DOI: https://doi.org/10.53350/pjmhs22162340

ORIGINAL ARTICLE

Frequency of Retinopathy in Premature Infants in a Tertiary Care Hospital

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ABSTRACT

Background: Retinopathy of prematurity is one of the important problems faced by neonates causing lifelong morbidity. It can be prevented by early detection and prompt treatment.

Objective: To determine the frequency of retinopathy in premature infants in a Tertiary Care Hospital.

Methodology: A three-centered cross-sectional study was conducted in tertiary care hospitals of Lahore. All neonates after taking informed consent form guardians were enrolled in the study according to selection criteria. All cases were screened for retinopathy of prematurity at four weeks of age for the first time and later followed up at 4 to 6 weeks interval according to disease stage on slit lamp by consultant ophthalmologist. The premature infants were diagnosed as retinopathy of prematurity based on the operational definition.

Results: The mean age was 15.80±5.57 hours, mean gestational age of positive cases was 30.46±1.40 weeks and mean birth weight of positive cases was 1528.2.36±201.47 g. There were 15 (14%) cases who had retinopathy of prematurity while 96 (86%) cases had normal eyes. Among them 11 (73%) cases were of stage 1, 3 (20%) cases of stage 3 and 1(7%) case of stage 4 retinopathy of prematurity.

Conclusions: In our study, retinopathy is observed in 14% of the premature infants.

Keywords: Preterm birth, Gestational age, Complication, Retinopathy of prematurity

INTRODUCTION

Retinopathy is one of the problems which premature infants come across during their treatment in nursery.[1] Retinopathy of prematurity (ROP) is caused by abnormal vascular growth in the retina and can cause blurring of vision and blindness in premature infants.[2] It can be prevented when diagnosed earlier. In Pakistan, unfortunately retinopathy cannot be picked up in most of the neonatal units due to lack of screening facilities.[3]

Much research has been performed on ROP during the last few years. Prolonged use of oxygen in premature babies, especially born with very low gestational age was found to be one of the important risk factor causing ROP. However, many other factors are also involved in this disease process like, apnea, infections, blood transfusions, exposure to light, anaemia and prolonged use of mechanical ventilators.[4] Scientist are now trying to identify potential factors causing retinopathy of prematurity, so that those premature can be prevented earlier and timely intervention can be initiated to save them.[1]

A local study was done on 86 babies and incidence of ROP was 10.5% during their first checkup.[5] Another study reported the incidence 0f ROP as 40.3%.[6] This variation in incidence of ROP may be due to inclusion of the cases on basis of gestational age and birth weight. The current study is designed with larger sample size (n=145) and variable birth weight preterm babies. This study is done to determine exact burden as ROP is becoming a significant problem in developing countries. On finding higher frequency of ROP, NICU can be redesigned as per requirement so that steps can be taken for its early detection and appropriate treatment should be applied to reduce the risk of permanent blindness.

MATERIALS AND METHODS

The study was conducted in the NICU Department of Pediatrics, Jinnah Hospital, Shaikh Zayed Hospital and Services Hospital, Lahore from 1st January to 1st June 2021 and 111 neonates were enrolled. We took preterm neonates admitted to NICU within 48 hours of birth with birth weight <2.5 kg. Preterm with congenital malformation (on birth record), having congenital cataracts (diagnosed on slit lamp), who were on prolonged oxygen therapy (more than 48 hours) and with missed birth record were excluded. All neonates after taking informed consent form parents or attendants were enrolled in this study. Basic information like contact details, gender, age (hours), gestational age and birth weight was taken from medical record. All neonates were screened for ROP on slit lamp by consultant ophthalmologists. 0.5% topical trocamide and 0.5% phenylephrine eye drops were used to dilate the pupils. We used binocular indirect ophthalmoscope, lid speculum and sclera depressors for eye examination. The premature infants were diagnosed as ROP and all necessary data was recorded.

Data was evaluated by using SPSS-22. To address effect modifiers, data was stratified for gestational age, birth weight and gender. Chi-square test after stratification was applied. P-value of less than 0.05 was taken as statistically significant.

