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THE STUDY OF INCICDENCE AND RISK FACTORS OF RETINOPATHY OF PREMATURITY IN A GOVERNMENT TERTIARY CARE CENTRE

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ABSTRACT

BACKGROUND

Advancing technology in antenatal and neonatal care has resulted in better survival of preterm neonates in developing countries in the past few decades. This has resulted in an apparent increase in the incidence of Retinopathy of prematurity (ROP), which is the most important cause of preventable blindness in infants'. Hence, the study was undertaken.

***OBJECTIVES:** 1. To study the incidence of ROP at the NICU of Vijayanagar institute of Medical sciences, Bellary. 2. To study the risk factors associated with ROP. **METHODS:** A prospective clinical study was done from 1st October 2012 to 30th September 2013 in 140 preterm babies less than 34 weeks of gestational age (GA) or less than 1750 gm of birth weight (BW) delivered in or referred to Vijayanagar Institute of Medical Sciences, Bellary. After taking informed consent from the parents, babies were assessed for the risk factors of ROP and recorded in a predesigned proforma. ROP screening was performed using wide-field digital imaging on a Retcam Shuttle (Clarity MSI, USA) and all babies were followed up till complete vascularisation of the retina. The babies who developed any stage of ROP were taken as cases and the babies who did not have ROP were taken as controls. Laser treatment was performed based on the Early Treatment Guidelines for ROP (ETROP). Statistical analysis was performed using SPSS software (Version 20.0). P value < 0.05 was taken as statistically significant. **RESULTS:** One hundred and forty babies were thus examined. The overall incidence of ROP in the study group was 19.3% (27 babies). Out of them, 8 babies (29.6%) had stage-i ROP and 19 babies (70.4%) had stage-2 ROP. Two babies (7.4%) required laser treatment. Risk factor analysis revealed that gestational age at birth (p=0.01), need for resuscitation Q0.023), duration of stay in the hospital (p<0.001), apnea (p<0.00l) and the duration of oxygen requirement (p=0.005) were significant. Early establishment of feeds was protective against ROP (p<0. 001). **INTERPRETATION AND CONCLUSIONS:** The incidence of ROP in this study is comparable with that of other metropolitan cities. A tertiary care referral centre like ours has sicker neonates who are prone to exposure to many risk factors. Meticulous monitoring and follow up is essential for early detection of ROP and timely institution of treatment to avoid the complications. Screening should be intensified in the presence of risk factors like resuscitation, oxygen requirement, apnea and prolonged hospital stay, which can reduce the incidence of severe stages of ROP as shown by this study.*

KEY WORDS

ROP, SPSS software, Retinopathy

INTRODUCTION

Retinopathy of prematurity (ROP), which was previously called as Retrolental Fibroplasia (RFL), is a vaso-proliferative disorder of the retina. Preterm infants are more prone for this disease especially low birth weight (LBW) neonates who are exposed to

large amount of oxygen (02). It is the major cause of preventable blindness in infants. The World Health Organisation (WHO) programme of Vision 2020 targeted against ROP mentioned that the incidence of ROP can be reduced by early screening and referral for treatment.[2] Spectrum of ROP is broad and ranges from a spontaneously recovering stage to a vision threatening sequelae. In infants with birth weight (BW) less than l000grams, the risk of ROP is 82%, and 9.3% of them are potentially under the risk of blindness.[3]

Initially there was a low incidence of ROP in developing countries like India because there was no adequate screening and reporting and there was inadequate awareness regarding the grave consequences of the disease. But now there is an apparently increasing incidence with better screening protocols, more availability of assisted ventilation services and increased survival of preterms in newborn units.[4]

The pathogenic process involved in causation of ROP is multifactorial[5]. It is attributed to many possible risk factors like prematurity, hyperoxia, sepsis, necrotising enterocolitis, intraventricular hemorrhage (IVH), low birth weight (LBW), prolonged exposure to O_2, severity of neonatal illnesses, severe respiratory distress requiring mechanical ventilation, shock, hypoxia, prolonged ventilatory support, need for blood bansfusion, acidosis, anemia, high ambient light and vitamin E deficiency where as breast feeding was proposed to be having a protective effect.[5'6]

OBJECTIVES

1. To study the incidence of ROP in preterm infants with a gestational age (GA) of less than 34weeks (wk) or a birth weight (BW) of less than l75Ograms (gm) admitted to the neonatal intensive care unit (NICU) in Vijayanagar institute of medical sciences, Bellary during a period of one year.[7] 2. To study the risk factors associated with ROP and the clinical spectrum of ROP.

