International Journal of Health Sciences and Research
www.ijhsr.org ISSN: 2249-9571

Original Research Article

The Burden of Retinopathy of Prematurity in a Rural Based Tertiary Care Hospital in West Bengal, India

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Received: 22/05/2015 *Revised: 22/06/2015* *Accepted: 24/06/2015*

ABSTRACT

Introduction: Retinopathy of prematurity (ROP) is increasingly being recognised as one of the major preventable cause of childhood blindness globally. ROP mainly affects children with low birth weight and prematurity. The present study was designed to assess the magnitude of the problem of ROP in a rural based medical college and hospital in West Bengal.

Materials and Methods: Babies with less than 2000grams of birth weight or less than 35 weeks of gestation or more than 2000grams of birth weight with known risk factors for ROP were included in the study. The inducted babies were screened for ROP within 2 weeks of birth or gestational age below 32 weeks whichever was earlier. Follow up ophthalmological examination was done every 2 weeks till 40 weeks of gestation or attainment of retinal maturity or development of ROP in them.

Results and analysis: Incidence of ROP in the study population was 38.67%. Analysis of risk factors showed statistically significant relation with birth weight (p=0.03, OR 2.21, 95% CI 1.095,4.49), gestational age (p=0, OR 5.016, 95%CI 2.627,9.580), uncontrolled use of oxygen (p=0, OR 19.914, 95%CI 4.634, 85.580), apnoea (p=0, OR 3.053, 95% CI 1.938,7.893), bradycardia (p=0, 95% CI 1.590, 5.860) and sepsis (p=0.04, OR 1.879, 95% CI 1.023,3.452).

Conclusion: The incidence of ROP was found to be very high. This emphasizes the need for regular screening in tertiary care centres and peripheral hospitals. All babies with history of apnoea, prolonged oxygen administration and septicaemia should undergo ROP screening irrespective of their gestational age.

Key Words: Retinopathy of prematurity (ROP), low birth weight, prematurity, Risk factors

INTRODUCTION

Retinopathy of prematurity (ROP) is a vasoproliferative disorder affecting the retina of premature infants. It is increasingly being recognised as one of the major and preventable cause of childhood blindness globally.

ROP mainly affects children with low birth weight and prematurity. Low birth weight is defined as birth weight below 2500gms or less. [1] Low birth weight babies can be further classified as very low birth weight that is 1500gms and extremely low birth weight that is less than 1000gms.

Prematurity is defined as birth before 37 weeks of gestation. [1] Apart from low birth weight various other risk factors such as uncontrolled use of oxygen, [2] anaemia, [2] apnoeaand sepsis [3] have been associated with development of ROP.

Incidence of ROP is reported to vary from 20% [4] to 47% [5] among different studies in India. However there is no published data on the incidence of ROP and its risk factors in eastern part of India, leave aside a rural based medical college with high birth rate such as ours. Early detection with timely screening and treatment has proved to be beneficial in preventing complications of ROP and its sequelae. [6,7] The present study was designed to assess the magnitude of the problem of ROP in a rural based medical college and hospital in West Bengal. It aims to determine the incidence of ROP in the said institution and assess its relevant risk factors.

