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A study on the management of patients with retinopathy of prematurity in a tertiary care setting

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ABSTRACT

Introduction: Retinopathy of prematurity (ROP) is a disorder of the developing retinal blood vessels in the premature infant retina. ROP is a well-established disease of premature babies and has emerged as an important cause of childhood blindness. Globally, at least 50,000 children are blind as a result of ROP and an additional unknown number will be visually impaired or blind in one eye. Among the preventable causes of blindness in children, which is 57%, retinopathy of prematurity (ROP) figures very high in the agenda. Since 22 percent of all blind children have retinal causes, ROP is amongst the first few in high and middle income group countries.

Aim & Objective: To assess the management of patients with Retinopathy of prematurity in a tertiary level neonatal unit & to observe the outcome of treatment applied in the state of Odisha.

Materials and Methods: After obtaining the clearance from institutional ethical committee the study was conducted at SNCU/NICU of SVPPGIP & SCB Medical college from September 2019 to October 2021. All premature neonates of either sex less than or equal to 34 weeks of gestational age and babies with birth weight less than or equal to 2000 gram who qualify the inclusion criteria were taken into study. It was a hospital based prospective study.

Observation: In our study the incidence of ROP was 37.7%. ROP is found to be associated with the following risk factors in our study like low gestational age, low birth weight, oxygen therapy, RDS, anaemia, blood transfusion and septicemia, multiple births, hyperbilirubinemia with low birth weight and low gestational age and oxygen therapy being the most important ones. Effectiveness of intra vitreal Bevacizumab injection for treatment of ROP as successful outcome is seen in 83.9% cases with injection alone and in 100% cases when combined with follow up LASER photocoagulation.

Conclusion: Intra vitreal anti VEGF injection can be used as primary treatment for treatment warranted ROP cases though more research is needed to find out the long-term side effect profile of these drugs.

Recommendation: Timely screening and prompt treatment can significantly reduce the progression of the disease decreasing the burden of childhood blindness.

1. Introduction

Retinopathy of prematurity is a disorder of the developing retinal blood vessels in the premature infant retina. The key pathological change in ROP is peripheral retinal neovascularization. This may regress completely without any sequelae or leave sequelae from mild myopia to bilateral total blindness. ROP is a well-established disease of premature babies and has emerged as an important cause of childhood blindness.[1] The condition was first described by Terry in 1942 as retrolental fibroplasias.[2]

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Advances in neonatal care have led to survival of very small babies, however a lack of ophthalmic back up to screen all such new born babies for ROP had resulted in disastrous ocular morbidity and mortality in the past, the condition is improving now.[3] Globally, at least 50,000 children are blind as a result of ROP and an additional unknown number will be visually impaired or blind in one eye.[4] Childhood blindness is a curse more so if it occurs immediately after birth. It is important not only in terms of economic burden but its severe social implication, which is very long in terms of blind years. Among the preventable causes of blindness in children, which is 57%, retinopathy of prematurity (ROP) figures very high in the agenda. Since 22 percent of all blind children have retinal causes, ROP is amongst the first few in high and middle income group countries. A well-organized screening strategy and timely intervention can to a large extent prevent blindness due to ROP.[5] Screening examinations are not without problems; however, they are uncomfortable for the infants, anxiety provoking for parents and in some cases may lead to an extended stay at the tertiary care centre. Screening programs at busy centres are time consuming and labour intensive. These issues must be weighed against the risk of missing a case of threshold ROP and the opportunity to intervene with treatment that would lower the risk of severe visual impairment.[6] Interventions for ROP requiring treatment include laser photocoagulation (LP) of the peripheral avascular retina, anti-vascular endothelial growth factor (anti-VEGF) injections, rarely used cryotherapy, and vitrectomies or scleral buckling for retinal detachment in the most advanced stages of the disease. Treatment prior to vitreoretinal traction is usually successful, but once a detachment occurs, the visual results are often quite poor. Therefore, appropriate screening and timely, accurate treatment are crucial to stop the disease's progression and prevent visual function deficits in ROP patients. In this study we try to find out the current trend in management of patients with ROP in our hospital (tertiary care centre).

2. Aim & Objective

To assess the management of patients with Retinopathy of prematurity and its outcome of the treatment applied in a tertiary level neonatal unit in the state of Odisha.

