

The Prevalence of Retinopathy of Prematurity and Relationship with Gestational Age and Birth-Weight

Selim Cevher^{1*}, Emine Alyamac Sukgen²

¹Department of Ophthalmology, Hitit University Medicine Faculty, Çorum, Turkey

²Department of Ophthalmology, Adana Numune Training and Research Hospital, Adana, Turkey

*Corresponding author: s.cevher@hotmail.com

[†]Speaker: s.cevher@hotmail.com

Presentation/Paper Type: Oral / Full Paper

Abstract – In this study we aimed to determine the incidence of retinopathy of prematurity (ROP) and the risk factors especially gestational age (GA) and birth weight (BW) associated with its development. Three hundred eighty-two consecutive infants were included in the data analysis. BW and GA were evaluated according to the development of ROP. ROP was detected in 133 infants (35%) of 382 infants; of those 58% had stage 1 disease, 10% had stage 2 disease, 22% had stage 3, 2% had stage 4a, 1% had stage 4b, 1% had stage 5 and 8% had aggressive posterior retinopathy of prematurity disease. Low BW and low GA was statistically associated with ROP. In conclusion, the incidence of ROP was detected at 35%. ROP is known to be a multifactorial disease, the major risk factors are low GA and low BW.

Keywords – Retinopathy of Prematurity, Risk Factors, Birth Weight, Gestational Age, Incidence

I. INTRODUCTION

Retinopathy of prematurity (ROP) is a proliferative retinopathy which is the preventable common cause of the blindness in preterm infants.

Detection and treatment of the ROP has become more important because progression of the disease is very quick. It has several risk factors such as; oxygen therapy, anemia, intraventricular hemorrhage, neonatal sepsis, blood transfusions, patent ductus arteriosus, respiratory distress syndrome and mechanical ventilation but the most important risk factors are low gestational age (GA) and low birth weight (BW) [1].

A lot of screening guidelines have been based on GA and BW to identify infants needing examination.

In this study, we aimed to determine the incidence of ROP and the risk factors especially GA and BW associated with its development and to contribute to screening criteria.

II. MATERIALS AND METHOD

Approval was obtained from the local ethics committee for the study. The study conformed to the tenets of the Declaration of Helsinki.

In this retrospective study, we examined 382 premature infants who was born with GA \leq 37 weeks at Adana Numune Research and

Training Hospital and referred from other hospitals, Adana, Turkey, between October 2013 and October 2014.

Exclusion criteria were lethal congenital anomalies, death before examination, death or loss to follow up before complete retinal vascularization was developed and incomplete screening procedure.

The first ophthalmological examination was performed by experienced ophthalmologist with indirect ophthalmoscope at 4 weeks after birth (GA \geq 27 weeks) or 31 weeks of corrected GA (GA \leq 27 weeks). The pupil were dilated with tropicamide 0.5% and phenylephrine 1%. Ophthalmologist used 20D and 28D lenses, sterile lid speculum and scleral depressor.

ROP was classified according to the international classification of ROP and screening procedure was designed in accordance with suggestions of the American Academy of Pediatrics, American Academy of Ophthalmology and American Association for Pediatric Ophthalmology and Strabismus.

Infants were classified into 4 groups according to GA; $<$ 28 weeks, 28-31 weeks, 32-34 weeks, 35-37 weeks. Infants also classified into 8 groups according to the BW; \leq 750g, 751-999g, 1000-1249g, 1250-1499g, 1500-1749g, 1750-1999g, 2000-2499g, \geq 2500g.

III. RESULTS

The overall incidence of ROP was 35% (133/382). 77 infants (58%) had stage 1, 13 infants (10%) had stage 2, 29 infants (22%) had stage 3, 4 infants (0.03%) had stage 4 and 5 of the disease and 10 infants (0.07%) had aggressive posterior retinopathy of prematurity (APROP). Mean GA who had any stage of the disease was 30.1 ± 2.1 weeks (range: 24 - 35.9 weeks) and mean BW was 1263.6 ± 390.2 g (range: 690 - 3190g).