MATERIALS AND METHODS

This hospital based longitudinal study was conducted in the neonatal unit of Burdwan Medical College and Hospital from March 2011 to February 2012. By simple random sampling, unit II of the paediatric department was selected. All neonates admitted to the neonatology department under unit II during the study period who met the inclusion criteria were inducted in the study by complete enumeration. Babies with less than 2000grams of birth weight or less than 35 weeks of gestation or more than 2000grams of birth weight with known risk factors for ROP were included in the study. Babies who were too sick for examination or who died during the follow up were excluded from the study. Detailed history regarding the babies and their mothers were obtained. A thorough general and systemic examination was done with the help of the attending pediatricians. The inducted babies were screened for ROP within 2 weeks of birth or gestational age below 32 weeks whichever was earlier. Follow up ophthalmological examination was done every 2 weeks till 40 weeks of gestation or attainment of retinal maturity or development of ROP in them. Babies with ROP were further followed up at weekly intervals. Anterior segment evaluation was done in diffuse torchlight. Dilated posterior segment examination was done with binocular indirect ophthalmoscope using a +20 D lens and a scleral depressor. Feeding of the baby was not allowed for 30 mins before & after examination. The extent of maturity of the retina was seen. Identification and staging was done according to the international classification of ROP. The collected data was compiled, tabulated, and analysed using standard statistical methods to find out incidence of ROP and its relations with risk factors. The necessary approval from the Institutional Review Board has been obtained.

RESULTS AND ANALYSIS

A total of 362 eyes of 181 babies were screened during the study period. The mean weight of the screened population was 1652.7 grams and the mean gestational age was 31.15 weeks. Of the babies screened, 46 babies (25.41%) had mature retina, 65 babies (35.91%) had immature retina which matured in subsequent visits and 70 babies developed ROP. Incidence of ROP in the study population was 38.67%. 17 out of 70 (24.3%) had immature retina in the first visit that went on to develop ROP in subsequent visits. Rest of the 53 patients (75.71%) had ROP in the first visit itself. The mean age at which ROP was first diagnosed in the study population was 32.65 weeks. Maximum number of cases (74.3%) showed involvement of Zone II, followed by Zone III (25.7%). There were no babies with Zone I involvement. Only 18 (25.7%) cases among the 70 cases developed plus disease

and required laser photocoagulation. Rest (74.3%) cases underwent spontaneous regression. Analysis of risk factors showed no statistically significant relationship with sex of the baby (p=0.2), mode of delivery (p=0.7), hyperbilirubinemia (p=0.4), use of phototherapy (p=0.2) and frequent (more than 2 units) blood transfusion. There was statistically significant relation with birth weight (p=0.03, OR 2.21, 95% CI 1.095,4.49), gestational age (p=0, OR 5.016, 95%CI 2.627,9.580), uncontrolled use of oxygen (p=0, OR 19.914, 95%CI 4.634, 85.580), apnoea (p=0, OR 3.053, 95% CI 1.938,7.893), bradycardia (p=0, 95% CI 1.590, 5.860) and sepsis (p=0.04, OR 1.879, 95% CI 1.023,3.452).

Table 1: Showing Analysis of risk factors for ROP among the study population (n=181)

Risk Factor		ROP present	ROP Absent	Total	P Value	Odds Ratio
Sex of babies	Male	39	58	97(100%)	0.207	NA
	Female	31	53	84(100%)		
Birth Weight (in grams)	<1000	2(100%)	0(0%)	2(100%)	0.031	2.219(95%CI;1.095-4.496)
	1001-1500	20(51.3%)	19(48.7%)	39(100%)		
	>1500	48(34.3%)	92(65.7%)	40(100%)		
Gestational Age(in Weeks)	27-29	10(55.6%)	8(44.4%)	18(100%)	0.00	5.016(95%CI;2.627-9.580)
	29-31	34(63.0%)	20(37%)	54(100%)		
	31-33	18(37.5%)	30(62.5%)	8(100%)		
	33-35	8(13.1%)	53(86.9%)	61(100%)		
Mode of Delivery	Normal Delivery	34(37.8%)	56(62.2%)	90(100%)	0.740	NA
	Breech	11(45.8%)	13(54.2%)	24(100%)		
	LUCS	25(37.3%)	42(62.7%)	67(100%)		
Uncontrolled oxygen Therapy	Yes	68(49.3%)	70(50.7%)	138(100%)	0.00	19.914(95%CI;4.634-85.580)
	No	2(4.7%)	41(95.3%)	43(100%)		
Hyperbilirubinemia	Present	44(40.7%)	64(59.3%)	108(100%)	0.480	0.805(95%CI;0.436-1.487)
	Absent	26(35.6%)	47(64.4%)	73(100%)		
Use of Photo Therapy	Yes	39(42.4%)	53(57.6%)	92(100%)	0.296	0.726(95%CI;0.398-1.325)
	No	31(34.8%)	58(65.2%)	89(100%)		
Apnoea	Present	29(63%)	17(37%)	46(100%)	0.00	3.911(95%CI;1.938-7.893)
	Absent	41(30.4%)	94(69.6%)	135(100%)		
Bradycardia	Present	32(57.1%)	24(42.9%)	56(100%)	0.00	3.053(95%CI;1.590-5.860)
	Absent	38(30.4%)	87(69.6%)	125(100%)		
Risk Factor		ROP present	ROP Absent	Total	P Value	Odds Ratio
Sepsis	Present	36(47.4%)	40(52.6%)	76(100%)	0.041	1.879(95%CI;1.023-3.452)
	Absent	34(32.4%)	71(67.6%)	105(100%)		