3. Materials and Methods

It is a hospital based descriptive (cross- sectional) study, done from September 2019 to October 2021 after getting clearance from institutional ethical committee. The screening record from September 2019 to July 2021 was taken into account and a follow up period of up to 2 months was included in our study i.e. from August 2021 to September 2021. Analysis, interpretation and dissertation writeup was between September 2021 to October 202. All premature neonates of either sex less than or equal to 34 weeks of gestational age and babies with birth weight less than or equal to 2000 gram at SNCU of SCBMCH, Cuttack and SNCU, NICU of Sardar Vallabhbhai Patel Postgraduate Institute of Pediatrics (SVPPGIP), Cuttack, Odisha were taken as source of data. Sample selection After taking informed written consent from patients' guardians, screening of all the above-mentioned neonates for the presence of ROP was done and cases who met the inclusion criteria for our study were selected based on the clinical findings of fundoscopic examination by indirect ophthalmoscopy with a 20D condensing lens or RetCam retinal images from the population of premature infants.

3.1. Inclusion criteria

1. Babies born at </= 34 weeks of gestational age &/or.
2. Babies born with birth weight </= 2000grams or.
3. Premature (34-37 weeks) babies with other risk factors like sepsis, multiple blood transfusions, respiratory distress syndrome, oxygen therapy, intraventricular hemorrhage, hyperbilirubinemia, anemia, multiple births who after screening are diagnosed as having any stage of ROP based on clinical findings of indirect ophthalmoscopy with 20D lens or RetCam images according to Revised International classification of ROP (ICROP) 2005 & completed follow up for upto 2 months.

3.2. Exclusion criteria

1. Babies born at >36 weeks of gestational age.
2. Babies with birth weight >2000gram without risk factors
3. Premature babies with lesions other than R.O.P such as Retinal haemorrhage, congenital coloboma, chorioretinitis and other such lesions.
4. Babies who were lost to follow up.

3.3. Methods

After selecting the study population and recording the below mentioned information, the ROP cases are categorised for different management options according to Early Treatment of Retinopathy of Prematurity (ETROP)2003 guidelines and Project operational guidelines: Prevention of Blindness from Retinopathy of Prematurity in Neonatal Care Units52 After giving the required treatment or observation, patients are followed to see the response to treatment after 1 week (1st follow up) and follow up is continued for 2 months. The observations are recorded in a tabular form and the outcomes obtained are compared with the expected outcomes.

3.4. Sample size and design

A total of 310 premature neonates of either sex less, less than or equal to 34 weeks of gestational age and babies with birth weight less than or equal to 2000 gram at SNCU of SCBMCH, Cuttack and SNCU& NICU of Sardar Vallabhbhai Patel Postgraduate Institute of Pediatrics, Cuttack, Odisha were screened out of which 117 babies who fulfilled the above-mentioned inclusion criteria were included in the present study.

3.5. Statistical analysis

Analysis was performed using SPSS version 16.0.

3.6. Observation

3.6.1. Incidence of ROP

Out of 310 babies screened, 117 were found to have ROP. Thus, the incidence of ROP has come out to be 37.7% in Cuttack region.

Out of 310 babies screened, 117 were found to have ROP. Thus, the incidence of ROP has come out to be 37.7% in Cuttack region. 48.7% are males, whereas, 51.3% are females which shows there is no clear gender predilection for the disease. Maximum percentage of ROP cases belong in 28 – 34 weeks age group (82.10%). The gestational age of ROP patients in our study ranged from 26 – 36 weeks. Birth weights of ROP patients in our study range from 810 – 2000 grams. Maximum cases have birth weight in the range of 1250 – 1750 g (82.1%). Lower gestational age (< 34 weeks), low birth weight (<1750 g), oxygen therapy and respiratory distress syndrome are the most common risk factors seen in 92.3, 93, 76 & 68.3% cases of ROP respectively. Anemia, hyperbilirubinemia are the next common risk factors seen in 47.8 & 43.5 % patients of ROP in our study.(Table 1)

38.5% of the cases had stage 1 ROP, whereas stage 2 and 3 were seen in 33.3 and 17.09% of cases respectively in right eyes of the patients. In left eyes of the patients in our study, stage 1 ROP was seen in majority of them (40.2%) whereas stage 2 & 3 were seen in 31.6 and 17.09 % cases respectively. Both eyes of the patients had same ROP of same stage except for 2 cases out of which 2 had stage I in right eye, stage II in left eye. Stage 4 or Stage 5 ROP was seen in any of the eyes in our study. APROP was found bilaterally in 13 of 117 ROP patients (11.11%) in this study who were subjected to immediate treatment the following day.(Table 2)

