The life-long effect of fetal growth restriction: neurodevelopmental outcome in growth discordant identical twins


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Objective
Singletons born after fetal growth restriction (FGR) are at an increased risk of poor neurodevelopmental outcome. FGR singletons are, however, generally compared to appropriately-grown singletons, a comparison that is inherently biased by obstetrical, parental and genetic factors. A study population of discordant identical twins that share a single placenta (monochorionic (MC)) naturally eliminates these confounders.

Methods
All MC twins with selective fetal growth restriction (sFGR) born in our center between 2002-2017 were eligible for inclusion. Cognitive performance was evaluated using two standardized psychometric age-appropriate tests, producing a full scale intelligence quotient (FSIQ). Motor functioning was assessed using a standardized neurological examination. A composite outcome of neurodevelopmental impairment (NDI) was used, subdivided into: mild NDI defined as FSIQ<85, minor neurological dysfunction or cerebral palsy grade 1 or mild visual/hearing impairment; and severe NDI defined as FSIQ<70, severe neurological dysfunction or severe visual/hearing impairment.

Results
The median gestational age at birth was 33.9 (interquartile range (IQR) 31.3-36.0) weeks for the 47 included twin pairs, with median birth weights of 1400 (IQR 1111-1875) grams in the smaller twin and 2003 (IQR 1600-2680) grams in the larger twin. The median age at participation was 11 (8-13) years. Median FSIQ was 94 (IQR 86-101) for the smaller twin and 100 (IQR 92-108) for the larger twin (p<0.0001). Moreover, the smaller twin had a 4.8 higher odds (95% CI 1.6-14.1) of mild NDI (36% (17/47)) compared to the larger twin (11% (5/47)) with p=0.005. There was no difference in the presence of severe NDI (4% (2/47) in both groups, p=0.591).

Conclusion
As the described mild impairments can impede children in their daily functioning, we recommend standardized long-term follow-up including neurodevelopmental testing for MC twins with sFGR and singletons with FGR to facilitate early identification of children at risk.