Section: Miscellaneous

Original Research Article

INCIDENCE OF RETINOPATHY OF PREMATURITY IN PRETERM INFANTS IN TERTIARY CARE HOSPITAL, BANDA DISTRICT, UTTAR PRADESH: A PROSPECTIVE OBSERVATIONAL STUDY

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ABSTRACT

Background: Retinopathy of prematurity (ROP) is emerging as leading cause of childhood blindness. The incidence of ROP is likely to increase in moderate to late preterm with birth asphyxia with oxygen supplementation. This study is conducted to determine the perinatal risk factor for ROP in late preterm. This study aimed to investigate the incidence of retinopathy of prematurity (ROP) in moderate to late preterm infants diagnosed with perinatal asphyxia.

Materials and Methods: A prospective observational study carried out at tertiary care hospital in which 180 preterm neonates were included with or without history of perinatal asphyxia in >32 week and <36 week preterm.

Results: ROP incidence was 99/180 (55%). Findings suggest a signification association of gestational age, duration of oxygen therapy, history of perinatal asphyxia and birth weight with ROP. Zone 3 (19.1%) plus disease (5.05%) stage 1 & 2 without plus diseased showed spontaneous regression (100%) on follow up warranting further investigation and early ophthalmologic screening in this high-risk group.

Conclusion: ROP is common in moderate to late preterm with risk factor like perinatal asphyxia. We should screen all moderate and late preterm with history of perinatal asphyxia with oxygen supplementation, having risk factor for ROP.

Keywords: ROP, risk factor, moderate and late preterm, perinatal asphyxia, oxygen supplementation.

INTRODUCTION

Birth between 32 weeks and 36 weeks gestation (referred as moderate to late preterm) account for approximately 70% of all preterm. In recent year incidence of prematurity increased mostly because of increased use of assisted reproductive technologies result in increased frequency of multifetal gestation and thus premature delivery. Though larger in size than usual premature infant they are still immature and at risk of developing short and long-term complications.[1] In developing countries like India, there is least knowledge regarding ocular complication of moderate to late preterm infant specially with suboptimal control of supplementary oxygen and monitoring. The studies are emerging about substantial incidence of retinopathy of prematurity in more mature and bigger infant. According to an update in 2014 by WHO, India account for highest number of preterm birth in world. India is leading among top 10 countries with maximum number of late preterm birth.[1,2]

Retinopathy of prematurity (ROP) is a vaso proliferative disorder of the retina in preterm infants. Neonates born at less than 32 weeks of gestation are at risk of developing ROP. However, preterm infants born at 32 weeks or later can also develop severe ROP if they have had a turbulent clinical course or needed prolonged oxygen therapy. Nearly one-fourth of neonates undergoing screening may show some degree of ROP, which regresses on its own in the majority. In a few infants, ROP, if untreated it can

progress to the stage of retinal detachment and blindness.[2,3] Hypoxic-ischemic encephalopathy (HIE), a serious neonatal complication caused by perinatal asphyxia, often coexists with systemic risk factors that may exacerbate the development of ROP.[4] Inability to provide and guide families of preterm baby for eye examination within 3 days of life and subsequently as indicated has become a reason for severe visual handicap and several medicolegal conflicts. Approximately 65% of infant with birth weight <1250g and 80% of those with birth weight < 1000g will develop some degree of ROP.[5] India is now in third epidemic phase of ROP characterized by severe ROP in mature preterm due to their increased chance of survival.[1,2] Timely screening and treatment of ROP can prevent blindness and minimize visual handicaps.[6] So, this study has been carried out to estimate the incidence & associated factors of ROP in late preterm infant admitted in SNCU, RDMC Banda, Uttar Pradesh, India.

