

Research Article

Prevalence of retinopathy in low birth weight infants presenting at tertiary care hospital

**Ume Amara Saeed, Umair Khan
and Iqra Sajid**

¹House Officer, Bahawal Victoria Hospital, Bahawalpur

²House Officer, Bahawal Victoria Hospital, Bahawalpur

³House Officer, Bahawal Victoria Hospital, Bahawalpur

ABSTRACT

Objective: To study the prevalence of retinopathy in low birth weight infants presenting at tertiary care hospital.

Material and methods: This cross sectional study was conducted at Department of Pediatrics, Bahawal Victoria Hospital, Bahawalpur from October 2017 to April 2018 over the period of 6 months. Total 60 infants having birth weight 800 gram to 2500 gram, gestational age from 28 weeks to 40 weeks, either male or female were selected. ROP was assessed in selected patients.

Results: Mean gestational age of the patients was 32.67 ± 3.767 weeks, mean weight was 1484.17 ± 532.940 gram and mean duration of hospital stay was 14.52 ± 6.606 days. ROP was noted in 20 (33%) patients, grade I ROP was noted in 11 (55%) patients followed by grade II 7 (35%) and grade III in 2 (10%) patients.

Conclusion: Findings of this study showed a higher number of infants with ROP and most of the cases found with grade I ROP. ROP was developed in all very premature infants. We also observed significant association of ROP with weight, Duration of oxygen supplementation and gender of infants.

Key words: ROP, oxygen supplementation, Retinopathy, Prematurity, risk factors, risk factors

INTRODUCTION

Retinopathy of prematurity (ROP) is a vasoproliferative disorder of the eye affecting preterm infants which can progress to cause visual impairment or blindness.¹ Recent advances in neonatal care in the last decade, have improved the survival rates for premature infants.² Consequently, the incidence of ROP has increased in parallel.³ ROP is an important cause of childhood blindness in both developed and developing countries. This view is also expressed by the World Health Organization's "Vision 2020 programme".⁴

Research has identified several factors which have been shown to have some causal association with ROP. However, three factors have shown

consistent and significant association with ROP: low gestational age, low birth weight and prolonged exposure to supplementary oxygen following delivery.⁵ Other putative risk factors include mechanical ventilation, sepsis intraventricular haemorrhage, anaemia, high number of blood transfusions, apnoea, male gender and poor postnatal weight gain. It is difficult to determine whether these factors are actual predictors of ROP or if they reflect the severity of illness.⁶

A number of studies, prospective as well as retrospective have been done in developed countries to find out the frequency and specific features of ROP present in their own populations.⁷

Pakistan is a developing country with poor health indicators. It is currently the sixth most populous country in the world. The majority of the population (66%) lives in rural areas.⁶ Intensive care facilities for premature infants are costly and specialized services are less likely to be established in remote and rural areas. Therefore, survival rates for premature neonates in these rural areas are low and ROP is not a significant cause of blindness there. However, in the urban cities where adequate neonatal care facilities are available, it can be predicted that ROP will emerge as an important cause of childhood blindness.

In the light of the above background, we decided to conduct a study to determine the incidence of ROP in the premature infants admitted in our hospital and to determine the risk factors associated with ROP.

MATERIAL AND METHODS

This cross sectional study was conducted at Department of Pediatrics, Bahawal Victoria Hospital, Bahawalpur from October 2017 to April 2018 over the period of 6 months. Total 60 baby having birth weight 800 gram to 2500 gram, gestational age from 28 weeks to 40 weeks, either male or female were selected. Weight of the patients was measured by using digital weighing machine. Gestational age was estimated according to maternal history, obstetric ultrasonography, if taken during the first trimester of pregnancy and was confirmed by physical examination of the newborns themselves. Retinopathy of prematurity staging was defined according to the International ROP classification.⁸

All the collected data was entered in SPSS version 17 and analyzed. Mean and SD was calculated for categorical data like gestational age, Duration of oxygen supplementation (hours), Oxygen concentration (%), Weight (grams) and Duration of hospital stay (days). Frequencies were calculated for ROP and gender. Stratification was done for gestational age, gender, duration of oxygen supplementation (hours), Oxygen

concentration (%), Weight (grams) and duration of hospital stay (days). Post stratification chi-square test was applied to see the effect of these on study variable which is ROP. P value ≤ 0.05 was considered statistically significant.

