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Screening of Preterm Infants for Retinopathy of Prematurity

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ABSTRACT-
Introduction -*To find the incidence of ROP in preterm and LBW infants and to evaluate various risk factors*
Discussion- *Retinopathy of prematurity is a disorder of the developing retinal blood vessels of the premature infant and is a complex disease ranging from mild transient changes to severe vasoproliferation, scarring and detachment leading to blindness*
Methodology –*In this study, sample population of 232 preterm babies from special neonatal care unit of our hospital from September 2014 – August 2015.Babies with Low birth weight, oxygen exposure, septicaemia, anemia, phototherapy, Jaundice ,RDS, Blood transfusion and hyperbilirubinaemia were included*
Conclusion- *In our study, the overall incidence of ROP was 18.53% .Regression rate was 79.06 % which is in concordance with literature. Although significant advances have been made in perinatal care, ROP remains a serious complication in premature babies.*
Key words-*Retinpathy of prematurity, preterm, risk factors*

INTRODUCTION

Retinopathy of prematurity (ROP) previously known as Retrolental Fibroplasia (RLF)is a vasoproliferative eye disease, first described by Terry in 1942[1] It is one of the main avoidable causes of visual impairment in premature infants in the developing and developed world. The magnitude of retinopathy of prematurity (ROP), a potentially blinding disorder, has been observed to be rising primarily due to improved survival of preterm babies and increasing expertise in its early recognition.[2]. ROP is under constant epidemiological study around the world.

Risk factors article Low birth weight and low gestational ages have consistently been associated with ROP.[3,4,5] Other risk factors include prolonged exposure to supplementary oxygen[6] hyperglycemia[7], blood transfusion[8], sepsis[9] intraventricular hemorrhage[6] and anemia [10].The precise association of these factors in the

progression of ROP has not been determined and there are limited studies on the incidence and risk factors of this important morbidity among preterm infants in different areas of India.

The aim of this prospective study was to determine the incidence of ROP in preterm infants at the MGMMC and MYH hospital in Indore and identify the risk factors for its development and to add to the existing literature and knowledge.

MATERIALS AND METHODS

The prospective study was carried out in our hospital between Sept 2014 – Aug 2015.Study sample of 232 preterm infants admitted to the NICU who received eye examination for ROP were eligible for the study. Ethical Committee clearance from the institution was obtained.

Eye examination

The screening examinations were performed on all infants who met the criteria with gestational age ≤34 weeks and/or Birth Weight ≤1500 g

The first examination was done at 4 weeks after birth.

Pupils were dilated with 0.5% tropicamide and 2.5% phenylephrine drops 2 hours before examination. Indirect ophthalmoscopy was routinely performed using a lid speculum after topical anesthesia. The retinal findings were classified according to the International Classification of ROP including the stage, extent, zone, and presence or absence of plus disease.

Genders of newborn and delivery pattern were recorded. The following risk factors occurring during the first 4 weeks after birth were recorded: Gestational age, Birth Weight, respiratory distress syndrome, intraventricular hemorrhage, hyperbilirubinemia, blood transfusion, sepsis, oxygen exposure.

RESULTS

In our study, out of the total 232 high risk preterm infants examined,43 infants were diagnosed with ROP and the incidence of ROP was 18.53%. Out of the infants diagnosed with ROP, 55.81% were males and44.18% were females.Incidence and severity were found to be inversely proportional to birth weight and gestational age. In our study, the maximum incidence of ROP was found in Gestational age <28 wks i.e.44.11%.As per literature babies with lesser G.A at birth had a higher incidence of ROP. In our study, we got maximum no. of ROP cases in preterm babies with birth weight <1 kg (30.23%).In our study, it is observed that the Incidence of Stage I is 32.55%, Stage II is 51.16%, Stage III is 9.39%, Stage IV is4.65%, Plus disease is 2.32%

Risk factors associated with ROP in order of frequency were found to be Low Birth weight> oxygen exposure> Anemia > phototherapy >Jaundice >Sepsis>RDS > Blood transfusion>>Twins.

In our study 34 (79.06%) infants out of 43 diagnosed ROP were regressed.8 (18.60 %) infants out of 43 diagnosed ROP underwent laser by Indirect Ophthalmoscopy. 2(4.65%) infants out of 43 diagnosed ROP underwent vitreo-retinal surgery.

In our study we found that 13 infants of Stage 1 and 21 infants of stage 2 showed signs of regression. Hence,in our study ROP regression rate was 79.06%.

