The Most Important Factors for Retinopathy of Prematurity in Preterm Infants

Ji Yeon Choi, M.D.¹, Young Ik Han, M.D.¹, Ji Hee Kim, M.D.², Eun Sun Kim, M.D.², and Jihyun Jeon, M.D.²

¹Department of Pediatrics, Bundang CHA Medical Center, CHA University School of Medicine, Seongnam
²Department of Pediatrics, Gangnam CHA Medical Center, CHA University School of Medicine, Seoul

Purpose: There are many known risk factors for a retinopathy of prematurity (ROP). We analyzed the most important risk factors and predictors of ROP among them.

Methods: We retrospectively reviewed the medical records of all premature infants admitted to the neonatal intensive care unit (NICU), between January 2010 and December 2012 at Gangnam CHA Medical Center, Seoul. All infants (n=185) were hospitalized for more than 28 days, received eye examination for ROP and showed one of the following criteria: birth weight (BW) below 1,500 g, gestational age (GA) below 32 weeks, or oxygen treatment (≥40% oxygen for more than 3 days). We divided the infants into the Non-ROP group (n=162) and the ROP group (n=23, more than stage 1) and analyzed group comparisons, risk factors and the importance of each factor of ROP by SPSS 13.0.

Results: Risk factors were duration of oxygen uses [Odds ratio (OR): 1.064, 95% confidence interval (CI): 1.007-1.125, \( P = 0.028 \)] and intravenous (IV) steroid (OR: 1.234, 95% CI: 1.000-1.523, \( P = 0.049 \)) by multi-factor adjustment. The most important factor was oxygenation duration. The following factors were time to full enteral feedings, and IV steroid duration.

Conclusion: The incidence of ROP will be decreased if we can reduce the length of oxygen uses, IV steroid use and advance the full feeding achievement.

Key Words: Retinopathy of prematurity, Risk factor, Oxygen, Enteral feeding, Steroid
important factors of ROP in preterm infants.

**Materials and Methods**

We retrospectively reviewed the medical records of all premature infants who were admitted to the neonatal intensive care unit (NICU) at Gangnam CHA Medical Center of Seoul between January 2010 and December 2012. All infants with birth weight (BW) below 1,500 g or gestational age (GA) below 32 weeks or oxygen treatment (≥40% oxygen for more than 3 days), who were hospitalized for more than 28 days and received eye examinations for ROP were enrolled in our study (n=185). Infants with cardiac, respiratory, neurological or ocular anomalies (except ROP) or genetic diseases and infants who died before eye examination were excluded.

The first eye examination was performed by a well-trained ophthalmologist at a postmenstrual age (PMA) of 31 to 36 weeks by indirect ophthalmoscopy, following the guideline of the American Academy of Pediatrics (AAP). The repeated examinations and reports were performed by decision of the ophthalmologist, depending on the severity of the disease. ROP was classified according to the International Classification of Retinopathy of Prematurity (ICROP). We divided the infants into a non-ROP group and a ROP group (more than stage 1). Data derived from the medical files included gestational age, birth weight, gender, type of pregnancy (singleton/multiple), Apgar scores (APGA) at 1 minute and 5 minutes, blood platelet count at birth day, proven sepsis confirmed by positive blood cultures, respiratory distress syndrome (RDS), respiratory data including duration of oxygen and intubation treatment, postnatal intravenous (IV) steroid duration, patent ductus arteriosus (PDA), necrotizing enterocolitis (NEC, ≥ stage II by modified Bell’s stage), intraventricular hemorrhage (IVH, ≥ grade II by Papile staging), bronchopulmonary dysplasia (BPD, by NIH workshop grading), red cell blood (RBC) transfusion times, duration of total parenteral nutrition (TPN), and time of achievement of full enteral feeding (enteric feeding ≥100 cc/kg/day). The documented perinatal variables included the presence of clinical chorioamnionitis, prolonged rupture of membrane (PROM), pre-eclampsia, multiple births, in vitro fertilization (IVF), and prenatal betamethasone usage. Clinical chorioamnionitis was defined according to the criteria proposed by Gibbs et al, which include an elevation of body temperature >37.8°C and two or more of the following criteria: uterine tenderness, malodorous vaginal discharge, maternal leukocytosis (>15,000/mm³), maternal tachycardia (>100 beats/min), and fetal tachycardia (>160 beats/min).

Data were analyzed by the Statistical Package for the Social Sciences (SPSS for windows, version 13.0). Group comparisons were done by t-tests between 2 groups, logistic regression model was used to determine the contributing factors of ROP and the importance of each factor was estimated using SPSS Tree program.

**Results**

There were 23 of 185 infants in the ROP group (12.4%); 15 infants (8.1%) developed a mild ROP (stage 1 and 2) and 8 infants (4.3%) were diagnosed with severe ROP (≥ stage 3). The birth weight varied between 750 and 2,900 g. The range of gestational age was between 26 and 36 weeks.

There was a significant difference in the mean birth weight and the mean gestational age in preterm infants with and without ROP (Table 1). The ROP