ISSN- O: 2458 - 868X, ISSN–P: 2458 – 8687
National Library of Medicine - ID: 101731606

International Journal of Medical Science and Innovative Research (IJMSIR)
IJMSIR : A Medical Publication Hub
Available Online at: www.ijmsir.com
Volume – 6, Issue – 2, March – 2021 , Page No. : 73 – 77

Relationship of Incidence and Severity of Retinopathy of Prematurity with Low Birth Weight: A Prospective Study At A Tertiary Hospital In Ajmer, Rajasthan

[1]Dr. Rohini Sharma, MS Ophthalmology, Consultant Ophthalmology, Bikaner, Rajasthan – 334001, India

[2]Dr. Rakesh Porwal, MS Ophthalmology, Senior Professor, Department of Ophthalmology, Jawahar Lal Nehru Medical College & Hospital Ajmer, Rajasthan – 305001, India

[2]Dr. Sanjeev Nainiwal, MS Ophthalmology, Senior Professor, Department of Ophthalmology, Jawahar Lal Nehru Medical College & Hospital Ajmer, Rajasthan – 305001, India

[3]Dr. Ravindra Kumar Jangir, MD General Medicine, Assistant Professor, Department of Medicine, Sardar Patel Medical College & Associated Group of Hospitals, Bikaner, Rajasthan – 334001, India

Corresponding Author: Dr. Ravindra Kumar Jangir, MD General Medicine, Assistant Professor, Department of Medicine, Sardar Patel Medical College & Associated Group of Hospitals, Bikaner, Rajasthan – 334001, India

Citation this Article: Dr. Rohini Sharma, Dr. Rakesh Porwal, Dr. Sanjeev Nainiwal, Dr. Ravindra Kumar Jangir, "Relationship of Incidence and Severity of Retinopathy of Prematurity with Low Birth Weight: A Prospective Study At A Tertiary Hospital In Ajmer, Rajasthan", IJMSIR- March - 2021, Vol – 6, Issue - 2, P. No. 73 – 77.

Type of Publication: Original Research Article

Conflicts of Interest: Nil

Abstract

Abstract: Retinopathy of Prematurity is a complex disease of the developing retinal vasculature in premature infants. Neonates born before 32 weeks of gestation are at risk of developing ROP. However, preterm infants born at 32 weeks or later can develop sever ROP if they have been sick or they require prolonged Oxygen Therapy. Earlier, Indian studies have shown that the incidence of ROP varies from 38-51.9% among low birth-weight babies. The present study, undertaken in Rajasthan, India, also indicates a strong co-relation between onset of ROP and birth weight.

Keywords: Retinopathy of Prematurity, Retinal vasculature, Preterm, Low Birth Weight.

Introduction

Retinopathy of prematurity (ROP) is a serious vasoproliferative disorder in the incompletely vascularized retina of premature infants. It currently represents the leading avoidable cause of childhood blindness and visual impairment, especially in developing countries. Several risk factors have been demonstrated to be associated with the development of ROP including low birth weight (BW), early gestational age (GA), being small for GA (SGA), multiple pregnancies, uncontrolled oxygen supplementation, mechanical ventilation, sepsis, apnoea, anaemia, necrotizing enterocolitis (NEC), intraventricular haemorrhage (IVH), patent ductus arteriosus (PDA), and blood transfusions.

Low weight at birth has been known as one of the most important known risk factors for the development of ROP. However, the BW of premature babies is strongly associated with GA and which risk factor is more important in developing ROP remains unknown.

Recent advances in neonatal care in the last decade have improved the survival rates for premature infants.[1] consequently, the incidence of ROP has increased in parallel therefore ROP continues to be an important cause of potentially preventable blindness worldwide. It is believed to account for 6-18% of childhood blindness in developed countries.[2] That is the reason that ROP is under constant epidemiological study around the world.[3] Retinopathy of prematurity (ROP) is a very serious blinding emergency in new-born babies. The disease has evolved through three epidemic phases, unfortunately, the last one is currently ongoing in developing countries like India.[4]

There is a geographic variation in the incidence of ROP in babies born at even similar gestational ages. In the West, ROP at least of the threshold variety is not seen in higher birth weight (BW) babies. Therefore, larger babies generally are not screened since the incidence of treatable ROP is low and these infants have been observed to have a generally good outcome even without treatment Wright et al recommended screening of all infants born at ≤ 32 weeks GA and/or ≤ 1500 g BW (regardless of supplemental oxygen).[5] In contrast, ROP is seen in larger, bigger BW babies in Asia and other developing countries. In south India, threshold ROP has been seen in babies born with 2000 g birth weight.[4]

Earlier Indian studies have shown that the incidence of ROP varies from 38- 51.9% among low birth-weight babies.[6-8] More recent studies have however shown lower rate of ROP ranging from 13 – 30%.[9-10] The baby is not born with ROP, ROP develops 2-3 weeks after birth, hence, there is a window of opportunity and the baby needs to be screened at the earliest within 30 days of birth. Once a treatable ROP is found it is an emergency and the treatment needs to be done within 48 – 72 hours to save the vision of the baby. Moreover, the disease is symptomless there are no symptoms and signs externally, like pain, redness or watering etc. till the parents begin to become aware that the baby does not have vision. So there is no sign which the paediatrician or the parents can pick up that the baby is going to have some eye problem. The present study aims to further validate the global findings by investigating the effect of BW on any and severe stages of ROP development in new borns.

