

FREQUENCY AND PROBLEMS ASSOCIATED WITH RETINOPATHY OF PREMATURITY (ROP) IN A TERTIARY CARE HOSPITAL

RAHMAN S¹, SHANTA NF², MORSHED M³, MILI SL⁴, KHAN M⁵, SARKAR A⁶

Abstract

Background: Retinopathy of prematurity (ROP) is a retinal disease that principally affects preterm infants. It is recognized as the leading cause of preventable blindness and visual impairment in the pediatric population. An increase in survival of very young preterm infants due to the advances in neonatology has subjected them to the risk of developing ROP.

Aims & Objectives: To find out the frequency and problems associated with Retinopathy of Prematurity (ROP) in premature babies.

Materials and Methods: This observational study was conducted at Dhaka Medical College and Hospital from July 2016-December 2016. A total of 73 preterm neonates with gestational age less than 35 weeks and weighing less than 2000 grams at birth, being born or admitted at Dhaka Medical College and Hospital were included in the study. After purposive sampling who had fulfilled the inclusion criteria and screened for ROP at 4 weeks after birth. The data analysis was done to find out the prevalence and problems associated with ROP of premature babies.

Result: A total of 73 neonates were screened. The prevalence of ROP was found to be 54% (n=40); of which 35% were in stage 1 and 35% were in stage 2 and the majority were in zone 3 (50%). The prevalence of ROP between 28-30 weeks of gestation was 75% (n=12) and between 31-34 weeks was 49.12% (n=28).

50% (20) neonates with birth weights less than 1500 grams were found to develop ROP. The prevalence of post-natal problems that predispose to ROP was oxygen therapy, apnea, blood transfusion, and sepsis, and the P-value was significant. Out of ROP-positive cases, 16(40%) need laser photocoagulation.

Conclusion: The prevalence of Retinopathy of Prematurity (ROP) in premature babies is high below 30 weeks of gestational age and birth weight less than 1500 gm. Problems significantly associated with ROP were oxygen therapy, apnea, blood transfusion, and sepsis.

Keywords: Retinopathy, prematurity,

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Introduction

Retinopathy of Prematurity is (ROP) characterized by the abnormal development of retinal vasculature in premature babies. Clinical manifestation range from mild usually transient changes of the peripheral retina to severe progressive proliferation, scarring and potentially blinding retinal detachment. It is estimated that ROP is the cause of 50000 cases of childhood blindness in the world every year¹.

The incidence of ROP in developed countries is about 10-27%, depending on the degree of prematurity and birth weight^{2,4}. Retinopathy of prematurity is a multifactor disease. The most important risk factors which predispose the development of retinopathy of prematurity include oxygen therapy, anemia, needing a blood transfusion, sepsis, and apnea³.

In a multicentre (CRYO-ROP) study, 90% of infants with birth weight >750gm developed

1. Dr. Sabira Rahman, Consultant, Central police Hospital, Dhaka
2. Dr. Nayeema Ferdous Shanta, Junior Consultant Paediatrics, Shibchar Upazila Health complex, Madaripur
3. Dr. Mashura Morshed, Junior Consultant Dhaka Medical College Hospital
4. Dr. Saifa Lubna Mili, Register, Ad-din Womens Medical College, Dhaka
5. Dr. Masuma Khan, Associate Professor, Ad-din Womens Medical College, Dhaka
6. Dr. Arpita Sarkar, Medical Officer, Central police Hospital, Dhaka

Correspondence: Dr. Sabira Rahman, Consultant, Central police Hospital, Dhaka

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retinopathy of prematurity, of them 37% of infants developed severe retinopathy of prematurity (stage 3). Out of this 37% ; 21.9% whose weight 750-999 grams and 8.5% whose weight 1000-1250 grams developed stage 3 ROP⁵.

The factors that have shown consistent and significant association with Retinopathy of Prematurity(ROP) are low gestational age, low birth weight, and prolonged exposure to supplement oxygen following delivery⁶. Other risk factors include mechanical ventilation, sepsis, intraventricular hemorrhage, surfactant therapy, anemia, and needing frequent blood transfusions and apnoea⁷.