TABLE 1-INCIDENCE OF ROP

1	HIGH RISK INFANTS SCREENED	232
2	DIAGNOSED ROP	43
3	INCIDENCE OF ROP	18.53%

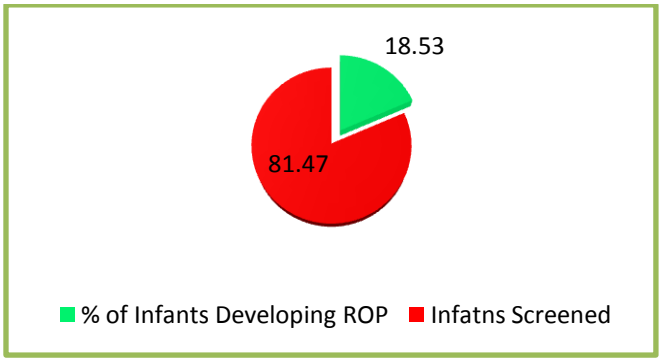

TABLE 2-INCIDENCE OF ROP IN RELATION TO GESTATIONAL AGE

GESTATIONAL AGE	HIGH RISK INFANTS SCREENED		DIAGNOSED ROP	
		NO. OF ROP	INCIDENCE OF ROP IN %	% OF TOTAL CHILDREN DIAGNOSED ROP
<28 WEEKS	34	15	34.88%(15/43)	44.11%(15/34)
28-34 WEEKS	198	28	65.11%(28/43)	14.14%(28/198)
TOTAL	232	43		18.53% (43/232)

'n' : No of infants diagnosed as ROP in particular G.A category.

'N': Total no of diagnosed ROP i.e. 43

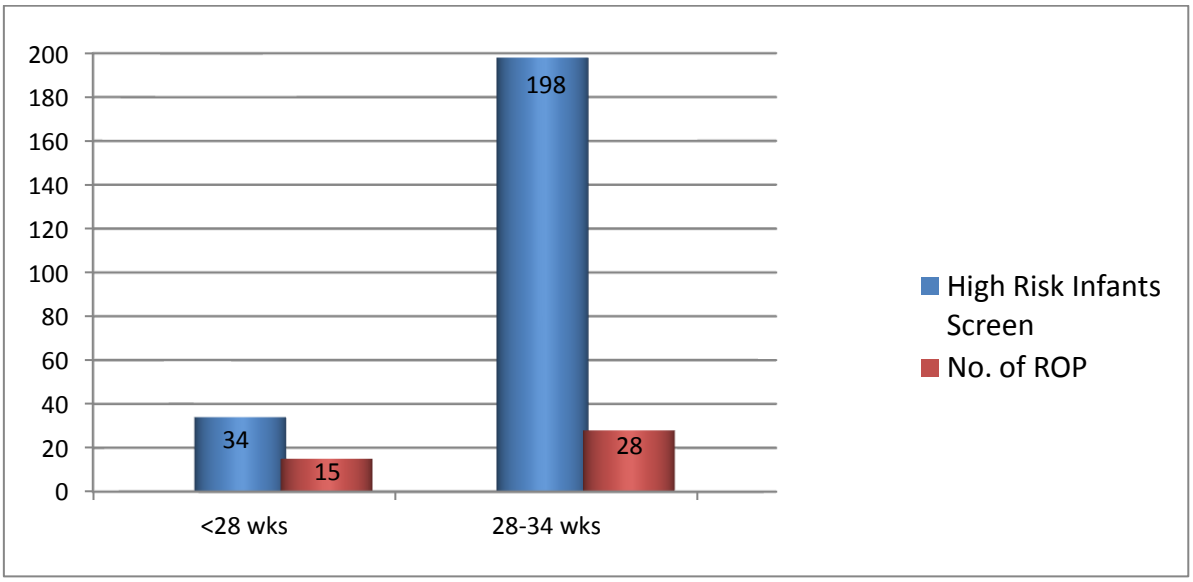

TABLE 3-INCIDENCE IN RELATION TO BIRTH WEIGHT

Birth Weight (Kgs)	High Risk Infants Screened	Diagnosed ROP		
		No. of ROP	Incidence Of ROP In %	% of Total Infants In The Respective Bw Category Developing ROP
< 1	28	13	30.23%	46.42%
1 – 1.5	115	24	53.48%	20.86%
1.6-2.5	89	6	13.95%	6.74%
TOTAL	232	43	100%	18.53%

