VOLUME - 11, ISSUE - 01, JANUARY - 2022 • PRINT ISSN No. 2277 - 8160 • DOI : 10.36106/gjra

Original Research Paper

Ophthalomology

"SCREENING AND STAGING OF RETINOPATHY OF PREMATURITY IN PRETERM INFANTS"

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ABSTRACT

PURPOSE-To screen the preterm infants for detection and staging of ROP.

METHODS-It was prospective clinical study. All Preterm infants(<34weeks) whose parents give written informed consent.Total 232 preterm high-risk infants were screened out during 1 year duration.Screening criteria was birth weight <2000gm, <34 weeks of gestational age,Oxygen supplementation for more than 7 days.Sampling was done by sequential sampling. Detailed history was evaluated-antenatal history and infants history.Dilated fundus examination by indirect ophthalmoscopy method.

RESULTS- The occurrence of ROP is 19.88%.Sixty percent of diagnosed ROP were males & 40% being females. The screening showed the occurrence of Stage I in is 36.95%, Stage II is 45.66%, Stage III is 10.86%, Stage IV is 2.17%,APROP is 4.34%, none of the studied neonates presented ROP at Stage V.Statistical analysis was done by chi-square test.

CONCLUSION- The premature child is not born with ROP and retinal disease is not present at birth. Each such child has a potential for normal vision, even if the retina is immature at birth. Screening aims to identify those infants early. The timely retinal screening of high risk preterm infants and appropriate management is important to prevent the development of advanced ROP.

KEYWORDS : Retinopathy of prematurity(ROP),Screening, Staging

INTRODUCTION

Retinopathy of prematurity (ROP) or Terry syndrome, previously known as retrolental fibroplasia (RLF),is a vasoproliferative disease of the eye affecting prematurely-born babies generally having received intensive neonatal care, in which oxygen therapy is often used and advantageous[1,2].The condition was first described by Terry in 1942 as retrolental fibroplasias based on his impression that the primary change involved a proliferation of the embryonic hyaloid system which incorporated the retina[3]. The term ROP was coined by Health in 1951. ROP is a complex disease process. It ranges from mild transient changes with regression to severe progressive vasoproliferation, scarring, detachment leading to blindness. It can often be treated successfully, if it is diagnosed in time. Its prevention requires identification of risk factors associated with ROP[4]. As such, all preterm babies are at risk for ROP, and very low birth weight is an additional risk factor. Both oxygen toxicity and relative hypoxia can contribute to the development of ROP.[5][6].

MATERIAL AND METHODS

Study Design: Prospective clinical study design

Sample Population: All Preterm infants(<34weeks) whose parents give written informed consent.

Screening Criteria For Rop

- All the babies <2000gm birth weight.
- All babies <34 weeks of gestational age.
- Oxygen supplementation for more than 7 days.

STUDY DURATION

March 2016-February 2017

Study Site

- Infants meeting the inclusion criteria in nursery, neonatal intensive care unit (NICU) In M.Y Hospital,Indore and Chacha Nehru Bal Chkitsalaya,Indore, special neonatal intensive care unit (SNCU) M.Y hospital,Indore.
- Infants meeting inclusion criteria and attending Ophthalmology & and Pediatrics OPD in M.Y Hospital, Indore.

Study Sample- 232 preterm high-risk infants

Sample Technique- Sequential sampling

Study Tools- Observation check list (predesigned, pretested)

Requirement:

- Indirect ophthalmoscope
- 20D lens
- Pediatric speculum
- Pediatric depressor
- Mydriatic eye drops
- Sterile cotton
- Dextrose 10% / Milk
- ROP documentation form
- Consent form
- Literature (Pamphlets/Flyers) for parents
- A nurse to help doctor in holding the child
- A neonatologist
- Resuscitation kit

Inclusion Criteria:

All preterm (≤34weeks)infants with:

- Low birth weight(<2500gm)
- Oxygen exposure for more than 7 days
- Septicemia
- Respiratory distress syndrome
- Neonatal asphyxia
- Jaundice / Phototherapy exposure
- Intra uterine growth retardation (fetus with estimated fetal weight $<10^{th}$ percentile on ultrasound that , because of a pathologic process.)
- Anaemia (Hemoglobin ≤10 g/dl or Hematocrit ≤30%)
- Blood transfusion
- Antenatal H/O:
- Antenatal h/o of steroids/NSAIDS
- Genitourinary infection
- Viral infection
- Multiple pregnancy
- Placental insufficiency
- Premature rupture of membrane

Systemic Examination: Associated systemic disease, risk

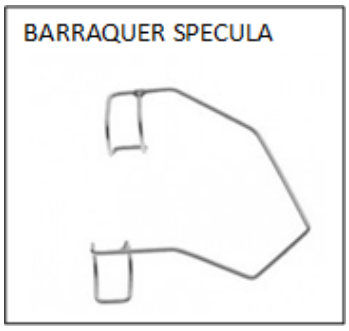
factor for development of ROP

Procedure

- Informed consent of parents were taken. Preparation for fundus examination.
- The pupils were dilated with Mydriatic drop (tropicamide 0.5%+ phenylephrine 2.5%) instilled at 10 min interval about 1 hour before the scheduled examination .
- Baby shouldn't be fed immediately before the examination as the child may vomit or aspirate.

