



Clinical Profile Risk Factors And Outcome Of Newborn Babies With Retinopathy Of Prematurity In A Tertiary Care Centre

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Abstract

Introduction: Retinopathy of Prematurity is a neo vascularized disease of the premature retina that in its most severe form can lead to retinal detachment and subsequent blindness. ROP is a multifactorial vaso proliferative disorder of the retina, that increases in incidence with decreasing gestational age and birth weight. Approximately 65% of infants with a birth weight of <1250 gm, and 80% of infants with a birth weight <1000 gm, will develop some degree of ROP.

Aim Of Study : 1. To study the clinical profile of ROP in newborn babies with ROP in an extramural center. 2. To find out the outcome of ROP following laser therapy. 3. To follow up the newborn babies with ROP after screening for the outcome.

Materials & Methods: This prospective study was conducted in Government virudhunagar Medical College & Hospital, virudhunagar, from April 2021 to July 2021 over 4 months. All the newborn babies admitted in the newborn wards with birthweight <1500g and gestational age <34 weeks were enrolled based on inclusion criteria and after obtaining written informed consent from the parents. The screening was done with a binocular direct ophthalmoscope. Eyes were examined using topical anesthetic drops after applying topical tropicamide drops till full dilatation occurred. Retinopathy was graded into Stages and Zone as per the ICROP classification. Infants with normal vascularization up to the retinal periphery are not examined again. Those with ROP were examined every two weeks till regression. Infants with Stage III ROP with the plus disease are considered the threshold for laser treatment.

Results: A total of 202 newborns were included in this study, among them 73 developed ROP. The overall incidence of ROP was found to be 36.1%. We also found that lesser gestational age, lower birth weight, RDS, apnea, NNH, oxygen therapy, use of blood products was found to be significant risk factors. The efficacy of laser photocoagulation was 94.7%. 36 out of 38 infants treated with laser showed regression ROP.

Conclusion: Larger birth weight babies and gestationally older babies may also develop ROP. So, the criteria for ROP screening should be extended to the larger birth weight babies up to 1.8 kg and older gestational age babies up to 36 weeks especially those with risk factors like sepsis, apnea, RDS, and those who need a blood transfusion. It seems that prevention of premature and deliveries and judicious use of oxygen are found to be the main step for prophylaxis of ROP

Keywords: larger weight babies, Retinopathy of prematurity, Laser therapy, Sepsis

Introduction

Retinopathy of Prematurity is a neovascularising disease of the premature retina that in its most severe form can lead to retinal detachment and subsequent blindness.^[1] ROP is a multifactorial vasoproliferative disorder of the retina, that increases in incidence with decreasing gestational age and birth weight. Approximately 65% of infants with a birth weight of <1250 gm, and 80% of infants with a birth weight <1000 gm, will develop some degree of ROP. Given the ongoing trend for resuscitation of smaller infants with lower gestational ages along with increased survival of VLBW & ELBW babies, an increase in the incidence of ROP is expected.^[2] Beginning at 16 weeks, retinal angiogenesis normally proceeds from the optic disc to the periphery reaching the outer rim of the retina nasally at about 36 weeks and extending temporally by approximately 40 weeks. Injury to this process may result in pathological changes in the growing retina. Initially, it causes cessation of vasculogenesis followed by the abrupt termination of vessels marked by a thin line in the retina which then grows into a ridge made up of mesenchymal and endothelial cells.^[3] Cell division and differentiation may resume later and vascularisation of the retina may proceed. Sometimes, abnormal proliferation of vessels out of the plane of the retina, into the vitreous, and over the surface of the retina may occur. Then it is followed by cicatrization and traction on the retina may occur and which can lead to retinal detachment.^[4] The Major risk factors associated with ROP are prematurity and associated retinal immaturity. The other contributory factors are oxygenation, respiratory distress, apnea, bradycardia, heart Disease infection, hypercarbia, acidosis, anemia, and the need for transfusion. Generally, the lower the gestational age, the lower the birth weight, and the sicker the infant is, the greater the risk is for ROP.^[5] The basic pathogenesis of ROP is unclear. Probably free radical-mediated cellular damage in newborns who are exposed to high inspired oxygen concentrations. Then followed by peripheral hypoxia and release of VEGF. in the nonvascularized retina. Retinal hypoxia may be due to poor pulmonary function, which causes upregulation of VEGF, which produces abnormal fibrovascular growth in susceptible infants. This faulty neovascularisation may cause scarring and loss of vision.^[6] Systematic serial ophthalmologic examinations of infants with birth weight <1500 gm, and infants of gestational age

<34 weeks should be done. The initial examination should be done at 4-6 weeks of chronological age.^[7] The follow-up period is usually 2 weeks or less. Cryotherapy or laser photocoagulation of the avascular retina is the treatment of choice for ROP in infants with advanced stages. Serial ophthalmological examinations are required in others. Regarding the prevention of ROP, oxygen alone is neither sufficient nor necessary to produce ROP and no safe level of oxygen has yet been determined.^[8]

