100%)	73 (100%)	100

Table 4: Risk factors associated with ROP

Risk factor	Odds Ratio	95% CI	P value
Birth weight	1.48	0.55 – 3.99	0.43
Birth order	0.88	0.22 – 3.56	0.16
Weight at discharge	2.07	0.80 – 5.32	0.13
Gestation age in weeks	1.44	0.47 – 4.35	0.51
APGAR at 1st min	8.75	2.95 – 25.90	0.0001*
APGAR at 5th min	17.75	3.52 – 89.43	0.0001*
Resuscitation	3.37	1.29 – 8.77	0.01*
HIE stage	3.55	1.22 – 10.27	0.01*
Capillary refilling time	6.03	1.60 – 22.72	0.007*
Hypothermia	2.15	0.44 – 10.33	0.33
NBS score	71	14.09 – 357.48	0.0001*
RDS	6.58	2.50 – 17.32	0.0001*
Neonatal Hyperbilirubinemia	13.72	3.40 – 55.37	0.0001*
Inotropes	4.71	1.54 – 14.40	0.001*
Anemia	1.45	0.48 – 4.35	0.50
Bacterial sepsis	1.24	0.44 – 3.47	0.67
GRBS	1.41	0.38 – 5.13	0.59
Creatinine	2.91	0.55 – 15.43	0.20

In the present study, out of many risk factors, the factors that are found to have a significant association with ROP are APGAR score, resuscitation, HIE stage, capillary refilling time, NBS score, RDS, neonatal hyperbilirubinemia, and ionotrope usage.

Discussion

In the present study, the prevalence of ROP in this research was found to be 27%. Stage 1 ROP was found in 8% of patients, stage 2 ROP was found in 19% of cases, and stage 3 ROP was found in 73% of cases. Zone 2 ROP was observing din 16% of the cases and zone 3 ROP was observed in 11% of the cases. Normal findings were seen in 73% if the cases. A highly significant association was seen between respiratory distress syndrome and occurrence of ROP. Here it was observed that the chances of occurrence of ROP was more in cases with respiratory distress). Despite advancements in neonatal care, it is still a major cause of childhood blindness and a severe complication in premature infants. Compared to earlier studies, the incidence of ROP was lower in this study: 19.2 percent, compared to 24 percent in India,[9] 29.2 percent in Singapore,[8] and 32.4 percent in Pakistan. It's possible that this is because all of these studies were conducted on infants that were born at a low birth weight. But it is higher than the incidence of 10% reported in a research from Beijing, which included infants of higher gestational age and birth weight (up to 2 kg and/or 34 weeks gestational age)[11-13].

we found low gestational age to be the most significant factor. Shah et al.[14]'s findings were in line with this conclusion. Both Karna et al.[15] and Fortes et al[16]. A number of prenatal variables, such as hyper- and hypoxia, blood transfusions, and sepsis, have been involved in the retina's heightened vulnerability to oxidative damage and other forms of damage caused by an immature vascularization in agreement with the findings of Arroe and Peitersen90, we discovered that birth weight had no effect on the development of ROP.

Sepsis was revealed to be a significant risk factor for the development of ROP in this investigation. which is in agreement with Shah et al[14] and Vinekar et al[17]. The results of Chaudhari et al. [18] and Smith[19], on the other hand, were at variance with this finding, we found that oxygen therapy is a risk factor in the development of ROP. Palmer et al.[20] showed that oxygen therapy was a nonsignificant determinant for occurrence of ROP.

In contrast to Darlow et al.[21], who concluded that male sex was a substantial risk factor, our study found no correlation between sex and ROP.

According to Chaudhari et al[22]. ROP was linked to the development of the PDA, hypotension, and intraventricular haemorrhage, Phototherapy did not have a substantial impact on ROP.

It was also shown to be insignificant in our investigation, which matched results from Dutta et al.[23] As Murthy et al. discovered, mechanical ventilation and continuous positive airway pressure (CPAP) were not major risk factors for ROP.

Limitations of the study: The minimal number of patients is a limitation of this research.

Conclusion

ROP was found in 19.2% of the patients studied in this research, and the findings from this investigation show that low gestational age, sepsis and oxygen treatment are independent risk factors for ROP. Advanced ROP may be prevented by doing timely retinal screenings on high-risk preterm newborns.

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