The incidence of ROP in GA with < 28 weeks was 100%, 28 - 31 weeks was 63%, 32 - 34 weeks was 15%, 35 - 37 weeks was 13%. The incidence rate of the disease was increased with the decrease in the GA ($p < 0.001$).

The incidence of the ROP in BW with < 750g was 100%, 750 - 999g was 91%, 1000 - 1249g was 71%, 1250 - 1499g was 44%, 1500 - 1749g was 37%, 1750 - 1999g was 29%, 2000 - 2449g was 11%, > 2500g was 16%. The incidence rate of the disease was increased with the decrease in the BW ($p < 0.001$).

IV. DISCUSSION

ROP is a preventable blinding disease of the retina. Although diagnosing and treatment methods have been developed, ROP still threat premature infants all over the world especially in middle-income countries such as Turkey, China, Eastern Europa, Latin America, and Asia. Detection and treatment with the screening programs are very important to prevent poor vision.

Its incidence differs from country to country. In low and middle income-countries the number of infants with ROP are higher than those in high-income countries.

In China, in 2013, the incidence of any stage of ROP was 17,8% [2]. In this study, the incidence of ROP was 55.8% GA \leq 28weeks and 26.8% GA between 29-32 weeks. They also found that the incidence of ROP was 54.5% BW \leq 1000g and 37.6% BW \leq 1500g. In 2017, Li et al. reported that the incidence of any stage of ROP was 11.9% and 2.0% infants receiving treatment in 2997 preterm infants [3].

In Brazil, Zin et al. found that the incidence of ROP was 16.9% and 3.6% of screened infants needed treatment [4].

From the study of Iran, the overall incidence of ROP in premature infants was 20.6% [5]. They found that the incidence of ROP BW with 1000g was 47.1%, 1000-1249g was 52.4% and 1250-1499g was 23.2%. They found that the incidence of ROP with GA \leq 28weeks was 53.1%, 29-32weeks was 25.7% and >32weeks was 7.5.

In Turkey, Bas et al.'s study, which involved 15.745 preterm infants, they reported the incidence of any stage of ROP was 35.6% and 13.3% in infants with GA \leq 32 weeks and >32 weeks, respectively, and 42% and 13.4% in those with BW \leq 1500g and >1500g, respectively [6]. They found that the overall incidence of ROP in this study was 30%.

In our study, the overall incidence of ROP was 35%. Comparing the incidence of ROP in other middle-income countries, the incidence of the disease was higher in our study. People who live in our city most of them have low socioeconomic condition and low educational level. We think that the reason for the high incidence rate associated with these situations.

Screening criteria usually base on GA and BW. In the United States, the last screening programme suggests that infants with BW of less than or equal to 1500g or GA of less than or equal to 30 weeks [7].

In United Kingdom, the last criteria state that infants with BW of less than 1251g or GA of fewer than 31 weeks must be screened for ROP and infants with BW of 1251 to less than 1501g or GA of fewer than 32 weeks should also be examined [8].

In China, In 2013, Xu., et al. suggested that infants with GA less than or equal to 33 weeks and/or BW less than or equal to 1750g must be screened [9].

In TR-ROP study, screening criteria was stated to be infants with a GA \leq 34 weeks or a BW < 1700g in Turkey [10].

Based on the results of our study, we recommend that infants with \leq 1750g or \leq 35weeks should be examined. Infants with BW \geq 2000g and have any risk factors such as oxygen therapy should also be examined.

V. CONCLUSION

ROP is still a serious disease and its incidence is different between countries and change from time to time according to the neonatal healthcare units conditions and their developments. Main risk factors are low GA and low BW. Countries should create their own criteria and revise it at certain intervals. Screening criteria for ROP in Turkey must be wider than high-income countries.

ACKNOWLEDGMENT

There is no conflicts of interest.

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