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An Association of Retinopathy of Prematurity with Different Neonatal Morbidities

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Abstract:
Introduction: *In Bangladesh advancement of neonatal care has increased the survival of preterm very low birth weight babies; thus, the incidence of ROP has also been increased. ROP can developed without oxygen therapy and even oxygen therapy, and all premature infants do not develop ROP.*
objectives: *The objective of the study is to find association of retinopathy of prematurity with different neonatal morbidities.*
Material & Methods: *This prospective observational study was conducted at Special Care Baby Unit (SCABU), Department of Neonatology and Pediatrics, Department of Ophthalmology; Bangladesh Institute of Research and Rehabilitation for Diabetes, Endocrine and Metabolic Disorders (BIRDEM) from October 2016 to March 2017. One hundred and twenty-nine (129) preterm very low birth weight infants admitted in SCABU, BIRDEM during the study period were selected considering the inclusion and exclusion criteria. Data were analyzed using SPSS version 20.0 and were expressed as mean ± standard deviation.*
Results: *Stepwise logistic regression analysis among all factors (revealed at univariant analysis), showed only lower gestational age [OR=0.201, 95% CI (0.068-0.596), P=0.004], frequent blood transfusion [OR=0.103, 95% CI (0.012-0.901), P=0.040] and use of mechanical ventilator [OR=0.241, 95% CI (0.051-1.144), P=0.041] significantly associated with occurrence of ROP. Out of 27 infants, 22.2% (6) had stage 1, 37% (10) at stage 2, 29.6% (8) at stage 3 and 11.1% (3) infants had APROP.*
Conclusion: *This study concluded that overall frequency of ROP was 30% (27) among screened infants (n= 90), where 81.5% (22) were among VLBW and 18.5% (5) were among ELBW infants. Out of them 22.2% (6) had stage I, 37% (10) at stage II, 29.6% (8) at stage III and 11.1% (3) infants had AP-ROP. Lower gestational age, use of mechanical ventilator and frequent blood transfusions were found to be the most significant risk factors.*
Key Words: *Neonatal, Ophthalmologist, Prevalence.*

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I. Introduction

In Bangladesh advancement of neonatal care has increased the survival of preterm very low birth weight babies; thus, the incidence of ROP has also been increased[1]. ROP can developed without oxygen therapy and even oxygen therapy, and all premature infants do not develop ROP[2,3]. The precise roles of these factors individually in the progression of the disease have not yet been determined[4]. Preventive measurements are the best treatment, if disease occurs; it should be followed up very closely[5]. ROP may resolve without treatment by itself or can cause complications such as moderate to severe visual impairment like strabismus, amblyopia, cataract etc[6,7]. It has also been well documented that very low birth weight babies may develop early and aggressive posterior ROP (AP-ROP)[8]. The rapidly progressive type of ROP that can lead to retinal detachment

without treatment[7.] Current screening criteria in the United States and many developed countries are based on gestational age (GA) and weight at delivery [9-12]. Retinopathy of prematurity (ROP) is a vasoproliferative disorder of the retina among preterm very low birth weight infants but an important avoidable cause of childhood blindness both in developed and developing countries. In Bangladesh advancement of neonatal resuscitation and neonatal intensive care has increased the survival of preterm very low birth weight babies; thus, the incidence of ROP has also been increased. Data on ROP prevalence and risk factors among VLBW infants is scarce in Bangladesh. As a result, the real burden of the disease is still unknown. As the timing of first screening usually depends on the infant's postnatal age, the convention is not to delay the first screening later than 4 weeks of age or 30 days of life for infants born at or more than 28 weeks of gestation [13,7]. Currently, it is estimated that over 50,000 children per year worldwide become are affected with ROP[14]. Approximately 50-70% in infants weighing less than 1500 grams at the time of birth and 50% of neonates with birth weight less than 1000grams developed some degree of ROP[15,16]. In each year 20 million of babies are born weighing less than 2500 gm, 95% of them in developing countries; in Bangladesh each year; of those, about 25000 babies weight 1500g or less [17]. However, there is no national prevalence data on ROP to understand the burden of disease.

II. Objectives

a) General objective:

- To find association of retinopathy of prematurity with different neonatal morbidities.

b) Specific objectives:

- To identify the Neonatal convulsion and association of ROP
- To identify of ROP with neonatal morbidities factors.