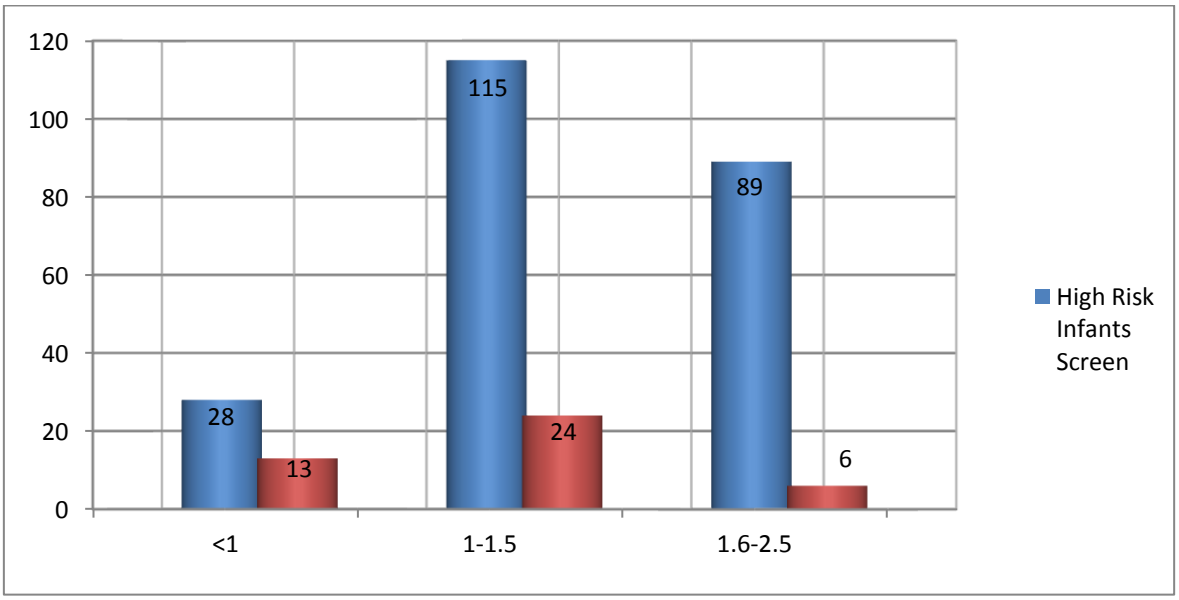

TABLE 4-INCIDENCE OF STAGES OF ROP

Stage Of ROP	Diagnosed ROP	Incidence	Incidence As % Of Actual Overall Incidence
Stage I	14	32.55%(14/43)	6.03%(14/43×18.53)
Stage II	22	51.16%(22/43)	9.48%(22/43×18.53)
Stage III	4	9.30%(4/43)	1.72%(4/43×18.53)
Stage IV	2	4.65% (2/43)	0.86%(2/43×18.53)
Stage V	0	0	
Plus disease	1	2.32% (1/43)	0.43%(1/43×18.53)
Threshold disease	0	0	
Total ROP	43		18.53%

