

Title: Radioactive iodine therapy as single modality treatment in tumor thrombus arising from follicular thyroid carcinoma.

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Abbreviated Title: Radioiodine therapy in tumor thrombus

Abstract:

Differentiated thyroid carcinoma rarely involves great veins with tumor thrombosis. Multimodality treatment with surgery, radioiodine therapy and targeted therapies are used for management of tumor thrombus associated with thyroid malignancies, though no established guidelines exist. Authors present a woman of post-operative follicular thyroid carcinoma (FTC) thyroid with tracer avid tumor thrombus in right brachiocephalic vein, treated with 131-iodine (^{131}I) as a single modality for both remnant and tumor thrombus. Her subsequent follow-ups revealed excellent response to treatment.

Keywords: Follicular thyroid carcinoma; tumor thrombus; ^{131}I therapy

Various malignancies may show incidental detection of tumor thrombosis, though a rare entity in thyroid cancer. Association of tumor thrombus with both poorly and well-differentiated thyroid malignancies has been reported. Previous studies demonstrated varying involvement from internal jugular vein to the right atrium (1-4). Established guidelines regarding the management of tumor thrombus associated with thyroid malignancies are still lacking, though treatment options are combinations of surgery, ¹³¹I ablation and external beam radiotherapy. In patients with obvious signs of venous obstruction, thrombectomy from the affected vein(s) followed by adjuvant EBRT or ¹³¹I therapy for the residual disease with better outcome have been reported by few investigators (2-4). However surgery is associated with increased risk of morbidity and mortality (1-4). ¹³¹I therapy as a single modality has been rarely used, as extensive tumor thrombus may result in unsuccessful treatment (5). This case report demonstrates successful treatment of tumor thrombus from FTC using ¹³¹I therapy as a single modality.

Case Report: A 64-year-old woman post total thyroidectomy for FTC presented with elevated post-operative stimulated serum thyroglobulin (Tg; >300 ng/ml) and normal serum anti-thyroglobulin (ATg; 14.1 IU/L) levels. Her diagnostic whole-body ¹³¹I scan revealed tracer avidity in remnant in thyroid bed and small venous thrombus in right brachiocephalic vein (Figure 1). Contrast computed tomography was avoided for possible interference with the planned ¹³¹I therapy. She was treated with 150 mCi of ¹³¹I in view of tracer avid small sized tumor thrombus and absence of signs/symptoms of venous obstruction. At the 6-months follow-up, patient's stimulated serum Tg (66.4 ng/ml) showed a falling trend with normal ATg level and negative ¹³¹I scan. She was treated with 130 mCi of ¹³¹I in view of incomplete biochemical response. Subsequent follow-up at 6 months after second therapy revealed significant decline in her stimulated Tg: 2.28 ng/ml, with negative ¹³¹I scan (Figure 2) and neck ultrasonography. Next follow-up at 1-year of post-therapy revealed excellent response (stimulated Tg:

<0.2 ng/ml, ATg: <15 IU/L) with negative ^{131}I scan and ultrasound neck. She is on suppressive dose of thyroid hormone and asymptomatic in her followed-up.

Discussion: This patient was incidentally diagnosed with right brachiocephalic vein tumor thrombus in post thyroidectomy diagnostic whole-body ^{131}I scan. Though treatment options available for this patient were surgery, ^{131}I therapy and EBRT, certain factors like: patient's age and gender (high-risk for surgery), tracer avid small sized thrombus, absence of signs/symptoms of venous obstruction and small remnant in thyroid bed led to choice of radioiodine therapy in this patient. EBRT was not considered as ^{131}I therapy alone showed excellent response and to avoid the morbidities associated with radiotherapy.

Conclusion: ^{131}I therapy as a single modality may be considered for elderly patients having well-differentiated disease with small, tracer avid and un-obstructive thrombus as in this index case after risk-benefit analysis.