RESULTS

Total 60 patients were included in this study. Mean gestational age of the patients was 32.67 ± 3.767 weeks, mean weight was 1484.17 ± 532.940 gram and mean duration of hospital stay was 14.52 ± 6.606 days. ROP was noted in 20 (33%) patients. (Fig. 1) Out of 20 patients with ROP, grade I ROP was noted in 11 (55%) patients followed by grade II 7 (35%) and grade III in 2 (10%) patients. (Fig. 2). Patients were divided into 4 categories according to their gestational age i.e. very premature (VPT), moderate premature (MPT), late premature (LPT) and term. In VPT group, there were 31 (51.67%) patients followed by MPT 9 (15%), LPT 9 (15%) and at term 11(18.33%). ROP was noted only in VPT group i.e. 20 (64.52%) patients and in MPT group, LPT group and term group no patient found with ROP. Statistically significant association of ROP with gestational age was noted with P value 0.000. (Table 1)

There were 29 (48.33%) patients were male and 31 (51.67%) patients were female. ROP was noted in 11 (37.93%) male patients and 9 (29.03%) female patients. (Table 2)

Patients were divided into two groups according to duration of oxygen supplementation i.e. <10 hours and ≥ 10 hours. In <10 hours group, there were 27 (45%) patients and ≥ 10 group, there were 33 (55%) patients. ROP was found in 5 (18.52%) patients and 15 (45.45%) patients respectively in <10 hours group and ≥ 10 hours group. Statistically significant ($P = 0.032$) association of ROP with duration of oxygen supplementation. (Table 3) Patients were divided into two groups according to oxygen concentration i.e. $\leq 60\%$ concentration group and $>60\%$ group. In $\leq 60\%$ concentration group, there were 19 (31.67%) patients and in $>60\%$ concentration group there were 41 (68.33%) patients and ROP was noted in

8 (42.11%) patients and 12 (29.27%) patients respectively in both groups. But insignificant association of ROP with oxygen concentration was found with p value 0.384. (Table 4) Three weight categories were made i.e. 1500-2500 gram group, 1000-1500 gram group and <1000 gram group. There were 25 (41.67%) patients, 13 (21.67%) patients and 22 (36.67%) patients respectively in 3 weight category groups. ROP was not noted in 1500-2500 gram group and was noted in 4 (30.77%) patients and 16 (72.72%)

patients respectively in 1000-1500 gram group and <1000 gram group. Statistically significant (P = 0.000) association of ROP with weight of the patients was noted. (Table 5)

Total 41 (68.33%) patients found with 1-16 days duration of hospital stay and 19 (31.67%) patients found with 17-28 days of hospital stay. ROP was noted in 12 (29.27%) patients and 8 (42.11%) patients and no association (P = 0.384) of ROP with duration of hospital stay was noted. (Table 6)

Fig. 1: Frequency of ROP

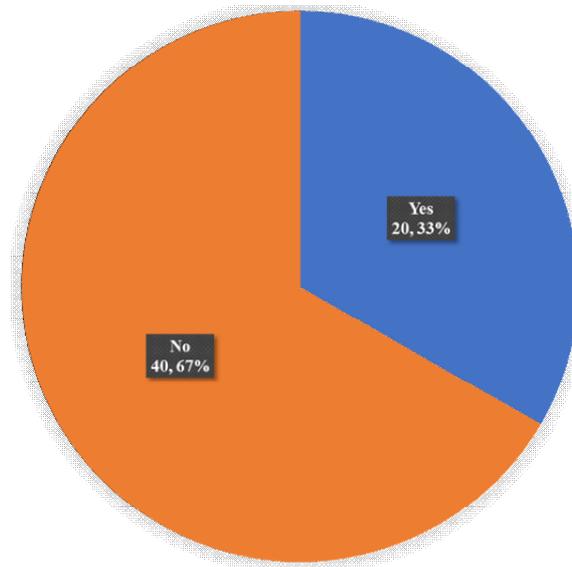


Fig. 2: Grades of ROP (N = 20)

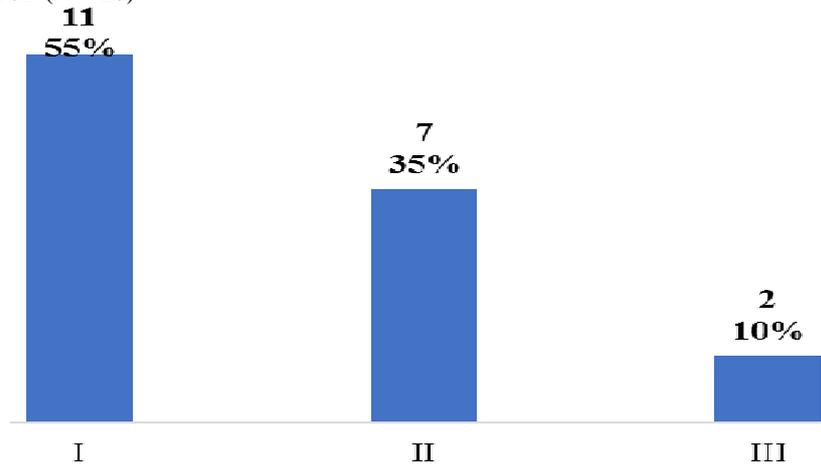


Table 1: Association of ROP with different risk factors

Risk Factor	ROP		Total	P value
	Yes	No		
Gestational age(weeks)				
VPT	20 (64.52%)	11 (35.48%)	31 (51.67%)	0.000
MPT	0	9 (100%)	9 (15%)	
LPT	0	9 (100%)	9 (15%)	
Term	0	11 (100%)	11 (18.33%)	

