Incidence of Retinopathy of Prematurity at a Tertiary Care Children Hospital

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ABSTRACT

Purpose: To study the incidence of retinopathy of prematurity at a tertiary care children hospital.

Methods: After obtaining ethical approval, this cross sectional study was performed on all the patients who presented to paediatric ophthalmology department of CH & ICH from July 2018 to December, 2021. These included neonates admitted in NICU of CH&ICH and also referrals from other hospitals. The babies born before 34 weeks of gestation or birth weight less than 2000 grams, and given supplemental oxygen, who required hospital admission were screened in first 30 days of life. Prior to examination, the pupil was dilated using 10% phenylephrine and 0.5% cyclopentolate and 0.1% tropicamide eye drops by a trained nurse. The fundus examination was carried out under topical anaesthesia using proparacaine 0.5%, after swaddling the baby. ETROP criteria was used for treatment, i-e patients with stage3 ROP or plus disease in Zone 1 were treated immediately. Other stages were kept on a close follow up.

Results: Three hundred and seventy seven neonates were male (60.5%). Total number of patients with any stage of ROP was 40 (13.07%). Those with type 1 ROP were treated with laser or intra- vitreal anti- VEGF (bevacizumab 0.625 mg in 0.05ml). Those with type 2 disease were observed on weekly basis for worsening of features. There were 13 patients who received intra- vitreal injection and only one of them required diode laser after injection.

Conclusion: A multidisciplinary team is essential to prevent blindness due to ROP in developing countries.Screening the babies who are at high risk of disease will lessen the burden on screening team.

Key words: Retinopathy of Prematurity, Bevacizumab, Blindness.

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INTRODUCTION:

It is estimated that 32,000 children become blind due to ROP worldwide. Most of these children belong to Asian countries.[1] ROP has been identified as a major cause of childhood blindness, in context of Vision 2020, in middle income countries.[2] 13.4% of all live births in South-eastern and South Asia are premature compared with less than 8% in UK. It is estimated 10 to 20,000 of 3.5 million premature children born in India each year may need treatment, in contrast to less than 350/year in UK.[3,4] Major risk factors responsible for development and poor visual prognosis of disease are prematurity, low birth weight and uncontrolled oxygen given in NICUs.[5]

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Other risk factors considered important for ROP development are maternal hypertension, respiratory distress syndrome, apnea, sepsis, genetic factors, multiple births, blood transfusions and intraventricular hemorrhage.[6,7,8] The preterm birth rate of Pakistan is 17%, global preterm birth rate estimated by WHO was 10.6%, 80% of which is concentrated in Asian and African countries.[9] According an estimate, 15 million babies in the world are born prematurely and nearly 1 million die due to related complications.[10]

Infant mortality has reduced from 72.62% in 2010 to 59.109 %in 2020.[11] This is due to better neonatal care services in the country. As a result, the country is at a threat of third epidemic of ROP. Like other developing countries, ROP screening services are present in some centres of Pakistan, although no screening guidelines have been formulated by our health department for Public Sector Hospitals.

In CH & ICH, there is a well-established neonatology unit and a paediatric ophthalmology department. A project was started in July 2017 in collaboration with London School of hygiene and tropical medicine, as a part of Queen Elizabeth golden jubilee project of upgrading of ROP services in developing countries. The aim was to screen all the preterm babies admitted in NICU of CH& ICH, for ROP and identify risk factors for poor visual outcomes.

METHODS

After obtaining ethical approval (2020-183-CHICH), this cross sectional study was performed on all the patients who presented to paediatric ophthalmology department of CH & ICH from July 2018 to December, 2021. These included neonates admitted in NICU of CH&ICH and also referrals from other hospitals. The babies born before 34 weeks of gestation or birth weight less than 2000 grams, and given supplemental oxygen, who required hospital admission were screened in first 30 days of life. Some patients who had other risk factors like respiratory distress, blood transfusion, etc. as identified by the neonatologist, were also screened and included in study.

The patients were enrolled for ROP screening after an informed consent. They were issued ROP screening cards mentioning patient's data in addition to his date of eye examination.

Prior to examination, the pupil was dilated using 10% phenylephrine and 0.5% cyclopentolate and 0.1% tropicamide eye drops by a trained nurse. The fundus examination was carried out under topical anaesthesia using proparacaine 0.5%, after swaddling the baby. Indirect ophthalmoscope was used and indentation done with a squint hook. Fundus photographs were obtained using a fundus camera and retinal diagrams were made on patients' record. The patients were called for follow up examination after 2 weeks, till the retina is completely vascularized. However, the patients with any stage of ROP were called earlier for follow up. ETROP criteria was used for treatment, i-e patients with stage3 ROP or plus disease in Zone 1 were treated immediately.[12] Other stages were kept on a close follow up. Most of the patients were treated with intravitreal bevacizumab followed by indirect laser photo coagulation in selected cases.