Abbreviations: LUCS (Lower uterine caesarean Section), CI (Confidence Interval)

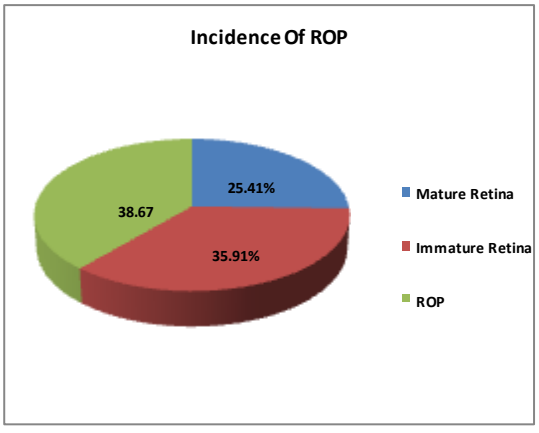

Fig 1: Showing the distribution of ROP among the study population (n=181)

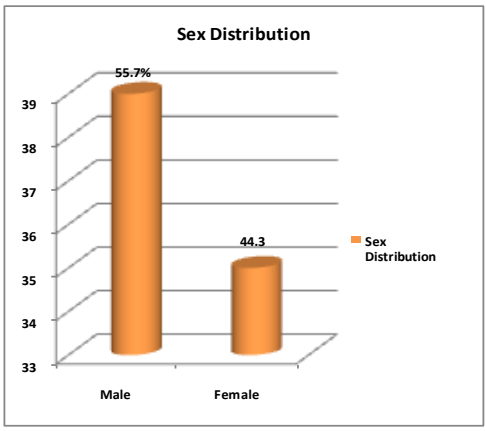

Fig 2: Distribution of ROP cases according to Sex (n=70)

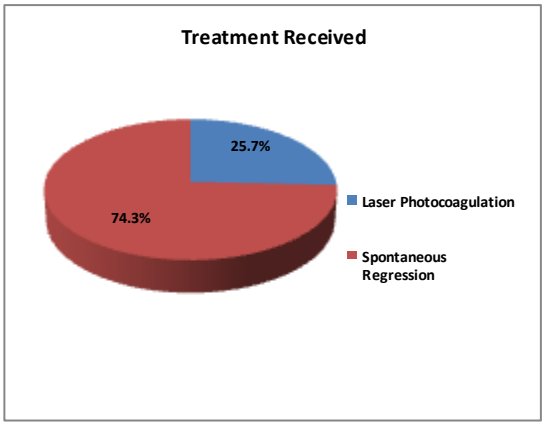

Fig 3: Showing the distribution of study population according to treatment received (n=70

DISCUSSION

The International classification for ROP [5,6] has been accepted as a standard for describing and documenting the disease. Their recommendation has been followed for documentation in this study.

