LEUKOCYTOSIS DURING FIRST FOUR WEEKS OF LIFE IS AN INDEPENDENT RISK FACTOR FOR RETINOPATHY OF PREMATURITY

Pia Lundgren¹, Susanna Klevebro^{2,3}, Aldina Pivodic⁴, Petter Brodin^{5,6}, Lois E H Smith⁷, Boubou Hallberg^{2,6}, Ann Hellström¹

¹Section for Ophthalmology, Department of Clinical Neuroscience, Institute of Neuroscience and Physiology, Sahlgrenska Academy, University of Gothenburg, Gothenburg, Sweden

²Department of Clinical Science, Intervention and Technology, Karolinska Institutet, Stockholm, Sweden

³Sachs' Children and Youth Hospital, South General Hospital, Stockholm, Sweden

⁴Statistiska konsultgruppen, Gothenburg, Sweden

⁵Science for Life Laboratory, Department of Women's and Children's Health, Karolinska Institutet, Stockholm, Sweden

⁶Department of Neonatology, Karolinska University Hospital, Stockholm, Sweden

⁷Department of Ophthalmology, Boston Children's Hospital, Harvard Medical School, Boston, MA, USA

Aim

This study retrospectively evaluated longitudinal white blood cell (WBC) counts, C-reactive protein (CRP), prenatal and neonatal morbidities as risk factors for severe retinopathy of prematurity (ROP) requiring treatment in a Swedish cohort of very preterm infants.

Background

ROP pathogenesis is multifactorial and ROP development may involve prenatal and neonatal inflammation. A markedly elevated WBC count, leukocytosis, may indicate an inflammatory response.

Study subjects and methods

We studied 164 infants born < 27 weeks gestational age (GA) and screened for ROP in 2008–2011 with a mean (SD) GA at birth of 25.4 (1.0) weeks and mean (SD) birth weight of 799 (160) grams, 18% (30) were treated for severe ROP.

- Prenatal and neonatal morbidities were recorded.
- Longitudinal WBC and CRP count up to 32 weeks postmenstrual age were reviewed.
- Leukocytosis was defined as $WBC \geq 30 \times 10^9/L$.

Conclusions

- Leukocytosis during the first four weeks of life was an independent risk factor for severe ROP requiring treatment in extremely preterm infants.
- Reducing inflammation in extremely preterm infants might reduce their risk of ROP development.

Results 1: Elevated WBC levels associated with ROP treatment

Mean WBC levels was higher in the second week of life ($16.7 \times 10^9/L$ vs $24.3 \times 10^9/L$, in infants requiring ROP treatment compared to infants not requiring treatment ($p=0.00084$), Figure 1.

Result 2: Leukocytosis was a risk factor for ROP treatment

Leukocytosis ($WBC \geq 30 \times 10^9/L$) during first four weeks was more often present in infants requiring ROP treatment (67% vs 34%, $p=0.0018$).

- ROP treatment was positively associated with leukocytosis during the first four weeks of life (OR 3.96, 95% CI 1.71-9.16, $p=0.0013$) but elevated CRP count were not associated.
- In multivariable logistic regression analyses: leukocytosis (OR 2.83, 95% CI 1.16-6.92, $p=0.022$) and days of mechanical ventilation during first four weeks of life (OR 1.06, 95% CI 1.00-1.12, $p=0.034$), were found to be independent risk factors for ROP treatment, adjusted for GA week.