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Iodine-131 Thyroid Uptake Results in Travelers Returning from Europe After the Chernobyl Accident

TO THE EDITOR: We read with great interest the recent paper of Castronovo (1) reporting the results of thyroid screening measurements for iodine-131 (¹³¹I) and corresponding dose assessment for 58 travelers returning from Europe to America after the Chernobyl accident. However, the results relating to the assessment of ¹³¹I content in the fetal thyroids (Persons 9 and 16) and the calculation of the fetal thyroid doses do not seem to be correct.

In (1), Table 1, the author quoted the expression for $f(t)$, the % of maternal ingested activity which was deposited in the fetal thyroid per gram of fetal thyroid as a function of gestational age t , in weeks. That expression should correspond to Eq. (3) from Reference (2) [Castronovo's reference (8)], namely:

$$f(t) = 5.43 t - 0.453 t^2 + 0.0203 t^3 - 4.61E-04 t^4 + 4.13E-06 t^5 - 24.8$$

Evidently, the constant term “–24.8” was omitted and did not appear in Table 1. That resulted in a significant overestimation in $f(t)$ for the above two pregnant travelers; the correct values in % per gram of fetal thyroid should be 5.01 and 3.76 instead of 29.81 and 28.56 (Table 5) (1), for Persons 9 and 16, respectively. Taking into account the mother's intake of ¹³¹I, the correct values of the activities deposited per gram of fetal thyroid are 0.19 nCi (7 Bq) and 0.12 nCi (4.4 Bq) for Persons 9 and 16, respectively.

Regarding the fetal thyroid dose assessment, from Figure 4 (2), one finds the thyroid doses for fetal ages of 26 and 17 wk to be ~8.5 rad and 5 rad, respectively, per 1 μ Ci of ¹³¹I deposited in the mother's thyroid. Consequently, for Persons 9 (fetal age 26 wk) and 16 (fetal age 17 wk) with mother's thyroid activities of 1.88 nCi (69.6 Bq) and 1.6 nCi (59.2 Bq), respectively, the fetal thyroid dose equivalents are equal to 16 mrem (160 μ Sv) and 8 mrem (80 μ Sv), which is different from the values 9.6 mrem (96 μ Sv) and 14.1 mrem (141 μ Sv) stated in Table 5 (1).

When dealing with human fetal thyroid dosimetry, one must be aware that many assumptions are always involved in metabolic modelling and calculations because of the lack of

published data. Although, for this reason, large uncertainties in the results are expected, several authors (2–4) obtained the similar results: the estimated fetal thyroid dose equivalent for ¹³¹I depends on the gestational age (13–40 weeks) and has a maximum in the range of 0.5–1.5 μ Sv/Bq intake by the mother.

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REPLY: I would like to thank Bašić, Kasal, Šimonović, and Jukić for alerting the scientific community of the omission of “–24.8” (Table 1) and the subsequent correction of the fetal thyroid dose equivalent (Table 5) in my manuscript.

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Measurement of Glomerular Filtration Rate with Technetium-99m DTPA: Comparison of Plasma Clearance Techniques

TO THE EDITOR: In the March 1987 issue of the *Journal of Nuclear Medicine* there is an article by Waller et al¹ based on their nice work comparing plasma clearance techniques for measurement of glomerular filtration with technetium-99m (^{99m}Tc) DTPA.

It seems that nobody knows our similar work on this subject that was accepted in the 21st International Annual Meeting of the Society of Nuclear Medicine Europe, Ulm/Neu-Ulm, Sept. 13–16, 1983 and published in *Nuclearmedizin*.²

This method is used daily in our clinical department, with similar results. Rather than assume *a priori* that the regression coefficient between clearances of chromium-51 (⁵¹Cr) EDTA and [^{99m}Tc]DTPA is equal to 1, we obtained blood samples at 5, 10, 15, 20, 25, 30, 60, 90, 120, 150, 180, 210, 240 min postinjection. The results were then fitted to a biexponential with good correlation (two-pool assumption) (Cl_p).

For a simplified method with the two-plasma samples (one-