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Original Research Article

A Profile of Premature Babies Coming for Retinopathy of Prematurity Screening

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Abstract:

Aim: Retinopathy of prematurity (ROP) is one of the leading causes of blindness in Indian children. ROP is more common in preterm infants who have required extensive neonatal care like prolonged oxygen therapy and several other risk factors. We conducted this study with aim of finding clinical & demographic profile of premature babies coming for ROP screening.

Methodology: A Retrospective Analysis of Hospital Data of ROP Screening of 98 babies, which was conducted between April 2020 to April 2021 at Tertiary Care Hospital of South Gujarat, was done. Babies falling in the recommended broad eligibility criteria (Gestational age ≤ 34wks, Birth weight ≤ 2000gm or Gestational age ≥ 34wks with other risk factors) were examined.

Result &Discussion: On evaluating the data, we found that majority of babies screened were having Gestational Age ≤ 30 wks (44.89%) & Birth Weight between 1-1.5kg (60.2%). At the time of presentation, out of 196 eyes of 98 babies screened, 166 (84.6%) eyes having ROP Stage 0 & 1. While 13 (6.6%) eyes having ROP Stage 2 & above. Preplus disease, Plus disease & APROP seen in 20 (10.2%), 7 (3.5%) & 2 (1.2%) eyes respectively. While 16 (8.1%) eyes found having mature retina. During this 1-year period, 16 (16.32%) babies were falling in criteria for ROP treatment.

Conclusion: On basis of this study, we found low birth weight & prematurity as major risk factor for development of ROP & requirement of timely screening, regular follow-up & treatment to reduce burden of ROP related blindness.

Keywords: Retinopathy, Premature, Oxygen, low birth weight etc.

Introduction

Retinopathy of prematurity (ROP) is one of the leading causes of blindness in Indian children [1]. This condition is reported mostly in preterm infants with very wide spectrum of severity ranging from minor transient changes in the retina with complete regression to extensive progressive vascular proliferation, scarring, retinal detachment and complete blindness. ROP is more common in preterm infants who have required extensive neonatal care like prolonged oxygen therapy and several other risk factors.

The World Health Organization has identified ROP as a priority for control, particularly in poor developing countries like India [2]. In the year 1942, it was Terry [3] who first described retrolental fibroplasia due to excessive oxygen administration as the causative agent. Since then it is established that administration of oxygen in premature infants should be closely monitored as it may result in increased mortality. Today oxygen therapy along with many other risk factors is established causative factor playing a causative role in the pathogenesis of ROP [4,5]. In western world, the majority of babies getting ROP weigh less than 1000 g at birth.

This has been termed the "second epidemic". Currently India and other developing countries are facing "third epidemic" which is a mixture of the first two epidemics [6]. This "third epidemic" is characterized by severe ROP in both relatively mature as well as immature babies reflecting varying levels of neonatal care. India accounts for the most Preterm births in the world (3.5 millions). India has the Third highest incidence of LBW, with about 1.7 million weighing <2500gm and about 0.4 million <1500gm. ROP, being not present at birth, requires timely screening & regular follow-up to identify

such cases & provide timely treatment to prevent visual morbidity.National neonatology forum (NNF), India recommends performance of screening in all preterm infants born <34 weeks gestation and/or <750 grams birth weight and screening infants between 34 and 36+6 weeks gestation or 1750 and 2000 grams birth weight with risk factors for ROP [7].

Incidence of ROP varies in different neonatal setup. It has been reported to vary from 21% to 65.8% in Western studies [8-10] .2-4 Studies from India have reported ROP in 20% to 52% of screened neonates. More recent studies reporting lower rates of ROP ranging from 20% to 30%. [11-13]

We conducted this study with aim to evaluate clinical & demographic profile of premature babies coming for ROP screening. And also attempts to identify the risk factors which predispose to ROP in a large population of neonatal Intensive Care Unit (NICU).

Methodology

We conducted this retrospective analysis of hospital data of ROP. Total screening of 98 babies was conducted between April 2020 to April 2021 at tertiary care hospital of south Gujarat. Babies falling in the recommended broad eligibility criteria (Gestational age ≤ 34wks, Birth weight ≤ 2000gm or Gestational age ≥ 34wks with other risk factors) were examined.