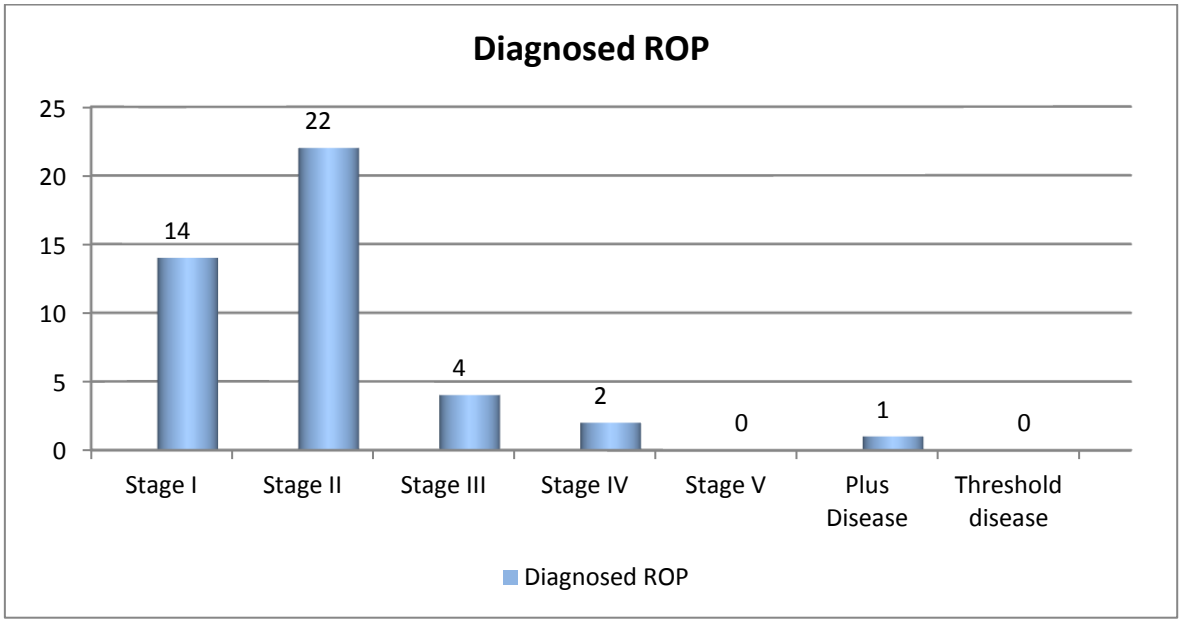

TABLE 5-INCIDENCE OF STAGES OF ROP IN RELATION TO GESTATIONAL AGE

Stages Of ROP	Gestational Age				Total
	< 28 Weeks		28-34 Weeks		
	NO	%	NO	%	
Stage I	3	20%	11	39.28%	14
Stage II	7	46.66%	15	53.57%	22
Stage III	2	13.33%	2	7.14%	4
Stage IV	2	13.33%	-	-	2
Stage V	-	-	-	-	0
Plus disease	1	6.66%	-	-	1
Prethreshold	-	-	-	-	
Threshold	-	-	-	-	
TOTAL	15		28		43

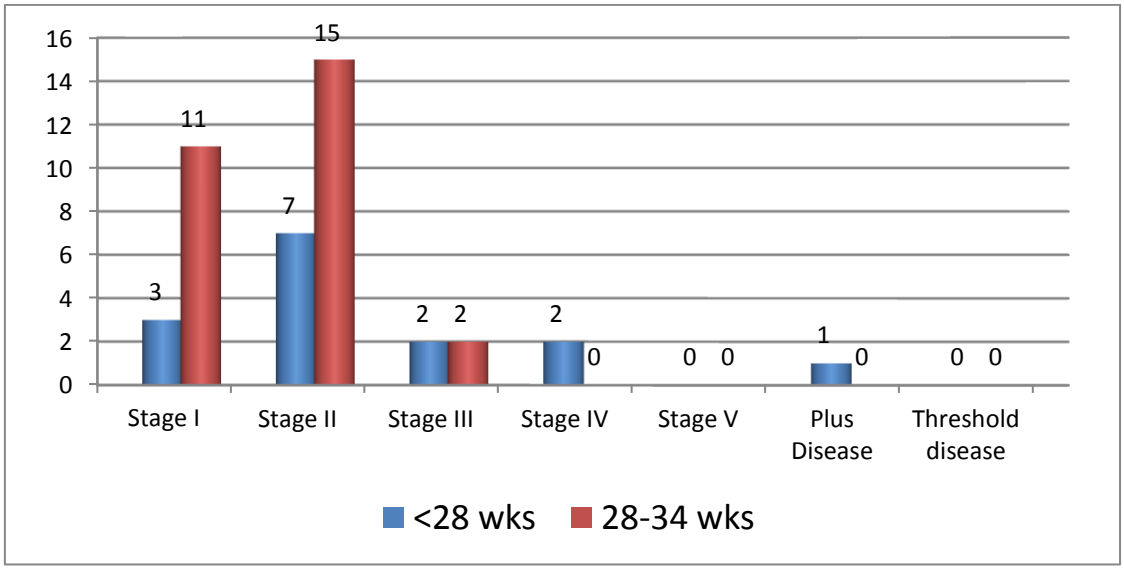

TABLE 6-COMPARISION OF RISK FACTORS IN PRETERM ROP

Risk Factors	Number of infants with respective risk factor(N)	Number of infants with risk factor who develop ROP(n)	Percentage (n/N)
O2 Exposure	73	21	28.76%
IUGR	43	12	27.90%
Low Birth Weight	232	43	18.53%
RDS	64	12	18.75%
Twins	28	10	35.71%
Septicemia	80	24	30%
Anemia	34	10	29.41%
Blood Transfusion	20	6	30%
Phototherapy	28	10	33.33%
ABO Incompatibility	6	3	50%

