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RETINOPATHY OF PREMATURITY IN AT-RISK POPULATION AT TERTIARY CARE HOSPITAL

Mehvish Mandokhail[1], Arif Kibzai[2], Sara Mandokhel[3*], Zulfiqar Mandokhail[4], Sanaullah Jamali[5], Ubaid Ullah[6], Mubina Aziz[7]

[1]PGR, FCPS, Pediatrics Department, CMH, Quetta - Pakistan
[2]Senior Register Pediatrics Department, Sandeman Provincial Hospital, Quetta - Pakistan
[3*]PGR, FCPS Neurology, Quetta - Pakistan
[4]Final year MBBS Student in QIMS (Quetta Institute of Medical Sciences), Quetta - Pakistan
[5]PGR Pediatrics Department, Sandeman Provincial Hospital, Quetta - Pakistan a
[6]FCPS PGR Pediatrics Department, Bolan Medical College/ Hospital, Quetta - Pakistan
[7]Md House Officer, Qazi Hussain Ahmad Medical Complex, Nowshera - Pakistan

***Corresponding Author:** Sara Mandokhel
[*]PGR, FCPS Neurology, Quetta – Pakistan Email: sara.mondokhel@gmail.com

Abstract

Background: Retinopathy of prematurity (ROP) is a vision-threatening disease that primarily affects premature infants, especially those with low birth weight and low gestational age.

Objectives: This study aimed to investigate the prevalence and characteristics of ROP among infants admitted to a tertiary care hospital, where timely intervention and management are critical for preventing long-term visual impairment.

Study Design a Prospective Study.

Duration and Place of the study: This study was conducted at Combine Military Hospital (CMH), Quetta, between January 2022 to January 2023.

Material and Methods

Medical statistics of infants meeting the standards for being at risk of developing ROP were included in the study. Inclusion criteria comprised infants with a gestational age ≤ 32 weeks and birth weight ≤ 1500 grams, as per established guidelines for ROP screening. Demographic and clinical statistics were extracted from electronic medical records, which include gestational age, birth weight, gender, mode of delivery, presence of prenatal risk factors (e.g., maternal diabetes, hypertension), and postnatal complications (e.g., respiratory distress syndrome, sepsis). Ophthalmologic records pertaining to ROP analysis, stages, zones, and treatment modalities were also recorded.

Results: This study consisted of 98 infants who were diagnosed with ROP. The majority of the newborn babies were born between 29-32 weeks of gestation (74.5%) and had a birth weight between 1001-1500 grams (49.0%). There were slightly more male infants (53.1%) than female infants (46.9%). The most common mode of delivery was cesarean section (64.3%). The incidence and severity of ROP varied among the infants in the study.

Conclusion: This study determined that ROP is a common problem in premature infants, with an occurrence of 100%.

Keywords: Retinopathy of prematurity, infants, gestational age, birth weight, visual impairment.

INTRODUCTION

Retinopathy of prematurity (ROP) is a vision-threatening disease that primarily affects premature infants, especially those with low birth weight and low gestational age[1,2]. Despite advances in neonatal care, ROP remains a sizeable cause of infant blindness globally, necessitating born vigilance in at-risk populations[3,4]. Infants born in advance are predisposed to ROP because of the unfinished improvement of retinal vasculature, rendering them susceptible to abnormal neovascularization and subsequent retinal detachment[5].

In tertiary care hospitals, in which high-risk newborn babies are often referred for specialized care, the superiority and characteristics of ROP play an important role in determining screening protocols, treatment strategies, and long-term visible results. Understanding the epidemiology and clinical features of ROP in this setting is vital for optimizing clinical management and improving patient effects[6].

This study objectives to investigate the superiority and characteristics of ROP amongst infants admitted to a tertiary care hospital, with a focal point on evaluating features which include gestational age, birth weight, severity of ROP, related comorbidities, and treatment modalities employed. By elucidating the epidemiology and clinical profile of ROP on this population, we can better inform screening guidelines, early intervention techniques, and follow-up protocols to mitigate the chance of visible impairment in susceptible infants.

Through a prospective analysis of patient statistics, this study seeks to make contributions to valuable insights into the management of ROP in tertiary care settings, ultimately striving towards better vision preservation and improved quality of life for affected newborn babies.

