

# Early Screening for Retinopathy of Prematurity to Improve Visual Outcome in Preterm Babies

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## ABSTRACT

**Background:** Retinopathy of Prematurity (ROP) is a major cause of blindness in children in the developing world. Various guidelines have been established to screen routinely all preterm babies to prevent the development of ROP. The debate of ideal time to screen the babies for ROP is ongoing with conflicting results among various studies.

**Aims and Objectives:** To investigate the utility of commencing Retinopathy of Prematurity (ROP) screening before three weeks after birth to detect severe, treatment grade ROP in preterm babies to improve visual outcome in preterm neonates.

**Material and Methods:** A prospective study of 66 consecutive inborn premature infants screened for ROP was done. All preterm babies less than 2000 grams < 34 weeks were screened from second week after birth. Demographic data, clinical profile of stage, type of ROP and age at diagnosis and treatment were analyzed.

**Results:** The mean birth weight and gestational ages of the 66 infants were 1155 grams and 29.6 weeks respectively. 19 (28.78%) infants had treatment grade ROP all of which underwent laser photocoagulation for treatment. Of these, 11 infants (58%) had type 1 and 8 infants (42%) had Aggressive Posterior Retinopathy Of Prematurity (APROP) and were lasered after a mean postnatal age of 3.9 weeks. Eight infants (42%) (4 with type 1 & 4 with APROP) were found to have treatment grade ROP before 3 weeks of life and were treated at mean age of 2.6 weeks. The mean birth weight of these early detected cases was 1070 grams and mean gestational age was 29.5 weeks respectively. All treated cases had a favorable outcome.

**Conclusion:** Commencing ROP screening by 2nd week of life for babies < 30 weeks or < 1000 grams babies will help to improve the visual outcome in preterm babies with this dreaded morbidity.

**Keywords:** Prematurity, ROP Screening, Visual outcome

## INTRODUCTION

Retinopathy of Prematurity (ROP) is a major cause of blindness in children in the developing and developed world despite current surgical treatment in the latest stage of the disease [1]. Formerly known as retrolental fibroplasia, ROP was originally described in the 1940s by Terry who first connected the condition with premature birth [2]. At that time, no treatment for ROP was available. Major advances in ROP treatment came in the 1980s and 1990s, when cryotherapy and laser photocoagulation of the avascular retina were shown to be partially effective in preventing blindness in ROP infants. However, although these ablation treatments can reduce the incidence of blindness by 25% in infants with late-stage disease, the patients often still have poor visual acuity after treatment. AAP recommends screening of infants born at 30 weeks' Gestational Age (GA) or less, or with a birth weight of 1500 g or less [3]. ROP takes the longest to develop in the most immature infants. Data from two large clinical trials—the Multi-center Trial of Cryotherapy (CRYO-ROP) study and the

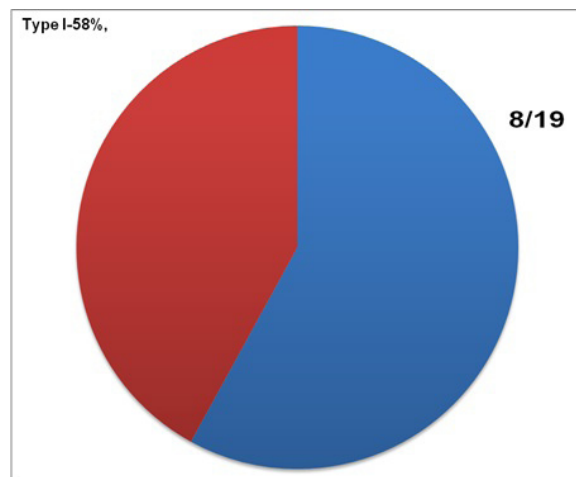
Light Reduction in Retinopathy of Prematurity (LIGHT-ROP) study—have been used to provide evidence-based criteria for initiating and stopping ROP screening. The recommendations were developed to ensure that eyes that had a high probability of requiring treatment would be identified in a timely manner, while at the same time minimizing the number of examinations for infants at low risk. Timing of the initial examination is based on both Post-menstrual Age (PMA) and Chronological Age (CA), and is undertaken to detect 99% of infants at risk of a poor visual outcome. The first examination is conducted between four and nine weeks' CA, depending on PMA at birth. Subsequent studies have confirmed the efficacy of conducting the first examination at four weeks' CA in more mature infants [4,5]. In spite of earlier screening still significant number of babies can develop severe ROP at earlier age (Vinekar et al., and Swarnarekha et al.). Earlier data from our country has suggested screening at 3 weeks of life which were associated with high incidences of ROP. Hence, the present study was done to assess the efficacy of screening at two weeks to improve the visual outcome in preterm neonates.