In our study, the incidence of ROP was found to be 38.7% whereas in various western studies it has been reported to vary from 21% to 65.8%. [8-10] Among the previously done Indian studies, Gopal et al [10] reported the incidence of ROP to be 38% among premature neonates with birth weight less than 2000grams. Rekha et al [2] reported the incidence of ROP to be 46% in babies with birth weight less than 1500 grams and gestational age less than 35 weeks. Varughese et al [11] reported the incidence of ROP as 52% among babies with birth weight less than 1500 grams and gestational age less than 34 weeks. The difference in the incidence of ROP between previous studies and the present study is probably because of the difference in the inclusion criterion. Some recent studies such as by Gupta et al [3] and Chaudhury et al [12] has shown the incidence of ROP to be 21.7% and 22.3% respectively. This is probably because the neonatal care centre in their hospital provided controlled delivery of oxygen to the premature at risk babies. In the present study 52.42% of cases progressed to stage 3 whereas Charan et al [5] reported that 11.52% of cases progressing to stage 3. The present study showed more number of babies in stage 3 than previous studies probably due to uncontrolled use of oxygen in the study population. There was no case with severe stages of ROP in our study because the cases were detected earlier and treated with laser therapy to prevent their progression to more severe stages of ROP.

No association was found between gender of the baby and the development of ROP whereas Aggarwal et al [13] showed increased incidence of ROP among males (RR6.395%; 95% CI 1.6-20.7). The causal role of oxygen in the development of ROP has been confirmed by controlled trials and clinical studies. [4,5] Like the present study, Rekha et al [2] (OR 1.57, 95%CI 1.15-2.13) and Gupta et al [3] (OR 64.66,95%CI 3.39-1231.99) showed statistically significant relation of development of ROP with duration of oxygen therapy (OR 1.57,95%CI 1.15-2.13). Like Gupta et al [3] (RR 24.30,95%CI 1.65-357.81),the present study also showed statistically significant relation of development of ROP with apnoea. Sepsis was also found to be statistically significant risk factor in the present study. This corroborates with the findings of Gupta et al [3] (RR 14.61, 95%CI 1.20-177.18) and Aggrarwal et al [13] (RR5.7, 95%CI 1.6-20.7).

The main limitation of this study is that it has been done in a single centre, so the availability of cases was limited. Few previously documented risk factors like multiple pregnancies could not be assessed due to small sample size. The number of babies weighing below 1000grams was very low hence statistical conclusion could not be derived from this subgroup. Due to very large catchment area and lack of awareness about the disease among general population,

there was large number of cases who were lost to follow up.

CONCLUSION

ROP has been considered as one of the main avoidable cause of childhood blindness in Vision 2020. Improving neonatal care allows more and more low birth weight babies to survive and develop the disease. So the incidence of ROP is increasing. Regular screening and timely intervention can save the progression to irreversible blindness.

This study was conducted in a rural based medical college with very wide catchment area and a huge number of premature deliveries. The incidence of ROP was found to be very high (38.67%). This emphasizes the need for regular screening not only in tertiary care centres but also in peripheral hospitals. The prerequisites for efficient screening mechanism are trained personnel with increased awareness. Hence the obstetrician, neonatologist and the ophthalmologist should receive proper institutionalised training and inter sectorial co-ordination for ROP screening and management. It is strongly recommended that in a rural based tertiary care centre like the study venue should enforce mandatory ROP screening with indirect ophthalmoscopy for all preterm babies weighing less than 2000 grams beginning 2-3 weeks after birth. All babies with history of apnoea, prolonged oxygen administration and septicaemia should undergo ROP screening irrespective of their gestational age.

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How to cite this article: Ghosh S, Dey AK, Chaudhuri SK et. al. The burden of Retinopathy of Prematurity in a rural based tertiary care hospital in West Bengal, India. Int J Health Sci Res. 2015; 5(7):88-93.

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