III. Methodology And Materials

This was a prospective observational study conducted at Special Care Baby Unit (SCABU), Department of Neonatology and Pediatrics, Department of Ophthalmology; Bangladesh Institute of Research and Rehabilitation for Diabetes, Endocrine and Metabolic Disorders (BIRDEM) from October 2016 to March 2017. One hundred and twenty-nine (129) preterm very low birth weight infants admitted in SCABU, BIRDEM during the study period were selected considering the inclusion and exclusion criteria. Data were collected in pre-formed questionnaire. Infants and mothers' demographic information were collected from the parents. Clinical variables were collected during the hospital stay. Indirect ophthalmoscopy was done in SCABU on the scheduled day if the baby was still admitted. Before enrollment in the study, parents were informed about ROP, purpose, procedure of ROP screening, benefit and risk of the procedure by oral communication and written consents were taken from them. Data analysis was performed by using SPSS version 20.0. Data were expressed as mean ± standard deviation. P-values ≤ 0.05 (at 95% CI) were considered statistically significant.

- **Inclusion Criteria**

o All newborn babies with a gestational age of 35 weeks or less at birth and a birth weight of 1500gm or less admitted at SCABU in BIRDEM General Hospital

- **Exclusion Criteria**

o Newborns who died before the first ophthalmologic inspection
o Newborns suffering from multiple and/or fatal hereditary incongruities
o Parents who did not give consent

IV. Results

This study population 41(45.6%) were male and 49 (54.4%) were female. All babies weighed less than 1500 gm, among them 11 (12.2%) were < 1000 gm and 79 (87.8 %) were ≥1000-1500gm. Forty-three, 43(47.8%) baby's gestational age was ≤32 weeks and forty-seven 47(52.2%) baby's gestational age was >32 weeks, 74(82.2%) were inborn, 16 (17.8%) were out born. Seventy-nine, 79 (87.8%) were delivered by LUCS and 11(12.2%) by NVD (Table 1). Table 2 & Figure 1 shows, out of 27 infants, 22.2% (6) had stage 1, 37% (10) at stage 2, 29.6% (8) at stage 3 and 11.1% (3) infants had APROP. Figure II shows the frequency of ROP among the study neonates. 70% had no ROP, 30% had ROP. Gestational age, Frequent blood transfusion, IMV was significantly associated with ROP, P value < 0.05 (Table 3). In Table 4, stepwise logistic regression analysis among all factors (revealed at univariant analysis), showed only lower gestational age [OR=0.201, 95% CI (0.068-0.596), P=0.004], frequent blood transfusion [OR=0.103, 95% CI (0.012-0.901), P=0.040] and use of mechanical ventilator [OR=0.241, 95% CI (0.051-1.144), P=0.041] significantly associated with occurrence of ROP. Among all diagnosed ROP neonates are follow up regularly and eleven percent, 11.1% (03) cases received anti VGEF injection and fourteen percent, 14.8% (04) received laser therapy (Table 5).

Table 1: Baseline characteristics of the study neonates (N=90)

Parameters	Frequency (n)	Percentage (%)
Sex		
Male	41	45.6
Female	49	54.4
Birth weight (gm)		
< 1000	11	12.2
≥1000-1500	79	87.8
Gestational age (weeks)		
≤32	43	47.8
>32	47	52.2
Place of delivery		
Inborn	74	82.2
Out born	16	17.8
Mode of delivery		
LUCS	79	87.8
NVD	11	12.2

Figure 1: Stages of ROP among studied infants (n=27).

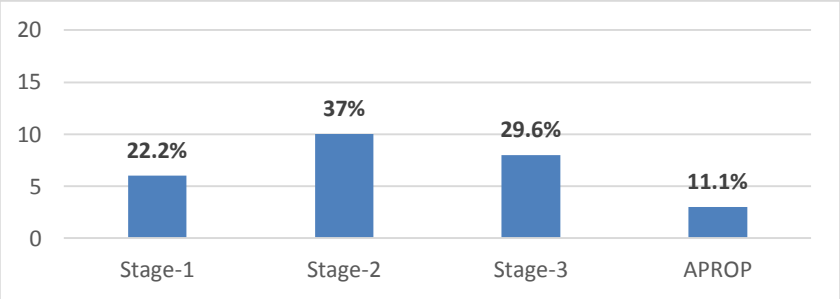

Table 2: Frequency of ROP of the study neonates (N=90)

Parameters	Frequency (n)	Percentage (%)
ROP	27	30.0
No ROP	63	70.0
Staging of ROP		
Stage- I	6	22.2
Stage- II	10	37.0
Stage-III	8	29.6
AP-ROP	3	11.1

