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Quantitation of Iodine-124 Contamination in Iodine-123 Radiopharmaceuticals: Characterization of a Second Dose Calibrator

TO THE EDITOR: We previously described a simple method to quantitate iodine-124 (^{124}I) contamination in iodine-123 (^{123}I) radiopharmaceuticals (*1*), supplying at that time a graph and characterization constants suitable for use with the dose calibrator manufactured by Capintec (Model CRC-10). We cautioned in that article, however, that these results were not appropriate for use with dose calibrators of different design nor with sample containers and Pb shields constructed at variance with those used to collect the data.

We have now characterized a second dose calibrator (RADCAL, Model 4045). Using the Pb shield provided for the moly breathrough test, the measured constants were found to differ very little from those reported in (*1*); T3 = 0.00663, T4 = 0.366 and D = 0.547. For convenience of the RADCAL users, the correct curve for the ^{124}I contaminant assay is shown (solid line) for comparison with that for the Capintec instrument (dashed line). Over the range shown, the curves differ by no more than 0.21 percent ^{124}I. Hence, for the purpose of assaying I-124 contamination, the two instruments and associated moly breathrough shields are seen to be essentially identical.

It is not surprising that the radiations of ^{123}I and ^{124}I produce comparable responses in these two instruments since they are of the gas ionization chamber type and have quite similar well dimensions. We caution again, however, that these curves and constants may not be appropriate for use with other dose calibrators, especially those that use NaI scintillation detectors because of their considerably different energy response functions.

References

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Adverse Reactions to Technetium-99m Methylene Diphosphonate

TO THE EDITOR: The published incidence of adverse reactions to [^{99m}Tc]MDP is low. Reported reactions in the United States indicate an incidence of 0.5 per 100.000 in 1984 (*1*). A publication from the United Kingdom covering the

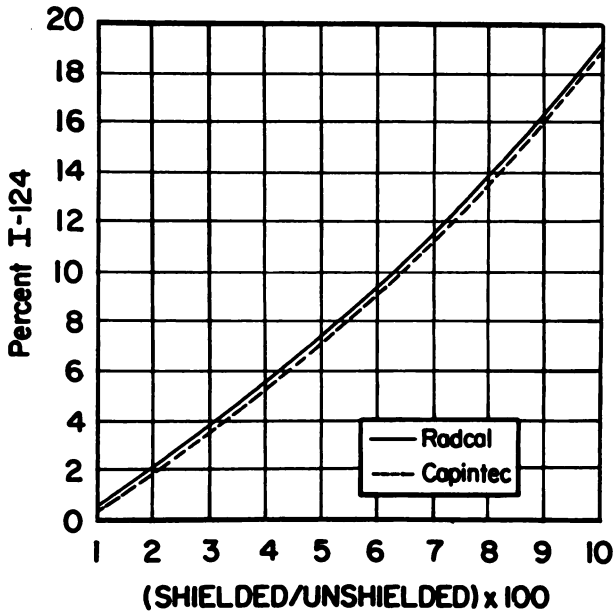

FIGURE 1
Curves for assay of percent ^{124}I contamination with two radionuclide dose calibrators. "Shielded" refers to dose calibrator readings of a vial containing ^{123}I radiopharmaceutical taken while within the moly breathrough shield with the instrument set to assay ^{123}I; "unshielded", to readings without use of the shield. Curve points were determined by the method of Reference (*1*).

period between 1977 and 1983 estimated an incidence between 1 per 1,000 and 1 per 10.000 of adverse reactions to radiopharmaceuticals (*2*). Nearly half of the more recent reports in the United Kingdom concerned reactions to [^{99m}Tc] MDP and the authors estimated that they were notified of <10% of the events including the trivial reactions. After encountering such a reaction, we attempted prospectively to determine the incidence in our bone scan patients.

A 56-year-old female came for an initial bone scan because of a painful left knee, probably arthritis. Her medical history included bilateral hip dysplasia and Parkinson's disease. She did not take medication. Approximately 30 min after intravenous administration of 654 MBq technetium-99m (^{99m}Tc) methylene diphosponate (MDP) (Solco Nuclear, Birsfelden, Switzerland) the patient experienced severe headache with photophobia, nausea, dizziness and sensation of warmth. She had not had those symptoms before and rarely had headache. The symptoms gradually disappeared 2 hr after onset. She reported these complaints when she returned for imaging 4 hr after administration. No therapy was given. There were no late manifestations in the days after the examination.

After this event every patient who came for bone scan to our department was asked for complaints in the interval between injection and imaging. Four patients out of 400 reported, only when asked, transient and moderate headache, dizziness and nausea ~30 to 60 min after injection. Late reactions did not occur. Two of these patients had carcinoma of the breast. One patient used the oral anticoagulant acenocoumarol and the other patient took no medication. The third patient had carcinoma of the lung and used ibuprofen. The fourth patient had probably reflex sympathetic dystrophy and used naproxen. None of the five patients with reactions had