RESULTS

The present study was conducted at the NICU of Vijayanagar Institute of Medical Sciences from 1St October 2012 to 30th September 2013. Of the total *456* admissions to NICU, 140 babies (30.7%) satisfied the inclusion criteria and were enrolled in the study. Neonates who developed any stage of ROP were considered as cases and the neonates without ROP were considered as controls. Incidence of ROP among Study Subjects (N=140). Overall incidence of ROP in the study group was 19.3% (27 babies). Out of them, eight babies (29.6%) had stage-i ROP and 19 babies (70.4%) had stage-2 ROP.

	Number	*Percentage*
Controls	*113*	*80.7*
Cases	*27*	*19.3*
Stage 1 ROP	*8*	*29.6*
Stage 2 ROP	*19*	*70.4*

PLACE OF BIRTH: INBORN VS OUTBORN

Babies who were delivered at VIMS were defined as Inborn and babies who were delivered at other places and referred to VIMS were defined as out born. The distribution of inborn and out born among cases and controls were not significant. Hence the cases and the controls were comparable groups.

	CASES (%)	*CONTROLS (%)*
INBORN	*14 (51.9)*	*57 (50.4)*
OUTBORN	*13 (48.1)*	*56(49.6)*
TOTAL	*27(100)*	*113 (100)*

DISTRIBUTION OF SEX AMONG CASES AND CONTROLS

There was no statistically significant difference in sex distribution among cases and controls. Hence, cases and controls were similar in terms of sex distribution also. The sex ratio in the study group was 1.26:1[Male: Female].

	CASES (%)	*CONTROLS (%)*
MALE	*17 (62.9)*	*61(53.98)*
FEMALE	*10 (37.1)*	*52 (46.02)*
TOTAL	*27(100)*	*113(100)*

DISTRIBUTION OF BIRTH WEIGHT AMONG CASES AND CONTROLS

The BW of the ROP babies ranged from 900gm-1700 gm while that of non ROP babies ranged from 1100gm-1750gm. Maximum number of cases had BW ranging from l000gm-1499gm where as maximum number of controls had BW ranging from l500gm-1750gm. There were only 2 cases with a BW<l000gm and both had stage 2 ROP. The incidence of ROP was 100% in babies weighing <1000gm at birth and 81.8% in babies weighing <1300gm at birth. LBW was significantly associated with increased incidence (p<0.00l) of ROP.

Birth Weight (In Grams)	*Number Of Cases*		*Number Of Controls*
	STAGE 1 ROP	*STAGE 2 ROP*	
<1000	*0*	*2*	*0*
1000-1299	*2*	*7*	*2*
1300-1499	*2*	*7*	*42*
1500-1750	*4*	*3*	*69*

DISTRIBUTION OF STAGES OF ROP AMONG VARIOUS GESTATIONAL AGES

The GA ranged from 27wks to 34wks among cases and 29wk to 34wk among controls. Of the total number of ROP cases, maximum number (66.6%) was amongst babies born with a GA of less than 32 wk, whereas among controls only one baby had a GA of less than 32wks, which was very significant. (p<0.001) Stage 1 ROP was distributed amongst babies with GA at birth ranging between 29wk-34 wk, where as stage 2 ROP was found amongst babies with a lower mean GA at birth ranging from 27wk-33wk.

GA AT BIRTH	**CASES**		**CONTROLS**
	STAGE 1	**STAGE 2**	
27	0	3	0
28	0	6	0
29	2	3	1
30	0	4	0
32	2	2	87
33	3	1	0

NEED FOR OXYGEN ADMIMSTRATION

Eighteen babies among the cases (66.6%) and 27 babies among the controls (23.9%) needed oxygen therapy by any of the modes like through oxygen hood, oxygen prongs, bubble CPAP (continuous positive airway pressure) or mechanical ventilation. The requirement for oxygen was significantly more among the cases.

	CASES		CONTROLS
	STAGE 1	STAGE 2	
Yes	3	15	27
No	5	4	86

COMPARISON OF THE DISTRIBUTION OF APGAR SCORES AMONG CASES AND CONTROLS

In the present study groups, no case or control had one minute APGAR score less than 3, but cases had a lower APGAR at both 1 and 5 minutes when compared to the controls. There was a statistically significant difference in the distribution of APGAR score between cases and controls recorded at first and fifth minute of life (P value <0.001).

