Section: Ophthalmology

Original Research Article

EVALUATE THE INCIDENCE, RISK FACTORS AND SEVERITY OF RETINOPATHY OF PREMATURITY IN A TERTIARY CARE CENTER

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Abstract

Background: To evaluate the prevalence, risk factors and treatment of retinopathy of prematurity (ROP) and to understand which babies are severely affected with rop. **Aims:** The present study was conducted to evaluate the incidence, risk factors, and severity of ROP in infants. **Materials and Methods:** A Tertiary Hospital based retrospective quantitative and qualitative case study conducted at the Department of Ophthalmology. Gestational age less than 34 weeks, between 34 to 37 weeks associated with risk factors and birth weight less than 2000 gms are included. **Results:** In 605 preterm infants data was analysed and 318 (52.5%) males and 287 (47.5%)females. The mean birth weight was 1528 +/- 343grams.The mean gestation age at birth was 32.6 +/- 4.7weeks. 393(64.9%)babies did not develop any ROP, 168(27.7%)babies developed non severe ROP, 44(7.2%)babies developed severe ROP requiring treatment. Severe ROP is seen among the infants, whose gestation age at birth is ranging from <30 to >34 weeks, with mean gestation age of <30weeks with 3.4%. Severe ROP is seen among preterm infants with birth weight ranging from <999 grams to> 1500 grams, with mean birth weight of 1000-1499grams with 4.9%. **Conclusion:** Monitoring standards of neonatal care and conducting quality improvement projects across the country are recommended to improve neonatal outcomes.

INTRODUCTION

Retinopathy of Prematurity (ROP) is a vasoproliferative retinal disorder of low birth weight premature infants. It can be mild with no visual defects, or it may become aggressive with new vessel formation (neo-vascularisation) and progress to retinal detachment and blindness. Retinopathy of prematurity is the leading cause of childhood vision loss worldwide. Approximately 32,300 infants worldwide are diagnosed with irreversible vision impairment due to retinopathy of prematurity annually, of which 20,000 become blind due to visually impairment. WHO vision 2020 program identified retinopathy of prematurity as an important cause of blindness in both high and middle income countries.4 The stimulus for the abnormal growth of blood vessels comes from the peripheral immature retina. Nearly one third to half of neonates undergoing screening may show some degree of ROP which fortunately regresses on its own in the majority of affected infants, in a few it progresses to the stage of retinal detachment and blindness.[1,2,3]

Timely screening and treatment of ROP can prevent blindness and minimise visual handicaps. Undiagnosed or treatment delayed ROP can lead to permanent blindness thus, it is important that all infants at risk be screened in a timely fashion, recognising that not all infants require treatment. Studies have shown that SGA may contribute to the above long list of risk factors.[4,5] The present study was conducted to evaluate the incidence, risk factors, and severity of ROP in infants.

MATERIALS AND METHODS

A Tertiary Hospital based retrospective quantitative and qualitative case study conducted at the Department of Ophthalmology, Niloufer Children's Hospital, Lakdikapool, Hyderabad with NICU set-up during the period of September 2022 to January 2023.

Inclusion Criteria

Gestational age less than 34 weeks, between 34 to 37 weeks associated with risk factors and birth weight less than 2000 gms

Exclusion Criteria

Gestational age more than 34 weeks more than 35 weeks without any risk factors and birth weight above 2000 gms

Study Procedure

A total of 605 preterm neonates meeting the screening criterion during the study period were

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included. The screening was performed by an ophthalmologist and a retina specialist in the neonatal intensive care unit (NICU). The first screening was conducted between the 20th and 30th days of life. Pupils were dilated with 0.4% tropicamide, and 2.5% phenylephrine eye drops instilled twice at an interval of 10 minutes. A third drop was instilled if the pupil was not sufficiently dilated. e retinal screening was performed using an indirect ophthalmoscope with a 20D lens under topical anesthesia and monitoring vital signs. A pediatric speculum with scleral depression was used to examine the retina. The screening was carried out until:

- Complete retinal vascularization;
- Regression of ROP was noted with complete retinal vascularization, or
- Zone III retinal vascularization was attained without previous zone I or II ROP.

Systemic risk factors and ocular findings were documented. Retinopathy of prematurity was classified according to the International Classification of ROP (ICROP). All the preterm neonates included in the study were further subdivided into two categories — appropriate for gestational age (AGA) and small for gestational age (SGA) using Fenton's Criteria [6]. Weight, head circumference, and length of the neonate were marked on specific separate charts for girls and boys. All babies diagnosed with type 1 ROP were treated as per early treatment of ROP protocol (ETROP), while those with aggressive posterior ROP (APROP) were treated with intravitreal anti-VEGF agents after taking informed consent.

Statistical Analysis

Collected data was compiled in an MS Excel sheet. e collected data were analyzed with statistical packages for social science v.20 (SPSS). Quantitative data are represented in the form of mean and standard deviation. Odds ratio, univariate analysis, and chisquare test were applied to assess the significant association between risk factors and ROP development. Multivariate analysis was applied to check significant risk factors development of ROP. P-value was checked at a 5% level of significance.

RESULTS

According to inclusion criteria, 605 preterm infants data was analysed. There were 318 (52.5%) males and 287 (47.5%)females. The mean birth weight was 1528 +/- 343grams.The mean gestation age at birth was 32.6 +/- 4.7weeks.