RESULTS

Thirty seven (41.07%) cases were 1-12 hours of age, and 74 (82.14%) cases were 13-24 hours of age. There were 68 male and 43 female babies. The mean gestational age was 32.36±2.28 weeks. The average birth weight was 1820.88±353.86 g. There were 27 (24%) cases who had 1000-1500 (g) weight and 84(76%) cases had 1501-2495 g of weight. The mean gestational age of 15 positive cases from 111 was 30.466±1.407 weeks.

Table 1: Distribution of postnatal age (hours), gender, gestational age (weeks) and birth weight (g) [n=111]

Variable	No.	%
Age (hours)		
1-12	37	41.07
13-24	74	82.14
Gender		
Male	68	61.3
Female	43	37.8
Gestational age (weeks)	32±2.3	
Birth weight (g)		
1000-1500	27	24.0
1501-2495	84	76.0

Table -2: Comparison of frequency of Retinopathy of prematurity by gender

Gender	ROP		χ^2 value	P value
	Yes	No		
Male	7 (6%)	61 (55%)	1.557	0.212
Female	8 (7%)	35 (32%)		

The mean birth weight in 15 positive cases was 1528.2± 201.479 gram. Nine (60%) cases who developed ROP were of 28 to 30

weeks gestational age at birth and 6(40%) positive cases belonged to 31 to 33 weeks gestational age at birth. In positive cases, birth weight between 1263 to 1500 (g) of 9(60%) cases and other 6(40%) having birth weight in the range of 1501 to 1969 (g) consisting of 8 females and 7 males with maximum birth weight of 1969g and minimum was 1263g. Average of weight was estimated as 1528.2g (Table 1). There were 15 (14%) cases who had retinopathy of prematurity while 96 (86%) cases had normal eyes (Fig. 1). Among 15 positive cases that had retinopathy of prematurity, 11 (73%) cases were of stage 1 disease, 3 (20%) cases were of stage 3 level and 1(7%) case was of stage 4 (Fig, 2). From 15 positive cases for ROP 12 cases were on Nasal CPAP and 3 were on mechanical ventilation who later shifted to nasal CPAP (Fig. 3). When the retinopathy of prematurity was compared with gender and age, the results was found no significant (P>0.05) and noted significant (P<0.05) in birth weight (Tables 2-4).

Table 3: Comparison of frequency of retinopathy of prematurity by age (hours)

Age (hours)	ROP		χ^2 value	P value
	Yes	No		
1-12	6 (5%)	31(28%)	0.347	0.558
13-24	9 (8%)	65(59%)		

Table 4: Comparison of frequency of Retinopathy of prematurity by birth weight (g)

Birth weight (g)	ROP		χ^2 value	P value
	Yes	No		
1000-1500	9 (8%)	19(16%)	11.992	0.001
1501-2495	6 (6%)	78(70%)		

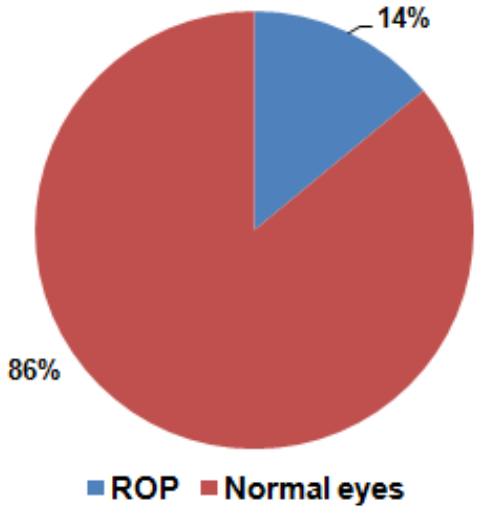

Fig-1: Distribution of retinopathy of prematurity (n=111)