Neonatal health has achieved significant progress in Bangladesh which has fostered the attainment of Millennium Development Goals in due time. Neonatal health services have been extended throughout the country and due to improved neonatal sepsis, increased numbers of preterm low birth weight babies are surviving. Therefore, ROP is an emerging problem. Retinopathy cryotherapy and laser photocoagulation have proven to be successful methods of treating active⁸. Early identification of retinal damage and institution of appropriate treatment prevent blindness and offer child better overall development. Screening programs and early intervention can provide enormous economic and social benefits. So aim of this study is to determine the prevalence of ROP and the problems associated with ROP and timely management will prevent the blindness due to retinopathy of prematurity

Methodology

This is cross sectional study was done at the department of neonatology, Dhaka medical college, and hospital from July 2016 to December 2016. All preterm babies with birth weight <2000 gm and gestational age <35 weeks were included in this study and neonates who had congenital anomalies were excluded.

A total of 73 neonates were included in this study. They were screened in the ROP screening program that was going on at Dhaka Medical College Hospital with the collaboration of Ispahani Islamia Eye Institute by an expert retina specialist.

A detailed history including low birth weight, gestational age at birth, weight for gestation & problems during Special care Neonatal Unit (SCANU) stay, and its management was recorded.

All babies underwent dilated fundus examination with indirect ophthalmoscope with 20D lens at 4-5 weeks postnatally or 31-34 weeks which came later. The RetCam Imaging system was used for staging of ROP.

Data were processed manually and analyzed with the help of SPSS version 16.0 Quantitative data were expressed as mean and standard deviation. Qualitative data were expressed as frequency and percentage

Result

Table-I

Baseline Demographic characteristics of studied neonates

Variables	Total number of patients with percentage (%)
Age(in days)	
21-25days	50(68.5)
26-30days	23(31.5)
Sex	
Male	41(56.16)
Female	32(43.84)
Gestational age	
28-30 weeks	16 (21.92)
31-34 weeks	57 (78.08)
Birth weight	
<1000 gm	1(2.5)
1000-1499 gm	34(46.57)
>1500 gm	38(52.05)
Place of delivery	
Home	8(11)
DMCH	48(65.75)
Clinic	17(23.28)
Mode of delivery	
Normal delivery	28(38.35)
Cesarean section	45(61.64)

A total of 73 premature babies fulfilled the inclusion criteria. There were 41 males and 32 females. 40 out of 73 babies (54%) developed retinopathy of prematurity.

Table II
Distribution of ROP caused by Gestational age

Gestational age	With ROP (%)	Without ROP (%)
28-30 weeks	12 (75)	4 (25)
31-34 weeks	28 (49.12)	29 (50.88)

This table shows that in between 28-30 weeks of gestation the prevalence of ROP was 75% (n=12) and in between 31-34 weeks of gestation the prevalence of ROP was 49, 12% (n=28).

Table III
Distribution of ROP cases by birth weight

Parameters	With ROP (%)	Without ROP (%)
Birth weight<1000gm	1 (2.5)	0
1000-1499gm	20 (50)	14 (42.4)
> 1500gm	19 (47.5)	19 (57.6)

This table shows in between 1000-1499gm of birth weight ,the prevalence of ROP was 50% and in between 1500gm-2000gm of birth weight the prevalence of ROP was 47.5%.

Table IV
Association of ROP with different clinical problems

Parameters	Without ROP (%)	With ROP(%)	P value
Oxygen therapy	13(28)	3 2(71)	0.041
	20(71.40)	8(28.60)	
Apnea	6(23.07)	20(76.92)	0.022
	17(45.94)	20(42.86)	
Sepsis	10(26.31)	28(73.68)	0.04
	21(63.63)	12(36.37)	
Bloodtransfusion	6(24)	19(76)	0.03
	27(56.25)	21(43.75)	
Phototherapy	18(42.86)	24(57.14)	0.29
	15(48.38)	16(51.62)	

During screening around 35% of newborn had stage 1 ROP,35% had stage 2 ROP, 20% had stage 3 ROP and 10% had stage 4 ROP.