Materials & Methods

This prospective study was conducted in Government virudhunagar Medical College & Hospital, virudhunagar, from April 2021 to July 2021 over 4 months. All the newborn babies admitted in the newborn wards with birthweight <1500g and gestational age <34 weeks were enrolled based on inclusion criteria and after obtaining written informed consent from the parents. The screening was done with a binocular direct ophthalmoscope. Eyes were examined using topical anesthetic drops after applying topical tropicamide drops till full dilatation occurred. Retinopathy was graded into Stages and Zone as per the ICROP classification. Infants with normal vascularization up to the retinal periphery are not examined again. Those with ROP were examined every two weeks till regression. Infants with Stage III ROP with the plus disease are considered the threshold for laser treatment. Eligible preterm babies with defined criteria were registered. Neonatal risk factors like RDS, anemia, apnoea, Prematurity, septicemia, neonatal hyperbilirubinemia were noted. Treatment details like oxygen therapy, CPAP, ventilator, use of blood products, phototherapy were noted. Using + 20 D Ophthalmoscope all the preterm babies were screened for ROP. Some of the babies with severe ROP were treated with laser photocoagulation. Others were followed up regularly every 2 weeks. The babies who were treated with laser photocoagulation were also followed up regularly every 2 weeks or weekly if required. The screening was done with a binocular direct ophthalmoscope. Eyes were examined using topical anesthetic drops after applying topical tropicamide drops till full dilatation occurred. Retinopathy was graded into Stages and Zone as per the ICROP classification. Infants with normal vascularisation up to the retinal periphery are not examined again. Those with ROP were examined every two weeks till

regression. Infants with Stage III ROP with the plus disease are considered the threshold for laser treatment. Laser photocoagulation was done for infants with severe ROP using 810nm red laser with laser indirect ophthalmoscope as early as possible, at least within 5 days of diagnosis of threshold disease. Avascular retina beyond the ridge was ablated by confluent medium intensity burns over one session. Topical treatment with tobramycin and steroids was given for 3 days after the procedure. If skip areas

Results

were seen on subsequent examination, the laser was repeated after one or two weeks according to the situation.

Statistical Analysis

Statistical analysis was done using SPSS 16.0 version software. Descriptive statistics like mean, standard deviation, variance, and range arrived. Various risk factors were calculated using, Univariate analysis, Multivariate analysis.

Table No.1 Percentage Of Rop In Gestational Age Group

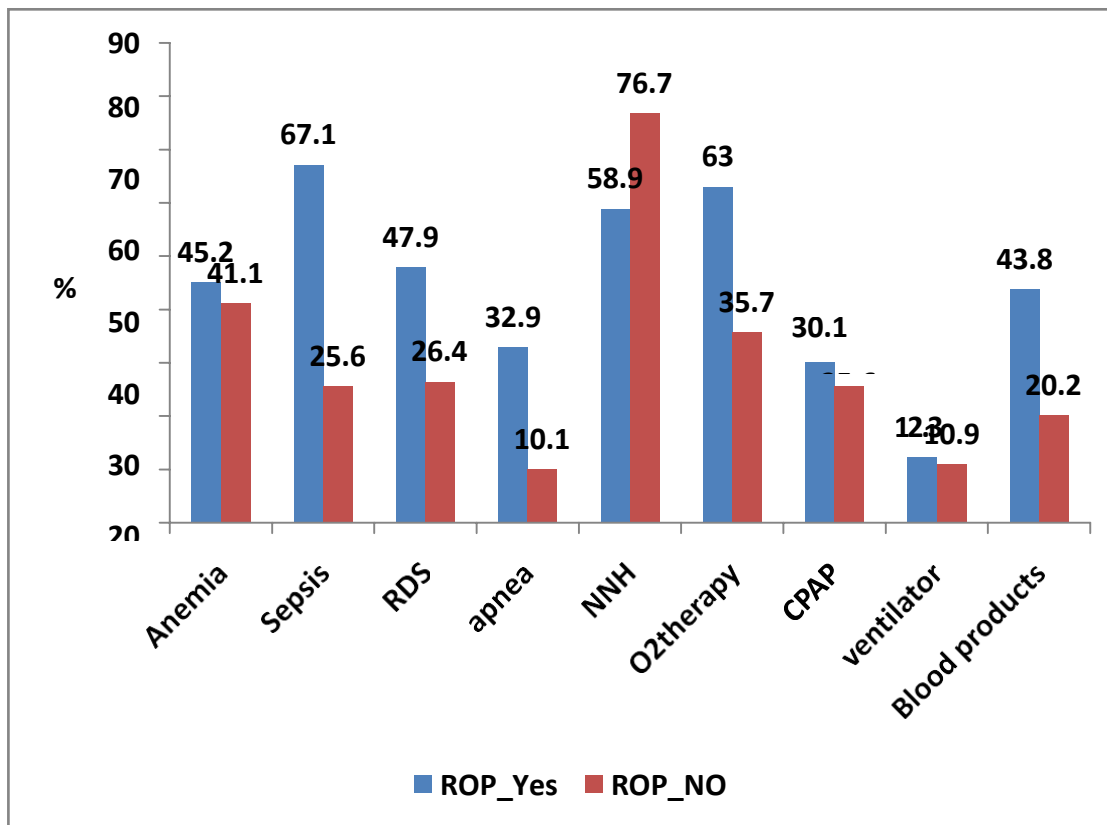
Gestational weeks	Age in	ROP +ve	ROP -ve	Total	% of ROP +ve
<28		3	1	4	75%
28 – 30		21	7	28	75%
31 – 32		39	22	61	64%
>33 – 34		6	54	60	10%
>34		4	45	49	8.1%

