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Retinopathy of Prematurity-Experience in A Rural Tertiary Hospital

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Abstract

Back ground: Blindness due to Retinopathy of Prematurity is common in preterms. Evaluation and Management if done early vision can be saved. *Aims*: To study prevalence , risk factors, impact of early diagnosis and management and outcome with or without treatment in babies of our NICU. *Design*: Longitudinal , Analytical study. *Setting*: Neonatal intensive care unit of a tertiary care rural hospital between January 2014- June 2014 and followed up till the age of 6 months. *Methods*: Infants with birth weight lessthen 1500 g and gestation less then equal to 32 weeks were screened for ROP at per decided schedule. Infants with birthweight greater than equal to 1500g and gestation greater than 32 weeks were screened only if they had additional risk factors. Those found to have threshold disease ROP had laser photocoagulation. Post discharge babies were followed up till the age of 6 months. *Results*: The prevalence of ROP in the 62 infants who were screened was 29%. No ROP was found in infants weighing greater then equal to 1800g or with a gestational age more than 33weeks. Risk factors predisposing to ROP were oxygen administration which was studied with two factors, maximum FIO_2 delivered and total duration of oxygen therapy, abnormal ABGs within 24 hours of birth, H/O seizures, shock and respiratory distress syndrome. Laser photocoagulation was done in 7 out of the 10 infants having ROP . Some babies had post-laser transient conjunctival redness. Vision in operated babies after 6 months was satisfactory. *Conclusion*: The prevalence was 29%.Common preterm morbidities are risk factors. Early treatment prevents blindness.

Key words: Laser Photo-Coagulation; High Risk Follow-up; Retinopathy of Prematurity; Visual Outcome; Risk Factors.

Introduction

Retinopathy of prematurity (ROP) is a disease process mostly reported in preterm neonates with a wide spectrum, ranging from mild, transient changes in the retina with regression to severe progressive vaso-proliferation, scarring, retinal detachment and blindness. If risk factors are looked after ROP can be prevented and if identified early, can be treated successfully saving the vision of the child.

In 1942, Terry [1] first described retrolental fibroplasia with implication of oxygen therapy as the causative agent. Hence, administration of oxygen in premature was severely curtailed, resulting in increased mortality. Today it is well known that oxygen therapy is not the single causative factor, but many other risk factors play a causative role in the pathogenesis of ROP [2, 3].

The aim of this prospective study was to find out the incidence of ROP in our rural tertiary care centre where state of art NICU and good screening facilities are available. It also attempts to identify the risk factors which predispose preterms to ROP and outcome at 6 months age for those who had ROP with or without laser photocoagulation.

Materials and Method

Ethical clearance for the study was obtained from the institutional ethics committee of DMIMS(DU)and

informed consent of the parents was also obtained before recruiting babies.

All neonates weighing less then 1500g and / or with a gestation less then equal to 32 weeks admitted to NICU of Acharya Vinoba Bhave hospital attached to JNMC Sawngi (m) wardha were routinely screened for ROP between Jan2014-June 2014. The initial examination was carried out as per schedule in the table no 1[4]. All the infants were screened by the trained ophthalmologist.

Neonates with birth weight greater then equal to 1500g or gestational age more than 32weeks were screened if they had an unstable neonatal course with risk factors like ventilation, oxygen requirement, septicemia, , exchange transfusion or use of blood products and apnoea [4]. A detailed history including birth weight, gestational age at birth, weight for gestation (AGA / SGA status) and, problems during NICU stay and its management were recorded.

The screening was done with a binocular indirect ophthalmoscope. The pupils were dilated using 0.4% Tropicamide +1.25% Phenylepherine eye drops two or three times, till full dilatation occurred. Retinopathy was graded into stages and zones as per the ICROP classification [5, 6] . Patients with any signs of ROP were examined every week till regression occurred or till they reached threshold for laser treatment.

Table 1: Schedule of initial examination

Gestage	Post natal age for examination
< 26 weeks	6 weeks
27-28 weeks	5 weeks
29-30 weeks	4 weeks
>30 weeks	3 weeks

All other patients were examined every two weeks, till vessels have reached ora serrata and retina was mature . Once treated and discharged were called once in a month till they attended the age of six months. Parents were instructed at discharge to carefully notice whether child can see or not. Every visit parents were inquired about the vision of the child. Detailed ophthalmological examination including fundoscopy was done at each visit.

Threshold ROP [4] was treated by photocoagulation and treatment of pre threshold ROP was left to discretion of ophthalmologist in individual cases.

Statistical analysis of risk factors was done using fisher's exact test and relative risk was calculated.