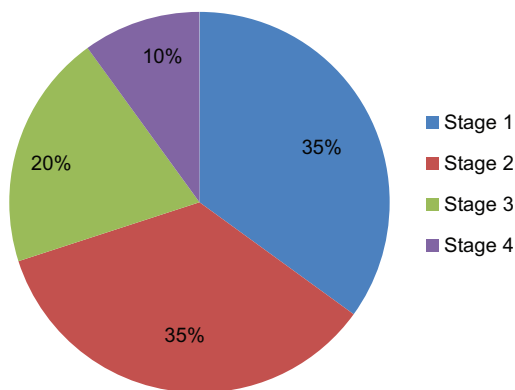


Figure 2: According to the findings, 50% of newborn was in ROP zone 3, and 45% had zone

Table-V shows in between 28-30 weeks of gestation ROP observed 12 (75%) newborns, of whom 4(33.33%) newborn had stage 1,3 (25%) newborns had stage 2,3 (25%) newborns had stage 3 and 2 (16.67%) newborns had stage 4 and stage 5 of the diseases. Out of 12 ROP positive cases 7 (43.75) newborns need treatment (laser photocoagulation).In between 31-34 weeks of gestation ROP observed 28 (49.12%) newborns of whom 10 (35.71%) had stage 1, 11(39.29%) newborns had stage 2, 5 (17.86%) newborns had stage 3 and 2 (7.14%) newborns had stage 4 and 5 of the diseases. Out of 28 ROP positive cases 9(15.79%) newborns need treatment (laser photocoagulation).

Table V
Distribution of treatment in relation to the gestational

Gestational age	Number of Infant	With ROP %	Treatment	Stage1 %	Stage 2 %	Stage 3 %	Stage 4-5 %
28-30 wk	16	75(12)	43.75(7)	33.33(4)	25(3)	25(3)	6.67(2)
31-34 weeks	57	49.12(28)	15.79(9)	35.71(10)	39.29(11)	17.86(5)	7.14(2)
	73	54.73(40)	21.92(16)	35(14)	35(14)	20(8)	10(4)

Discussion

Retinopathy of prematurity (ROP) is a disorder of the developing retinal vessels in the premature infant retina. The condition was first described by Terry in 1942 as retrolental-fibroplasia⁹. As developing countries began to adopt modern neonatology techniques in the 1980s and 1990s, increasing the survival of preterm neonates, ROP began to emerge the middle-income countries (the third epidemic), where it can account for as much as 60% of childhood blindness¹⁰.

Screening premature low-birth-weight infants for retinopathy of prematurity is carried out as a routinely done worldwide. Severe retinopathy of prematurity (ROP) can lead to retinal detachment and permanent visual loss. Early detection of severe retinopathy of prematurity allow specific treatment intervention to be implicated and decrease the sequel of retinopathy of prematurity and reduce the unfavorable outcome^{11,12}.

In this study preterm babies with birth weight <2000gm and gestation <35 weeks and if they had additional risk factors were screened for retinopathy of prematurity. Wilkonson et al.¹³ followed screening criteria for detection of retinopathy of prematurity in infants with birth weight <1500 gm and <32wks gestational age. In a recent article in India, Chawla, et al.¹⁴ have suggested the same screening criteria.

In the current study among the 73 preterm infants 40 were diagnosed with Retinopathy of prematurity. The incidence of retinopathy of prematurity was 54.0% which is higher in this study. It is found high may be because Dhaka Medical College Hospital is an apex institute. Most of the babies were in critical condition and some of them had more than one risk factor

causing retinopathy of prematurity. Another explanation may be improvements in the Neonatal intensive care unit, results increased survival of premature infants with a more complicated course. The incidence of higher percentage of retinopathy of prematurity comply with the Study reported by Gopal, et al¹⁵, incidence of ROP was 38%. Gitalisa A et al¹⁶ in indonesia reported the incidence of ROP 30.3%.

Prevalance of ROP in this present study is 54%. The prevalance of ROP is higher 75% in 28-30 gestational age group. In babies with birth weight in between 1000-1499 gm the prevalance is 50%. In babies birth weight >1500 gm the prevalance is 47.5%. Present study found prevalance thus more with decreasing gestational age agreement with other studies. The incidence of ROP in other Indian studies range from 11.9% to 52%. In a study done by Chaudhari S, et al, the incidence of ROP was 83% in 28-30 weeks, 32% in 31-33 weeks, and 13% in 33-36 weeks, the incidence of ROP in ELBW infants was 36.2%, in the 381 VLBW infants, it was 23.6% and was 11.4% in 105 infants weighing 1500-1999 gm. [23] Prevalance of the retinopathy of prematurity is higher in present study 54% which is comparable to the study by Binkhathlan et al. 56%¹⁷

In the study oxygen therapy was found a significant association with ROP. This study shows that 71% (n=32) of newborns developed ROP. 28.60% of newborns who have not received oxygen developed ROP. In ROP-positive cases, 32(80%) newborns need oxygen therapy. There is a significant association of ROP with oxygen therapy with a p-value of 0.04. In a studies done by Chaudhari S et. Al, Gupta VP et al, oxygen found to be significantly associated with ROP.