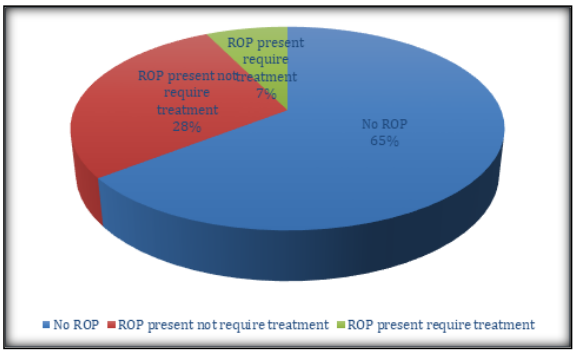

Figure-1: Showing incidence of ROP

Out of 605 babies 393(64.9%)babies did not develop any rop, 168(27.7%)babies developed non severe rop, 44(7.2%)babies developed severe rop requiring treatment.

According to our study severe ROP is seen among the infants, whose gestation age at birth is ranging from <30 to >34 weeks, with mean gestation age of <30weeks with 3.4% [Table 1].

According to our study severe ROP is seen among preterm infants with birth weight ranging from <999 grams to> 1500 grams, with mean birth weight of 1000-1499grams with 4.9% [Table 2].

Table 1: Incidence of ROP according to gestation age at birth

BW [g]	No ROP	ROP present not require treatment	ROP present require treatment
Gestational age at birth			
<30 week	97(16%)	63(10.4%)	21(3.4%)
30-32 weeks	52(8.5%)	70(11.5%)	18(2.9%)
32-34	100(16.5%)	25(4.1%)	3(0.5%)
>34	0	13(2.1%)	2(0.3%)
total	390(64.5%)	171(28.2%)	44(7.2%)

Table 2: Incidence of ROP according to birth weight

Birth weight	No ROP	ROP present not require treatment	ROP present require treatment
<999 grms	23(3.8%)	22(3.6%)	7(1.1%)
1000-1499 grms	107(17.7%)	117(19.3%)	29(4.9%)
>1500 grms	260(42.9%)	32(5.2%)	8(1.3%)
total	390(64.5%)	171(28.2%)	44(7.2%)

DISCUSSION

ROP is a serious morbidity of prematurity, whose incidence and severity increase with decreasing GA and BW. Studies conducted in high-income countries have shown that infants born at ≥32 weeks are not at risk for developing ROP and most infants born at >28 weeks who develop ROP have a mild disease that spontaneously regressed without treatment. The findings of the TR-ROP study were comparable to

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those from other developing countries and showed that more mature and heavier babies were at risk for severe ROP.[7,8]

There was no correlation between gender and appearance of ROP changes, which is consistent with the CRYO-ROP study and New York cohort study, but contradictory to other studies that found males to be more prone to ROP changes. Also, there was a significant correlation between appearance of ROP changes more than stage 0 and RDS stage, consistent with previous reports. Exposure to mechanical ventilation, CPAP especially for long durations, was associated with increased incidence of ROP changes more than grade 0 in this study. Similar results were reported by other studies.[9,10,11]

In our study Out of 605 babies 212(34.9%) babies developed ROP. Out of these 44(7.2%)babies developed severe ROP requiring treatment. In the US, between 2000 and 2012, it was reportedly 16.4% among premature infants with a length of stay (LOS) in the hospital longer than 28 days.[13] In Taiwan, between 2002 and 2011, a 36.6% incidence of ROP was reported among premature infants using the same definition.[14] In South Korea, there were 2 nationwide studies: one reported an incidence of 29.8% among infants with a GA<37 weeks between 2007 and 2018,[15] while the other reported an incidence of 31.7% among premature infants with a BW<1,500 g between 2006 and 2014,[16] Uday Tekchandani, et al,[17] done which was done in year period between 2013 and 2017 in a single tertiary care institute in North India. We report an overall incidence of ROP of 32.3% among all "at risk" infants screened (ranging between 28 and 39% across the years, with severe ROP seen among 17.7% infants. In Taiwan, studies report an incidence of ROP of 37.8%, which is slightly higher than our study. Most of the studies from India are of short duration,[18,19,20] and report incidences of ROP, which are higher than the western world. Limited information is available on trends over time. Kumar et al.[18] report an incidence of 11.9% across 5 years, but they had a limited cohort of infants who were only inborn.

In our study severe ROP is seen among the infants, whose gestation age at birth is ranging from <30 to >34 weeks, with mean gestation age of <30weeks with 3.4%. The Indian guidelines for screening of ROP released in 2010 advocated screening of heavier babies with an older period of gestation as compared to the guidelines of the United States (>1500 g BW and >30 weeks GA),[19] and the United Kingdom (>1500 g BW and >32 weeks GA).[20] In the present study, up to 31% babies with ROP would have likely been missed if western guidelines were used for screening in India.

According to our study severe ROP is seen among preterm infants with birth weight with mean birth weight of 1000-1499grams with 4.9%. A recent change in the Indian guidelines,[21] warrants the screening of all infants with a BW of less than 2000 g and a GA of less than 34 weeks to be done within the first 4 weeks of birth, with an earlier screening of more premature (<28 weeks) or lighter babies (<1200 g) which is to be done within the first 2–3 weeks of life. We report a higher percentage of APROP as compared to staged ROP in comparison to previously reported literature. Majority of disease was in Zone II, which was comparable to other Indian literature. There was a relationship between poor postnatal weight gain and an increased risk for ROP.16 Poor postnatal weight gain was also found as an independent risk factor for severe ROP in infants with a BW≤1500 g in our study. Using univariate analyses, several risk factors including RDS, respiratory support, sepsis, NEC, PDA, intracranial haemorrhage and BPD were significantly associated with severe ROP in VLBW infants in our cohort. These perinatal morbidities may have decreased postnatal weight gains.

CONCLUSION

In our study, the incidence of severe rop requiring treatment was found to be 7.2 % Mostly seen among babies with mean gestation age at birth <30 weeks and with mean birth weight 1000-1499 grams.

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