SUMMARY
Background: Fetuses from mothers with Graves’ disease (GD) may experience hypothyroidism (HO) or hyperthyroidism (HR) due to transplacental transfer of antithyroid drugs (ATD) or anti-TSH receptor antibodies (TRAb), respectively. Little is known about the fetal consequences. Early diagnosis is essential to successful management. The authors investigated a new approach to fetal diagnosis of thyroid dysfunction and validated the use of fetal thyroid ultrasonography (US).

Methods: Mothers with past or present GD (N = 72) and their fetuses were monitored monthly from 22 weeks of gestation onwards. Fetal thyroid size and Doppler signals, and fetal bone maturation were determined by ultrasonography. Thyroid function was determined at birth. Thyroid function tests and ATD dosage were monitored in the mothers.

Results: The 31 fetuses whose mothers were TRAB negative and took no ATD during late pregnancy stages had normal test results. Concerning the other 41 fetuses, 30 had normal test results at 32 weeks, with 29 euthyroid at birth and only 1 with moderate HO on cord blood tests. In the remaining 11 fetuses, goiter was visualized by US at 32 weeks, and fetal thyroid dysfunction was diagnosed and treated. There were 10 good pregnancy outcomes and 1 fetal death (late referral). The sensitivity and specificity of fetal thyroid US at 32 weeks gestation for the diagnosis of clinically relevant fetal thyroid dysfunction were 92% and 100%, respectively.

Conclusions: In pregnant women with past or current GD, US of the fetal thyroid gland by an experienced ultrasonographer provides an excellent diagnostic tool. This tool in conjunction with close teamwork among internists, endocrinologists, obstetricians, echographers and pediatricians (i.e. obstetric are providers) can ensure normal fetal thyroid function.

COMMENT
The article describes the vast experience of an integrated team of pediatric endocrinologists in Paris in monitoring pregnant women with Graves’ disease (GD). The study shows the interest of fetal thyroid ultrasonography (US) (when performed by experienced ultrasonographers) in assessing the potential repercussions of maternal disease (and treatment with ATD) on the fetus. Several lessons can be learned from the study. First, results confirm the notion that in mothers with past GD (not active) who do not receive ATD and are TRAb negative, the risk of thyroid dysfunction in the fetus is negligible. Second, in pregnant women with active GD, there is a risk for fetal thyroid dysfunction. This risk results from a balance between thyroid hormone inhibiting effects of ATD taken by the mother and transferred to the fetus, and the fetal thyroid stimulatory effect of positive TRAb produced by the mother and affecting the fetal thyroid. Even in high-risk mothers, most fetuses did well (30/41) and the good outcome was predicted from the absence of fetal goiter at US. Finally, in a small group of fetuses from the high-
risk mothers (11/41), fetal goiter was present and often associated with thyroid dysfunction (hypo- or hyperthyroidism). Therefore, the best strategy for monitoring pregnant women with GD who receive ATD and/or are TRAb positive is to perform fetal US monthly after mid-gestation to screen for goiter and other evidence of fetal dysfunction. (Daniel Glinoer, MD; PhD)

**Figure 2.** Ultrasonography for fetal thyroid monitoring according to maternal status and cord blood thyroid function test results. Hypot, Hypothyroidism; Eut, euthyroidism; Hypert, hyperthyroidism. 1) In one mother, FT₄ (20.2 pmol/l) was at the upper limit of normal with suppressed TSH (<0.05 mIU/l) despite the high maternal dose of propylthiouracil (PTU). 2) FT₄, Mean of FT₄ in all of these newborns with 1 sd; TSH, mean TSH in all of these newborns with 1 sd.