The mean APGAR score at 1 minute of the cases was *5.48* ±0.93 and the controls was 6.24± 0.82.(p<0.001) The mean APGAR score at *5* minutes of the cases was 7.89 ± 0.84 and the controls was 8.42 ± *0.57* (p<0.00l). Mean APGAR scores at l minute and *5* minutes were significantly lower among case when compared to the controls, signifying that neonates with perinatal asphyxia are at risk of ROP.

PARAMETER	CASES	CONTROLS	P VALUE
APGAR at 1 mm			
3	1	3	
4	2	3	
5	10	1	<0.001
6	11	63	
7	3	43	
APGAR at 5 mm			
6	1	1	
7	8	2	<0.001
8	11	58	
9	7	52	

EVALUATION OF MATERNAL AND FETAL RISK FACTORS AMONGST CASES AND CONTROLS

22.2% of the cases had maternal pregnancy induced hypertension compared to 19.46% of the controls, which was not significant.

7.4% of cases had maternal antepartum hemorrhage compared to 15% in the controls which was not significant.

18.5% of the cases had antenatal steroid exposure compared to 23% in the controls which was not significant.

22.2% of the cases had meconium stained amniotic fluid indicating intrauterine asphyxia compared to 19.46% of the controls, which was not significant.

Parameter	Cases	Controls	P value	Significance
Pregnancy Induced Hypertension				
Yes	6	22	0.748	Not
No	21	91		significant
Ante Partum Hemorrhage				
Yes	2	17	0.298	Not
No	25	96		significant
Maternal Steroid administration (Dexamethasone)				
Yes	5	26	0.6 14	Not

No	25	84		Significant
Meconium stained amniotic fluid				
Yes	6	22	0.748	Not
No	21	91		significmt

COMPARISON OF VARIOUS NEONATAL COMPLICATIONS AMONG CASES AND CONTROLS

1. The following are the various neonatal complications which were significant on univariate analysis of cases and controls:
2. Respiratory distress syndrome: 66.6% of the cases had respiratory distress syndrome compared to 23.9% in the controls which had a high significance (p=<0.00 1).
3. Clinical sepsis: Clinical sepsis was present in 70.3% of the cases where as it was present only in 46% of the controls (p=0.023).
4. Hypoxic ischemic encephalopathy was a significant factor among cases (p=0. 002).
5. Acute kidney injury: Acute kidney injury was considered in the study group if oliguria (urine output <l ml/kg) is present anchor if serum creatinine was elevated 2 standard deviation above the mean value for gestational age or rise in value was 0.3mg/dl/day. 22.2% of the cases had acute kidney injury where as only 6.1% of the controls had it, which was significant (p=0.010).
6. Convulsions: Presence of convulsion during the period of admission was a very significant factor among cases *(18.5%)* when compared to the controls (1.7%) (p<0.001).
7. Hypotension: 33.3% of the cases had hypotension requiring inotropic support of atleast one drug. Among controls there were only 12.4% of the babies who required the same. Presence of hypotension was significant risk factor among the cases (p=0.008)
8. Transfusion of blood and blood products: Transfusion of whole blood or any blood products like packed red blood cells, platelet concentrate and fresh frozen plasma transfusion was considered here. 37% of case required any one of the above were as only *15.9%* of the controls required it. (p0.004.)

Parameter	Cases	Controls	P value	Interpretation
Respiratory distress syndrome				
Yes	18	27	<0.001	Significant
No	9	86		
Clinical Sepsis				
Yes	19	52	0.023	Significant
No	8	61		
Hypoxic Ischaemic encephalopathy				
Stage 0	18	101		
Stage 1	4	9	0.002	Significant
Stage2	5	3		
Acute Kidney Injury				
Yes	6	7	0.01	Significant
No	21	106		
Convulsions				
Yes	5	2	<0.001	Significant
No	22	111		
Administration of Blood product[whole blood, packed RBCs, platelet concentrate, fresh frozen plasma]				
Yes	10	18	0.014	Significant

No	*17*	*95*		
Hypotension				
Yes	*9*	*14*	*0.008*	*Significant*
No	*18*	*99*		

On multivariate *analysis, GA,* duration of hospital *stay,* day of establishment of feeds, apnea, need for resuscitation and duration of oxygen administration were found to be independent risk factors.

