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PREVALENCE OF RETINOPATHY OF PREMATURITY IN ASIAN INDIAN BABIES FROM A TERTIARY CARE CENTRE

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ABSTRACT: PURPOSE: To assess the prevalence of retinopathy of prematurity (ROP) in Asian Indian babies from a tertiary care centre **MATERIALS AND METHODS:** A prospective observational case study was conducted in the neonatal care unit of father Muller charitable institutions on all premature babies weighing < 2000 g at birth with gestational age ≤ 32 weeks admitted during the study period. **RESULTS:** 62 preterm infants were studied. Out of the 62 babies screened, 6 babies (9.68%) developed retinopathy of prematurity (ROP) and 56 babies (90.42%) were found to have normal retinal maturation, out of which one was a male baby and 5 were females. Out of the 6 babies with ROP, stage 1 disease was seen in 4 babies (66.67%), stage 2 disease was seen in 1 baby (16.67%) and stage 3 disease was seen in 1 baby (16.67%). (fig 2). No babies in our study group were diagnosed with stage 4 or stage 5 disease. 5 babies (83.3%) in our study had proliferative ROP and 1 baby (16.7%) had fulminant ROP. **CONCLUSIONS:** The prevalence of ROP in our study was found to be 9.68% and that of treatable ROP was 16.7%.

KEYWORDS: retinopathy of prematurity, preterm, prevalence

INTRODUCTION: Retinopathy of prematurity (ROP) is emerging as one of the leading causes of visual impairment and childhood blindness in developing countries like India accounting for about 6–8% of all blind children. ROP is characterized by abnormal fibrovascular proliferation of the immature retina in premature infants leading to tractional retinal detachment in untreated cases causing blindness.^{1,2}

Recent advances and improved survival of premature and low birth weight babies in neonatal care in developing countries has been accompanied by an increase in the incidence of ROP. Thus, it is imperative to investigate the epidemiology of ROP, aiming to reduce the incidence of ROP-induced visual impairment and blindness. Indian studies till date have shown the incidence of ROP to be around 14 to 41% in preterm infants.³

The American screening guidelines for ROP suggests that baby's ≤ 1500 g birth weight or ≤ 32 weeks gestational age must be screened, with heavier babies to be screened on recommendation by the attending neonatologist.⁴ However, developing countries may require modification of these screening guidelines owing to inferior neonatal care and poor compliance by the patients.⁵

The purpose of our study was to evaluate the incidence of ROP in babies weighing < 2000g in a peripheral tertiary care neonatal unit of India.

MATERIALS AND METHODS: A prospective observational case study was conducted in the neonatal care unit of father Muller charitable institutions. Ethical Committee clearance from the institution was obtained.

The inclusion criteria for the study were:

1. Premature babies weighing < 2000 g at birth with gestational age $\leq$ 32 weeks.
2. Minimum three months follow-up period.

All the preterm babies admitted to NICU between the time periods of January to August 2014 were included in the study. We routinely screened all infants whose birth weights were $\leq$ 2000 g and or whose gestational age at birth was $\leq$ 32 weeks. Infants outside these criteria were also screened if the attending neonatologist sought a referral for this purpose based on the difficult postnatal course. All the babies were examined by one paediatric ophthalmologist (SB) in the retina clinic, or at the neonatal intensive care unit (NICU) under aseptic precaution using indirect binocular ophthalmoscope with lens of +20 Diopters and a scleral depressor. Pupils were dilated with 2.5% phenylephrine and 0.5% tropicamide.

First the anterior segment of the eye was examined to look for tunica vasculosa lentis, pupillary dilation and lens/media clarity. Followed by, the posterior pole to look for plus disease, followed by sequential examinations of all clock hours of the peripheral retina.

Clinical diagnosis and follow up protocol was done according to the International Classification of ROP. (ICROP)¹² Treatment wherever required was according to the ETROP study guidelines with laser photocoagulation. Intravitreal anti VEGF agent was administered in one morbid baby unable to undergo laser photocoagulation.

Data were collected prospectively based on gestational age, birth weight and clinical retinal findings and were analyzed.

RESULTS: During our study period 62 neonates admitted in the NICU with a minimum follow up of 3 months were under the inclusion criteria mentioned. The study group showed a small female preponderance with 34 babies being female and 24 were male. The sex distribution between the two groups was not statistically significant ($P = 0.51$). The birth weight (BW) of the babies varied from 750 g to 2000 g with the mean birth weight being 1603.7 g. The gestational age (GA) of the babies varied from 28 weeks to 36 weeks and the average GA was 31.62.

Out of the 62 babies screened, 6 babies (9.68%) developed retinopathy of prematurity (ROP) and 56 babies (90.42%) were found to have normal retinal maturation, out of which one was a male baby and 5 were females. (Fig. 1)

Out of the 6 babies with ROP, stage 1 disease was seen in 4 babies (66.67%) stage 2 disease was seen in 1 baby (16.67%) and stage 3 disease was seen in 1 baby (16.67%). (Fig. 2). No babies in our study group were diagnosed with stage 4 or stage 5 diseases.

ROP was further classified as proliferative ROP which required more frequent examinations of the retina and managed conservatively or minimal intervention in the form of intra vitreal anti VEGF drug and fulminant ROP (plus disease) which needed active intervention in the form of laser photocoagulation. 5 babies (83.3%) in our study had proliferative ROP and 1 baby (16.7%) had fulminant ROP.

The occurrence of ROP was studied according to BW and gestational age (GA). All the 6 babies developing ROP had a BW < 1500g and were born before 32 weeks of gestation and none of the babies >1500g or born after 32 weeks of gestation developed any stage of ROP. (Fig. 3, 4).