In this study, apnea was found to be a significant risk factor. [p=0.02]. In this study, 26(35.61%) out of 73 cases had apnea. out of 26 cases, 20 (76.92%) had ROP. In 40 ROP - positive cases 20 (50%) had apnea. Several studies in India also found apnea as a significant risk factor. In a study done by Agarwal R et.al¹⁸, in 2002 apnea came as a significant risk factor. In another study by Gupta VP et.al,¹⁹ in 2004 apnea came as a significant risk factor. In another study by Chaudhary S et.al,²⁰ in 2009 apnea came as a significant risk factor.

In this study, 25 (34.24%) out of 73 cases of newborns needed a blood transfusion. Out of 25 cases, 19 (76%) had ROP. In 40 ROP-positive cases, 19 (47.5%) had needed blood transfusion. There is a significant association of ROP with blood transfusion with a p-value of 0.03. In a study done in Brazil by pinheiro AM et al²¹, there was a significant association between blood transfusion and ROP [p=0.022].

In the present study another prevalent problems associated with ROP are sepsis. Among

38 (52%) out of 73 cases had sepsis. Out of 38 cases 28 (n=73.68%) newborn had ROP. In 40 ROP positive cases 28 (70%) had sepsis. There is a significant association of ROP with sepsis with p value of 0.04. .Reza Saeidi et al²² a study done at Mashhad,iran ,they revealed that low gestational age, low birth weight ,sepsis and respiratory distress syndrome were independent predictors for the development of ROP.

In this present study among 42 (57.53%) out of 73 cases need phototherapy. Out of 42 cases 24(57.14%) had ROP. In 40 ROP positive cases 24(60%) had phototherapy. The prevalence of these postnatal risk factors has not been clearly outlined in previous studies. Yousef Alizadeh et al²³, a cross sectional retrospective study ,they found that among 310 infants ROP was diagnosed in 64(20.6%) of referred preterm infants(95% CI;17.7%-23.5%);these included stage 1 in 48%,stage 2 in 29% and stage 3 or higher diseases in 23% of subjects. Low birth weight ,low gestational age,oxygen therapy ,

In this present study during screening around 35% of babies had stage 1 ROP ,35% has stage

2 ROP ,20% babies had stage 3 ROP and 10% babies had stage 4 & 5 ROP. In 40 ROP positive cases 16 (21.92%) need treatment as laser photocoagulation.

Nawshad et al²⁴ % out of 114 (4.4%) children were found to be blind due to retinopathy of prematurity with a GA<33 weeks. In a hospital based study (2006-2007) in Dhaka Shishu Hospital revealed that 11.11% of the infants became blind out of 72 infants born between 27 and 34 weeks and birth weight between 750-1490g. Another publications at Ispahani Islamia Eye Institute and Hospital reports, out of 53 preterm low birth weight infants from january 2010 to july 2012, 19 babies had ROP, 15 need laser, 13 respond well, 4 children referred to India for surgical intervention²⁵.

A cross-sectional retrospective study found that among 310 infants ROP was diagnosed in 64(20.6%) of referred preterm infants (95% CI; 17.7%- 23.5%); these included stage 1 in 48%, stage 2 in 29%, and stage 3 or higher diseases in 23% of subjects. After logistic regression analysis, only low GA and low BW were independently associated with the condition.

Conclusion

This study suggests that low birth weight, low gestational age, oxygen therapy, phototherapy, blood transfusion, and apnea were risk factors for ROP. So all preterm infants with a gestational age of 34 weeks or less should be screened at 4 weeks of postnatal age. In addition this study also found that treating threshold ROP with laser photocoagulation appears to be very effective. In addition this study also found that treating threshold ROP with laser photocoagulation appears to be very effective.

Limitation

1. The study population was selected from one selected hospital in Dhaka city, so that the results of the study may not be reflect the exact picture of the country.
2. Period of study was short.
3. Sample size was small.

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