Factors	*P Value*
Resuscitation	*0.023*
Apnea	*<0.00 1*
Duration of Stay in hospital	*<0.001*
Gestational Age	*0.0 10*
Days of Establishment of OGF	*<0.00 1*
Duration of Oxygen	*0.005*

EVALUATION OF NEED FOR TREATMENT AMONG CASES

Two babies (7.4%) had stage 2 plus disease and both required laser treatment.

DISCUSSION

Significance of ROP screening lies in the fact that ROP is the most common cause of childhood blindness which is preventable. The primary prevention of ROP can be done by limiting the exposure to antenatal, natal and postnatal risk factors which are proposed to contribute to the increased incidence as well as severity of ROP. Secondary prevention of ROP is done by timely screening and early treatment to prevent blindness that can occur in severe ROP who miss the screening and are not treated. So the secondary prevention of ROP is given utmost importance in the WHO VISION 2020 programme[2]. In this era of improving standards of neonatal care, ROP is becoming a significant problem in developing countries like India. Though there are data from the different urban and rural areas of India, reports from large randomised multicentric trials is lacking from our country. So there is a scarcity of data on the epidemiology of ROP from the Indian sub continent.85 Studies from developed countries have reported that although the clinical spectrum and incidence of ROP is not similar in all the units, there is an overall decrease in the incidence of the disease wherever there is an ongoing surveillance programme. So timely screening is a very important aspect in management of ROP. Incidence of ROP The incidence of ROP in the present study is 19.3% Various studies have Shown that about 9.4%-25.4% of babies with gestational age 32wk or less develop some degree of ROP.

INDIAN STUDIES	GESTATIONAL AGE(WK)	BIRTH WEIGHT(gm)	INCIDENCE
Maheshwari	≤35	≤1500	20%
Patil	≤32	≤1250	17.5%
Dutta	≤32	≤1750	21%
Gupta	≤32	≤1250	21.7%
Chaudhari	≤32	≤1500	22.3%
Present Study	≤34	≤1750	19.3%

INTERNATIONAL STUDIES	*GESTATIONAL AGE(WK)*	*BIRTH WEIGHT(gm)*	*INCIDENCE*
Chye	*≤37*	*≤1250*	*15%*
Coranath	*≤32*	*≤1750*	*9.4%*

Nair	*≤32*	*≤1500*	*25.4%*
Austeng	*≤37*	*-*	*72.7%*

Studies in the literature usually use a cut-off point of a BW of 1,250gm or 1,500gm or 1,750gm, a GA of 28wk or 32 wks, or both. Using a BW of 1750gm or less, a GA of 34 wk or less, or both as criteria for inclusion in this study explains the similar incidence of ROP when compared to other Indian studies. The overall incidence of ROP in the present study is 19.3%. Patil et al reported the overall incidence of ROP as 17.5% and there was no case of severe ROP. They studied 40 babies with <32wk or < 1250gm. Maheshwari et al. in 1996 reported overall incidence as 20% and severe ROP as 7%. They studied 66 babies with <35wk or < 1500gm. Gupta et al in 2003 reported overall incidence as 21.7% and severe ROP as 5%. They studied 60 babies with < 35wk or <1500gm. Dutta et al screened 108 babies of <32 wk or <1700gm and reported overall incidence as 21%. However, in most instances it is not possible to compare studies, as the inclusion criteria are different. The incidence of ROP in our study would have increased if the screening was done only in babies weighing <1300gm or in babies <32wk of GA at birth. Screening of babies with a GA of <34wk and/or <1750gm BW in this study have made the incidence of ROP comparable to other Indian studied.

Inclusion criteria of ROP Screening if changed to lower limit of GA or BW (<30wk and <1250gm) would make screening more cost effective and detect the more severe stages of ROP easily enough to permit treatment, reduce unnecessary examinations and avoid wastage of time and manpower.87'88 But there are high chances of missing ROP cases which can lead to sequelae which are avoidable with screening and early treatment. In the present study all the babies who were < 28wk of GA developed ROP. All the babies who had a BW <1000gm developed stage 2 ROP which was the maximum stage of ROP in this study.

SEVERITY OF ROP Most of the studies consider stage 3 and above as severe ROP. The percentage of severe ROP among various stages of ROP is depicted in the box below.