Zone II involvement was seen in 48.7% cases, whereas 29.1% had zone III involvement and 22.2% of them had ROP in zone I. All patients in the study had same zone involvement in both the eyes.(Table 3)

22.2% of ROP cases had plus disease bilaterally, 33.3% had pre plus in both eyes and in rest of them, no plus disease was seen.(Table 4)

Threshold and type 1 ROP patients were given immediate treatment whereas type 2 ROP patients were subjected to follow up according to ETROP guidelines.(Table 5)

Only a small percentage i.e. 26.5% of ROP cases required treatment in the form of injection anti-VEGF only (27 cases) or injection anti VEGF and LASER photocoagulation (4 cases) whereas majority 73.5% of them required observation and follow up.(Table 6)

Out of 31 patients who were given intra vitreal anti VEGF injection, 26 showed signs of regression after 5 days of follow up whereas 5 of them failed to show signs of regression who were then subjected to retinal LASER photocoagulation after 10 days of the initial treatment. All 5 of them showed signs of regression on subsequent follow up after 1 week.(Table 7)

After 2 months of follow up, complete resolution i.e. mature retina in zone III was seen in 22.2% cases. Rest all of the cases showed regression but not complete resolution and were continued to be followed up till complete resolution is seen.(Table 8)

4. Discussion

Incidence: In our study, the incidence of ROP is found to be 37.7% which is comparable to the studies done by Wani VB et al,[1] Holmstrom et al,[7] Gopal et al,[8] Aggarwal et al[9] reporting incidence of 38.9%, 40.4%, 38%, 32% respectively. Incidence of ROP in India varies between 38-51.9% as reported in various studies. The difference in the reports of different studies may be attributed to high dropout rate from study due to poverty, lack of awareness about the outcome, severity & impact of the disease; critically ill babies or those with major anomalies usually succumb or are lost to follow up. In my study, out of 310 babies screened for ROP, 125 were found to have ROP (40.4%) but 7 babies were lost to follow up, so 117 babies were included in the making the incidence to be 37.7%.

Gender wise distribution Out of 117 ROP cases, 57 are males (48.7%) and 60 are females (51.3%) in our study. We observed no gender predilection as the ratio of male: female is 0.95 in our study. This finding is supported by CRYO-ROP study (66.4% male and 65.3% female; M: F:: 1.01:1). Although there are some reports indicating a male predilection of ROP, the CRYO-ROP study revealed no difference based on sex.

Age wise distribution: The gestational age of ROP patients in our study ranged from 25 – 37 weeks. Maximum percentage of cases belong in 28 – 34 weeks age group (82.10%). This makes gestational age an important risk factor for development of ROP as most of the cases are seen in babies </= 34 weeks of age which shows that the cut-off of GA for screening being 34 weeks is appropriate. This has been supported by various studies like Kavurt S[10] et al in which they stated that being small for gestational age was a significant risk factor for severe ROP. Palmer

Table 1: Socio-demographic picture of retinopathy of prematurity (ROP)

Parameter		Frequency	Percentage
ROP	Present	117	37.74
	Absent	193	62.26
	Total	310	100
Gender	Male	57	48.7
	Female	60	51.7
	Total	117	100
Gestational age in weeks	<28	13	11.11
	28-31	56	47.87
	32-34	39	33.33
	>34	9	7.69
	Total	117	100
Birth weight (in grams)	<1250	13	11.1
	1250-1500	44	37.7
	1501-1750	52	44.4
	1751-2000	8	6.8
	Total	117	100
Risk factor	Gestational age (<28wk)	108	92.3
	Birth weight <1750gm	109	93
	Supplemental oxygen (including ventilation)	89	76
	Respiratory distress syndrome	80	68.3
	Blood transfusion	31	28.2
	Septicemia	39	33.3
	Multiple birth	34	29
	Intraventricular hemorrhage	9	7.6
	Anemia	56	47.8
	Hyperbilirubinemia	51	43.6