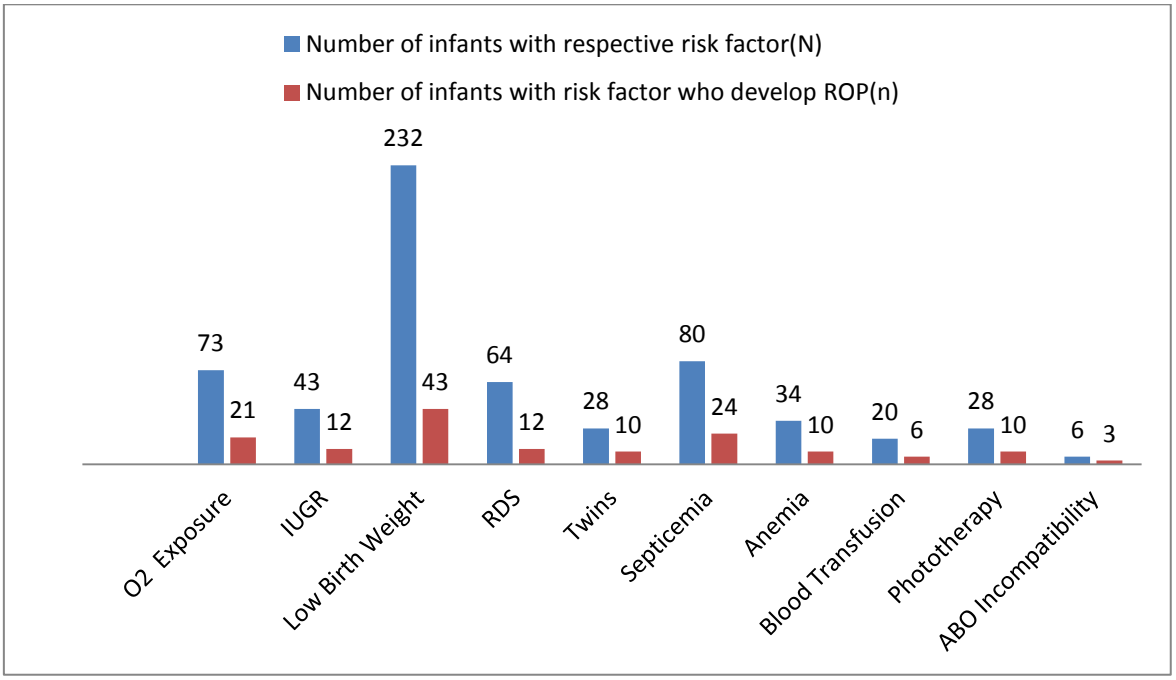

TABLE 7-TREATMENT MODALITIES OF ROP

Treatment Modality	Diagnosed ROP	No Of Infants Underwent Treatment	% (N/N)
Follow-up	38	_	88.37%(38/43)
Cryotherapy	_	NONE	_
LIO	8	8	18.60%(8/43)
Vitreous /retinal Surgery	2	2	4.65%(2/43)