Aims and Objectives

The aim of this prospective study was to assess the incidence and severity of ROP among the preterm infants.

Materials and Methods

The present clinical study entitled “Screening for Retinopathy of Prematurity in High Risk Infants” will be conducted in the Department of Ophthalmology, JLN Medical College & Hospital, Ajmer. • Source of Data: Infants admitted in SNCU, JLN Medical College & Hospital, AJMER and attached hospitals. • Study Design: prospective study • Study duration: 12 months (SEPTEMBER 2016 TO SEPTEMBER 2017) • Sample size: all infants meeting the inclusion criteria will be included in the present study.

Method: all Infants will be screened under supervision of a paediatrician. Pupils will be dilated with Tropicamide 0.5%. One drop of Tropicamide will be instilled every 10-15 minutes for 4 times starting 1 hour before the scheduled time for examination. Screening of ROP will involve indirect ophthalmoscopy using 20

D lens by experienced ophthalmologist. After instilling a topical anaesthetic drop like Proparacaine, a wire speculum is inserted to keep the eye-lids apart. First the anterior segment of the eye is examined to look for pupillary dilation, and lens / media clarity; followed by the posterior pole to look for plus disease; followed by sequential examination of all clock hours of the peripheral retina using paediatric scleral indenter. Antibiotic eye drops will be instilled in both eyes after examination. For documentation of the ROP, International Classification of ROP (ICROP) is used.

The examinations are kept as short as possible and precautions taken to ensure that emergency situations can be dealt with promptly and effectively. Discomfort to the baby is minimized with pre-treatment of the eyes with a topical proparacaine and swaddling the baby. Proper sanitation & asepsis is maintained using gloves & mask during examination. First screening examination will be carried out at 31 weeks of gestation or 4 weeks of age, whichever is later. Follow-up examinations are conducted until ROP resolution or retinal maturation is achieved and babies with treatable ROP were referred to higher centre for further management.

Inclusion criteria

- Infants born with gestational age ≤32 weeks
- Infants born with the birth weight ≤2000 gm
- Selected preterm infants with a gestational age of more than 32 weeks with sickness like need of cardiorespiratory support, prolonged oxygen therapy, apnoea of prematurity, anaemia needing blood transfusion and neonatal sepsis or believed by their attending paediatrician or neonatologist to be at high risk.

Exclusion criteria

- Clinically unstable and critical new-borns
- Infants whose parents don't give consent for screening

Results

The most significant risk factors for development of ROP were low- gestational age and low-birth weight, as shown in many studies. In the present study birth weight was a significant risk factor for the development of ROP on univariate regression which is in agreement with many studies which reported that lower birth weight was significantly associated with development of ROP, and explained that by more susceptibility for oxygen therapy, prolonged ventilation, sepsis, and blood transfusion in very low birth weight infants. The mean birth weight associated with ROP in present study was 1236.72 grams (SD 288.53 grams) compared to 1449.38 grams (SD 279.06 grams) in infants without ROP. Maheshwari et al found mean Birth-weight of 1222 grams (SD = 304g) associated with ROP and mean birth weight of 1539 grams (SD 316g) in neonates not associated with ROP which are similar.

Table 1: Co-relation of birth weight with incidence of ROP

Birth Weight [In gms]	Cases with ROP	Cases without ROP
<1000 gms	12	06
1000 -1500 gms	34	158
1501 – 2000 gms	9	81

Table 2: Severity of ROP according to Birth Weight

Birth Weight [In gms]	Cases with severe ROP	Non-Severe/No ROP incidence
<1000 gms	6	12
1000 -1500 gms	5	187
1501 – 2000 gms	0	90

Discussion

ROP continues to be an important cause of potentially preventable blindness worldwide. It is believed to account for 6-18% of childhood blindness in developed countries. During the study period 300 infants were screened in the SNCU (special neonatal care unit) including those who were born with gestational age ≤ 32 weeks and birth weight ≤ 2000 grams or selected cases with gestational age more than 32 weeks with additional risk factors.

Early identification of retinal damage and the institution of appropriate treatment prevent blindness and offer a child better overall development.[11]

The most significant risk factors for development of ROP were low- gestational age and low-birth weight, as shown in many studies.[12-14]

As regard the effect of low-gestational age on occurrence of ROP, the present study found that it is a significant risk factor in ROP on univariate regression. This was in agreement with the results of studies done by Shah et al.,[15] Karna et al.[16] and Fortes et al.[17] This was explained by immaturity of vascularization that induces an increased susceptibility of the retina to oxidative damage and to a number of perinatal factors which include hyper and hypoxia, blood transfusions, and sepsis. In the present study birth weight was a significant risk factor for the development of ROP on univariate regression which is in agreement with many studies[15,18,19] which reported that lower birth weight was significantly associated with development of ROP, and explained that by more susceptibility for oxygen therapy, prolonged ventilation, sepsis, and blood transfusion in very low birth weight infants.