MATERIALS AND METHODS

A hospital based prospective observational study was conducted in ROP clinic arranged by Shri Sadguru Sewa Sangh trust, Chitrakoot District in Rani Durgawati Medical College, Banda among on 180 moderate to late preterm infants admitted to (NICU) in tertiary care centre RDMC Banda between January 2024 and January 2025. The preterm infants included in the study were of gestational age 32 to 36 weeks, with history of perinatal asphyxia with supplementary oxygen > 24 hrs and without history of perinatal asphyxia while those who were having Apgar score <5 at 5 min of age, congenital heart disease, extremely low birth weight, any major congenital anomalies, any genetic syndrome and neonatal infection were excluded from the study. A written informed consent was obtained from the parents of neonates who were included in the study. A detailed history including birth weight, gestational age at birth, expected date of delivery (EDD), problems during NICU stay and its management were recorded in a pre-structured performa.

Method of Examination

The neonates were followed up at 4 weeks of birth for First screening of ROP. The study population was screened for ROP with Indirect Ophthalmoscope after dilatation with Tropicamide plus Phenylephrine eye-drops. Ophthalmologic evaluations for ROP were conducted starting at 4 weeks postnatal age or 31 weeks postmenstrual age, whichever came later, using indirect ophthalmoscopy by a trained paediatric ophthalmologist. Relative risk of developing ROP in perinatal asphyxia infants was determined and analysed.

ROP was classified according to revised international classification of retinopathy of prematurity, update in 2021. International Classification of ROP (ICROP) 3rd edition is used for classifying ROP. ICROP-3 describes vascularization of the retina and characterizes ROP by its position (zone), severity (stage), and extent (clock hours).[6-9] After that follow up examination of those neonates done at interval of 2 to 3 weeks based upon retinal findings. Screening was continued regularly until retina was completely vascularized, ROP was fully regressed, there are no signs of risk for visual loss and ROP was progressed to a level of severity where treatment is indicated.

Indication of the treatment was based on results of Early Treatment for Retinopathy of Prematurity. Those who had ROP were examined every week till regression occurred or till they reached criteria for laser treatment, which was type I Pre-threshold ROP as per ET ROP guidelines.[7,10] Laser was done by the same Ophthalmologist under topical anesthesia and systemic sedative and analgesic in the Shri Sadguru Seva Sangh Hospital transporting the baby preferably within 48 hours of diagnosis. If regression was found to be inadequate or skip areas were seen on subsequent examination, laser was repeated. Intravitreal Bevacizumab was given in severe cases of APROP prior to laser treatment. All intervention including laser and intravitreal Bevacizumab therapy were undertaken after obtaining informed written consent from the parents.

Data was analyzed using online statistical calculators. Chi square test, Fisher's exact test, Relative risk was calculated.

RESULTS

The incidence of ROP in this study was 55% (99/180). The maximum proportion of ROP was observed in gestational age 34-35 weeks (64.2%), oxygen therapy duration 3-5 days (100%), having history of perinatal asphyxia (63.3%), birth weight 1.5- 2 kg (62.1%). ROP was significantly associated with gestational age, oxygen therapy duration, perinatal asphyxia and birth weight. The relative risk of ROP is 1.5 (1.1-2.1) and 1.4 (0.9- 2.0) in gestational age 34-35 weeks, 36-37 weeks respectively in comparison to gestational age 32-33 weeks, 2.6 (2.1- 3.2) in oxygen duration therapy 3-days, 1.4 (1.1-1.8) with history of perinatal asphyxia, and 1.4 (1.0-1.8) in birth weight 1.5- 2 kgs. [Table 1]

Table 1: Risk factors associated with ROP (n=180)

Risk factors	ROP		Relative Risk (95% CI)	p- value
	Present	Absent		
	n (%)	n (%)		
Gestational age (weeks)				
32-33	29 (43.3)	38 (56.7)	1	0.044
34-35	43 (64.2)	24 (35.8)	1.5 (1.1-2.1)	