RESULT

Six hundred and twenty eight patients were issued ROP screening cards in NICU of CH& ICH. They were counselled regarding threat of blindness due to ROP, to their baby, if not treated in time. 164 patients expired prior to their first examination. 337 patients were completely screened between July, 2018 and December, 2021. Three hundred and seventy seven neonates were male (60.5%). 107 patients did not come for check-up at all. Total number of patients with any stage of ROP was 40 (13.07%). Those with type 1 ROP were treated with laser or intra- vitreal anti- VEGF (bevacizumab 0.625 mg in 0.05ml). Those with type 2 disease were observed on weekly basis for worsening of features. There were 13 patients who received intra- vitreal injection and only one of them required diode laser after injection. Two patients refused for the treatment and did not return. 03 patients did not arrive in time after first screening examination and developed Stage 4 ROP. They were referred to vitreo retinal surgeon for surgery. Twenty patients were observed and their disease resolved without treatment. In addition, 16 patients of ages more than 3 months reported to the department at with stage 5 ROP. They were never screened for ROP in first 30 days of their life. It is pertinent to mention that 17 of 20 patients with Stage 2 ROP in zone 1 had no plus disease, so they were kept under close observation. They settled without any intervention.

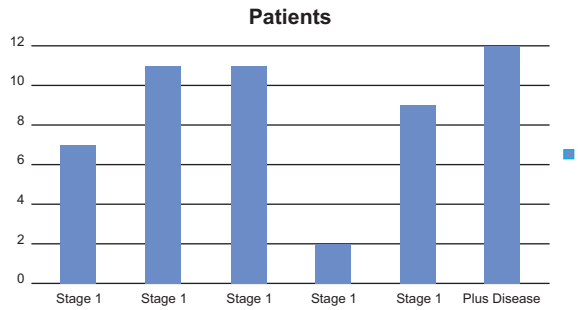

Figure 1: distribution of ROP patients according to stage

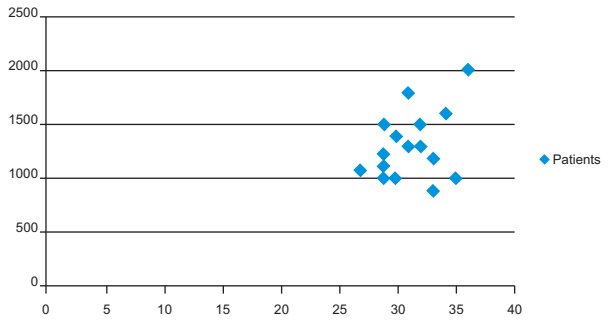

Figure 2: ROP cases according to their birth weight and gestational age.

DISCUSSION

The incidence of ROP in our study was 13.02 %. Other published data on the subject from Pakistan shows similar results. All these studies have used broader criteria of screening babies of birth weight 2000 grams and gestational age of 36 weeks. This value is comparable to ROP incidence reported from 2 other studies from our country being 11.5 % and 15 % in 2013 and 2016.[13,14] However, our value is low as compared to another study published from Bahawalpur this year[15]. Those patients who developed ROP in two studies showed babies of birth weight more than 1500 grams and gestational age at birth of more than 32 weeks showed treatable ROP.[14,15] In contrast to this, a study from Agha khan hospital showed no baby screened, above 1500 grams birth weight and born at more than 32 weeks of gestation developed ROP.[13]

The key to prevent blindness due to ROP is timely screening. In most of the national and international studies from India, China, Indonesia and Turkey, it has been pointed out that more mature and heavier babies develop ROP. Therefore, it is recommended to screen babies up to 36 weeks of gestation and 2000 to 2500 grams birth weight for ROP.[16,17,18,19] However, in our study, it is observed that almost all patients who required treatment for ROP were born before 32 weeks of gestation and birth weight was less than 1500grams. Only 2 babies were outside this criteria. Both of them remained admitted in NICU for respiratory distress and one also received blood transfusions thrice in first month of life. They were referred for ROP screening, being high risk and treated in time. This highlights the role of neonatologists to identify high risk factors for ROP development, especially in babies who fall outside British criteria of 32 weeks gestational age and 1500 grams birth weight.[20]

Blindness due to ROP can be prevented at a primary level by Gynaecologist, secondary level by neonatologist and at a tertiary level by Ophthalmologist.[21] Adams G has clearly pointed out in her report on ROP in Asia, that a multidisciplinary team is required to prevent ROP caused blindness. This model was adopted in ROP- net program of London school of hygiene and tropical medicine, in 2017.[22] Our institute was leading centre for ROP screening and treatment in that project. It was observed that there is an active role of neonatologist. In addition to keeping a check on amount oxygen given to a neonate, he can identify babies at high risk of ROP, especially those outside British criteria of ROP screening. This will help screen minimum number of neonates yet not missing anyone. Being a single centre study was the major limitation of this research.

CONCLUSION

A multidisciplinary team is essential to prevent blindness due to ROP in developing countries. Screening the babies who are at high risk of disease will lessen the burden on screening team and also utilize the resources in a developing country in more appropriate and targeted pattern.

Conflict of Interest: None to declare

Author Contributions: Asma Mushtaq: Concept, Literature review, Data collection.

Ahmed Raza: Literature Review, Data Collection, Article Draft.

Zaib Un Nisa: Literature Review, Data Collection & Analysis.

Seema Qayyum: Data Collection, Critical Review

Irfan Waheed: Data Collection, Critical Review

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