

# Radiation Safety in the Management of Patients Undergoing Radioactive Iodine Ablation Therapy

Monica Beck, MSN, RN

High-dose radioiodine therapy for thyroid cancer poses risks to healthcare workers, family members, and the public. Oncology nurses can effectively manage these risks by employing the three key principles of time, distance, and shielding.

## At a Glance

- The use of high-dose radioiodine therapy is increasing in tandem with the rising incidence rate of thyroid cancer.
- In inpatient settings, oncology nurses should use the principles of time, distance, and shielding to minimize radiation risks to visitors and staff.
- In outpatient settings, oncology nurses should carefully educate patients about minimizing risks to others at home and in the community.

Monica Beck, MSN, RN, is a clinical assistant professor in the College of Nursing at the University of Alabama in Huntsville. The author takes full responsibility for the content of the article. The author did not receive honoraria for this work. No financial relationships relevant to the content of this article have been disclosed by the author or editorial staff. Beck can be reached at [monica.beck@uah.edu](mailto:monica.beck@uah.edu), with copy to editor at [CJONEditor@ons.org](mailto:CJONEditor@ons.org).

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This article aims to equip oncology nurses with essential knowledge to safely manage patients with thyroid cancer undergoing therapy with orally administered high-dose radioactive iodine (RAI), also known as I-131. RAI therapy is a long-established and generally effective treatment for differentiated thyroid cancer (Silberstein et al., 2012), but its use carries risks to patients and those who might come into close contact with them, including healthcare workers and family members (Greenlee et al., 2011). Armed with basic principles of radiation safety, oncology nurses can minimize risks to the entire healthcare team, patients, and the public.

The incidence of I-131 administration has been increasing in recent years in tandem with a broad increase in the

incidence of thyroid cancer, particularly in women. The National Cancer Institute's (NCI's) Surveillance, Epidemiology, and End Results program database indicates that the age-adjusted incidence of thyroid cancer in the United States rose from 8.2 per 100,000 persons in 2001 to 14.2 per 100,000 persons in 2011 (NCI, 2014). The American Cancer Society (2014) described thyroid cancer as the most rapidly increasing cancer in the United States. Some scholars have raised concerns that these recent statistics have been driven partly by overdiagnosis—that is, by the detection of tiny thyroid lesions that are unlikely ever to become life-threatening (Morris, Sikora, Tosteson, & Davies, 2013).

Thyroid cancer treatment generally begins with the surgical removal of all or

part of the thyroid gland. Surgery commonly is followed by orally administered RAI, which for more than 60 years has been used to destroy residual cancerous tissue after thyroidectomies (Silberstein et al., 2012). Like all forms of iodine, including ordinary dietary iodine, I-131 is taken up by the thyroid gland, where its radioactive beta particles break down the local tissue (Lehne, 2010). I-131 also emits gamma rays, which travel across a longer range and are the source of potential radiation hazards to the people in close contact with the patient.

The rate of I-131 therapy appears to be increasing in absolute and relative terms. Haymart et al. (2011) found that “between 1990 and 2008, across all tumor sizes, there was a significant rise in the proportion of well-differentiated thyroid cancer patients receiving radioactive iodine” (p. 721). In 2009, the American Thyroid Association (ATA) issued guidelines that discouraged the use of RAI in patients whose primary thyroid tumors were well-differentiated tumors less than 1 cm in diameter (Cooper et al., 2009). Contrary to the guidelines, however, many physicians continue to order RAI, even for these low-risk patients (Haymart et al., 2013).

With the incidence of thyroid cancer and RAI administration increasing, nurses being equipped with knowledge to minimize the risks of radiation exposure is essential. Healthcare workers, family members, and anyone else who might come into contact with the patient during the days immediately after RAI administration run the risk of absorbing low or moderate doses of radiation. Such exposures can generate a long-term risk of developing thyroid cancer,