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INCIDENCE OF RETINOPATHY OF PREMATURITY AND RISK FACTORS IN NICU GRADUATES IN TERTIARY HEALTH CARE CENTRE IN NORTH INDIA.

Neonatology

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ABSTRACT

Introduction: Retinopathy of prematurity continues to be an important cause of childhood blindness. If identified early, it can be treated successfully. Today it is well known that oxygen therapy is not only the single causative factor, but many other risk factors play a causative role in the pathogenesis of ROP. **Aims' and objective:** To study the incidence of retinopathy of prematurity (ROP) in the NICU graduates and obtain information on risk factors associated with ROP. **Material and method:** Preterm infants with birth weight < 1750g and gestation ≤ 34 weeks were screened for ROP at 4 weeks after birth. Infants with birth weight ≥ 1750g and gestation > 34 weeks were screened only if they had additional risk factors. Statistical analysis was performed with SPSS software version 17.0. Student's t test was used to compare normally distributed numerical variables whereas chi square test was used for categorical variables. **Results:** Incidence of ROP in 122 screened newborns between May 2014 and September 2016 was 16.39%. No ROP was found in infants weighing >1650g or with a gestational age more than 34 weeks. Risk factors predisposing to ROP were gestational age (P=<0.001), birth weight (P=0.042), apgar scores at 1 (P=0.038) and 5 minutes (P=0.018), oxygen therapy (P=0.015), respiratory distress at birth (P=0.011), surfactant administration (P=0.008) and septicemia (P=0.009). **Conclusion:** Gestational age, birth weight, surfactant administration and septicemia were the major risk factors. Other risk factors were oxygen therapy, respiratory distress at birth, and apgar scoring.

KEYWORDS

Retinopathy Of Prematurity, Gestational Age, Birth Weight.

INTRODUCTION

Retrolental fibroplasia in premature neonates was first reported by Terry, et al. in 1942[1]. Subsequent studies identified oxygen therapy as the main cause of this complication and the condition was renamed as retinopathy of prematurity (ROP) by Heath in 1951[2]. Although various other factors have been recognized as predisposing triggers for the retinopathy during the last 60 years, still prematurity and low birth weight remain as the major risk factors for the occurrence of ROP[3]. This disease is the major cause of blindness in infants, and up to 70000 cases of blindness due to ROP have been reported up to date[4]. With the advent of new technologies and improved care for premature newborns, survival rates of extremely low birth weight (ELBW) neonates have jumped from 5 % to 65 % and those of very low birth weight (VLBW) infants from 35 % to 90 % during the recent years [5]; therefore, ROP is being increasingly diagnosed in these infants. Although, with proper care, most neonates develop mild degrees of ROP, but in some babies the condition is progressive and needs treatment[6].

As early diagnosis and prompt treatment is crucial in preventing blindness, this study was planned to determine to study the incidence of retinopathy of prematurity (ROP) in the NICU graduates and obtain information on risk factors associated with ROP.

Material and Methods

In this retrospective study, All infants admitted to the NICU were screened for ROP if they met the following criteria: (a) Presented at ≤34 weeks of gestation, (b) weighed ≤1750 g at birth, or (c) possessed other significant risk factors such as sepsis, respiratory distress syndrome (RDS), or long-term oxygen use. Screening was performed by a single retina specialist in the NICU under aseptic conditions, using an indirect binocular ophthalmoscope with a + 20 diopter lens.

This is a retrospective study of all NICU admissions between May 2014 and September 2016 at a tertiary care centre. Infants diagnosed with ROP were identified and any information that may increase the risk of ROP development was recorded including low birth weight, gestational age, sex, history of sepsis, history of blood transfusion, apgar score at 1 and 5 minutes, oxygen therapy, number of days oxygen required, apnea, total parenteral nutrition, metabolic acidosis, seizures, surfactant administration, respiratory distress at birth, neonatal jaundice, intracranial haemorrhage, necrotizing enterocolitis, multiple gestation and maternal risk factors such as diabetes, smoking, pre-eclampsia,maternal bleed was recorded.

Statistical analysis was performed with SPSS software version 17.0. Student's t test was used to compare normally distributed numerical variables whereas chi square test was used for categorical variables.

RESULTS

A total of 122 preterm neonates who met the inclusion criteria were screened for retinopathy of prematurity [ROP]. The mean birth weight was 1450 +/-391 grams and the mean gestational age was 31.9+/- 2.5 weeks respectively[Table 1].