STUDY	***MAHESHWARI 1996***	***REKHA 1996***	***PATIL 1997***	***GUPTA 2004***	***AUSTENG 2009***	***PRESENT 2013***
SEVERE ROP (%)	*7*	*8*	*0*	*5*	*34.8*	*0*

In our study there were no stages of ROP above stage 2, which was similar to study conducted by Patil et al. This could be explained by the fact that the screening programme and surveillance for the risk factors was good in our hospital.

SIGNIFICANT RISK FACTORS IN VARIOUS STUDIES

Though accumulating evidence indicates that ROP is a multifactorial disease, immaturity of retina and a period of hyperoxia are the main contributing etiological factors in the pathophysiology of ROP. In our study, the incidence of ROP was significantly inversely proportional to both birth weight(p=0.05) and gestational age (p<0.001). On univariate analysis, the duration of oxygen administration, mean of maximum and minimum Sp02, need for oxygen supplementation, clinical sepsis, apnea, RDS, HIE, mean APGAR at first and fifth minute of life, acute kidney injury, convulsions, positive CRP, administration of blood and its products and hypotension are significantly associated with development of ROP.

LOW BIRTH WEIGHT AND PREMATURITY

The prevalence of ROP was more among VLBW neonates and the risk is inversely proportional to BW and GA in studies conducted by Maheshwari et al. The mean gestational age of the cases was 29.93wk ±2.18wk and the controls were 32.42wk± 0.89wk. The range of gestational age was 27 wks — 34wks among cases and 29wk-34wk among controls. Mean birth

weight of the ROP cases were 1340gms and non ROP babies was 1480gms. Incidence and severity of ROP increased as the birth weight decreased.

OXYGEN ADMINISTRATION

The duration of oxygen administered was an independent risk factor for development of ROP (p=0.005). 66.6% of babies who received oxygen therapy developed ROP in the present study and nearly 50 %of the babies on oxygen therapy developed the disease in other studies.18,85 Though cases were exposed to hyperoxia and hypoxia more than the controls, it was not found to be a significant factor in causing ROP. This can be explained due to the close monitoring of babies on oxygen therapy by pulse oximetry and arterial blood gas analysis in our unit. The causal link between ROP and supplemental oxygen has been confirmed by controlled trials and clinical studies. However, a safe level of oxygen usage has not been defined. Preliminary work has suggested that continuous oxygen monitoring may reduce the incidence of ROP. In present study oxygen administration is a significant risk factor for development of ROP but not an independent risk factor on multivariate analysis.

ANTENATAL MATERNAL STEROID INTAKE

A study conducted by Rosemary et al showed that antenatal steroid administration by the mother had a protective effect against ROP in the neonates. But in our study it was not a significant risk factor.

LOW APGAR SCORE AND HYPDXIC ISCHAEMIC ENCEPHALOPATHY

Preterm babies who had a lower APGAR at 1 minute had a higher risk of having ROP in the study conducted by Shah et al. In our study APGAR at 1 minute and APGAR at 5 minutes were both lower among cases compared to controls, but was not an independent predictor of ROP on multivariate analysis. Distribution of various stages of HIE was significant among the cases but was not an independent risk factor for ROP.

SURFACTANT ADMINISTRATION

Surfactant used to treat hyaline membrane disease has been shown to reduce the risk of ROP but it did not significantly reduced the incidence of ROP in the present study (p=0.12). It may be due to the fact that very few cases among babies having RDS had surfactant therapy. BLOOD TRANSFUSION AND EXCHANGE TRANSFUSION It has been hypothesized that the adult hemoglobin, being more capable of releasing oxygen to tissues, causes tissue-level hyperoxia and cause ROP.89 Exchange transfusion has been identified as a risk factor for the development of ROP by Rekha et al and Maheshwari et al.15'23 The hyperoxia in the tissues leads on to free oxygen radical release and reflex vasoconstriction leading on to the familiar cascade of events that causes ROP.90.91 In our study blood transfusion was found to be a risk factor for development of ROP on univariate analysis, but not so on multivariate analysis. SEPSIS Clinical Sepsis is an independent risk factor for ROP in the present study 0) =0.023) and corroborates with findings of other studies.18'44'85 Gupta et al in his study reported 52% sepsis among babies with ROP.18 In the present study clinical sepsis was a risk factor on univariate analysis and 70.37% of the cases had clinical sepsis, but it was not an independent risk factor on multivariate analysis. Its prevention and early treatment may reduce the incidence of ROP. The risk of ROP was independently proportional to the presence of bacterial and fungal sepsis only in ELBW babies and those with threshold ROP in the study conducted by Vikek and associates. But in our study, culture proven sepsis was not an independent risk factor of ROP.