The mean birth weight associated with ROP in present study was 1236.72 grams (SD 288.53 grams) compared to 1449.38 grams (SD 279.06 grams) in infants without ROP. Maheshwari et al[7] found mean Birth-weight of 1222 grams (SD = 304g) associated with ROP and mean birth weight of 1539 grams (SD 316g) in neonates not associated with ROP which are similar.

Summary and Conclusion

The study provided data for incidence of ROP in Rajasthan which is not readily available. Efficacy of the Screening program running in the NICU and SNCU in Department of Paediatrics, JLN Hospital, and Ajmer was assessed successfully. Out of the 300 infants screened 11 infants developed ROP requiring intervention and were referred to Higher Centre.

Acknowledgement: Authors wish to thank Dr. Shailendra Vashistha, MD (Assistant Professor, Department of IH&TM, Govt. Medical College, Kota) and VAssist Research (www.thevassist.com) for their contribution in preparing the manuscript.

References

1. Dominico R, Davis K, Davis O. Documenting the NICU design dilemma: Comparative patient progress in open-ward and single family room units. J Perinatol. 2011;31:281–8.
2. Coats DK, Aaron MM, Mohamed AH. Involution of retinopathy of prematurity after laser treatment:

Factors associated with development of retinal detachment. Am J Ophthalmol. 2005;140:214–22.

3. Akçakaya A, Yaylali S, Akçay G. Screening for retinopathy of prematurity in a tertiary hospital in istanbul: Incidence and risk factors. J PediatrOphthalmol Strabismus. 2011;15:1–5.
4. VasumathyVedantham. Retinopathy of prematurity screening in the Indian population: It′s time to set our own guidelines! Indian J Ophthalmol. 2007 Sep-Oct; 55(5): 329–330.
5. Wright K, Anderson ME, Walker E, Lorch V. Should fewer premature infants be screened for retinopathy of prematurity in the managed care era? Pediatrics. 1998;102:31–4.
6. Gopal L, Sharma T, Ramchandran S, Shanmugasundaram R, Asha V. Retinopathy of prematurity. A study. Indian J Ophthalmol 1995;43:50-55
7. Maheshwari R, Kumar H, Paul VK, Singh M, Deorari AK, Tiwari HK. Incidence and risk factors of retinopathy of prematurity in a tertiary care newborn unit in New Delhi. Natl Med J India 1996;9:211-4.
8. Rekha S, Battu RR. Retinopathy of prematurity: incidence and risk factors. Indian Pediatr 1996;33:999-1003.
9. Kumar P, Sankar MJ, Doerari A, et al. Risk factors for severe Retinopathy in preterm low birth weight infants. Indian J Pediatr 2011;78:812-6.
10. AnandVinekar, Mangat R Dogra, TiakumzukSangtam, Anil Narang, Amod Gupta. Retinopathy of prematurity in Asian Indian babies weighing greater than 1250 grams at birth: Ten year data from a tertiary care center in a developing country. I J o O. 2007;55:331-336.
11. Fanaroff AA, Martin RJ, editors. Neonatal perinatal medicine. 7th ed. Louis: Mosby; 2002. pp. 676–745.
12. Kim T, Sohn J, Yoon YH. Postnatal risk factors of retinopathy of prematurity. Paediatr Perinat Epidemiol. 2004;18:130–4.
13. Imren A, Sibel O, Gursel Y. Risk Factors in the development of mild and severe retinopathy of prematurity. J AAPOS. 2006;10:449–53.
14. Dammann O, Brinkhaus MJ, Bartels DB. Immaturity, perinatal inflammation, and retinopathy of prematurity: A multi-hit hypothesis. Early Hum Dev. 2009;1016:1–5.
15. Shah VA, Yeo CL, Ling YL. Incidence, risk factors of retinopathy of prematurity among very low birth weight infants in Singapore. Ann Acad Med Singapore. 2005;34:169–78.
16. Karna P, Muttineni J, Angell L. Retinopathy of prematurity and risk factors: A prospective cohort study. BMC Pediatr. 2005;5:18.
17. Fortes JB, Barros CK, Lermann VL. Prevention of blindness due to retinopathy of prematurity at hospital de clinicas de porto alegre, Brazil: Incidence, risk factors, laser treatment and outcomes from 2002 to 2006. Acta medica Lituanica. 2006;13:130–6.
18. Fortes JB, Eckert GU, Procianoy L. Incidence and risk factors for retinopathy of prematurity in very low and in extremely low birth weight infants in a unit-based approach in southern Brazil. Eye (Lond) 2009;23:25–30.
19. Roberto F, Miguel AH, Ricardo JH. Screening for retinopathy of prematurity: Results of a 7-year Study of underweight newborns. Arch Med Res. 2007;38:440–3.