Table 1: Demographic and perinatal characteristics of the study neonates

Characteristics	N [%]
Sex	
• Female	32 [26.3]
• Male	90 [73.7]
Birth Weights (Mean)	1450 +/-391 Grams
Gestational Age (Mean)	31.9+/- 2.5 Weeks
Mother age (Mean)	24.3+/-3.1 years
Plurality	
• Singleton	110 [90.1]
• Multiple	12 [9.9]
Pre-Eclampsia	22 [18.0]
Maternal Bleeding	14 [11.5]
Apgar Score At 1 Minute	
• <6	29 [23.8]
• >=6	93 [76.2]
Apgar Score At 5 Minute	
• <6	20 [16.4]
• >=6	102 [83.6]
Oxygen Requirement	97 [79.5]
Apnea	14 [11.5]
Respiratory Distress	96 [78.7]
Surfactant Requirement	23 [18.9]
Blood Transfusion	25 [20.5]
Tpn	18 [14.8]
Metabolic Acidosis	5 [4.1]
Seizures	8 [6.6]
NNJ	40 [32.8]
ICH	2 [1.6]
NEC	2 [1.6]
Sepsis	59 [48.3]
Diabetes	2 [1.6]
Smoking	3 [2.5]

Incidence of ROP in 122 screened newborns was found to be 16.39%. No ROP was found in infants weighing >1650g or with a gestational age more than 34 weeks. Risk factors predisposing to ROP were gestational age (P=<0.001), birth weight (P=0.042), apgar scores at 1 (P=0.038) and 5 minutes (P=0.018), oxygen therapy (P=0.015), respiratory distress at birth (P=0.011), surfactant administration (P=0.008) and septicemia (P=0.009)[Table 2].

Table II: characteristics of preterm infants with or without ROP on initial screening

Characteristics	Infant with ROP (20)	Infants without ROP (102)	P (statistically significance < 0.05)
Birth weight [in grams]	1296+/-205	1481+/-412	0.042
Gestational age[weeks]	30.04+/-1.7	32.3+/-2.5	<0.001
Sex [%male]	17 (85)	73 (71.6)	0.212
Mother age (in yrs)	24.2+/-3.5	24.4+/-3.2	0.816
Multiple gestation	2	10	0.979
Preeclampsia	4	18	0.802
Maternal bleed	3	11	0.589
Apgar score at 1 min <6	9	20	0.038
Apgar score at 5 min <6	7	15	0.018
Oxygen requirement	20	77	0.015
Apnea	4	10	0.191
Respiratory distress	20	76	0.011
Surfactant administration	8	15	0.008
Blood transfusion	7	18	0.080
TPN	2	16	0.514
Metabolic acidosis	1	4	0.34
Seizures	1	7	0.759
NNJ	4	36	0.185
ICH	0	2	0.529

DISCUSSION

ROP is a major preventable cause of blindness in children throughout the world.Since the recognition of ROP in 1942, three epidemics have been reported: the first one between 1940-45 when oxygen therapy wasidentified as the major cause; the second was described during 1960 – 1970, when improved neonatal care in industrial countries led to increased survival of ELBW babies; and the third from 1980 up to date, as preterm babies of more than 32 weeks gestational age and a birth weight greater than 1500 grams continue to survive with the neonatal care available in developing countries with limited resources[7].

The prevalence of ROP varies greatly in different countries, with differing birth weights, gestational age, and risk factors. According to two major studies, CRYO Therapy-ROP (CRYO-ROP)[8] and ET-ROP[9], 65.8 % to 68 % of newborns with a birth weight < 1250 grams develop some degree of ROP. Fielder and Reynolds report an overall rate of 5% -8% ROP in developed countries, while a rate of 30 % has been reported from developing countries, but not many infants with ROP or blindness due to ROP are reported from very poor countries, because owing to lack of resources, most VLBW infants die before developing ROP[7].

In our study, the rate of ROP was 16.39% as compared to 10.45 % from the United States[10], 29.2 % from Singapore[11], 32.4 % from Pakistan[12], 29 % from Kerman[13], and 17.14 % from Tehran[7].

No significant differences in the rate or severity of ROP was seen between neonates born from multiple gestation and singletons in contrast to Sabzehei et al. Motta et al[14] also observed the similar finding as in our study.

Blood transfusion was not found to be significant factor in our study in comparison to Sabzehei et al.

Our study indicates that Gestational age, birth weight, surfactant administration and septicemia were the major risk factors. Other risk factors were oxygen therapy, respiratory distress at birth and low apgar scoring.

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