Table 2: Stage wise case of ROP

Stage		Right eye		Left eye	
		Number	Percentage	Number	Percentage
1		45	38.5	47	40.2
2		39	33.3	37	31.6
3		20	17.09	20	17.09
4	a	0	0	0	0
	b	0	0	0	0
5		0	0	0	0
APROP		13	11.11	13	11.11
Total		117	100	117	100

Table 3: Zone wise distribution of ROP

Zone	Number	Percentage
I	26	22.2
II	57	48.7
III	34	29.1
Total	117	100

Table 4: Distribution of plus, pre plus ROP

Distribution	Number	Percentage
Plus	26	22.2
Preplus	39	33.3
No plus	52	44.4
Total	117	100

Table 5: Threshold & pre-threshold ROP

Parameter		Number	Percentage
Threshold		18	15.38
Pre-threshold	Type I	13	11.11
	Type II	19	16.29

Table 6: Management strategy

Management	Number	Percentage
Observation& follow up	86	73.5
Injection anti-VEGF only	26	22.2
Injection anti-VGEF & LASER Photocoagulation	5	4.8
LASER Photocoagulation only	0	0
Vitreo-retinal surgery for RD	0	0
Total	117	100

Table 7: Response to treatment

Treatment	Regressed	Not regressed	Total
Injection anti-VEGF	26(83.9%)	5	31
Injection anti-VGEF & LASER	5(100%)	0	5

Table 8: Status at 2month follow up

Status	Number	Percentage
Spontaneous regression	60	51.3
Regression after treatment	31	26.5
Complete resolution	26	22.2
No regression	0	0
Total	117	100

et al[11] reported that incidence and severity of ROP was closely related to lower post conceptional age as was seen in our study. Lower percentage (11.11%) of cases below 28 weeks is because of low survival of these extremely premature babies in Indian setting. This is supported by the data provided by National Neonatology Forum (NNF).

9 babies above 34 weeks of GA who were found to have ROP in our study had additional risk factors like history of respiratory distress syndrome (all 9), blood transfusion (5 of them), intraventricular hemorrhage (2 cases), hyperbilirubinemia (6 cases), septicemia (7 cases).

ROP and birth weight: Birth weights of ROP patients in our study range from 810 – 2000 grams which shows that 2000 g as the cut off for birth weight is an appropriate screening criteria given by ETROP. Maximum cases have birth weight in the range of 1250 – 1750 g (82.1%) which shows ROP is more frequent in babies with low birth weight. This has been supported by Multicentre Trial of Cryotherapy which showed that lower the birth weight greater the risk of developing ROP. In another study done by Chye Jk, Lim CT[12]] out of 100 infants they found 15 infants with ROP and all of them except 1 had birth weight less than 1250 g. Recent Indian studies have shown that the incidence of ROP varies from 38-51.9% among low birth weight babies. In a study done by Lingam Gopal et al,[8] a total of 50 infants of less than 2000g birth weight were screened for ROP by binocular indirect ophthalmoscope. The incidence of ROP was found to be 38%. The incidence of ROP was higher with the lower birth weights but occurrence of threshold ROP even at a birth weight of 1600g is significant. Hence screening of infants should be done up to 2000g birth weight.

ROP and risk factors: In our study, we find that, lower gestational age (< 34 weeks), low birth weight (<1750 g), oxygen therapy and respiratory distress syndrome are the most common risk factors seen in 92.3, 93, 76 & 68.3% cases of ROP respectively. Anemia, hyperbilirubinemia are the next common risk factors seen in 47.8 & 43.5 % patients of ROP in our study. 33.3 %, 28.2% had history of septicemia and blood transfusion respectively. 29% (34) cases were twin deliveries and 9 were found to have intraventricular hemorrhage. Many studies showed the above mentioned conditions as important risk factors for development of ROP like Chaudhari S et al,[13] Flynn et al,[14] Gupta VP et al,[15] Rekha S et al,[16] JA Englert et al[17] CRYO-ROP & so on.

Stage wise distribution of ROP: In our study, 38.5 & 40.2% cases had stage 1 ROP in right and left eyes respectively. 33.3% and 31.6% cases had stage 2 ROP in right and left eyes respectively. 17.09% cases had stage

3 ROP in both right and left eyes. APROP was seen in both the eyes of 13 cases (11.11%). No cases were seen to have stage 4 or stage 5. This is probably due to effective implementation of screening practices at our centre which ensures early detection of ROP cases and their timely treatment preventing progression into late stages with poor visual prognosis. The results in our study are comparable to that done by Palmer et al[11]. In the study by Palmer et al[11] as part of the CRYO-ROP study, 38.29% babies were found with stage1, 32.97% in stage 2 and 27.81% in stage 3. No babies were detected in stage 4 or 5 ROP.