Table No.2 Percentage Of Rop In Various Stages

S.No.	Stage	No. of Cases (Total 73)	%
1	I	33	45.2
2	II	21	28.7
3	III	14	19.2
4	IV	4	5.4
5	V	1	1.3

Table:2 Out of 73 infants who had ROP, 33 were in stage I, 26 infants were in stage II, 14 were in stage III, 4 were in stage IV, one infant was found to be in stage V. Among 73 infants who developed ROP, 38 infants required laser photocoagulation out of which 36 babies showed regression of ROP. The other 2 infants progressed to higher stages of ROP, of which one developed retinal detachment.52.10 % required laser therapy.47.90% does not require laser therapy.

Graph :1 Univariate Analysis Was Done Accounting For Each Risk Factor.



Graph :1 The risk factors included are 1. Gestational age 2. Birthweight 3. Anemia.4. Respiratory Distress Syndrome 5. Apnea 6. Neonatal Hyperbilirubinemia (NNH) 7. Oxygen therapy 8. Continuous Positive Airway Pressure (CPAP) 9. Ventilators 10. Use of blood products. Among the risk factors lesser gestational age ($p=0.000$) VLBW & ELBW, ($P=0.000$), RDS ($P=0.0002$) apnea ($P=0.0001$), NNH ($P=0.008$), O₂ therapy ($P=0.000$), and use of blood products ($P=0.000$) were found to be significant.

Discussion

We screened all the babies admitted in our newborn wards with birth weight <1500gm and/or gestational age <34 weeks. The study conducted by Swarna Rekha et al [12] also had the same screening criteria which showed an incidence of ROP as 46%. In our study, the incidence was 36.1%. The incidence of ROP in various studies in India varies from 20% to 60.2%. [9] The incidence of ROP in the west had been reported as 53% - 88.5% in <1000g babies. In our study, it was 77.7% which was comparable to the previous studies. The incidence of ROP in <1500g babies was found to be 34.9-60.1% in western studies. In our study, we found the incidence was about 49.2% which seems to follow a similar pattern. Incidence of ROP has been reported as 82.5% in babies <28 weeks and in our study, it was 75% which is somewhat lower than the previous studies. The incidence of ROP in the 28 - 30 weeks group was found to be 27% in the previous study. But in our study, the incidence seems to be higher than the

previous one (64%). There were varying screening criteria described by different authors for ROP screening. [10] Many risk factors were found to be predisposing to the development of ROP. Of which oxygen therapy, anemia, use of blood products, septicemia, apnea, and RDS were important risk factors. In our study lower birth weight, lesser gestational age, apnea, RDS, oxygen therapy, sepsis, use of blood products, neonatal hyperbilirubinemia were found to be significant risk factors. [11] septicemia was a significant risk factor. Laser therapy does not need the use of general anesthesia and has milder complications. In our study, 38 infants with ROP required laser photocoagulation. Of which 36 infants (94.7%) had regression of ROP after laser photocoagulation which showed good results with laser therapy. [12,13] As ROP is essentially asymptomatic in earlier stages, carefully timed retinal examination of at-risk infants for ROP by an ophthalmologist experienced in retinal examination

in infants is required to minimize the risk of loss of vision in these infants.^[14,15]

Limitations Of The Study

The intramural sample and sample were not included. So the comparison between intramural and extramural populations could not be obtained. Since the oxygen blender was not available, the fio2 concentrations at which level, the maximum risk for development of ROP could not be obtained. As the arterial blood gas analysis was not available consistently, the association of acidosis with ROP as a risk factor could not be identified.

Conclusion

In our study, we conclude that the incidence of ROP was 36.1%. Laser photocoagulation was found to be a safer therapeutic procedure with good outcomes and milder complications. Larger birth weight babies and gestationally more older babies may also develop ROP. So, the criteria for ROP screening should be extended to the larger birth weight babies up to 1.8 kg and older gestational age babies up to 36 weeks especially those with risk factors like sepsis, apnea, RDS, and those who need a blood transfusion. It seems that prevention of premature and deliveries and judicious use of oxygen are found to be the main step for prophylaxis of ROP.

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