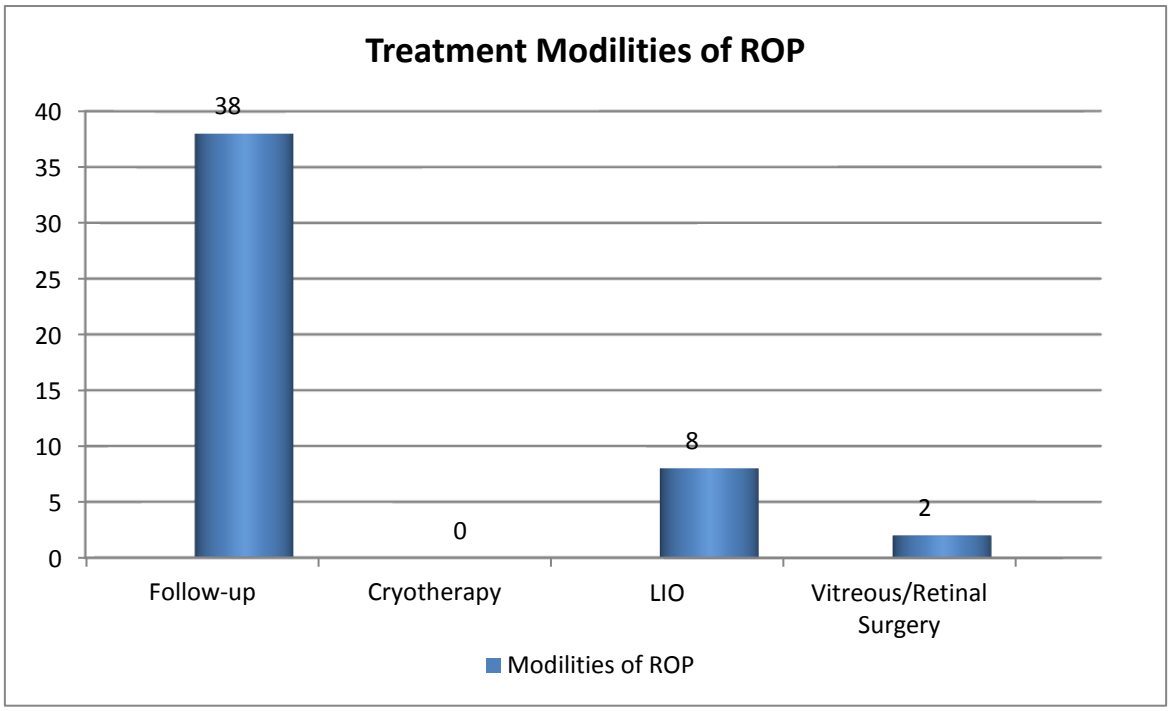

TABLE 8-RATE OF SPONTANEOUS REGRESSION OF ROP

Stages Of ROP	No. Of Diagnosed ROP	No. Of Infants In Regression	Percentage Of Regression n/N
Stage I	14	13	30.23%
Stage Ii	22	21	48.83%
Stage Iii	4	_	_
Stage Iv	2	_	_
Stage V	0	_	_
Plus Disease	1	_	_
TOTAL ROP	43	34	79.06%

'n' : Diagnosed ROP in particular stage 'N': Total no of ROP diagnosed i.e 43

DISCUSSION

Retinopathy of prematurity is a disorder of retinal vascular development in preterm infants. It continues to be a significant complication in preterm neonates despite advances in neonatal care and remains a major cause of childhood blindness worldwide.[11]

INCIDENCE

The incidence of ROP in neonatal intensive care units (NICUs) or referral to tertiary care hospital in India ranges from approximately 21-40%.[12,13] In our study, the incidence of ROP was found to be 18.53%.

Risk factors

ROP is a multi factorial disease involving many factors. Virtually all studies of risk factors for ROP, identified prematurity and low birth weight as having the greatest association with risk of ROP. [3,4,5]. Both factors are related to the extent of immaturity of retinal neural and vascular

development at birth, and therefore the retinal vulnerability to insult. Furthermore, the lower the gestational age and birth weight, the more profound the loss of factors normally provided by the intrauterine environment for which the immature fetus is unable to take over production. Additionally, low gestational age increases the duration of an infant's exposure to adverse postnatal insults, contributing to the risk of retinopathy of prematurity. [14]

Oxygen therapy was an independent risk factor for the development of ROP.[7] We found a significant relationship between the occurrence of ROP and use of oxygen therapy. On the other hand, Palmer *et al*.,[15] reported that oxygen therapy was a non significant factor for occurrence of ROP. They reported that ROP may develop in cases that did not receive oxygen therapy.

In our study, otherrisk factors associated with ROP in order of frequency were oxygen exposure> Anemia > phototherapy> Jaundice >Sepsis>RDS > Blood transfusion>Twins.

Transpupillary laser treatment to ablate nonvascularisedretina has effectively replaced cryotherapy, because of better visual outcomes and fewer adverse effects. [16] Laser photocoagulation was found to be very effective in regressing ROP. In agreement with Coats *et al*.,[17] we found that the eight cases that required laser intervention improved and ROP regressed with regular follow-up.

CONCLUSION

The incidence of ROP among the preterm infants screened was 18.53%..The analysis of the risk factors for ROP will help us to understand and predict its development in high-risk neonates. Although significant advances have been made in perinatal care, ROP remains a serious complication in prematurely born individuals. Screening and identification of infants with ROP is essential and recommended to minimise blindness and long-term visual morbidity in these infants.

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