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This narrative review aims to summarize the relationship between hyperthyroidism, upper reference range thyroid hormone (TH) levels, and cancer, and to address the clinical management of hyperthyroidism in cancer patients. Methods A comprehensive search was performed by an independent reviewer through Google Scholar and PubMed Electronic databases. All searches were restricted to English language manuscripts published between 2000 and 2020. Results Numerous in vitro, in vivo, and population-based studies suggest cancer-stimulating effect of triiodothyronine and thyroxine. THs are presented as mediators for tumor growth, proliferation, and progression. Many population and case-control studies suggest an increased risk of several solid but also hematologic malignancies in relation to hyperthyroidism and upper normal range TH levels. However, results are not unambiguous. In this review, we will summarize population and case-control studies that investigated the relationship between hyperthyroidism, upper reference range TH levels, lower thyrotropin (TSH) levels, lower reference range TSH levels with cancer risk, cancer prognosis, and cancer outcome. The vast majority of evidence suggests an association between clinical and subclinical hyperthyroidism with the risk of developing several types of cancer. Furthermore, hyperthyroidism is also linked with a poorer cancer prognosis. In this review, we will also discuss the diagnosis of hyperthyroidism in patients with pre-existing cancer and cover the management of hyperthyroidism in cancer patients, with special attention on the role of nuclear medicine. Conclusions It is crucial to emphasize the importance of the rapid establishment of euthyroidism, and consequently, the importance of radioiodine therapy, as the therapy of choice in most cancer patients. We want to show that in this day and age there still is a high relevance for I-131 to achieve a permanent solution and thus likely reduce the risk of adverse influence of hyperthyroidism on the occurrence of new and course of existing cancer cases.