Gender				
Male	11 (37.93%)	18 (62.07%)	29(48.33%)	0.019
Female	9 (29.03%)	22 (70.97%)	31 (51.67%)	
Duration of oxygen supplementation (hours)				
<10	5 (18.52%)	22 (81.48%)	27 (45%)	0.032
≥10	15 (45.45%)	18 (54.55%)	33 (55%)	
Oxygen concentration (%)				
≤60%	8 (42.11%)	11 (57.89%)	19 (31.67%)	0.384
>60%	12 (29.27%)	29 (0.73%)	41 (68.33%)	
Weight (grams)				
1500-2500	0	25 (100%)	25 (41.67%)	0.000
1000-1500	4 (30.77%)	9 (69.23%)	13 (21.67%)	
<1000	16 (72.72%)	6 (27.27%)	22 (36.67%)	
Duration of hospital stay (days)				
1-16	12 (29.27%)	29 (70.73%)	41 (68.33%)	0.384
17-28	8 (42.11%)	11 (57.89%)	19 (31.67%)	

DISCUSSION

ROP, which was previously called retrolental fibroplasia, is a disorder of proliferative retinopathy of premature and low birth weight infants with the extent of the immaturity of the retina depending mainly on the degree of prematurity at birth.⁹

It is very important that at-risk preterm infants should receive timely retinal examinations before the extent of ROP becomes permanently destructive.¹⁰

It has been believed for many years that oxygen therapy increases the risk of ROP in preterm infants. However, ROP can occur even with careful control of oxygen therapy.¹¹ RDS caused by developmental insufficiency of surfactant production and structural immaturity in the lungs is a serious complication of preterm birth. Infants with greater RDS would be at increased risk for ROP due to prolonged oxygen use.¹²

The purpose of the present study was to assess the retinopathy in low birth weight infant. Mean gestational age of the patients was 32.67 ± 3.767 weeks, mean weight was 1484.17 ± 532.940 gram and mean duration of hospital stay was 14.52 ± 6.606 days. In this study ROP was noted in 20 (33%) patients. Three weight categories were made i.e. 1500-2500 gram group, 1000-1500 gram group and <1000 gram group. There were 25 (41.67%) patients, 13 (21.67%) patients and 22 (36.67%) patients respectively in 3 weight

category groups. ROP was not noted in 1500-2500 gram group and was noted in 4 (30.77%) patients and 16 (72.72%) patients respectively in 1000-1500 gram group and <1000 gram group. Statistically significant ($P = 0.000$) association of ROP with weight of the patients was noted.

Findings of this study was in agreement with the study by Lermann et al,¹³ who reported ROP in premature infants as 27.2%. Retinopathy of prematurity was confirmed in 50% of the patients with weights below 1,000 g and 71.5% of newborn infants born at gestational ages of less than 28 weeks. Reisner et al.¹⁴ studied 1,070 newborn infants, observing a 20% prevalence of ROP among newborn infants weighing less than 2,500 g, 21% for those below 1,500 g, 35% for weights under 1,250 g and 72% for babies born weighing less than 1,000 g. Threshold disease was found in 9% of the newborn infants with weights below 1,500 g.

In 1991, Charles et al. reported a prevalence of ROP of 72% among newborn infants weighing less than 1,200 gram and of 66% for newborn infants born at less than 32weeks. gestational age.¹⁵

Purohit et al. studied 3,025 newborn infants in a multicenter study in the USA from 1979 to 1981 and found a prevalence of ROP of 11% for weights below 1,750 g and 43% for birth weights below 750 g.¹⁶ Hussain et al. ¹⁷ studied 950 newborn infants and observed an ROP prevalence of 21.3% and 4.6% of Stage 3 or higher ROP.

Larsson et al. reported prevalence rate of ROP as 25.5%.¹⁸

CONCLUSION

Findings of this study showed a higher number of infants with ROP and most of the cases found with grade I ROP. ROP was developed in all very premature infants. We also observed significant association of ROP with weight, Duration of oxygen supplementation and gender of infants.

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