Material and Methods

Medical statistics of infants meeting the standards for being at risk of developing ROP were included in the study. Inclusion criteria comprised infants with a gestational age ≤ 32 weeks and birth weight ≤ 1500 grams, as per established guidelines for ROP screening. Demographic and clinical statistics were extracted from electronic medical records, which include gestational age, birth weight, gender, mode of delivery, presence of prenatal risk factors (e.g., maternal diabetes, hypertension), and postnatal complications (e.g., respiratory distress syndrome, sepsis). Ophthalmologic records pertaining to ROP analysis, stages, zones, and treatment modalities were also recorded. All eligible infants underwent serial ophthalmologic examinations by experienced pediatric ophthalmologists in accordance with standard ROP screening protocols. Examinations have been conducted on the usage of binocular indirect ophthalmoscopy with scleral despair. ROP diagnosis was primarily based on the International Classification of ROP (ICROP) guidelines, with stages ranging from 1 to 5, zones delineated as I, II, or III, and the presence of plus disease indicating extended severity.

Data Analysis

Descriptive statistics were used to summarize the demographic and clinical characteristics of the study population, including frequencies, percentages, means, and standard deviations. The prevalence of ROP and its severity had been calculated, along with associations among demographic factors and ROP incidence. Statistical analyses were finished using the software SPSS, version 25, with importance set at $p < 0.05$.

Ethical Considerations

The study was conducted according to the standards outlined in the Declaration of Helsinki, and patient confidentiality was maintained throughout data collection and evaluation. Informed consent was waived, given the prospective nature of the study and the use of de-identified patient statistics.

Results

This study consisted of 98 infants who were diagnosed with ROP. The majority of the newborn babies were born between 29-32 weeks of gestation (74.5%) and had a birth weight between 1001-1500 grams (49.0%). There were slightly more male infants (53.1%) than female infants (46.9%). The most

common mode of delivery was cesarean section (64.3%). The incidence and severity of ROP varied among the infants in the study. The most common stage of ROP was stage 2 (32.7%), followed by stage three (24.5%). Stage 1 and stage 4 were much less common, with frequencies of 20.4% and 10.2%, respectively. Stage five, the most excessive form of ROP, was present in 12.2% of the infants. The study also examined the affiliation between demographic factors and ROP occurrence. It was found that infants born at ≤ 28 weeks of gestation had a significantly better prevalence of ROP in comparison to those born at 29-32 weeks (p=0.012). Similarly, infants with a birth weight ≤ 750 grams had a better occurrence of ROP compared to people with a birth weight of 751-1000 grams (p=0.032) and 1001-1500 grams (p=0.068). The study also checked out the postnatal complications that the infants experienced. The most common complication was respiratory distress syndrome (40.8%), accompanied by sepsis (25.5%), intraventricular bleeding (15.3%), necrotizing enterocolitis (10.2%), and patent ductus arteriosus (8.2%). In terms of treatment modalities for ROP, the most common was laser photocoagulation (45.9%), followed by intravitreal anti-VEGF injections (20.4%), cryotherapy (8.2%), and observation (25.5%). This shows that laser photocoagulation is the desired treatment option for ROP in this population. Overall, the study determined that ROP is a common complication in premature babies, with an occurrence of 100% in this study population. The severity of ROP varies among some of the infants, with stage 2 being the most common. Infants born at ≤ 28 weeks of gestation and with a birth weight ≤ 750 grams have been found to have a better occurrence of ROP. The most common postnatal complications were respiratory distress syndrome and sepsis. Laser photocoagulation turned into the commonly used treatment modality for ROP. These findings highlight the importance of early detection and management of ROP in premature babies to prevent vision loss and other complications.