## MATERIAL AND METHODS

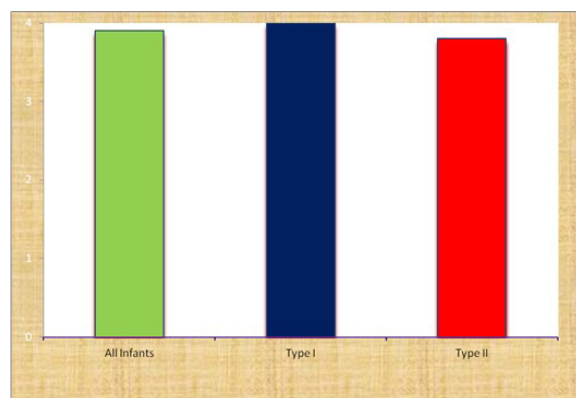
We conducted a prospective study over a period of six months at MS Ramaiah Memorial Hospital from March 2008 to August 2008. We enrolled all preterm babies less than 2000gms / and / or < 34 weeks Gestational age babies in the study. Written informed consent was obtained for ROP screening from all the parents and hospital ethical committee clearance was obtained. Risk factors correlation was analysed at the end. All babies underwent ROP screening from second week and was done by trained ophthalmologist with indirect ophthalmoscopy and Ret-cam digital imaging. ROP was graded according to ICROP 2005 guidelines. All babies followed up with weekly screening till retinal maturity to assess the favorable outcome. All babies with ROP treated according to ETROP (Early Treatment for Retinopathy of Prematurity) Trial guidelines.

## RESULTS

Sixty six babies were enrolled in the study. Mean birth weight was 1155 (840-1400gms) and mean PMA was 29.6 weeks. 28(42%) babies had ROP of any stage and 19(28.7%) babies had treatment grade ROP. Out of 19, 11(58%) babies had Pre threshold ROP and 8(42%) had Aggressive Posterior ROP [Table/Fig-1]. Eight infants (42%) (4 with Type1 and 4 with APROP) were found to have treatment grade ROP (12.1%) before the age of three weeks. All these babies had mean weight was 1070 grams with mean gestational age of 29.5 weeks.



[Table/Fig-1]: Sub-classification of Treatment grade ROP



[Table/Fig-2]: Mean age at Treatment Threshold ROP

All treatment threshold ROP cases were lasered after mean post natal age of 3.9 weeks and those babies with treatment threshold ROP at two weeks were treated at mean post natal age 2.6 weeks [Table/Fig-2]. Risk factors for early ROP association showed sepsis and Apnea of Prematurity are the commonest associations and were observed in 62% of cases followed by Hyperbilirubinemia, IUGR, Mechanical Ventilation and Blood Transfusion [Table/Fig-3].

Risk Factors	No. of babies	Percentage
RDS	2	25%
MV/ BCPAP	3	37%
HOOD O2	2	25%
BLOOD TR.	3	37%
HBR	4	50%
SEPSIS	5	62%
IUGR	3	37%
AOP	5	62%
PDA	1	12%

[Table/Fig-3]: Risk Factors for Early ROP

## DISCUSSION

There is an alarmingly increasing incidence of ROP in developing countries including India. The ROP was detected in 42% of our cases which was also observed by Charan et al., [7]. The treatment threshold ROP was observed in 28.7% of our cases which was also observed by Dogra et al., [8]. Our study demonstrated that the earlier screening for ROP resulted in detection of treatment threshold ROP in 12.1% cases as early as two weeks of age. If we follow western guidelines will result in missed ROP in 11% (American guidelines) and 7% (European guidelines) [9] of cases respectively. In our study we found the sepsis and Apnea of Prematurity were commonest risk factors for developing early ROP. Recent studies from the United States and other developed countries mention significant systemic illnesses in their infants with ROP [10-12]. We also found hyperbilirubinemia, Blood transfusion and need for Mechanical ventilation / CPAP were associated risk factors. Wagner in his editorial noted that oxygen monitoring requires sophisticated pulse oximeters and other equipment not readily available in developing countries [13]. As expected, the occurrence of ROP correlated with more supplemental oxygen and the administration of CPAP. In India, Rekha et al., [14] reported that duration of oxygen therapy and anemia were independent factors predicting the development of ROP. In another recent study, Dutta et al., [15] reported the administration of packed cell and double volume exchange transfusions in the neonatal period as major risk factors for the development of threshold ROP. There is a need to study prospectively, the maternal factors responsible for severe ROP in heavier babies. In our study the treatment threshold ROP was detected as early as two weeks in babies born close to 30 weeks and weighing around 1000grams. Hence, the current

guidelines, which are based on joint recommendations from AAP and AAO 1997, need to be reassessed. In our study all 8 babies detected of having treatment grade ROP before 3 weeks of age underwent laser therapy and all showed favorable outcome.

## CONCLUSION

In conclusion, treatment Grade ROP is not uncommon in developing world and can manifest as early as two weeks of age. Hence, a more efficient strategy which includes increasing awareness among ophthalmologists and neonatologists regarding the magnitude of the problem is essential. A closer look at the recommended (AAP 2006) guidelines for developing countries with special emphasis on earlier screening as early as two weeks of age, at least in extremely premature babies would reduce the blindness burden associated with ROP in these babies.

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