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INCIDENCE AND RISK FACTOR FOR RETINOPATHY OF PREMATURITY IN RURAL TERTIARY CARE CENTER

Paediatrics

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KEYWORDS

INTRODUCTION

The number of blind children in the world is estimated to be approximately 1.5 million.[1] Among these cases, retinopathy of prematurity (ROP) is one of the most important preventable causes. Each year, nearly 50,000 infants worldwide go blind due to ROP.[2] It has been found that the risk of ROP varies among different countries in the world. For example, the incidence of ROP in low-to-moderate development countries was 47.2% in Nigeria[3] and 33.9% in India.[4] In high-to very high development countries, the incidence was 26.1% in Iran and 10.1% in Norway.[5,6]

ROP, also known as retrolental fibroplasia, was first recognized as a disease by Dr. Theodore L. Terry in 1942.[7] Given the tremendous impact of the lifelong visual impairment or blindness caused by ROP on the quality of life of affected infants.[8,9]

Retinopathy of prematurity (ROP) is a disease characterized by the development of abnormal retinal vessels due to incomplete vascularization of retinal tissue resulting from hyperoxia, which causes downregulation of VEGF and death of endothelial cells. This mechanism suggests that VEGF plays an important role in the endothelium. After occlusion of growing vessels, retinal tissue becomes ischemic and hypoxic during development. This process leads to the upregulation of VEGF, resulting in neovascularization.[10-13]

Several risk factors such as low birth weight[14-16], low gestational age (GA), high oxygen saturation, mechanical ventilation, phototherapy, intraventricular hemorrhage (IVH)[17-19], anemia, blood transfusion, patent ductus arteriosus (PDA), respiratory distress syndrome (RDS), bronchopulmonary dysplasia (BPD), necrotizing enterocolitis (NEC), sepsis, and low Apgar scores have been associated with the development of ROP.[20-23]

Identification of risk factors affecting the progression of ROP and knowledge of its etiology can help ophthalmologists and neonatologists perform careful screening, make an accurate diagnosis, and prevent the development of the disease. The aim of this study was to estimate the incidence of ROP and to evaluate the association between ROP and potential risk factors for this disease.

AIMS & OBJECTIVES

1. To study the incidence of ROP in rural tertiary care center.
2. To identify the risk factors predisposing to ROP.

MATERIAL & METHODS

This was a prospective observational study of preterm infants admitted in a tertiary neonatal intensive care unit of Department of Pediatrics at SRTR Government Medical College, Ambajogai, Dist. Beed, Maharashtra, India.

Inclusion criteria were (a) body weight ≤ 1500 g or GA ≤ 32 weeks; or (b) body weight > 1500 g or GA from 32 to 37 weeks and any of the following risk factors: Respiratory distress syndrome (hyaline membrane disease), sepsis, blood transfusion, multiple pregnancy, intraventricular hemorrhage.

Patients who died before complete resolution of ROP or did not come to the outpatient clinic for follow-up were excluded from the study.

Fundoscopy was performed. Retinal examination was performed at the bedside. Each patient was classified according to the most advanced stage of ROP detected at follow-up, considering the eye with the most advanced disease, based on the International Classification of Retinopathy of Prematurity.

International Classification of Acute Stages of Retinopathy of Prematurity

Location:
- *Zone I*: (innermost zone) A circle centered around the optic disc, the radius of which is equal to twice the distance from the center of the optic disc to the macula
- *Zone II*: Extends centrifugally from the edge of zone I to the nasal ora serrata
- *Zone III*: The residual temporal crescent of retina anterior to zone II

Extent: Specified by the hours of the clock as the observer looks at the eye

Staging:
- *Stage 0*: Immature vascularization, no ROP
- *Stage 1*: Demarcation line separating avascular and avascular retina
- *Stage 2*: Ridge which may have small isolated tufts of neovascular tissue on its surface known as "popcorn"
- *Stage 3*: Ridge with extraretinal fibrovascular proliferation (neovascularization) extending into the vitreous
- *Stage 4*: Partial retinal detachment
  - Stage 4a: extrafoveal retinal detachment
  - Stage 4b: foveal retinal detachment
- *Stage 5*: Total retinal detachment

Plus disease: (+) Increased venous dilation and arteriolar tortuosity of the posterior pole vessels equal to or greater than the "standard" photograph v

Patients were also classified as presenting type 1 prethreshold ROP or not, which determines the need for treatment, as established by the Early Treatment for Retinopathy of Prematurity (ETROP) randomized trial.