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DISCUSSION: ROP prevalence depends on several factors - race, geographical area, survival rate of neonates, and quality of neonatal intensive care units. In our study, the overall prevalence of ROP was 9.68%, which was lower than that in Germany (36.1%)⁶, Sweden (36.4%)⁷, and Singapore (29.2%)⁸, but comparable to that in developing countries, including Iran (8.5%)⁹ and Brazil (18.2%)¹⁰. The advanced technology in developed countries and the fact that the survival rate of preterm infants with low gestational age and very low birth weight is high, may account for the higher incidence of ROP. However, in developing countries, the perinatal care is imperfect and the survival rate of preterm infants with very low birth weight is lesser, which leads to a lower incidence of ROP.

The incidence of ROP in our study was lesser compared to other Indian studies as well which varied from 22.6% in a study by Sudha Chaudhari et al ¹¹ as well other recent Indian studies that showed an incidence between 38-51.9%.^{12,13}

In our study, that the incidence of proliferative ROP and severe ROP, requiring treatment was 83.3% and 16.7% respectively. ROP was most often seen in Zone 2. There were no infants with ROP in Zone 1 and none of the infants progressed to stage 4 or 5. Laser photocoagulation had good immediate results with regression of ROP in all treated infants.

ROP screening guidelines vary vastly between developed and developing countries. Although many authors have reported no ROP in heavier babies above 1500 g and above GA of 32 weeks¹⁴ guidelines of screening babies born at ≤ 34 -35 weeks gestational age (based on the work by Fielder et al.)¹⁵ and/or BW 1500 g (or even up to 1700 g) and/or exposed to oxygen for more than 30 days exists in India. As higher cutoff limit, Jalali et al. have recommended screening babies born at ≤ 37 weeks GA and/or BW 2000 g in the presence of a high sickness score in order to prevent missing any infant with threshold ROP.¹⁵

Our study showed no ROP in babies weighing 1500 g and above and also in babies with GA > 32 weeks. All screening programs are time-consuming and labor-intensive especially in a peripheral unit with sparse specialized ophthalmology units, uncomfortable to the infants, cause anxiety to the parents and sometimes lead to an extended stay at nurseries. All these factors have to be weighed against missing a child with treatable ROP. In fact an average of 39 screening examinations and 19 hours of an ophthalmologist's time is necessary to detect one single case of threshold ROP.¹⁶

In conclusion we recommend NICU s in peripheral units to consider more relaxed screening guidelines and larger studies are needed to confirm our findings.

Fig. 1: shows the number of babies developing ROP among all screened

Fig. 2: distribution of different stages of ROP

Fig. 3: ROP based on birth weight (B W)

Fig. 4: ROP based on gestational age (GA)

REFERENCES:

1. Chang SY, Shu JL, Feng LH, Wen MH, Jorn HL. Retinopathy of prematurity: screening, incidence and risk factors analysis. *Chin Med J* 2001; 64: 706-12.
2. Azad R, Chandra P. Retinopathy of prematurity. *J Indian Med Assoc.*2005; 103: 370-2.
3. vinekar A, Retinopathy of prematurity in Asian Indian babies weighing greater than 1250 grams at birth: Ten year data from a tertiary care center in a developing country. *Indian J Ophthalmol.* 2007 Sep-Oct; 55 (5): 331-336.
4. Hakeem AH, Mohamed GB, Othman MF. Retinopathy of prematurity: a study of prevalence and risk factors. *Middle East Afr J Ophthalmol.* 2012. Jul-Sep; 19 (3): 289-94.
5. Gilbert C, Fielder A, Gordillo L, Quinn G, Semiglia R, Visintin P, 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: e518-25.
6. Seiberth V, Linderkamp O. Risk factors in retinopathy of prematurity. A multivariate statistical analysis. *Ophthalmologica.* 2000; 214: 131-35.
7. Larsson E, Carle-Petrelus B, Cernerud G, et al. Incidence of ROP in two consecutive Swedish population based studies. *Br J Ophthalmol.* 2002; 86: 1122-26.
8. Shah VA, Yeo CL, Ling YL, Ho LY. Incidence, risk factors of retinopathy of prematurity among very low birth weight infants in Singapore. *Ann Acad Med Singapore.* 2005; 34: 169-78.
9. Saeidi R, Hashemzadeh A, Ahmadi S, Rahmani S. Prevalence and predisposing factors of retinopathy of prematurity in very low-birth-weight infants discharged from NICU. *Iran J Pediatr.* 2009; 19: 59-63.
10. Fortes Filho JB, Eckert GU, Procianoy L, et al. Incidence and risk factors for retinopathy of prematurity in very low and in extremely low birth weight infants in a unit-based approach in southern Brazil. *Eye (Lond)* 2009; 23: 25-30.
11. Chaudhari S, Patwardhan V, Vaidya U, Kadam S, Kamat A. Retinopathy of prematurity in a tertiary care center-incidence, risk factors and outcome. *Indian Pediatr.*2009; 46: 219-24.
12. Gopal L, Sharma T, Ramachandran S, Shanmugasundaram R, Asha V. Retinopathy of prematurity: A study. *Indian J Ophthalmol.* 1995; 43: 59-61.
13. 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: 89-97.
14. Yanovitch TL, Siatkowski RM, McCaffree MA, Corff KE. Retinopathy of prematurity in infants with birth weight $\geq$ 1250 grams-Incidence, severity and screening guideline cost-analysis. *J AAPOS.* 2006; 10: 128-34.
15. Fielder AR, Shaw DF, Robinson J, Ng YK. Natural history of retinopathy of prematurity: A prospective study. *Eye.* 1992; 6: 233-42.
16. Brennan R, Gnanaraj L, Cottrell DG. Retinopathy of prematurity in practice. I: Screening for threshold disease. *Eye.* 2003; 17: 183-8.

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