Growth pattern and nutritional intake
as predictors of retinopathy of prematurity

Avhandlingen baseras på följande arbeten:

I. **Lundgren P, Stoltz Sjöstrom E, Domellöf M, Källen K, Holmström G, Hård AL, Smith LE, Löfqvist C, Hellström A.**
    WINROP identifies severe retinopathy of prematurity at an early stage in a nation-based cohort of extremely preterm infants.
    PLoS One. 2013 Sep 12;8(9):e73256

II. **Lundgren P, Wilde Å, Löfqvist C, Smith LE, Hård AL, Hellström A.**
    Weight at first detection of retinopathy of prematurity predicts disease severity.
    Br J Ophthalmol. 2014 Nov;98(11):1565–9

II. **Lundgren P, Kistner A, Andersson EM, Hansen-Pupp I, Holmström G, Ley D, Niklasson A, Smith LE, Wu C, Hellström A, Löfqvist C.**
    Low birth weight is a risk factor for severe retinopathy of prematurity depending on gestational age.
    PLoS One. 2014 Oct 15;9(10):e109460

IV. **Stoltz Sjöström E, Lundgren P, Öhlund I, Holmström G, Hellström A, Domellöf M.**
    Low energy intake during the first four weeks of life increases the risk for severe retinopathy of prematurity in extremely preterm infants.
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Abstract

Growth pattern and nutritional intake as predictors of retinopathy of prematurity

Background Retinopathy of prematurity (ROP) is a sight-threatening disease that affects extremely preterm and very preterm infants. Approximately 5–10% of infants screened for ROP go on to develop severe ROP that requires treatment. To minimize unnecessary screening procedures, which can be stressful for these fragile infants, it is important to identify new risk factors and predictors that better determine which infants are at high risk for ROP. The objective of this study was to investigate growth pattern (peri- and postnatal weight gain) and nutritional intake as risk factors for severe ROP.

Methods WINROP (Weight, insulin-like growth factor 1, neonatal, retinopathy of prematurity) is a web-based surveillance system that aims to identify infants at high risk of ROP based on their birth weight (BW), gestational age (GA), and postnatal weight gain. In all cohorts that we studied, BW, GA, gender, and maximum ROP stage and ROP treatment were retrospectively retrieved from hospital records. In Paper I, we validated WINROP in a Swedish population-based cohort of extremely preterm infants (born at GA <27 weeks) (n=407). This cohort, called the EXPRESS cohort, was further evaluated in Paper IV in relation to nutritional intake and the correlation with severe ROP. In Paper II, the association between infant weight standard deviation scores (WSDS) at first sign of ROP and ROP requiring treatment was evaluated in a Gothenburg cohort screened for ROP (n=147). In Paper III, the birth weight standard deviations score (BWSDS) was calculated in 5 cohorts (n=2941) that were previously included in WINROP studies; Paper III assessed the impact of low birth weight as a risk factor for severe ROP.

Results WINROP correctly identified 96% (45/47) of infants who required treatment for ROP in an extremely preterm cohort. Low weight (p=0.001) and low WSDS at first detection of ROP (p=0.002) were risk factors for severe ROP. Low BWSDS (p<0.001) was a risk factor for severe ROP for all preterm infants; however, the impact of low BWSDS increased with increasing GA. In addition, low energy intake (p<0.01) during the first four weeks of life was associated with the development of severe ROP (p<0.01).

Conclusions Weight at birth and postnatal weight gain can be useful predictors for severe ROP as can weight at first detection of ROP. In addition, low energy intake during the first four weeks of a preterm infant's life may be associated with later severe ROP.

Keywords: birth weight, nutrition, preterm infant, retinopathy of prematurity, risk factor, weight gain.