ROP screening was performed on weekly OPD in collaboration with a trained and experienced Vitreo-Retinal Surgeon and pediatric department of hospital. Patients were comfortably seated and their pupils dilated with Tropicamide + Phenylephrine eye drops generally 20-30 minutes before examination. Examination was conducted only after complete dilatation. During examination procedure, pain protocol was followed and vitals were monitored. The fundus examination was done with strict aseptic precautions using Indirect Ophthalmoscope and 20D lens with the use of eyelid specula and scleral depressors as necessary, under topical anaesthesia (0.5% proparacaine drops). Video indirect ophthalmoscope used for teaching & training purpose. Screening was performed by two senior ophthalmologists with more than 10 years of experience in ROP. Informed verbal consent was obtained from parents for ROP screening. After procedure findings were noted and ROP was classified using the revised International Classification of ROP classification.

Inclusion criteria:

- Gestational age ≤ 34wks
- Birth weight ≤ 2000gm
- Gestational age ≥ 34wks with other risk factors like,Oxygen requirement in postnatal period, Respiratory Distress Syndrome, Apnea, Sepsis, Blood Transfusion, Fetal Hemorrhage, Multifetal pregnancy, other preterm infants based on discretion of Pediatrician.

Recommended time for first ROP screening , before “day 30” of life and by “day 20” of life in smaller babies (<30wks &/or birth weight <1200gm).

ROP Treatment Criteria according to ETROP

- Zone I, any stage with plus disease
- Zone I, stage 3 without plus disease
- Zone II, stage 2 or 3 with 2 or more quadrants of plus disease

Infants were stratified into birth weight groups and gestational age (GA) groups (≤ 30 weeks, 31-34 weeks, 35-37 weeks, 38-40 weeks, >41 weeks) which were based on the results of previous studies. This was done to enable ease of comparison with other national and international data.

Results

Total 98 babies were examined during the study duration. Out of these 42 were female & 56 were male. In our study 4 twin gestation (8 babies) and 01 Triplet gestation (3 babies) were enrolled. Technically total 196 eyes of 98 babies were examined.

Incidence of ROP in our study came out as 21% as out of 196 eyes examined 139 of stage 0 and 16 of mature retina were counted as normal. Majority of babies 44 screened were below 30 weeks of gestation constituting maximum proportion (44.89%) of total babies. Total 31 (31.6%) babies belong to 31-34 weeks age group, 17 babies (17.35%) from 35-37 weeks, 05 from 38-40 weeks and 01 baby was > 41 weeks (Figure 1.0).

Maximum number of babies (59) fall in group of 1-1.5 kg Birth weight (60%). 15 babies were < 1.0 kg. Weight group of 1.6-2.0 kg had 14 babies enrolled. 10 babies weigh more than 2.0 kg (Figure 2.0).

Screening was done within 28 days of birth by senior trained ophthalmologist. At the time of screening, various ROP stages were identified in varying proportion, out of which immature stage contained maximum no. of babies. Of 98 babies technically 196 eyes were examined, 139 (70.9%) and 27 (14%) eyes having ROP Stage 0 & 1 respectively. While 13 (6.6%) eyes having ROP Stage 2 & above. Preplus disease, Plus disease & APROP seen in 20 (10.2%), 07 (3.5%) & 02 (1.2%) eyes respectively. Out of 196 eyes examined 16 (8.1%) eyes found having mature retina (Figure 3.0). Over the period of one year, out of total 98 babies examined, 20 babies completed follow-up as advised. 29 babies lost to follow-up after initial screening. 16 babies were falling in criteria for ROP treatment. Out of these 16 babies, who required treatment, 09 were male and 07 were female babies.