Fundus examination with indirect ophthalmoscope

- Antenatal & infants history recorded
- Informed consent of patient's parents is obtained
- The initial examination for ROP should be done in the nursery
- The neonate is wrapped in a towel so that a single assistant can hold the head steady for examination.
- Examination should be done in dim illuminated room.
- Apply pediatric eye speculum after instilling 1drop of paracaine.



- Posterior segment examination done with indirect ophthalmoscopy with 20D lens.
- Examination of peripheral retina is done with the help of scleral indentor, which in turn stablizes globe.
- All quadrants of retina are examined with gentle head movement.
- Findings are noted in ROP form.
- Topical antibiotic applied
- Stage & severity of ROP was classified according to ICROP.

Precautions

- Avoid excess of phenylephrine.
- Avoid spilling of eye drops.
- Baby shouldn't be fed within 1 hour of examination.
- Periphery of retina should be cautiously examined for the extent of change.
- Globe indentation may give an erroneous impression of plus disease. Therefore, Plus disease should be looked without indentation.

Time Of Screening

- The initial examination should be at 4-6 weeks postnatal, or between 31 & 33 weeks of gestation.
- All preterm infants included in the study were screened as follows:

Screening Schedule

GESTATIONAL AGE	TIME OF SCREENING
< 26 WEEKS	1ST THURSDAY AFTER 30WEEKS
26 WEEKS	1ST THURSDAY AFTER 31 WEEKS
27-28 WEEKS	1ST THURSDAY AFTER 32 WEEKS
29-31 WEEKS	1ST THURSDAY AFTER 33 WEEKS
32 WEEKS	1ST THURSDAY WHEN OVER 3 WEEKS OLD

FOLLOW UP SCHEDULE

- If retina is immature (retinal vessels not seen up to nasal ora serrata) then baby must be screened every 2 weeks till the retina is mature.[7]
- In eyes with retinal vessels seen only up to the zone 1 at initial visit, weekly evaluation is needed. These eyes can develop rush disease very quickly, and not necessary the classical stages 1-3 before reaching threshold ROP.
- If there are early signs of ROP then the child must be examined every week for any progression or regression of the disease.
- If child develop pre-threshold ROP, then the child should be seen every 3-7 days for progression.
- In case of threshold ROP, urgent peripheral retinal laser/cryo-ablation should be done within 48-72 hours.
- In eyes with ROP stage 4/5, early surgical treatment such as buckling / vitreous surgery can help save some vision, though the majority has a dismal prognosis.
- In case of doubt examination should be conducted weekly or bi-weekly, at least till the child is 38-40 weeks.

Follow-up examinations on the basis of retinal findings classified according to the international classification:

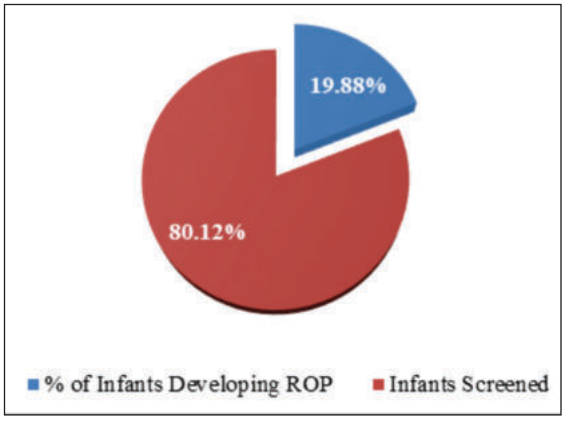
1-week or less follow-up	Stage 1 or 2 ROP: zone I
	Stage 3ROP: zone II
1- to 2-week follow-up	Immature vascularization:
	Zone I—no ROP
	Stage 2 ROP: zone II
	Regressing ROP: zone I
2-weekfollow-up	Stage 1 ROP: zone II
	Regressing ROP: zoneII
2- to 3-week follow-up	Immature vascularization:
	Zone II—no ROP
	Stage 1 or 2 ROP: zone III
	Regressing ROP: zone III

- The presence of plus disease (defined as dilation and tortuosity of the posterior retinal blood vessels) in zone I or II suggests that peripheral ablation, rather than observation,is appropriate.

