INVASIVE THYMOMA POST I-131 ABLATION FOR PAPILLARY THYROID CANCER
1) Lina Leykina, M.D., 2) Grace Y. Kim, M.D., 3) Timothy A. Jennings, M.D., 1) Jessie A. Block-Galarza, M.D.
Albany Medical College, 1) Division of Endocrinology; 2) Division of Hospitalist; 3) Department of Pathology, Albany, New York

Introduction
Long term follow up of radioactive iodine therapy for Graves’ disease has demonstrated no increased overall cancer mortality in patients treated with [131I] (Ron et al., 1998). Nevertheless, continuing concern about potential effects of radiation on germ cells prompts some endocrinologists to advocate anti-thyroid drugs or surgery in younger patients who have acceptable operative risk.

Although overall cancer death rate is not increased after radioactive iodine therapy, there is a small but significant increase shown in specific types of cancer, including stomach, kidney and breast (Metso et al., 2007). This finding is especially significant because these tissues all express the NIS and may be especially susceptible to radiation effects.2

Thymus also expresses NIS, and thymic I-131 uptake becomes more evident after thyroidecmy. In the absence of most of the thyroid tissue, thymus has less competition for iodine by thyroid gland.3

We are reporting a case of a metastatic invasive thymoma, stage B3, which occurred 9 years after I-131 ablation for papillary thyroid cancer.

We have reviewed the following literature in attempt to find a previously reported cause - effect relationship between I-131 treatment and thymomas: Journal of clinical Nuclear Medicine, European Journal of Nuclear Medicine, The Endocrine society publications, NEJM and PubMed. We found no reported cases of thymoma occurrence post I-131 treatment. We have also reviewed 33 cases of thymoma obtained from either biopsy or resection between 2005 and August 2013 at AMC. Retrospective chart review has not revealed previous exposure to I-131

To summarize, our literature review suggests that there is radiological as well as tissue evidence of thymic uptake of I-131 as well as thymic hyperplasia, which would facilitate the uptake, particularly in an acutely ill patient.

Case Presentation
39 year old female with no previous medical history other than positive PPD, presented for an evaluation of multinodular goiter. Thyroidectomy specimen revealed 7.5mm papillary carcinoma, non-encapsulated with penetration through thyroid capsule papillary stage T4aN1aM0.

Subsequently, she was treated with100mci of I-131 for remnant ablation. No cancer recurrence detected with thyrogen stimulated whole body scan and thyroglobulin measurement. She has been on levothyroxine since surgery with variable compliance. No other medications or herbal supplements. Nine years after the I-131 ablation, patient was admitted for dyspepsia and was found to have metastatic thymoma, stage B3, requiring multiple courses of chemotherapy and surgical interventions. There is no family history of thymoma, thyroid cancer or myasthenia gravis. Patient has a 30 pack/year history of smoking cigarettes, no alcohol/drug use.

Discussion
Thymus can enlarge diffusely and becomes hyperplastic in response to stress of disease. It can accumulate iodine as a result of the presence of the human NIS. This protein catalyzes iodine uptake by the thyroid gland and by other tissues. Thymic iodine uptake is relatively low; therefore uptake is predominantly seen when images are obtained more than 72hrs after therapeutic dosages of I-131 in children. Even in adulthood, I-131 uptake has been shown to occur in hyperplastic thymus that does not contain ectopic thyroid tissue or metastatic foci.3

Thymic uptake of I-131 is known to be one condition which can be confused with metastatic mediastinal spread, and it has appeared relatively frequent (4.5% - 8.2%) in small series and some case reports published previously. In 1998 Wilton et al. published retrospective data on a small number of consecutive patients in the European Journal of Nuclear Medicine, indicating that possible thymic uptake could be recognized in 10/38 (26%) patients.4

Discussion (continued)
Michigishi et al reported two cases of papillary carcinoma of the thyroid in which whole-body scans following therapeutic doses of iodine-131 revealed intense anterior mediastinal uptake. In both cases, the mediastinal uptake was absent from scans obtained after removal of the entire thymus. Histologically, the resected thymus glands showed hyperplasia and contained neither thyroid tissue nor metastatic foci of thyroid carcinoma. The authors concluded that anterior mediastinal uptake of radiiodine was caused by hyperplasia of the thymus.5

We hypothesize that the reported patient’s thymus was hyperplastic at the time of I-131 ablation due to a recent illness (thyroid cancer) and the stress of surgical thyroid resection. Since I-131 is uptaken by thymus via NIS, its presence in thymus may have contributed to the development of thymoma in our patient.

Conclusion
This case continues to reinforce the concept that clinicians need to make a careful individual evaluation of risk /benefit when deciding whether to treat a patient with radioactive iodine. Although for many years radioactive iodine has been considered as innocuous treatment, secondary cancers have been described in patients with early stage tumors who have been given this therapy. Thymomas are rare tumors, so one case report cannot establish a cause-effect relationship. However, clinicians’ awareness of such a possibility may encourage more judicious use of radioactive iodine, especially in the younger population, and may stimulate additional studies of this possible complication of radioactive iodine therapy.

References