

TABLE I (Contd.)—Comparison of Re-evaluation of TBAs' Responses in the Three PHCS.

Questions and Choices	Responses of TBAs			Total (n=46)
	Ganjad (n=14)	Kasa (n=18)	Saiwan (n=14)	
11. How will you identify a small baby from foot print? (for referral) Demonstration: The length falls in red zone of a plastic ruler.				
Correct	14	15	8	37
Incorrect	—	3	6	9
12. Can a very small baby survive at home?				
Yes	1	3	—	4
(No)	13	15	14	42
13. How will you transport such a baby to the primary health center?				
Wrap only	1	5	3	9
Wrapped in thermocol box.	—	5	—	5
(Prewarmed, in thermocol box)	13	8	11	32

Correct choices are shown in parentheses.

*Remaining TBAs gave no answers.

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High Risk Factors for Development of Retinopathy of Prematurity

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Increased survival of pre-term and seriously ill new-born babies has resulted in an increase in the incidence of retinopathy of prematurity (ROP) in the recent years(1).

Long term morbidity of ROP has a spectrum ranging myopia to blindness. Screening programmes and early intervention can provide enormous economic and social benefits(2). Even though a large number of Level III Neonatal Intensive

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Care Units (NICU) are now established in India, very little work is done on this aspect. This communication evaluates the high risk factors for development of ROP in our center.

Subjects and Methods

This prospective study was done over a period of 2 years in the graduates of level III NICU of a referral teaching hospital to find out the incidence of ROP and to study the role of various high risk factors in the etiology of ROP. Patients were included into the study if the gestational age was below 32 weeks, birth weight was less than 1250 g, oxygen therapy with FiO_2 more than 40% was administered over 24 hours, babies had been on ventilator and babies had hypoxic ischaemic encephalopathy (HIE).

All selected cases were subjected to indirect ophthalmoscopic examination after full dilatation of pupils. The examination was done under local anesthetic drops and using eyelid speculum after restraining the baby in the mother's lap. The first examination was done at the time of discharge or at 6 weeks, whichever was earlier and it was repeated at 12 weeks and 6 months. Cases showing signs of ROP were re-examined every 2 weeks till the signs regressed or remained stationary. The management protocol followed was monitor stage I and stage II cases, cryotherapy for stage III and scleral buckling and vitreous surgery for more advanced stages.

Record keeping and staging was done in the format suggested by the International Classification of Retinopathy(3). Database management was done by Foxpro software and statistical analysis was done by Epi-info and SPSS computer software. For univariate analysis of various risk factors, 't' test was used for continuous data and Fisher's exact test for categorical data.

Results

Out of 40 subjects, 17 (42.5%) were below 32 weeks and 16 (40.0%) between 32-37 weeks of gestation. There were 19 (47.5%) babies <1500 g, and 15 (37.5%) between 1500-2500, g. Oxygen therapy for more than 7 days was provided to 24 (60%) babies. At 6-8 weeks of post-natal age 7 (17.5%) babies developed signs of ROP of whom 5 cases had Stage I disease (71.4%) while 2 had Stage II disease (28.6%). None had more severe disease. ROP was observed in 50% of babies whose birth weight was <1250 g as compared to 6.6% in those weighing 1250 g or more ($p < 0.05$). Ventilated infants had a significant, higher probability (OR 14) of developing ROP compared to non-ventilated infants. Factors like HIE, prolonged oxygen therapy and prematurity were not statistically significant. *Table I* provides the results of univariate analysis between the ROP and non-ROP groups for the various risk factors studied.

Discussion

Retinopathy of prematurity is a vasoproliferative retinopathy occurring mainly in preterm infants. ROP occurs due to injury to the differentiating primitive capillary meshwork of the retina. Vessels surviving this insult form arterio-venous shunts. In 90% of cases, cells inside these shunts divide and produce normal capillary meshwork resulting in complete regression. In the remaining 10%, the cells proliferate and grow on the surface of retina and vitreous resulting in the proliferate disease. This leads to traction on retina and may result in detachment. Low birth weight, prematurity, oxygen therapy, hypoxia, hypercapnia, ventilator therapy and blood transfusions are known risk factors(1,2).

Nearly 18% of our cases developed signs of ROP at 6-8 weeks of postnatal age.

TABLE I—Univariate Analysis of Risk Factors for ROP

Variable	ROP (n=7)		No ROP (n=33)		OR (95% CI)
Birth weight (g)*	1212.14	(387.78)	1849.39	(497.10)	—
Gestation (wk)	31.12	(3.18)	34.33	(3.80)	—
Duration of O ₂ therapy (days)	8.6	(3.6)	5.9	(3.5)	—
No. Ventilated (%)*	5	(71.4)	5	(15.2)	14(1.58, 168.68)
Duration of Ventilation (days)	5.5	(3.0)	4.2	(1.3)	—
No. with HIE (%)	3	(42.9)	6	(18.2)	3.38(0.38, 25.67)

Values are depicted as either mean (SD) or Numbers (%).

* Significant difference between ROP and Non-ROP groups ($p < 0.05$).

Other studies have quoted an incidence ranging from 20-39%(4-6). The disparity in the reported incidence is likely to be influenced by methodological factors, selection criteria and protocol for retinal examination. The earliest case reported in the literature is at 31 weeks of post menstrual age. Early Stage I changes could have been missed in extreme preterm babies as we did our first examination at 6 weeks of post conceptional age.

We came across only milder forms of disease. All cases were of Stages I and II. All signs of ROP showed regression by the age of 6 months. Other studies have shown variable incidence of milder stages and have also documented complete regression of earlier stages of the disease(6,7). We can expect more cases of advanced stages with increasing survival of very low birth weight and extreme preterm babies and more use of ventilator therapy.

Birth weight below 1250 g and ventilator therapy were significant high risk factors for the etiology of ROP in our study. These risk factors have also been reported in other studies(4,8,9). Birth weight is the most important high risk factor and it inversely correlates with the severity of ROP. The immaturity of retinal vessels correlates

with the birth weight. Babies on ventilator therapy are exposed to higher FiO₂ and they have alterations in auto-regulation of cerebral blood flow exposing them to higher risk for ROP.

In our study, 29.4% of babies below 32 weeks of gestation developed ROP. Only 19.4% of babies on oxygen therapy (FiO₂ >40% and duration >24 hours) developed the disease while the duration of therapy did not make any difference. One third of babies suffering from HIE had signs of ROP. However, these observations are not statistically significant. Most of our patients on oxygen therapy did not receive more than 60% of FiO₂ for long durations. Studies have shown extreme prematurity to be a significant risk factor(8,9). Low survival of extreme preterm babies and limited sample size could explain our observation that prematurity alone was not a significant risk factor. Other reports have shown that oxygen therapy alone is not significant, nor HIE is the responsible risk factor(4,8,9).

In conclusion, all graduates of NICU with high risk factors like birth weight below 1250 g and ventilator therapy should be examined by indirect ophthalmoscope at 6 weeks and 12 weeks. Pre-term babies less than 28 weeks of gestation should be

first examined at 3 weeks of post conceptional age. Early stages of ROP need to be followed up till the signs regress. More severe stages will need intervention by an ophthalmologist and require laser or cryotherapy.

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