The first examination was performed between 4 and 6 weeks of chronological age. Subsequent examinations were scheduled according to the findings observed at each examination.

Data collection was discontinued when retinal vascularization was complete, reaching extreme temporal periphery, or when ROP showed complete regression after treatment. After that, patients were referred for routine follow-up assessment with a pediatric ophthalmologist at 6 months of age. Patients discharged from the NICU were scheduled for outpatient follow-up if reassessment was indicated as above.

RESULTS

Table No. 01: Distribution of study subjects according to multiple variables.

Variable		Number	Percentage (%)
Birth weight	1000 to 1500	5	83
	> 1500	1	17
Gestation	< 32 weeks	4	67
	≥ 32 weeks	2	33
ROP stage	1	3	50
	2	1	17
	3	2	33
Zone	1	3	50
	2	3	50

	3	0	0
Male		3	50
Female		3	50

Table No. 02: Distribution of study subjects according to risk factors.

Risk Factors	ROP N=6 (14%)	Without ROP N=36 (86%)	p value
Male gender	3 (50%)	19 (53%)	0.68
Multiple gestation	5 (83%)	11 (30.5%)	0.02
Sepsis	4 (67%)	10 (28%)	0.04

Table No. 03: Distribution of study subjects according to Comorbidities.

Comorbidities	Number	Percentage (%)
Sepsis	4	67
RDS	6	100
Oxygen therapy	6	100
Anemia of prematurity	2	33

DISCUSSION

During the study period 42 patients met the inclusion criteria with mean gestational age of 31 ±1.5 weeks and mean birth wt of 1200 ±226 gms. A total of 6 patients diagnosed with ROP (incidence of 14.2%) out of which 50% develop stage 1 ROP, 17% stage 2 and 33.3% stage 3 ROP. 33% develop type 1 ROP requiring laser treatment.

In the overall sample there were 28 patients with gestation below 32 weeks of birth or weight below 1500gms out of which 5 (83%) develop ROP of any stage No gender predominance in incidence of ROP is present in this study (50% male and 50% female) but male predominance is seen in type 1 ROP.

Multiple gestations were the most common prenatal risk factor with ($p< 0.02$) by Fisher exact test. The most prevalent post-natal risk factor among pt with ROP were RDS , sepsis and use of oxygen therapy. 100% of patients with ROP experienced RDS and 100% required oxygen therapy. Mean duration of oxygen therapy required was 10 days ranging from (1-20 das). 33% patients require ventilator support for an average of 3.5 days.

67% patients with ROP developed sepsis showing (p-0.04) by exact fisher test. 33% infants with ROP diagnosed with anemia of prematurity and required pcv transfusion. Similar findings were seen in the study of Freitas AM et al, Yucel OE et al, Akkawi MT et al.

CONCLUSION

Severe ROP is a debilitating disease that, if left untreated, can lead to permanent vision loss, resulting in a reduced quality of life for the individual and a significant financial burden for the individual and the community.

In India, the incidence of ROP ranges from 24% to 47%. Our study shows that the incidence of ROP among preterm infants requiring admission to the neonatal intensive care unit (NICU) of a rural tertiary center is 14%, although this lower value may be due to small sample size.

Our data suggest that there is no gender predominance in the overall incidence of ROP, but males predominate in type 1 ROP requiring immediate laser ablation.

We found that multiple births are the most common prenatal risk factor and that RDS, prolonged oxygen therapy, and sepsis are important risk factors for the development of ROP.

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