Infant Weight Gain and Later Blood Pressure

To the Editor:

Recently, Law et al\(^1\) reported that increased weight gain during early childhood (1 to 5 years) but not during infancy (birth to 1 year) is associated with later systolic blood pressure. From the latter, they concluded that “... none of the evidence so far indicates that promotion of infant growth increases cardiovascular risk.”\(^1\) In our opinion, this conclusion is not only incorrect in the light of various reports, but also in the view of Law’s own data.

In their report, Table 2 shows first-year weight gain to be positively correlated with adult body mass index (BMI). Adult BMI was the variable that showed the strongest association with systolic blood pressure (Table 4). It has been known since the 1970s that increased infant weight gain promotes later obesity, as recently confirmed impressively.\(^2\) Obesity is the key feature of the Metabolic Syndrome X and is closely related to hypertension. Therefore, it seems highly unlikely that increased early weight gain, via increased later BMI, may not influence the development of hypertension.

“Promotion of infant growth,” as favored by Law et al, may be achieved mainly by forced feeding. Experimental as well as clinical studies show, however, that increased infant weight due to forced feeding may result in increased blood pressure later.\(^3,4\) Most recently, in offspring of mothers with hyperglycemia during pregnancy, meanwhile affecting about every 10th pregnant woman, we have demonstrated that the amount of milk ingested neonatally may contribute to later overweight.\(^5\) To evaluate whether early neonatal weight gain is related to later blood pressure in this at-risk population, data of 34 infants (16 males, 18 females) were analyzed in the highest available age.

During early childhood (1 to 5 years) but not during infancy (birth to 2 years of age), early weight gain was significantly related to systolic blood pressure (mean: 127 g). Early neonatal weight gain (first 2 weeks; mean: 189 g) was significantly related to systolic blood pressure (mean: 103 ± 10 mm Hg) at 6 years of age. Early weight gain was positively correlated with systolic blood pressure in childhood (\(β=0.40; P=0.02\)). There was a positive association between the volume of milk ingested neonatally (mean: 160 ± 49 g/day) and early weight gain (\(β=0.35; P=0.05\)) as well as later systolic blood pressure (\(β=0.36; P=0.04\)). The positive association between early weight gain and systolic blood pressure was still observed after adjustment for birth weight and sex (\(β=0.40; P=0.03\); all by linear regression analysis).

We completely agree with Law et al that research in this field is of high public health importance. Therefore, before drawing conclusions on benefits or harms of “promoting” infant weight gain, the consequences should be evaluated directly, considering the dynamics of weight development during the first year of life.

Furthermore, we suggest that attention be paid to maternal diseases during pregnancy and lactation (like diabetes or hypertension) that may strongly influence and confound the outcome and interpretation of studies like those by Law and associates.

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Response

We agree with Harder and Plagemann that “it seems highly unlikely that increased early weight gain, via increased later body mass index (BMI), may not influence the development of hypertension.” One of the main messages of our article was that weight gain between 1 and 5 years was associated with higher adult systolic pressure, and that this effect was modified by adjustment for adult BMI. However, we found no independent relationship of infant weight gain with adult blood pressure.\(^1\) We do not dispute the findings presented by Harder and Plagemann and others that increased infant weight gain is associated with childhood obesity. However, our project described relationships with adult blood pressure, a different cardiovascular risk factor, measured in a different phase of life.

In our article, we did not, as suggested by Harder and Plagemann, “favor” promotion of infant growth, nor do we advocate “forced feeding.” We agree that interventions in early life aimed at promoting cardiovascular health should be tested and evaluated rigorously.

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