Zone wise distribution: Zone II involvement was seen in 48.7% cases, whereas 29.1% had zone III involvement and 22.2% of them had ROP in zone I. All patients in the study had same zone involvement in both the eyes.

Plus, pre plus ROP: In our study, we find that, 22.2% of ROP cases had plus disease bilaterally, 33.3% had pre plus in both eyes and in rest of them, no plus disease was seen. Based on zone involved, stage of ROP and presence or absence of plus disease, we classify the cases as threshold, pre threshold type 1 or pre threshold type 2 ROP. This classification is required to decide on the different management options to be employed for the ROP cases according to ETROP guidelines.

Threshold, pre threshold disease :18 cases were found to have threshold ROP bilaterally in our study which also included 13 cases of APROP. They require treatment within 48 hours of detection according to ETROP guidelines either in the form of intra vitreal anti VEGF injection or retinal LASER photocoagulation. A total of 13 cases were included in the pre threshold type 1 (high risk) ROP in our study. At the time of initial examination, pre threshold type 2 (low risk ROP) was seen bilaterally in 23 cases, out of which 4 progressed to type 1 ROP and were included in that group, so the total number of type 2 ROP cases remains 19 in the study. Early treatment of Retinopathy of prematurity (ETROP) trial recruited neonates at 26 centres in the U.S and compared early treatment of high risk pre threshold with conventional threshold treatment. The results showed an overall significant benefit for the early treatment of eyes with high risk pre threshold disease55. This study redefined the earlier guidelines. They defined the actively treatable and observational types of pre-threshold ROP as type 1 (high risk pre threshold ROP) and type 2 ROP respectively. Threshold and type 1 ROP patients were given immediate treatment whereas type 2 ROP patients were subjected to observation and follow up.

Management strategies: In this study we find that, only a small percentage i.e. 26.5% of ROP cases required treatment in the form of injection anti-VEGF only (27 cases) or injection anti VEGF and LASER photocoagulation (4 cases) whereas majority 73.5% of them required observation and follow up.

Treatment-warranted ROP/ Criteria for treatment by ETROP: Treatment for ROP should be undertaken if any of the following indications are reached: 1. Zone I, any ROP with plus disease. 2. Zone I, stage 3 without plus disease. 3. Zone II; stage 3 or 2 with plus disease. There were 86 cases in our study which did not fall under treatment warranted ROP criteria and were observed for the progression/ regression of ROP on subsequent follow up visits, the frequency of which was decided based on following guideline (which is internationally accepted by ETROP and is also recommended in India by Project operational guidelines: Prevention of Blindness from Retinopathy of Prematurity in Neonatal Care Units)53: 1 week or less follow-up Stage 1 or 2 ROP: zone I (11 cases),Stage 3 ROP: zone II (17 cases),1 to 2 weeks follow-up , Immature vascularization: zone , Stage 2 ROP: zone II (23 cases), Unequivocally regressing ROP: zone I, 2 weeks follow-up Stage 1 ROP: zone II (17 cases), Unequivocally regressing ROP: zone II, 2 to 3 weeks follow-up Immature vascularisation: Zone II, Stage 1 or 2 ROP: zone III (18 cases), Regressing ROP: zone III.

Thus, 28 were followed up within 1 week of initial examination, 23 cases were followed up within 1-2 weeks, 17 & 18 of them were followed up at 2 & weeks of examination respectively. The babies are continued to be followed up and examined at every visit using indirect ophthalmoscopy with 20D lens or RetCam imaging. After each follow up they are advised either for the next follow up or treatment depending upon the severity of ROP. In our study we included findings of those ROP cases who could be followed upto at least 2 months from the initial examination or the treatment day. Based on the findings of studies like BEAT-ROP & RAINBOW stating better results with intra vitreal anti VEGF injection as compared to retinal LASER photocoagulation in ROP patients; along with the ease of administration, less discomfort to babies associated with anti VEGF injection, it is considered as first line treatment for ROP at our institute. This is also supported by a review article by Hapsari and Saitorus published I 2005 issue of Asia Pacific Journal named “Intravitreal Bevacizumab in Retinopathy of Prematurity: Inject or Not?” specifically focuses on the off-label use of bevacizumab in ROP and comprehensively summarize past retrospective and prospective clinical studies. The authors describe three recurrent scenarios where intravitreal bevacizumab appears to have utility in ROP. These include (1) type 1 ROP zone I and/or posterior zone II; (2) aggressive posterior ROP with poor retinal visualization in which laser photocoagulation would be difficult to perform; and (3) stage 4 ROP before vitrectomy.