Results

There were 72 preterm babies in NICU during study period who fulfilled criteria for ROP screening based on weight , gestational age and risk factors. Ten babies(14%) died before the age of first initial examination. Birth weight of 62 babies ranged from 900-2100 g with a mean of 1.49± 0.26g.There were 25 babies(40%) whose weight was below 1500gms(VLBW) out of these 4 (6.4% of total)were below 1000gm (ELBW)and 37 (60%)babies were more than 1500gms. There were 28(45%) AGA and 34 (55%) SGA babies.

The gestational age ranged from 28-35 weeks with a mean of 32.4±1.90 weeks. There were 40(64.5%) males and 22(35.5%) females.

ROP was seen in 18 (29%) infants . The prevalence of ROP according to gestational age is shown in Fig. 1. As the gestational age decreased to below 32 weeks, the prevalence of ROP increased (Chi-square= 14.403 p value 0.0001,S). There were 4 ELBW and all infants(100%) found to be affected . The proportion of ROP, in 11 VLBW infants was 54%(6 babies) and was 22% (8 babies) among 38 infants weighing 1500-1800gms. No ROP was seen in infants with birth weight greater then equal to 1800g and gestational age more than 33 weeks.

Only one ELBW baby had aggressive ROP, other 3 had zone 1 stage 3 disease. Four among more than 1500gm and 2 of less than 1500gm had zone 3 disease and had regression . Eight babies had stage 2 zone 1 and 2 disease and reached threshold or prethreshold stage .Two ELBW babies died after initial examination. Out of 10 babies where laser photo-coagulation was indicated it could be done in 7 babies ,as 3 babies refused intervention.

There was no significant difference (p value = 0.69) in the prevalence between males and females and between AGA and SGA(p value= 0.4).

A statistical analysis was done for each risk factor. Statistical significance by fisher's exact test and relative risk for each factor was calculated. The risk factors included were oxygen therapy (more than 50% FIO_2 and and more than 7 days of oxygen therapy), abnormal ABGs at birth, seizures, use of blood products, septicemia, apnea, shock, respiratory distress syndrome (table 1).

Fig. 1: ROP and Gestational age

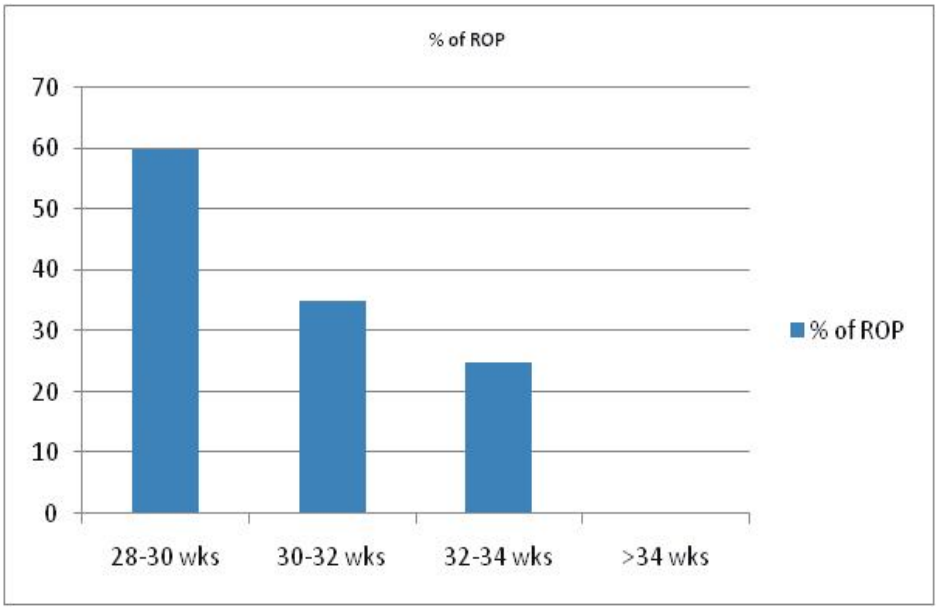

Table 2: Shows Risk factors and prevalence of ROP(fisher's exact test)

Risk factors	Pts with ROP	No ROP	P value	Relative risk
Oxygen therapy				
FiO2 >50%	14	16	0.0047	3.73
Duration >7 days	8	6	0.0478	2.22
Abnormal ABG	18	20	0.0001	Infinity
H/O seizures	5	3	0.0392	2.62
Sepsis	9	31	0.1516	<1
Apnea of prematurity(AOP)	4	21	0.08857	<1
Patients with shock	10	6	0.0013	7
RDS	11	7	0.0013	3.8
Use of blood products	3	17	0.1360	<1

All babies withstood the procedure well and there were no post-laser complications other than reddening of the conjunctiva, which disappeared in 2-3 days. All the infants were followed up till the retina was fully mature.

