The Fault Is Not in Our Stars but May Be in Our Embryos: Glomerular Number in Low Birth Weight Babies

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The issue of long-term outcomes for infants with low birth weight (LBW) has gained a strong foothold in the areas of hypertension and chronic kidney disease (CKD). Based on the pioneering work of David Barker [1, 2] on the fetal origins of adult disease, there is now general acceptance of the thesis that LBW is a robust predictor for both fetal and adult well-being. An important extension and focus in the renal community have been on the notion of “nephron endowment,” referring to the number of functional units, i.e., “nephrons,” and the appreciation that there may be compromised optimal development of functional units with preterm delivery and/or LBW [3–5].

The contributions of limited nephron endowment and low fetal birth weight are emerging as important factors in global health initiatives [6]. These issues were brought to focus in a recent international multidisciplinary conference entitled “The fault is not in our stars but may be in our embryos: glomerular number in low birth weight babies” and held at the Aldo and Cele Daccò Clinical Research Center for Rare Diseases in Ranica just outside Bergamo (Italy) in April 2016 (http://www.marionegri.it/media/news/PROGRAMMA_2_Aprile2016.pdf). This conference was organized under the aegis of the Italian Society of Nephrology, with invaluable and substantial support from the Fondazione Internazionale Menarini and additional help from the Chiesi Foundation under the auspices of the Istituto di Ricerche Farmacologiche Mario Negri. The workshop was a unique opportunity to discuss issues related to fetal programming of CKD, to

highlight the relevance of this problem to the global health burden of chronic disease, and suggest possible practical solutions for the future. The workshop was intended to raise awareness about the role of developmental programming in the risk for developing subsequent renal disease, and to support implementation of locally adapted preemptive strategies that will have important long-term benefits in terms of future health and cost saving worldwide.

The consensus statement for this important conference is presented in this issue of *Nephron* [7]. The participants in the workshop and consensus statement were a group of experts in obstetrics, neonatology, and nephrology who focused on the associations between fetal and childhood development and increased risk of adult disease, including hypertension, diabetes, and CKD. LBW and prematurity, the most consistent clinical surrogate for a low nephron number, are associated with an increased risk of hypertension, proteinuria, and kidney disease in later life. This relationship is amplified with the use of nephrotoxic drugs that may further reduce nephron number soon after birth, as well as by rapid catch-up growth or overfeeding during infancy or childhood, especially in the setting of previous maternal and fetal malnutrition/undernutrition, which may predispose to obesity and type 2 diabetes in later life. The consensus statement addresses the broad spectrum of developmental programming of kidney disease from preconception to aging.

References

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