



Incidence and Risk factors of Retinopathy of Prematurity in Tertiary Care Centre of Western India

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Abstract

Aim: This study is aimed to estimate the incidence of retinopathy of prematurity and to identify the risk factors which predispose to retinopathy of prematurity.

Material & Methods: The present prospective study was conducted at Ophthalmology department of tertiary care centre in Aurangabad, India from September 2010 to May 2013. Total 150 preterm infants admitted to the neonatal intensive care unit or discharged were included in this study. Diagnosis of ROP was done by binocular indirect ophthalmoscopy and graded into stages and zones as per the international classification of ROP. The data was analysed by using the SPSS-23 program and applying the chi-square test.

Results: Of the total 150 infants screened, ROP was seen in 71 infants with the overall incidence of 47.33%. The stage I ROP was with the highest incidence (22%), followed by decreased incidence pattern in stages II, III, IVa. There were no patients with stage V. The highest percentage of retinopathy of prematurity was seen in infants with gestational age < 28 weeks and extremely low birth weight (<1000 g) infants. The oxygen administration for more than 2 days ($p=0.0001$), sepsis ($p=0.001$), intraventricular haemorrhage ($p=0.001$), blood transfusion ($p=0.001$) and respiratory distress syndrome ($p=0.01$) were found to be statistically significant for the development of retinopathy of prematurity.

Conclusion: All high risk babies should be screened for ROP as early screening and intervention can help to increase the child's chances of better vision and hence better quality of life and also reduce the load of paediatric blindness due to ROP.

Key words: Retinopathy, prematurity, incidence, risk factors, low birth weight.

INTRODUCTION

Retinopathy of prematurity (ROP) is a vasoproliferative disorder of the developing retina of low birth weight preterm infants that potentially leads to blindness^[1]. The incidence of blindness due to retinopathy of prematurity varies between countries and it is influenced by the level of perinatal care and the existence of screening programs for early diagnosis^[2]. The visual impairment or blindness due to retinopathy of

prematurity carry a high financial cost for the community as well as individual by affecting the normal motor, language, conceptual, and social development of the child^[3]. The risk factors like low gestational age, low birth weight and prolonged exposure to supplementary oxygen following delivery have shown consistent and significant association with retinopathy of prematurity^[4]. Other putative risk factors have been proposed are mechanical ventilation, sepsis,

intraventricular haemorrhage, surfactant therapy, anaemia, frequent blood transfusions, apnea and necrotizing enterocolitis^{[5],[6]}. The analysis of risk factors for ROP development will help to understand and predict ROP development in premature infants. Recent advances in neonatal care in the last decade have improved the survival rates for premature infants, consequently, the incidence of retinopathy of prematurity has increased in parallel^[7]. Considering these facts, this study was aimed to estimate the incidence of retinopathy of prematurity in preterm infants and to identify the risk factors which predispose to retinopathy of prematurity.

MATERIAL & METHODS

The present prospective observational study was conducted at Ophthalmology department in cooperation with department of Paediatrics of tertiary care centre in Aurangabad, India from September 2010 to May 2013. Ethical clearance was obtained from the hospital ethics committee and informed consent of the parents was also obtained. 150 preterm infants admitted to the neonatal intensive care unit or discharged with gestational age ≤ 32 weeks, gestational age > 32 weeks but < 35 weeks and associated with risk factors, birth weight ≤ 1700 grams, birth weight > 1700 grams but < 2000 grams and associated with risk factors i.e. oxygen therapy more than 2 days, sepsis, multiple births, seizures, multiple blood transfusions, respiratory distress syndrome, intraventricular haemorrhage, necrotising enterocolitis were included in the study. Babies

with birth weight > 2000 gms, gestational > 35 weeks, media opacities such as corneal edema, corneal opacity, cataract etc were excluded from the study. Examination of the eyes was done in the neonatal unit or in the neonatal follow up clinic at 4-6 weeks postnatal age or 31st week of postgestational age whichever was later. All the screened babies (ROP and non ROP) were followed up to complete maturation of peripheral retina. Diagnosis of retinopathy of prematurity was done by binocular indirect ophthalmoscopy with 20D lens. Eyes were examined with an infant speculum and a scleral depressor under topical anaesthesia using 2% proparacaine drops. The pupils were dilated by using 0.4% tropicamide +1.25% phenylephrine eye drops two or three times, till full dilatation occurred. Retinopathy was graded into stages and zones as per the international classification of ROP^[8]. All findings were recorded on a standard proforma for screening of retinopathy of prematurity. The data was statistically analysed by using the statistical package for social sciences (SPSS-23) program and applying the chi-square test.

