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Original Research Article

Determining the Prevalence of Retinopathy of Prematurity (ROP) in Premature Babies: A Prospective Observational Study

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Abstract

Aim: The aim of the present study was to determine the prevalence of ROP in premature babies in a tertiary care hospital.

Material & Methods: It was a prospective study carried out in premature babies referred for ophthalmological examination in Department of Ophthalmology, over a period of one year. 200 babies were enrolled in this study. Babies with GA of <32 weeks at birth and birth weight <1500 gm, babies with gest age>32 weeks or birth weight >1500 gm were included if they were exposed to oxygen therapy for more than >7 days.

Results: Out of 200 patients screened for ROP, 60 babies (30%) were found to have ROP of different zones and stages. We found out that total 32% of 200 babies which accounts for 64 babies were very low birth weight. 44% of total babies were low birth weight which accounts for 88 babies. 24% babies were having normal birth weight which accounts for 48 babies. In the present study, 55% were pre term babies and 45% were delivered at full term. In our study 55% of very low birth weight babies, were having ROP which accounts for 33 out of 64 babies. 241.66% of low birth weight babies were having ROP (25 out of 88). Only 3.34% of normal birth weight babies were having ROP. ROP was found in 54 Out of 110 pre term babies. Only 6 babies out of 90 full term babies had ROP. These findings were statistically significant (P less than 0.0001).

Conclusion: Retinopathy of Prematurity was most commonly seen in low-birth-weight babies. High rate of premature birth and increasing advancementof healthcare without proper standards resulted in thirdepidemic. It is essential to screen premature babies and babies with low birth weight. Awareness regarding ROP screening is a key factor for its prevention. There is urgent need of screening guidelines of ROP for developing countries like India.

Keywords: Premature, Low BW, ROP.

Introduction

Retinopathy of prematurity (ROP) is a vaso-proliferative disorder of the retina, which principally occurs in premature neonates during vascular development and maturation stage. It was first identified by Terry in 1942 and named it retrolental fibroplasias [1] because of his impression that it was the pathology that involve embryonic hyaloid proliferation of retina. The term ROP was given by Heath in 1951. [2] The incidence of ROP is closely correlated with the weight and the gestational age at birth. It is one of the most common causes of visual loss in children and can lead to lifelong vision impairment and blindness. [3] There are approximately 45 million blind people in the world today out of which, 30% are in Asia. Of the total blindness, childhood blindness accounts for 4%. It is estimated that there are about 1.4 million blind children, 1 million of whom live in Asia. India shares 20% of the world's childhood blindness. [3] ROP afflicts over 3,00,000 infant's worldwide. [4] In developing countries like India the incidence of ROP has been reported at 24 – 47 % among high risk preterm infants. [5]

ROP is characterized by abnormal neovascular development in the retina of premature infants. These abnormal blood vessels are fragile and can leak or bleed, scarring the retina and pulling it out of position. This causes a tractional retinal detachment, which is the main cause of visual impairment and blindness in ROP.[6] The stages of ROP describe the ophthalmoscopic findings at the junction between the vascularized and avascular retina; stage 1 is a faint demarcation line, stage 2 is an elevated ridge, stage 3 is an extra retinal fibrovascular tissue, stage 4 is a subtotal retinal detachment, while stage 5 is a total retinal

detachment. Low birth weight and gestational age were found to be the most important risk factor for the development of ROP. [5] ROP is multifactorial disorder, having various risk factors including prematurity, low birth weight, oxygen therapy. [6] In many cases it may undergo spontaneous regression or may progress to blindness. If detected early and timely intervention is done, the blindness is preventable. In developed countries; its incidence continues to increase with the improvement in the survival of extremely premature infants. [7,8] The abnormal neovascular development in ROP is fragile and can leak or bleed, scarring and pulling the retina causing retinal detachment, which is the main cause of visual impairment and blindness in ROP. [9] By early detection and timely intervention, blindness due to ROP is preventable. [1,10]

The purpose of this study was to know the incidence of ROP and to correlate it with maternal and neonatal risk factors. [11]

Material & Methods

It was a prospective study carried out in premature babies referred for ophthalmological examination in Department of Ophthalmology, Nalanda Medical College and Hospital, Patna, Bihar, India over a period of one year. 200 babies were enrolled in this study. Babies with GA of <32 weeks at birth and birth weight <1500 gm, babies with gest age>32 weeks or birth weight >1500 gm were included if they were exposed to oxygen therapy for more than >7 days.

Inclusion Criteria

- Babies with GA<32 weeks and birth weight <1500 gm, babies with GA >32 weeks and birth weight >1500 gm if exposed to oxygen therapy for more than 7 days were included in the study.

Exclusion Criteria

- Neonates with congenital anomalies, chromosomal abnormalities and inborn error of metabolism will be excluded from study.

Methodology

More than 100 premature babies were examined by indirect ophthalmoscope with 20 D lens and scleral depressor demographic history and risk factors, like respiratory distress, sepsis, multiple blood transfusion, multiple birth, apneic episode and oxygen documented.

First examination was done at 4th post-natal week then weekly and biweekly until retinal vascularization has reached zone 3.

The pupils were dilated using 2.5% phenylephrine and 1% tropicamide eye drops instilled into each eye three times at intervals of 15 minutes one hour before examination. The examination was done under all aspectic condition. One drop of topical paracaine eye drops were used and paediatric wire speculum was used to keep eyelids apart. Indirect ophthalmoscopy was done by same ophthalmologist using 20 D lens and scleral depressor If no ROP was detected at initial examination. the infants were re-evaluated once every two weeks. Until vascularization was complete. If ROP was detected the examination was performed weekly for stage 1 and 2 more frequently for stage 3 till the disease start resolving.