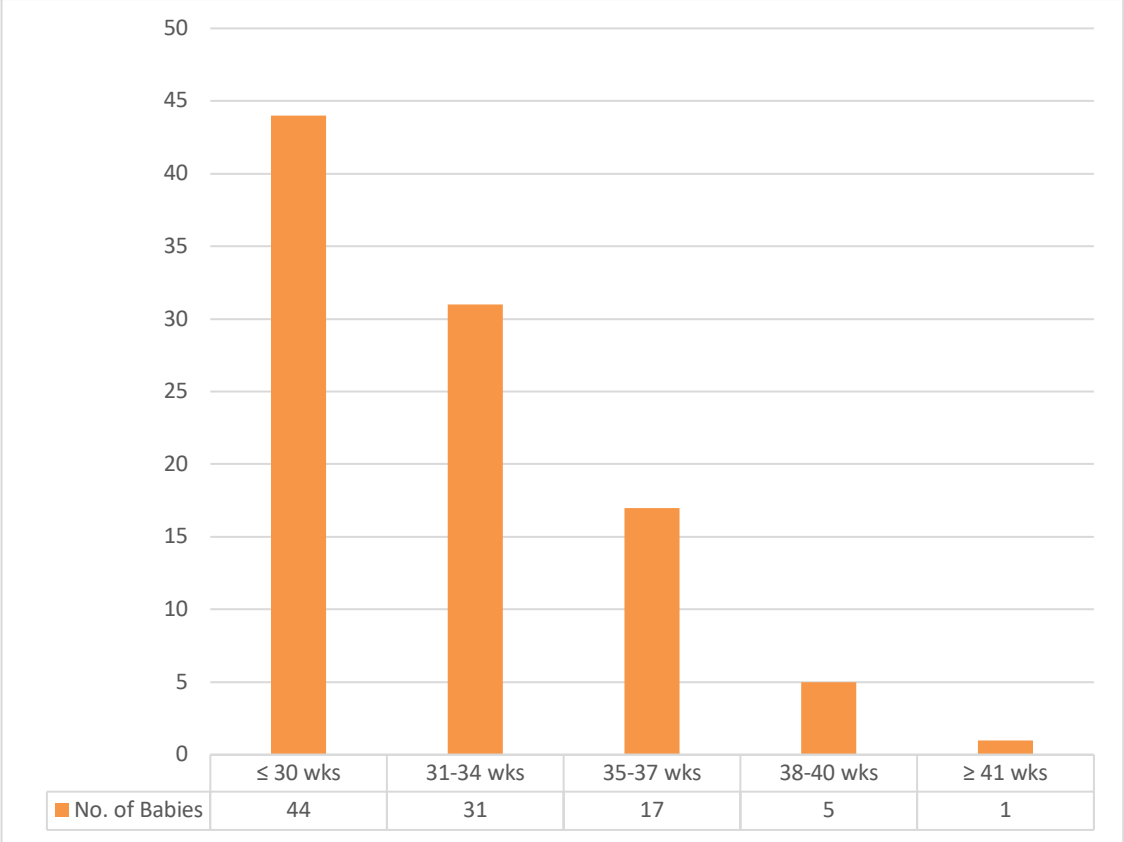

Figure 1.0: Distribution of babies examined according to gestation age:

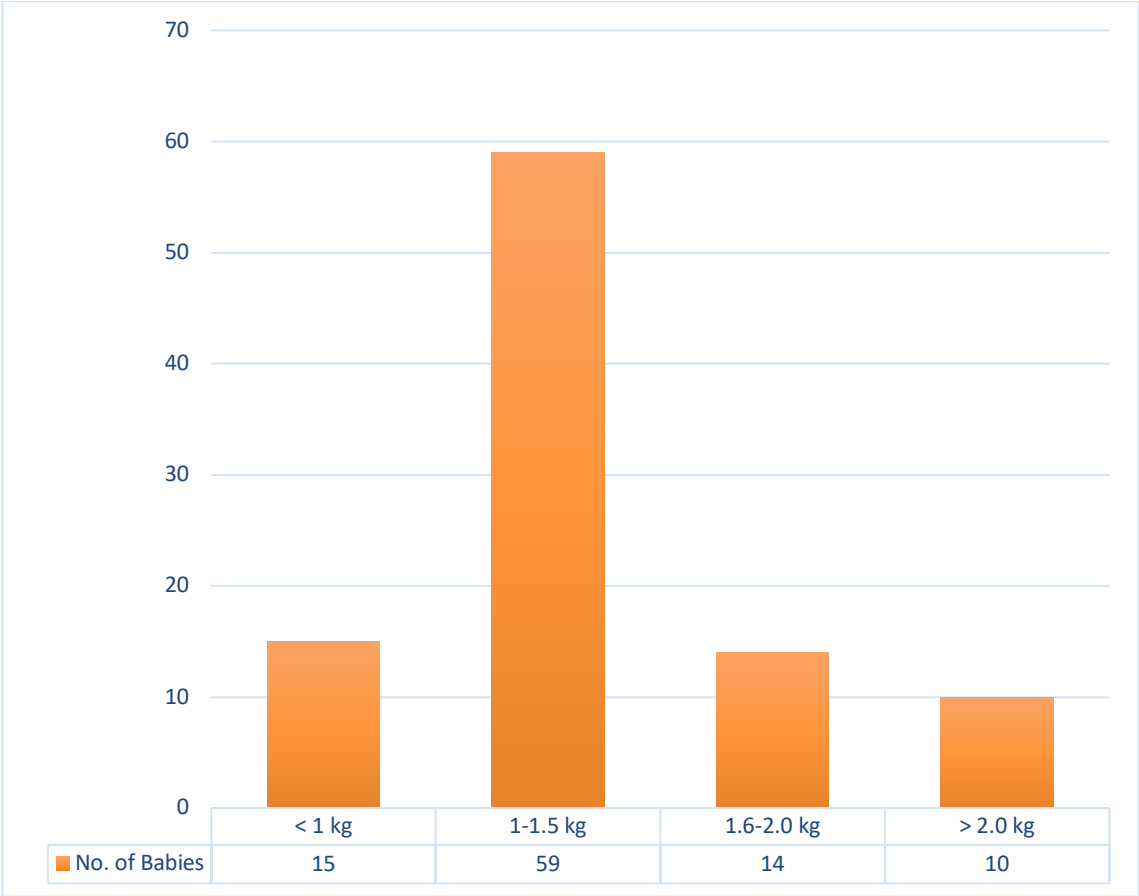

Figure 2.0: Distribution of babies according to Birth weight:

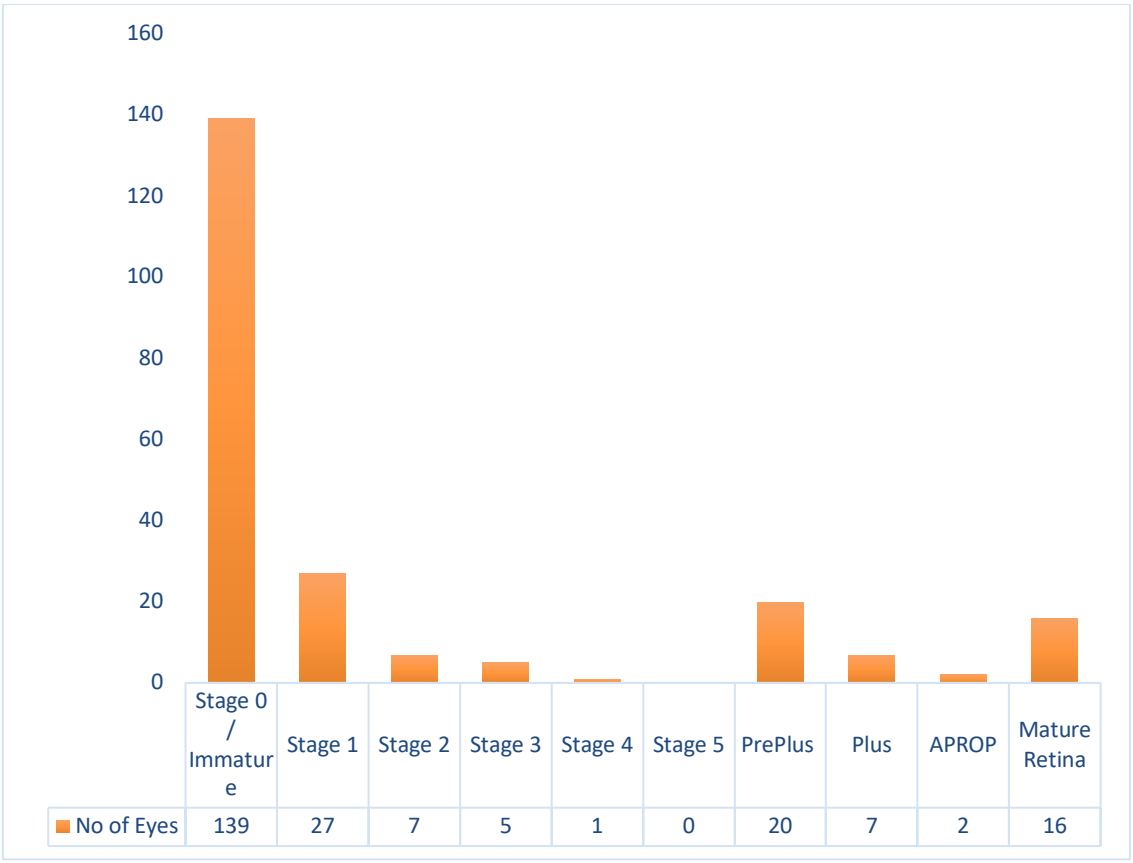

Figure 3.0: Total 98 babies examined. Technically 196 eyes examined

Discussion:

Nowadays with availability of extensive neonatal care and increased survival of low and very low-birth weight born infants, incidence of ROP expected to increase in the near future. In country like ours, the gestational age is not always known correctly; also ROP has been reported in larger babies with a birth weight between 1500 and 2000 grams.

In present study incidence of ROP was 21% which was similar like in Maheshwari R et al14, (20%), Chaudhari S et al [15], (22.3%) and Goyal A et al [16], (25.4%). Incidences of ROP in various studies in India have been reported to be 51% from Delhi (79 patients), 47% in a study from Chandigarh (165 patients), 44% from north east (50 patients), 38% from Chennai (50 patients), 22% from Bangalore (7106 images), 22.3% from Pune (552 infants) and 11.8% from AIIMS, Delhi (704 patients) [23-25]. Main reason for difference in incidence rate is due to the selection criteria, as different studies included different age group for determining the incidences of ROP.

In study done by Charan R et al [17] all babies <1700 gm screened for ROP. Le c et al [18], retrospectively analysed data of 2910 infants admitted to the NICU between March 2008 and December 2013 and include neonates with <1750 g of birth weight. In study carried out by Kapoor et al [19] at Safdarjung Hospital, all babies of <1800 grams were screened irrespective of their gestational age. There are varying screening criteria described by different authors. Maheshwari, et al [14]. Screened all babies weighing, 1500g with a gestational age <35 weeks. Gupta, et al [20]. Screened all babies <1500g and/or gestational age ≤35 weeks.

The examination findings characteristics of these babies are very similar to the findings published during the first epidemic in the 1940s, when excessive supplemental oxygen was widely used. The first epidemic which was largely 'oxygen induced' ended after checking the usage of unmonitored oxygen. In the second epidemic prematurity is playing a major role in causing ROP, while oxygen is having a minor one. But now developing countries are in era of 'third epidemic' which is also seen in larger older babies.

Birth weight usually correlates with maturity of the newborn. Hence in most of the previous studied, incidence of ROP was highest in babies weighing <1500 gm. But now it is also found that in older babies with some specific conditions.

In present study, out of 98 babies examined, 16 cases (16%) required treatment. -While in other studies like 46% required cryotherapy in Maheshwari R et al [14], 21% required laser and 5% required cryotherapy in Gopal L et al [20], 19.5% required cryotherapy in Rekha S et al [21], 8% required

cryotherapy in Aggarwal R et al [12], 33% required laser in Chaudhari S et al [15],4% required laser in Hungi B et al [22], 12 % required laser in Le c et al [18], and 9.8% required laser in Goyal A et al [16].

Incidence of ROP stage 0 and stage 1 found to be most prevalent, similar results were found by Maheshwari el al and Rekha S et al. Aggressive posterior ROP (APROP) can occur early in very low birth weight (VLBW) infants and has poor visual outcome which is relatively common in Indian infants. We also find that the communication between paediatricians and ophthalmologists is of utmost importance. It is the neonatologist who first identifies the babies suspected of ROP and calls for ophthalmic examination. Integrated training of ophthalmologists and paediatrician is also important, and ophthalmic examination before 04 weeks after birth should be made routine practice in all possible cases.

Conclusion:

As childhood blindness is common in India and timely treatment can prevent most of them. ROP is a condition not present at birth and develop subsequently with age progression thus requires timely screening & regular follow-up by experts to catch disease in time. We found low birth weight & prematurity as major risk factor for development of ROP along with other factors like sepsis, blood components usage and others. Requirement of timely screening, regular follow-up & treatment to reduce burden of ROP related blindness. Oxygen supplementation should always be used judiciously and duration should be limited as short as possible. Similarly, blood products should be used very cautiously in newborns.

It is also important that parents should understand the need for timely screening and arrangements needed for further management.

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