RDS is significant risk factor in the present study but not an independent risk factor on multivariate analysis. Gupta et al and associates reported ROP in 33.3% of babies with RDS. In our study, 40% of babies among cases had RDS, which is almost comparable to the other studies mentioned.

APNEA ROP is known to be associated with apnea. The number of episodes of apnea was a risk factor on univariate analysis and presence of apnea was an independent risk factor for ROP on multivariate analysis. This can be compared to 54.1% and 54.5% as reported by Agarwal" and Gupta' [8] respectively. Appropriate management of apnea may reduce the incidence of ROP. Apnea was also found to a risk factor for ROP in studies conducted by Shohat et al and Gunn and co workers.

MECHANICAL VENTILATION

In the present study, mechanical ventilation was required by only 2 babies in the study group, and both developed ROP. But this was not significant on analysis due to small number.

PROLONGED PARENTERAL NUTRITION

Human milk is a negative predictor of ROP, indirectly implying that prolonged parenteral nutrition is a risk factor for ROP as concluded in the study by Porcelli and co-workers. In this study, cases had a late onset of enteral feeds compared to controls, supporting this fact. Also the day of initiation of feeds was an independent risk factor of ROP.

MULTIVARIATE ANALYSIS OF THE RISK FACTORS

In study conducted by Chaudhari et al septicemia (P<0.00 1), apnea (P-0.0001) and oxygen therapy (P=0.03 1) were independent risk factors In our study on multivariate analysis. GA, duration of hospital stay, day of establishment of feeds, apnea, need for resuscitation and duration of oxygen administration were found to be independently significant risk factors.

EVALUATION OF NEED FOR TREATMENT AMONG CASES

In study by Austeng, 33.3% required treatment. In our study, only two babies (7.4%) had stage 2 plus disease and both required laser treatment. This may be due to the fact that our study had wide screening criteria compared to the other study and also there was strict monitoring for the avoidable risk factors and appropriate and timely screening as per the AAP guidelines.

CONCLUSION

1. The incidence of ROP in our study is 19.3% 8 babies (29.6%) had stage-1 ROP and 19 babies (70.4%) had stage-2 ROP.
2. Male to female ratio was 1.25:1.
3. 59.25% of the cases had a stage in zone 2 and 40.75% had a stage in zone 3.
4. The birth weight of the ROP babies ranged from 900gm-1700 gm (mean 1340±220 gm), while that of non-ROP babies ranged from 1100gm-1750gm (mean 1480± 160gm). Lower birth weight was significantly associated with increased incidence.
5. The mean gestational age of the cases was 29.93wk ±2.18wk and the controls were 32.42wk ±0.89wk. Low GA is an independent risk factor for ROP.
6. Low birth weight and prematurity are important risk factors for ROP.
7. Mean gestational age at which complete vascularization of retina is evident is 40.94% wk. ROP cases had delayed complete vascularization compared to the controls
8. On univariate analysis, the duration of oxygen administration, mean of maximum and minimum Sp02, need for oxygen supplementation, clinical sepsis, apnea, RDS, hypoxic ischaemic encephalopathy, mean APGAR at first and fifth minute of life, acute kidney injury, convulsions, positive C reactive protein,, administration of blood and its products and hypotension are significantly associated with development of ROP.
9. On multivariate analysis by application of multiple logistic regression models, GA, duration of hospital stay, day of establishment of feeds, apnea, need for resuscitation and duration of oxygen administration were found to be independent risk factors.
10. Early initiation of feeds and continuous pulse oximetry for monitoring the arterial oxygen saturation can reduce the incidence of ROP, especially the incidence of severe ROP.
11. Meticulous fundus examination with indirect ophthalmoscopy should be done in all preterm babies as per the guidelines and screening should be intensified in the presence of factors like apnea, need for resuscitation, oxygen administration, clinical sepsis, RDS, hypoxic ischaemic encephalopathy, low APGAR, acute kidney injury, convulsions, clinical sepsis, positive CRP, administration of blood and its products and hypotension.

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