Figure 2: Pie chart of frequency of ROP among the study neonates

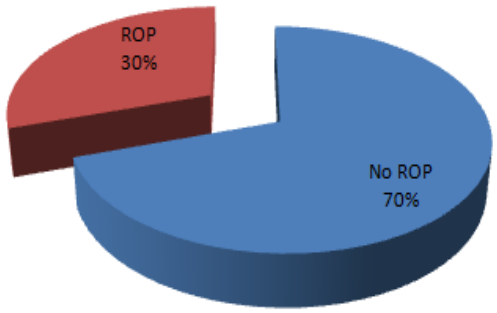

Table 3: Distribution of neonate with different factors and association of ROP (N=90)

Parameters	ROP		OR (95% CI)	P value
	Positive (n=27)	Negative (n=63)		
Sex				
Male	12 (44.4%)	29 (46.0%)	0.93 (0.37-2.32)	0.890
Female	15 (55.6%)	34 (54.0%)		
Birth weight (gm)				
< 1000	5 (18.5%)	6 (9.5%)	2.15 (0.59-7.80)	0.233
≥ 1000- 1500	22 (81.5%)	57 (90.5%)		
Gestational age (weeks)				
≤32	19 (70.4%)	24 (38.1%)	3.85 (1.46-10.18)	0.019
>32	8 (29.6%)	39 (61.9%)		
BT				
Yes	26 (96.3%)	47 (74.6%)	8.85 (1.11-70.58)	0.018
No	1 (3.7%)	16 (25.4%)		
Oxygen use				
Yes	23 (85.2%)	49 (77.8%)	1.64 (0.48-5.54)	0.421
No	4 (14.8%)	14 (22.2%)		
CPAP				
Yes	14 (51.9%)	21 (33.3%)	2.15 (0.85-5.39)	0.099
No	13 (48.1%)	42 (66.7%)		
IMV				
Yes	7 (25.9%)	3 (4.8%)	7.00 (1.65-29.66)	0.007
No	20 (74.1%)	60 (95.2%)		

Table 4: Multivariant logistic regression of the factors and association of ROP (N=90)

Anomalies	B	Wald	p value	OR	95% CI (min-max)	
Gestational Age (≤32)	-1.603	8.373	0.004	0.201	0.068	0.596
Blood Transfusions (Yes)	-2.271	4.220	0.040	0.103	0.012	0.901
Intermittent Mode of Ventilation (IMV) (Positive)	-1.424	3.207	0.041	0.241	0.051	1.144
Intraventricular Hemorrhage (IVH) (Positive)	-0.906	2.403	0.121	0.404	0.128	1.271

Table 5: Treatment received of neonates having ROP (N=27)

treatment option	Frequency (n)	Percentage (%)
Avastin (anti VGEF)	03	11.1
laser therapy	04	14.8
No Treatment	20	74.07

V. Discussion

Retinopathy of prematurity (ROP) has been acknowledged as one of the major causes of blindness in infants and children in developed countries, and has emerged as a problem in developing countries as well. ROP is an important cause of potentially preventable blindness in developed countries.[13,14] This is because of advancement in neonatology for which survival of premature and very low birth weight neonates have been increasing in the developing countries.[18,19]**.** The data of the present study shows that infants with retinopathy of prematurity group were significantly more in premature babies (P value = 0.019). We could not demonstrate a significant association of ROP with perinatal asphyxia, septicemia, respiratory distress syndrome, apnea, use of CPAP, neonatal seizure and jaundice, where P values were 0.830, 0.643, 0.343, 0.763, 0.099, 0.787, 0.813 respectively. Few studies have documented significant association of the some of the above-mentioned factors with retinopathy of prematurity in their studies and concluded that retinopathy of prematurity is more common among the sick infants. Many studies have found significant association between presence of IVH and ROP [20,21]. This study found that the more premature infants had IVH (P value=0.019) due to immaturity and needed prolong hospital stay. From this study it has been known that a significant number of infants (18.5% of ELBW and 81.5% of VLBW infants) have the disease, but actual situation could not be effectively estimated due to large number (10.07%) of drop out and small sample size. So, studies in larger scale should be undertaken to know the exact incidence and risk factors in our set up. Another observation in this study was

recognition of aggressive posterior retinopathy of prematurity (AP-ROP) in the Bangladeshi infants. Three babies 11.10% had aggressive form of the disease, an uncommon, rapidly progressing and severe form of ROP.

LIMITATIONS OF THE STUDY:

In this study, sample size was low and the time duration was short. The results may not be applicable for all infants and drop out of some babies could not be avoided.