Follow up after treatment: After the treatment with anti VEGF, all the patients were followed up after 5 days; it was observed that, out of 31 patients who were given intra vitreal Avastin, 26 (83.9%) showed signs of regression after

5 days of follow up whereas 5 of them failed to show signs of regression who were then subjected to retinal LASER photocoagulation in a single setting after 10 days of the initial treatment, following the procedure described above (in literature review) and using all safety precautions. These 5 cases were threshold ROP cases involving posterior zone II. All 5 of them showed signs of regression on subsequent follow up after 1 week.

Status at 2 months follow up: After 2 months of follow up, complete resolution i.e. mature retina in zone III was seen in 22.2% (26) cases. All of these cases were cases who were subjected to observation and follow up. Rest all the cases showed regression but not complete resolution and were continued to be followed up till complete resolution is seen or till 50 weeks post conceptional age, out of which 60 cases showed spontaneous regression without any treatment, whereas 31 cases who were treated showed regression after treatment without any recurrence after 2 months. Thus, at 2 months follow up, response to treatment given in our study is 100% but further follow up is required as there have been reports of recurrence in various studies like 4% recurrence cases in BEAT-ROP study after 6 months follow up. The final outcome of these babies is still under study as they are prone for complications of ROP like refractive error, amblyopia, glaucoma and retinal detachment which may develop later. So, all the babies in our study are continued to be followed up, initially monthly after complete vascularization is seen till 6 months followed by 6 monthly follow up till at least 2 years of age to check for visual acuity, refractive status, fundoscopy, intra ocular pressure etc.

5. Conclusion

During the study period of nearly 2 years from September 2019 to October 2021, 310 babies were screened for ROP in which 117 were found to be positive for ROP. The incidence of ROP in our study was 37.7%. ROP is found to be associated with the following risk factors in our study like low gestational age, low birth weight, oxygen therapy, RDS, anaemia, blood transfusion and septicemia, multiple births, hyperbilirubinemia with low birth weight and low gestational age and oxygen therapy being the most important ones. Out of 117 ROP cases in our study, we find that, only 31 (26.5%) of them required treatment whereas rest 73.5% (86) of them were subjected to observation and follow up. Intra vitreal Bevacizumab (Avastin), 0.025 mL, is used as primary treatment option for the past 2-3 years at our institute for threshold and pre threshold type 1 ROP cases. In our study, we find that, out of 31 cases treated with Avastin injection, 26 showed signs of regression till 2 months follow up and only 5 of them didn't show signs of regression after injection Bevacizumab. Those 5 babies were treated with retinal ablation by LASER photocoagulation after 10 days of initial treatment, who showed signs of regression till 2 months follow up. At 2 months follow up at the end of our study, all 117 cases of ROP showed signs of regression with complete spontaneous resolution seen in 26 cases. Regression in 31 cases was seen after treatment whereas rest 50 had spontaneous regression. This study shows effectiveness of intra vitreal Bevacizumab injection for treatment of ROP as successful outcome is seen in 83.9% cases with injection alone and in 100% cases when combined with follow up LASER photocoagulation. Proper follow up is done for all the ROP patients and other neonates with immature retina till maturation of peripheral retina or till 50 weeks Post conceptional age. The discharged patients after maturation of retina are advised to follow up in ophthalmology OPD at 6 monthly interval at least till 2 years of age to look for sequelae of ROP and needed management.

Based on this study, we can say that proper screening and management of ROP can lead to prevention of progression of disease to a more severe stage with poor visual prognosis, thereby reducing the burden of childhood blindness. Intra vitreal anti VEGF injection can be used as primary treatment for treatment warranted ROP cases though more research is needed to find out the long-term side effect profile of these drugs.

6. Conflict of Interest

None.

7. Source of Funding

None.

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