RESULTS

Total 150 infants were screened for ROP including 73 males and 77 females. Their birth weight ranged from 780 to 2000 g with a mean of 1351 g. The gestational age ranged from 25 to 35 weeks with a mean of 30 weeks. Retinopathy of prematurity was seen in 71 infants with the overall incidence of 47.33 %.

Table No 1: Stage wise distribution of retinopathy of prematurity

Stage of ROP	Patient with ROP (n)	Incidence (%)
I	33	22
II	21	14
III	15	10
Iva	02	1.3
V	00	00
Total	71	47.33

Among all the stages of ROP, stage I retinopathy of prematurity was found to be with the highest incidence (22%), followed by decreased incidence pattern in stages II, III, IVa. There were no patients with stage V (Table1).

Table 2. Gestational age wise retinopathy of prematurity

Gestational Age (weeks)	Number	ROP n (%)
< 28	31	20 (64.51)
28 - 32	86	38 (44.18)
32 - 34	21	10 (47.61)
> 34	12	03 (25)

The highest percentage of retinopathy of prematurity was seen in infants with gestational age < 28 weeks and least in gestational age > 34 weeks (Table2).

Table 3. Birth weight wise retinopathy of prematurity

Birth weight (grams)	Total no.	ROP n (%)
<1000	25	17 (68%)
1001-1500	79	35 (44.30%)
1501-1700	35	15 (42.85%)
1701-2000 (with risk factors)	11	04 (36.36%)

The highest percentage of retinopathy of prematurity was found in extremely low birth weight (<1000 g) infants.

Table 4. Risk factors predisposing to retinopathy of immaturity

Risk factors	Total no. of babies screened	No ROP	ROP	X 2	P value
Oxygen administration for > 2 days	49	14	35	16.96	0.0001
Sepsis	25	6	19	9.88	0.001
Intraventricular haemorrhage	29	7	22	11.73	0.001
Multiple births	7	6	1	3.217	0.72
Respiratory distress syndrome	17	5	12	4.15	0.01
Necrotizing enterocolitis	16	9	7	0.092	0.761
Blood transfusion	26	7	19	8.36	0.001

Among the risk factors included in this study, oxygen administration for more than 2 days ($p=0.0001$), sepsis ($p=0.001$), intraventricular haemorrhage ($p=0.001$), blood transfusion ($p=0.001$), respiratory distress syndrome ($p=0.01$) were found to be statistically significant for the development of retinopathy of prematurity while multiple birth, necrotising enterocolitis were seen insignificant statistically.

DISCUSSION

Studies from India reporting incidence of ROP provides interesting insights. Although screening criteria differ across different units and time-periods, overall incidence of ROP varies from 20% to 52% with more recent studies reporting lower rates of ROP ranging from 20% to 30%^{[9]-[12]}. The incidence of ROP (47.33%) reported in our study was in agreement with the Indian studies. Cryotherapy for retinopathy of prematurity (CRYOROP) Study^[13] and ETROP study^[14] were reported an incidence of ROP of 65.8% and 68% respectively among the infants of less than 1251 g. The incidence of ROP reported in our study was less than these above described studies. This difference was may be because the

percentage of survival of the infants with extremely low birth weight is less and infant mortality rate was quite high as compared to their setup. The highest incidence of stage I retinopathy of prematurity noted in this study along with the decreased incidence pattern in stages II, III, IVa was comparable with the study of Eduardo GoncalvesI et al^[15] in which Stage I of the disease was the most frequently observed form. Several studies in the literature have shown that the lower the birth weight and the lower the gestational age are, the higher the chance of developing ROP also is^[16]. Moreover, lower birth weight and lower gestational age are associated with the development of more serious forms of ROP. In our study also, we found the highest percentage of

retinopathy of prematurity in infants with extremely low birth weight (<1000 g) and gestational age of < 28 weeks. Retinopathy of prematurity is a multifactorial disease and many risk factors have been proposed since the disease was described by Terry in 1942. The statistically significant correlation of oxygen administration for more than 2 days, sepsis, intraventricular haemorrhage, blood transfusion and respiratory distress syndrome with retinopathy of prematurity found in this study was in concordance with the study of Chaudhari S et al^[9], VA Shah et al^[17] and Rekha S et al^[18]. The statistical insignificance of multiple birth and necrotising enterocolitis in this study can be also comparable with the above described studies.

CONCLUSION

The observed incidence of ROP in current study was within a range of other Indian studies, however, it is less than that of developed countries. All high risk babies should be screened for ROP as early screening and intervention can help to increase the child's chances of better vision and hence better quality of life and also reduce the load of paediatric blindness due to ROP.

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