VI. Conclusion And Recommendations

This study concluded that out of several significant risk factors, lower gestational age, use of mechanical ventilator and frequent blood transfusions were found to be the most significant risk factors when stepwise multivariant logistic regression analysis was done. Multicenter studies in larger scale with larger sample size should be undertaken to find out the real picture of ROP and associated risk factors among the preterm very low birth weight newborns in Bangladesh. Timely identification through ROP screening and proper intervention in due time are the mainstay of preventing this preventable blindness. Building awareness among obstetricians, neonatologists, paediatricians, ophthalmologists, health professionals and above all the parents about the disease. It is believed that this study would give clinical information and resources needed to combat the upcoming epidemic of ROP in our country.

References

[1]. Akter S, Parvin R, Yasmeen BHN, Anwar KS, Hossain MM. Association of infection, blood transfusion and other clinical factors with retinopathy of prematurity (ROP). Northern International Medical College Journal 2014;5(2):325-28.

[2]. Gagandeep V, Arun P. Incidence and risk factors for retinopathy of prematurity in a tertiary care neonatal unit. TJPRC: IJGPM 2016;1(1):45-50.

[3]. Lucey JF, Dangman B. A re-examination of oxygen in retrolental fibroplasias. Pediatrics 1984;73:82-96.

[4]. Imren A, Sibel O, Gursel Y. Risk Factors in the development of mild and severe retinopathy of prematurity. J AAPOS. 2006;10:449–53.

[5]. Babaei H, Ansari MR, Alipour AA, Ahmadipour S, Safari-Faramani R, Vakili J. Incidence and risk factors for retinopathy of prematurity in very low birth weight infants in Kermanshah, Iran.World applied sciecces journal 2012;18(5):600-04.

[6]. Haines LA, Godio LB, Baker A, Wilkinson. Uk population based study of severe retinopathy of prematurity: screening, treatment and outcome. Archives of disease in childhood-fetal and neonatal edt. 2005;90(3):240-44.

[7]. Jalali S, Anand R, Kumar H, Dogra MR, Azad R, Gopal L. Programme planning and screening strategy in retinopathy of prematurity. Indian J Ophthalmol 2003;51:89-99.

[8]. Quiram PA, Capone A, Current understanding and management of retinopathy of prematurity. Current opinion in ophthalmology 2007,18:228-34.

[9]. Fierson WM. American Academy of Pediatrics Section on O, American Academy of O, American Association for Pediatric O, Strabismus, American Association of Certified O. Screening examination of premature infants for retinopathy of prematurity. Pediatrics. 2013;131(1):189–95.

[10]. Jefferies A L, Hilliard R I, Peliowski-Davidovich A, Sorokan S T, Whyte H E A, Whyte R K. Retinopathy of prematurity: recommendations for screening. Paediatrics & Child Health. 2010;15(10):667–74.

[11]. Wilkinson AR, Haines L, Head K, Fielder AR. UK retinopathy of prematurity guideline. Eye 2008;23(11):2137-39.

[12]. Gilbert C, Fielder A, Gordillo L et al. Characteristics of infants with severe retinopathy of prematurity in countries with low, moderate, and high levels of development: implications for screening programs. Pediatrics 2005;115(5):518-25.

[13]. "Screening examination of premature infants for retinopathy of prematurity". Section on Ophthalmology. American Academy of Pediatrics. Pediatrics 2006; 117: 572-76.

[14]. Gilbert G. Retinopathy of prematurity: a global perspective of the epidemics, population of babies at risk and implications for control.Early human development 2008;84(2):77-82.

[15]. Verma A, Nema N, Patel S, Ishrat S, Sidharth M. Retinopathy of prematurity: Incidence and risk factors. Int J Ophthalmol Eye Res. 2016;4(3):198-01.

[16]. Zin A, Gole GA. Retinopathy of prematurity-incidence today. Clin Perinatol 2013;40(2):185-00.

[17]. Begum Ha, Islam Y, Ali SA, Nahar N. Outcome of low birth weight infants. Bangladesh J Child health 1996;20(2):42-46.

[18]. Brooks, SE, Marcus, DM, Gillis, D, Pirie, E, Johnson, MH, & Bhatia, J 1999, 'The effect of blood transfusion protocol on retinopathy of prematurity: a prospective randomized study', Pediatrics, vol.104, pp. 514-18.

[19]. Valentine, PH, Jackson, Kalina, RE,& Woodrum DE 1989,Increased survival of low birth weight infants;impact on the incidence of retinopathy of prematurity', Pediatrics,vol. 84,pp. 442-45.

[20]. Abdel HA, Kakeem A, Gamal B, Othman FM. Retinopathy of prematurity: A study of prevalence and risk factors. Middle East Afr J Ophthalmol.2012;19(3):289-94.

[21]. Raksha SS, Rajalakshmi R, Vitamin E status of the new born in relation to gestational age, birth weight and maternal vitamin E status. British Journal of Nutrition 1987;58:191-98.

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