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## **5B.2. INTRAVENOUS IODINATED CONTRAST EFFECTS IODINE UPTAKE FOR MONTHS**

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Radiographic studies such as Computerized Tomography (CT) scans and angiograms are commonly done with intravenous injection of contrast agents that contain organic iodine. The purpose of this chapter is to explain the implications of a history of exposure to iodinated contrast for the management of patients with differentiated thyroid cancer. Table 1 summarizes the main points.

### **IODINATED CONTRAST CONTAINS AN ENORMOUS AMOUNT OF IODINE**

The quantity of iodine that a patient receives from injection with an iodinated contrast agent is enormous compared to the amount of iodine in the normal diet. For example, the typical chest CT study is done with a minimum of 100 ml of intravenous contrast material that contains at least 150 mg of iodine per ml of contrast. This means that a single contrast-enhanced chest CT scan gives an adult over one hundred thousand times the minimum daily allowance of dietary iodine (>15 grams versus 150  $\mu$ g, respectively). When exposed to an iodine load of this magnitude, body stores of iodine in interstitial fluids, in colloid within the thyroid, and in virtually every organ in the body (Costa 1978) are expanded. This represents a major problem in thyroid cancer management because the body draws on iodine stores to prevent the iodine depletion that we are trying to achieve when preparing a patient for I-131 therapy or a radioiodine scan.

**Table 1.** Summary of Points About Iodinated Contrast.

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- Iodinated contrast agents contain an enormous amount of iodine
  - A single iodinated contrast exposure is likely to compromise radioiodine uptake for 3–12 months
  - Do not use iodinated contrast in a patient with differentiated thyroid cancer
  - Determine if the patient has received iodinated contrast within the past 6 months before scheduling radioiodine therapy or a radioiodine scan
  - Measure a 24-hour urinary iodine level on day 7 of a low-iodine diet in any patient with a history of iodinated contrast exposure in the past 6 months\*
  - Do not begin the preparatory program for radioiodine administration unless the 24-hour urinary free iodine level is  $\leq 100$  micrograms\*
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\* These recommendations are explained in more detail in the chapter “Measuring Urinary Iodine”.

### **DURATION OF THE EFFECT OF INTRAVENOUS CONTRAST ON IODINE METABOLISM**

The degree and duration of reduced I-131 uptake as a result of exposure to iodinated contrast has not been well studied. However, the available data suggests that giving a patient iodinated contrast agents substantially increases total body iodine stores for at least three months following contrast exposure, and in some cases as long as 2 years (Costa 1978). A study by Spate et al. (1998) measured iodine content in the toenails at monthly intervals following injection of iodinated contrast as part of a radiographic study done for medical purposes. They found that it took a minimum of 100 days (~ 3 months) for the body iodine level to return to baseline following a single injection of iodinated contrast and the time required to achieve this in most patients in their study was 200–300 days (~6–10 months). The study by Costa et al. (1978) found that in some cases tissue levels of iodine remained high for as long as 2 years after administration of radiologic contrast material.

### **RECOMMENDATIONS**

The data from the Spate and Costa studies suggest that iodinated contrast may compromise the uptake of radioiodine for many months following contrast administration. Based on this, we recommend that iodinated contrast not be given to patients who may need radioiodine therapy or radioiodine whole body scans over the next year. In our opinion, ultrasound, MR scan, PET scan, technetium bone scan, and noncontrast CT scan are more than adequate to evaluate thyroid cancer status. We attempt to educate our colleagues in other disciplines about the importance of not using iodinated contrast in patients with a history of differentiated thyroid cancer but find it more productive to remind the patient to call us before undergoing a radiographic study at the request of another physician. When we want to give radioiodine to a patient who has received iodinated contrast within the past 6 months we measure a 24-hour urinary iodine level on day seven of a low-iodine diet as described in the chapter “Measuring Urinary Iodine”.

**REFERENCES**

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- Spate, VL, JS Morris, TA Nichols, CK Baskett, MM Mason, TL Horsman, PL Horn-Ross, AC Shiau, and IR McDougall. 1998. Longitudinal study of iodine in toenails following IV administration of an iodine-containing contrast agent. *J Radioanal Nucl Chem* **236(1–2)**:71–76.