RESULTS

Table 1 Occurrence Of Rop

1.	PRETERM INFANTS SCREENED	232
2.	DIAGNOSED ROP	46
3.	OCCURRENCE OF ROP(IN PERCENTAGE)	19.88%

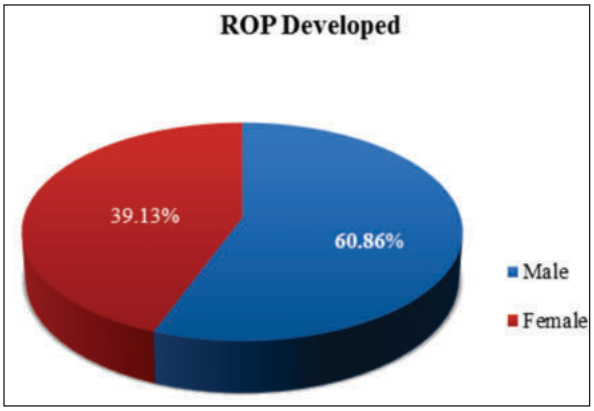


Graph 1: Occurrence of ROP

Table2 Sex Distribution In Rop

	MALE	FEMALE	TOTAL
ROP+VE	28	18	46
ROP-VE	102	84	186
TOTAL	130	102	232
OCCURRENCE	60.86%	39.13	

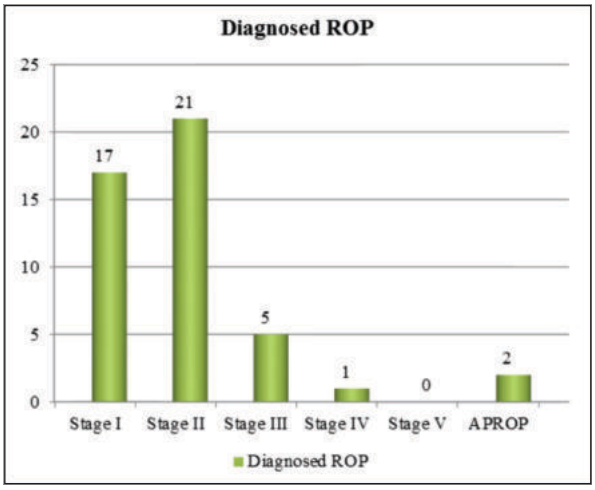
Chi square statistic is 0.5445, p value is 0.46, result is not significant at p value <0.05



Graph 2: Sex Distribution in ROP

Table 3 Occurrence Of Stages Of Rop

Stage Of ROP (n)	Diagnosed ROP	Occurrence of ROP (n/N)
Stage I	17	36.95%
Stage II	21	45.66%
Stage III	5	10.86%
Stage IV	1	2.17%
Stage V	0	_
APROP	2	4.34%
Total ROP (N)	46	



Graph 3: Occurrence of stages of ROP

DISCUSSION

Occurrence Of Rop In Preterm Infants:

- In our study the occurrence of ROP is 19.88%.Incidence of ROP in a study conducted at NICU , Surat in Gujrat in 2016 was 21.87%.(by Poonam S et al) [8]
- Murthy KR, Nagendra, Babu K , Niranjan)[9] .Incidence of ROP in a study conducted at tertiary referral hospital in South India in 2006 was 23.8%
- Incidence of ROP in a study by Shu Fen Ho was 19.3%(ROP : An Optimum Screening Stratergy Journal Of American Association for Pediatric Ophthalmology and Strabismus, December2005)[10]

Sex Wise Distribution Of Rop:

- In our study, a total of 232 preterm infants were examined, 60.86% of diagnosed ROP were males &39.13% being females. Statistical Analysis was done by Chi square test($\chi 2$), and a probability of less than 0.05 was considered significant. The result was not statistically significant as p value was 0.460.
- Vinekar A. [11]found Thirty-three patients (70.2%) were female and 14 were male (29.8%), suggesting that females may have had a greater tendency to survive than males. However, this observation was not statistically significant.

Occurrence Of Stages Of Rop:

In our study it is observed that the Occurrence of Stage I in is 36.95%, Stage II is 45.66%, Stage III is 10.86%, Stage IV is 2.17%,APROP is 4.34%, none of the studied neonates presented ROP at Stage V.

In a cohort study conducted by Poonam H. Singh and Amita U. Surana(2004)[8],Out of 64 babies,14 babies had ROP; 14.28% had stage I ROP, 64.28% had stage II, and 1 (7.1%) baby had stage 3 with plus disease.

CONCLUSION-

The premature child is not born with ROP and retinal disease is not present at birth. Each such child has a potential for normal vision, even if the retina is immature at birth. Screening aims to identify those infants early.The timely retinal screening of high risk preterm infants and appropriate management is important to prevent the development of advanced ROP.

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