Retinopathy of prematurity after selective fetal growth restriction: results from a unique identical twin model

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Objective
Low birth weight (BW) resulting from fetal growth restriction (FGR) and/or prematurity is a well-known risk factor for retinopathy of prematurity (ROP). However, these studies have been undertaken with singletons and are therefore subject to confounding by genetic, obstetric and maternal factors. We investigate the effect of FGR on the development of ROP in monochorionic (MC) twins with selective FGR (sFGR); a unique identical twin model, controlling for confounding factors.

Methods
All MC twin pairs with sFGR (defined as BW discordance of ≥ 20%), born in our center between 2010-2021 were retrospectively reviewed for the presence of ROP. The diagnosis of ROP was based on The International Classification of Retinopathy of Prematurity (ICROP). All outcomes were compared between the smaller and the larger twin.

Results
We included 88 twin pairs with sFGR, with a median gestational age at birth of 33.0 (interquartile range (IQR) 30.7-35.7) weeks and a median BW of 1395 (IQR 966-1834) grams for the smaller twin and 1986 (IQR 1493-2570) grams for the larger twin. The within-pair comparison demonstrated a significantly higher prevalence of ROP in the smaller twin (14%, 12/88) compared to the larger twin (5%, 4/88), OR 3.3 (CI95%: 1.4-7.7).

Conclusion
Although being genetically identical, sFGR is associated with a more than tripled odds of developing ROP, suggesting that adverse growth conditions in utero affect postnatal retinal vascular proliferation.