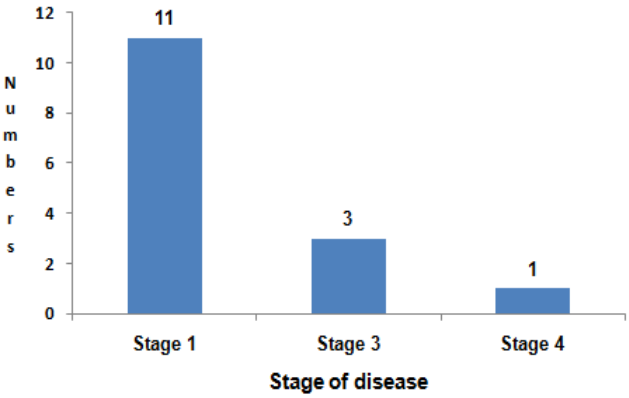

Fig-2: Distribution of ROP of positive case (n=15)

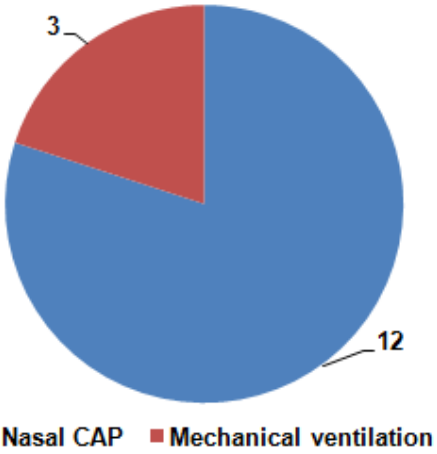

Fig. 3: Role of CPAP Versus mechanical ventilation in ROP of positive cases

DISCUSSION

Retinopathy of prematurity (ROP) is a blinding disease that affects premature babies who received excessive oxygen in intensive care units. It can be mild and may go unnoticed or can be severe enough to cause abnormal vascularization of retinal tissues leading to scarring and later retinal detachment. This disease has more often been seen in the recent years when babies weighing less than 1500 grams were saved due to improved neonatal care. This ROP can be prevented by strict control of hypoxia and oxygen delivery in the nursery.[7]

Around the world, 10% babies are born premature, out of which 32,000 preterm babies develop ROP.[8,9] Prolonged use of oxygen in premature babies, especially born with very low gestational age was found to be one of the important risk factors causing ROP. However, many other factors are also involved in this disease process like, apnea, infections, intraventricular haemorrhage, blood transfusions, pulmonary haemorrhage, anemia, and prolonged use of mechanical ventilators.[4]

In our study, there were 15(14%) cases that had retinopathy of prematurity while 96(86%) cases had normal eyes. A study held in UK reported the incidence of ROP as 40.3%.[6] This frequency was higher than found in our study because of increase rate of preterm survival there with better compliance to follow ups advised for eye examination. A recent retrospective cohort study estimated the incidence of ROP and evaluated potential risk factors. Results showed that a total of 602 newborns were evaluated after applying the selection criteria. Mean gestational age was 30.7± 2.5 weeks. The incidences of ROP at any stage was 33.9%.[10]

A similar local study was performed in Karachi. The study included preterm neonates having birth weight ≤1.5 Kg and gestational age of ≤32 weeks. Premature neonates born with major congenital malformations, chromosomal anomalies, congenital cataracts, or tumors of the eyes were not included. Out of 86 babies who were enrolled in the study, ROP was identified in 9 (10.5%) neonates at the first eye examination. ROP was significantly associated with birth weight (p-value 0.031), gestational age (p-value 0.033) and chronological age (p<0.001).[11]

Another retrospective study was done in 2015 in China, to determine the incidence and risk factors of retinopathy of prematurity (ROP) in extremely low birth weight (ELBW)neonates. A lighter BW and smaller GA were independent risk factors for ROP.[12]

In 2012, another Retrospective, longitudinal study was done to analyze incidence and severity of retinopathy of prematurity (ROP) among extremely premature infants. The result has indicated that overall incidence of any ROP was 64.7%; 88% of infant's in-group 1 had any ROP compared to 48% infant's in-group 2. The overall incidence of type 1 ROP was 11.6%; in-group 1 it was 24.4%, compared to 2.5% in group 2.[13]

CONCLUSION

Through the findings of this study, it is concluded that frequency of retinopathy of prematurity is 14% in preterm infants. Hence, we must design guidelines for early detection and appropriate management to reduce the risk of morbidity associated with this problem.

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