Total of 13 (7 operated, 6 regressed ROP) babies were followed up for 6 months. One had strabismus and needed spectacles. Rest had good vision. Those who refused surgery (3 patients) also were contacted on phone. One patient's parents reported normal vision ,two had problems with vision and were on treatment somewhere else.

Discussion

We screened all babies admitted to our NICU with birth weight less then 1500g and gestation less then equal to 32 weeks. Infants with birth weight greater then equal to 1500g and gestation more than 32 weeks were screened only if they had additional risk factors. In a recent article, Chawla, *et al.*[7] have suggested the same screening criteria. There are varying screening criteria described by different authors. Maheshwari *et al*.[8] screened all babies weighing less then 1500g with a gestational age less then 35 weeks. Gupta, *et al*.[9]screened all babies lessthen equal to 1500g and / or gestational age lessthen equal to 35 weeks. Vinekar, *et al.*[10] suggested that the scenario in developing countries is quite different. Larger and gestationally 'older' infants are more likely to develop ROP compared to their counterparts in Western countries. Hence, the application of Western screening guidelines for developing countries has been questioned by Jalali *et al*.[11]. As a higher cutoff limit, they recommended screening babies born at less then 37 weeks gestation and / or birth weight less then 2000g in the presence of a high sickness score, in order to prevent missing any infant with threshold ROP. In our study, we would have missed 5 cases of ROP needing laser if we had used less then 30 weeks criteria, as per American Academy of Pediatrics (AAP) updated recommendations[12] . Using higher cut off points like less than 37 weeks will increase the number of

babies need to be screened .Screening large number of babies may not be cost effective and will be cumbersome. With the criteria used by us we did not miss any baby as most come for our high risk clinic.

The proportion of ROP was 29% in our study which was much lower than that reported by Gopal *et al.*[9] but it was similar to what observed by Chaudhari, et al.(10) In more recent studies, also incidence of ROP reported is similar to our study or is higher[14,15].The high prevalence in developing countries is described popularly as 3rd epidemic of ROP[16]. First in 1940-1950 and second being in 1970-1980 both being in industrialized countrie[5]. This high prevalence is due to better survival of tiny babies but technology not able to keep pace in developing countries.

No ROP was seen in the present study in infants with birth weight e"1800g and gestational age more than 33 weeks even with risk factors but to suggest cut off we need larger studies with more number of patients.

It has been suggested by other authors[5] also that 62.5% of infants would be missed if AAP criteria are applied[12] which was also seen with Chaudhary et al 13% babies could have been missed[10]. The reason being in developing countries larger and more mature babies are affected. So, it appears that screening all babies with birth weight less than 1500g and gestation less then equal to 32 weeks may be a better option in developing countries. Infants with birth weight between 1500-2000g and gestational age more than 32 weeks should be screened at the discretion of the neonatologist, depending on other risk factors during the course of stay in the NICU. Same was done in present study.

Many risk factors have been reported to predispose to the development of ROP. Oxygen therapy, packed cell volume transfusion, septicemia, apnea and clinical sepsis are important risk factors [8,9,15]. In our study, oxygen administration (which was studied with two factors, maximum FIO_2 delivered and total duration of oxygen therapy), abnormal ABGs within 24 hours of birth, H/O seizures, shock apnoea and respiratory distress syndrome were found to be significant risk factors. Chaudhari et al.[15] found oxygen administration, septicemia, and apnea as significant risk factors. Vinekar *et al.*[10] found that shock was a significant risk factor. Aggarwal *et al.*[14] found apnea, clinical sepsis and male sex to be significant risk factors. Lin et al [18] and Chen et al.[19], found RDS and HIE to be significant risk factors respectively.

All the treated babies in our study underwent laser therapy without any complications. Many authors[10,20] have reported that long term structural and functional outcome using laser was superior to that obtained with cryotherapy. Laser obviates the need for general anesthesia and has few any complications (20]. As Laser is not free of complications newer modalities are being tried like anti Vascular endothelial growth factor monoclonal antibody Bevacizumab which is easy and inexpensive therapy. Other drugs for ROP is Pegaptanib sodium ,Granulocyte colony stimulating factor,and Jun Kinases inhibitors(20).All of these are still under study.

We followed all affected babies and found doubtful blindness in those who refused intervention. This again emphasizes the importance of screening program and prompt management.

Since ROP is highly prevalent in india and essentially asymptomatic in the early stages, standards of practice now demand carefully timed retinal examination of at risk infants for ROP by an ophthalmologist experienced in the examination of the retina, this minimizes the risks of visual loss by these infants. Early thrapy in expert hands shows good result.

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