

Soy Formula Complicates the Management of Congenital Hypothyroidism

High fiber soy flour has been reported to cause goiter formation and hypothyroidism in humans and other animals. Soy-based formulas are now made from isolated soy protein to which iodine has been added. Whether or not these contemporary formulas could be associated with neonatal thyroid dysfunction was investigated by Conrad and colleagues in a retrospective analysis of patient charts at Children's Memorial Hospital in Chicago. Seventy-eight children born between 1990 and 1998 who were followed at CMH until at least 1 year of age were eligible for the study. Data included weight, length, total T4, TSH, levothyroxine dose, dietary information, and thyroid scan results. All children diagnosed with congenital hypothyroidism had a thyroid scan at their facility.

Eight children received soy formula, and 70 did not. Treatment was started 2 days earlier (median data) in the soy group. There were no significant differences between initial levothyroxine doses or the 1-year dose between the groups. T4 and TSH levels were comparable before the start of therapy, but TSH levels were significantly higher in the soy group at the first evaluation following initiation of therapy (42.6 mU/l vs 6.6 mU/l, $p < 0.01$). Time to normalization of TSH levels was significantly longer in the soy group (150 days vs. 40 days, $p = 0.02$, median data). At 6 months, 62.5% of the soy group had elevated TSH values compared to 17% of the non-soy group ($p = 0.01$). The difference in TSH values persisted throughout the first year of life. There were no significant differences in

height or weight, z-scores, or any other parameter.

The authors discuss possible reasons for their findings, including severity of hypothyroidism, immaturity of the T4-TSH feedback loop, or inadequate dosing, none of which could be demonstrated in this study. The authors speculate that the cause is malabsorption and increased fecal loss of levothyroxine. Free T4 levels were not measured in these children. Neuropsychological data were not available.

Conrad S, Chui H, Silverman B. Soy formula complicates management of congenital hypothyroidism. *Arch Dis Child*. 2004; 89:37-40.

Editor's Comment: *This retrospective study provides some provocative information. Although these infants had similar total T4 levels, thyroid dysfunction was present throughout the first year of life in those fed a soy-based formula. Whether or not there are any long-term sequelae related to this disparity remains to be seen. Newer recommendations for treatment of congenital hypothyroidism are based on normalization of TSH levels at a much quicker rate than previously. It would appear that infants fed soy-based formula will require higher doses of levothyroxine than those on other diets. This is important information for pediatricians and pediatric endocrinologists. A dietary history remains an important part of every child's health evaluation.*

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