36-37	27 (58.7)	19 (41.3)	1.4 (0.9- 2.0)	
Duration of oxygen therapy (days)				
<3	52 (39.1)	81 (60.9)	1	<0.001
3- 5	47 (100)	0 (0)	2.6 (2.1- 3.2)	
History of perinatal asphyxia				
Present	62 (63.3)	36 (36.7)	1.4 (1.1-1.8)	0.017
Absent	37 (45.1)	45 (54.9)	1	
Birth weight (kgs)				
1.5-2	64 (62.1)	39 (37.9)	1.4 (1.0-1.8)	0.034
2-2.5	35 (45.5)	42 (54.5)	1	

The maximum proportion of advance stage was observed in gestational age 32- 33 weeks (13.9%) whereas for stage 1 & 2 it was maximum in gestational age 36-37 weeks. The ROP stage was significantly associated with gestational age. [Table 2]

Table 2: Distribution of ROP in different gestation age group (n=99)

Gestational age (weeks)	Stages of ROP				p- value
	Stage 1 & 2	Zone 3	Stage 3	APROP	
32-33	13 (36.1)	7 (19.4)	11 (30.6)	5 (13.9)	0.003
34-35	15 (38.5)	17 (43.6)	5 (12.8)	2 (5.1)	
36-37	18 (75)	3 (12.5)	3 (12.5)	0 (0)	

DISCUSSION

The present study was conducted in context of a tertiary care level SNCU whereas most of the previous studies concentrated on preterm population in tertiary care NICU. Very few articles have exclusively concentrated on late preterm newborn. Newborns cared in NICU may differ considerably from newborn in SNCU both in terms of disease severity and quality of treatment received. There have been only a few studies in India from SNCU setting so far. Though ROP is mostly a disease of extremely preterm newborn in western countries, it is not so uncommon in more mature and heavier newborns in developing countries. ROP has been reported in larger babies with a birth weight between 1500 and 2000 grams. There have been several anecdotal reports from ophthalmologist that ROP has been seen in newborn between 1750g and 2000 gm birth weight.[11-15]

Gopal et al,[12] had reported 38% incidence of ROP in 1995, Maheshwari et al,[13] had reported 20% incidence of ROP in 1996. Nair et al, had reported 25.4% incidence of ROP in 2003. However, in most instances, it is not possible to compare studies, as the inclusion criteria are different. Some centre includes only smaller preterm babies while other has more liberal inclusion criteria.

Authors have found increasing days of oxygen use, birth asphyxia a to be risk factors of ROP in late preterm. In India National Neonatology Forum guidelines recommend screening of infants less than 34 weeks gestational age or less than 1750 grams birth weight, and 34-36 weeks,[12] gestational age and 1750-2000-gram birth weight if sick. In view of increased incidence of ROP in more mature preterm Jalali et al,[15] recommended modification of screening criteria for ROP in India and other middle-income group countries to include entire preterm population. In present study incidence of APROP was 7.07%. Compared to extremely preterm newborns in developed countries, more mature and heavier infants in low-middle income countries are prone to develop APROP especially in the setting of uncontrolled oxygen use, multiple episodes of sepsis and other co morbid risk factors.[15]

In this study author have attempted to analyze incidence and risk factor of ROP in moderate to late preterm and has addressed one of the major contributors of recent ROP epidemic in India due to improving survival of preterm at tertiary care level SNCU where the standard care for prevention of severe ROP is often lacking.

CONCLUSION

There is an increasing trend of occurrence of ROP in newborns in moderate to late preterm receiving supplementary oxygen. Both the incidence and severity of ROP were increasing in neonates with perinatal asphyxia with supplementary oxygen, therefore should be prioritized for ROP screening and intervention.

In developing countries like India, all newborns <2000 grams and <32 weeks should be screened irrespective of risk factors. Early screening is advised in VLBW and ELBW newborns because ROP tends to be asymptomatic in the early stages followed by a fulminant course later in these newborns. Oxygen should be used judiciously in newborns and try to limit duration as less as possible. Effective screening and timely intervention halted the progression of ROP to end stages.

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