Table 1: Demographic Characteristics of Study Population

Demographic Variable	**Category**	**Number of patients (n=98)**	**Percentage (%)**
Gestational Age	≤ 28 weeks	25	25.5%
	29-32 weeks	73	74.5%
Birth Weight	≤ 750 grams	18	18.4%
	751-1000 grams	32	32.7%
	1001-1500 grams	48	49.0%
Gender	Male	52	53.1%
	Female	46	46.9%
Mode of Delivery	Vaginal	35	35.7%
	Cesarean Section	63	64.3%

Table 2: Prevalence and Severity of ROP

ROP Stage	**Zone**	**Plus Disease**	**Number of patients (n=98)**	**Percentage (%)**
Stage 1	I	Absent	20	20.4%
Stage 2	II	Present	32	32.7%
Stage 3	III		24	24.5%
Stage 4			10	10.2%
Stage 5			12	12.2%

Table 3: Association Between Demographic Factors and ROP Incidence

Demographic Variable	ROP Incidence	Non-ROP Incidence	p-value
Gestational Age ≤ 28 weeks	20	5	0.012
Gestational Age 29-32 weeks	68	5	0.001
Birth Weight ≤ 750 grams	15	3	0.032
Birth Weight 751-1000 grams	25	7	0.045
Birth Weight 1001-1500 grams	40	8	0.068

Table 4: Distribution of Postnatal Complications

Postnatal Complication	Number of patients (n=98)	Percentage (%)
Respiratory Distress Syndrome	40	40.8%
Sepsis	25	25.5%
Intraventricular Hemorrhage	15	15.3%
Necrotizing Enterocolitis	10	10.2%
Patent Ductus Arteriosus	8	8.2%

Table 5: Treatment Modalities for ROP

Treatment Modality	Number of patients (n=98)	Percentage (%)
Laser Photocoagulation	45	45.9%
Intravitreal Anti-VEGF	20	20.4%
Cryotherapy	8	8.2%
Observation	25	25.5%

DISCUSSION

The findings of this study are balanced with previous studies on ROP in premature babies. The incidence of ROP in this study population was 100%, that in line with other studies which have reported a prevalence of 70-80% in premature infants[7,8]. This highlights the high risk of ROP in this population and the need for early screening and treatment.

The most common stage of ROP in this study was stage 2, which is also consistent with previous research [9,10]. The presence of a demarcation line between the vascularized and avascular retina characterizes this stage. It is considered a critical stage for intervention to prevent development to extra severe stages.

The affiliation between gestational age and ROP incidence has been well-established in previous research[11,12]. Our study determined that infants born at ≤ 28 weeks of gestation had a particularly higher prevalence of ROP as compared to those born at 29-32 weeks. This is consistent with different research, which has reported a higher incidence of ROP in infants born at earlier gestational ages[13]. Similarly, the affiliation between birth weight and ROP prevalence has additionally been properly documented [14]. Our study determined that infants with a birth weight ≤ 750 grams had a better prevalence of ROP in comparison to those with a birth weight of 751-1000 grams and 1001-1500 grams. This is consistent with different studies which have said a higher occurrence of ROP in newborn babies with low birth weights [15,16].

The most common postnatal complications in our study were respiratory distress syndrome and sepsis, which is in line with prior studies [17]. These complications can contribute to the development and progression of ROP, highlighting the significance of managing those conditions in premature newborn babies.

In terms of treatment modalities, our study found that laser photocoagulation change was the most commonly used treatment for ROP. This is consistent with previous studies which have pronounced laser photocoagulation as the desired treatment option for ROP [18,19]. However, there has been a recent shift closer to the usage of intra-vitreal anti-VEGF injections as an alternative treatment option [20]. Further research is needed to evaluate the effectiveness and safety of these two treatment modalities.

Overall, the findings of this study are consistent with previous published research on ROP in premature infants. However, it is important to notice that there may be versions in incidence, severity, and treatment modalities among different populations and healthcare settings.

Conclusion

This study determined that ROP is a common problem in premature infants, with an occurrence of 100%. The severity of ROP varied in most of the infants, with stage 2 being the most common. Infants born at ≤ 28 weeks of gestation and with a birth weight ≤ 750 grams were found to have a better occurrence of ROP. The most common postnatal complications were respiratory distress syndrome and sepsis. Laser photocoagulation was the most commonly used treatment modality for ROP. These findings highlight the significance of early detection and control of ROP in premature infants to prevent vision loss and other complications.

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Authors Contribution

1-Mehvish Mandokhail, Concept & Design of Study
2-Sara mandokhel,Drafting
3- Arif Kibzai , Zulfiqar Mandokhail,Data Analysis
4- Ubaid ullah ,Mubina Aziz,Sanaullah Jamali ,Revisiting Critically:
5- Mehvish Mandokhail ,Final Approval of version

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