Pregnancy Testing Before High-Dose Radioiodine Treatment:
A Case Report

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This case emphasizes that negative urine pregnancy testing and a written declaration of the patient are not sufficient to safely exclude an early pregnancy. Serum pregnancy testing inherently has a diagnostic gap of about 1 wk following conception. We recommend sufficient contraception at least 1 mo before radioiodine treatment in women of childbearing age.

Key Words: positron emission tomography; thyroid cancer; high-dose radioiodine treatment; pregnancy test


After total thyroidectomy, including bilateral cervical lymph node dissection, a 35-yr-old woman suffering from papillary thyroid cancer (pT3 N1b Mx) had high-dose radioiodine treatment. Urine pregnancy testing performed routinely in child-bearing women was negative. In addition, the patient gave her written informed consent stating that she was not pregnant. Further tests were performed, including ultrasonography, nuclear medicine, and PET scans, which ultimately revealed a pregnancy in the sixth week. The patient's pregnancy was terminated in the eighth week for 2 reasons. First, there was a potential teratogenic risk for the
embryo. Second, due to the stage of thyroid cancer (pT3 N1b Mx) at diagnosis, further high-dose radioiodine treatment was necessary for complete ablation of thyroid tissues.

**DISCUSSION**

Routine urine pregnancy testing is performed on all women of child-bearing age before the administration of radioiodine. Patients are requested to affirm that they are not pregnant at the time of signature in a standardized written consent form.

Beta-HCG can be detected in the urine beginning with the first or second day after the lack of the expected menstruation. In other words, there is a diagnostic gap in urine pregnancy testing. Assuming a regular 28-d cycle, urine pregnancy testing becomes true-positive from 15 to 16 d after conception. In contrast, β-HCG can be detected in blood samples as early as 7 to 8 d after conception since the serum concentration of β-HCG is significantly higher than its urine concentration (1–4). Serum pregnancy testing becomes true-positive as early as 1 wk after conception. In principle, even serum pregnancy testing has a diagnostic gap of about 1 wk from conception, which we recommend sufficient contraception for at least 1 mo before radioiodine treatment in women of childbearing age.

This pregnancy was terminated in accordance with the patient’s wish for 2 reasons. First, there was a significant teratogenic risk due to the absorbed dose of at least 0.2 Gy to the uterus/embryo. Second, this patient’s papillary thyroid cancer was presenting with multiple radioiodine-trapping metastases, radioiodine-avid thyroid remnants in the thyroid bed, and massively elevated thyroglobulin levels required additional sessions of high-dose radioiodine treatment.

In this case, the radiation burden to the embryo was caused both from high-dose radioiodine treatment and from PET. The absorbed dose in the uterus was calculated to be at least 0.2 Gy from the 3.7 GBq (100 mCi) $^{131}$I treatment and another 0.01 Gy from the 370 MBq (10 mCi) $^{18}$F-FDG used for PET (5,6). The absorbed dose to the uterus probably was even higher than calculated (7,8) due to an increased blood supply in pregnancy with corresponding higher $^{18}$F-FDG uptake.

**REFERENCES**

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