ROP was defined as the incomplete or abnormal vascular proliferation of the retina, The ROP classified by location on retina (zone 1-3), and severity (stage 1-5), according to criteria established by the international committee for classification of ROP.[11] All patients diagnosed with stage 3 ROP treated with laser photocoagulation.

The ophthalmological examinations were initiated at the 4th week of life and were repeated weekly or biweekly, until full vascularization of the retina reached zone 3 (the most peripheral temporal retinal zone), or until full remission of ROP after treatment.

Statistical Analysis

The prevalence rate of ROP was described in simple proportion. Group comparisons were done by the Chi-square ($\chi 2$) test or Fisher's exact test for categorical variables. A probability (P) of less than 0.05 was considered significant.

Results

Table 1: Magnitude of ROP

ROP	N	%
No	140	70
Yes	60	30
Total	200	100

Out of 200 patients screened for ROP, 60 babies (30%) were found to have ROP of different zones and stages.

Table 2: Distribution of birth weight and gestational stage

Birth weight	N	%
Very low (<1 kg)	64	32
Low (1 to 2.5 kg)	88	44
Normal (>2.5 kg)	48	24
Total	200	100
Gestational age		
PRE term (<34 weeks)	110	55
FULL term (>34 weeks)	90	45

We found out that total 32% of 200 babies which accounts for 64 babies were very low birth weight. 44% of total babies were low birth weight which accounts for 88 babies. 24% babies were having normal birth weight which accounts for 48 babies. In the present study, 55% were pre term babies and 45% were delivered at full term.

Table 3: Birth weight association with ROP

	Birth weight			
	Very low (<1 kg)	**Low (1 to 2.5 kg)**	**Normal (>2.5 kg)**	**Total**
No	31 (22.14%)	63 (45%)	46 (32.86%)	140
Yes	33 (55%)	25 (41.66%)	2 (3.34%)	60
Total	64	88	48	200

We have observed that statistically significant P value (P less than 0.0001) was found out in low birth weight babies. Babies having low birth weight have more chances of Retinopathy of Prematurity than normal birth weight babies. This result was statistically significant. In our study 55% of very low birth weight babies, were having ROP which accounts for 33 out of 64 babies. 241.66% of low birth weight babies were having ROP (25 out of 88). Only 3.34% of normal birth weight babies were having ROP.

Table 4: Relation of ROP and gestational age

	Gestational age		Total
	Pre term (<34 weeks)	**Full term (>34 weeks)**	
No	56 (40%)	84 (60%)	140
Yes	54 (90%)	6 (10%)	60
Total	110	90	

ROP was found in 54 Out of 110 pre term babies. Only 6 babies out of 90 full term babies had ROP. These findings were statistically significant (P less than 0.0001).

Discussion

ROP is a pathological process that occurs in immature retina if left undetected can lead to tractional retinal detachment and thereby results in total blindness with increasing burden of blindness as well as economic burden too. To prevent these consequences it is high time requirement to screen the preterm and high risk babies at appropriate time and treat them as and when require till they reach to irreversible stage. In an order to achieve this goal screening guidelines were made and followed, records were kept to assess the prevalence outcome and associated risk factors.

Out of 200 patients screened for ROP, 60 babies (30%) were found to have ROP of different zones and stages. In contrast, the study which was done by Abdel H. A. A. Hakeem [12] in England had 19% ROP prevalence. The study done by Dr. K. Rajendran in Tamil Nadu had prevalence of 19%. [13] The prevalence of both the studies was lower than our study. We found out that total 32% of 200 babies which accounts for 64 babies were very low birth weight. 44% of total babies were low birth weight which accounts for 88 babies. 24% babies were having normal birth weight which accounts for 48 babies. In the CRYO-ROP study the incidence of the disease in a group of premature newborns with a birth weight <1251gms was 65.8% and 81.6% for infants of less than 1000 g birth weight. [14] In the present study, 55% were pre term babies and 45% were delivered at full term.

Since ROP is essentially asymptomatic in the early stages, standards of practice now demand carefully timed retinal examination of at risk infants. High ROP rates are associated with comorbidities of preterm birth [15] which has major social consequences like blindness especially in middle income countries and south- east Asia. [16] It has implications throughout life of the child and family. ROP is a multifactorial disease [17,18] with associated risk factors like birth weight gestational age, oxygen sup- plementation, prolonged mechanical ventilation, anaemia, Intraventricular haemorrhage, necrotizing enterocolitis, sepsis. [19]

In our study 55% of very low birth weight babies, were having ROP which accounts for 33 out of 64 babies. 241.66% of low birth weight babies were having ROP (25 out of 88). Only 3.34% of normal birth weight babies were having ROP. ROP was found in 54 Out of 110 pre term babies. Only 6 babies out of 90 full term babies had ROP. These findings were statistically significant (P less than 0.0001).

Conclusion

Retinopathy of Prematurity was most commonly seen in low-birth-weight babies. High rate of premature birth and increasing advancement of healthcare without proper standards resulted in third epidemic. It is essential to screen premature babies and babies with low birth weight. Awareness regarding ROP screening is a key factor for its prevention. There is urgent need of screening guidelines of ROP for developing countries like India.

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