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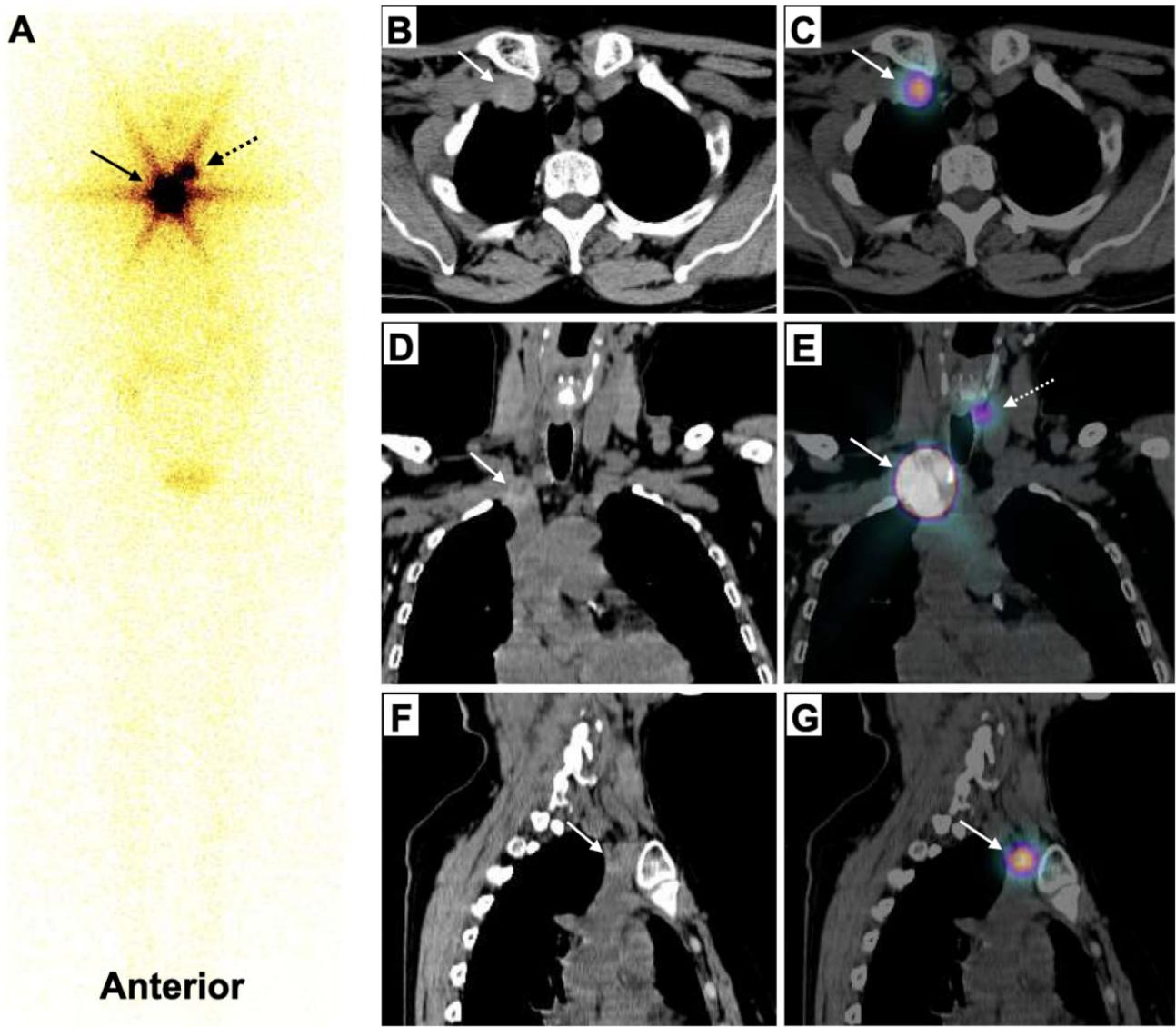


Figure 1: (A) Initial whole-body ^{131}I planar images on Siemens-Symbia T-series, showing focal tracer uptake in neck (dashed arrow) and intense focal tracer uptake in upper thorax (arrow). (B-G) CT and fused images showing tracer uptake in remnant (dashed arrow) and relatively hyperdense thrombus in right brachiocephalic vein (arrows).

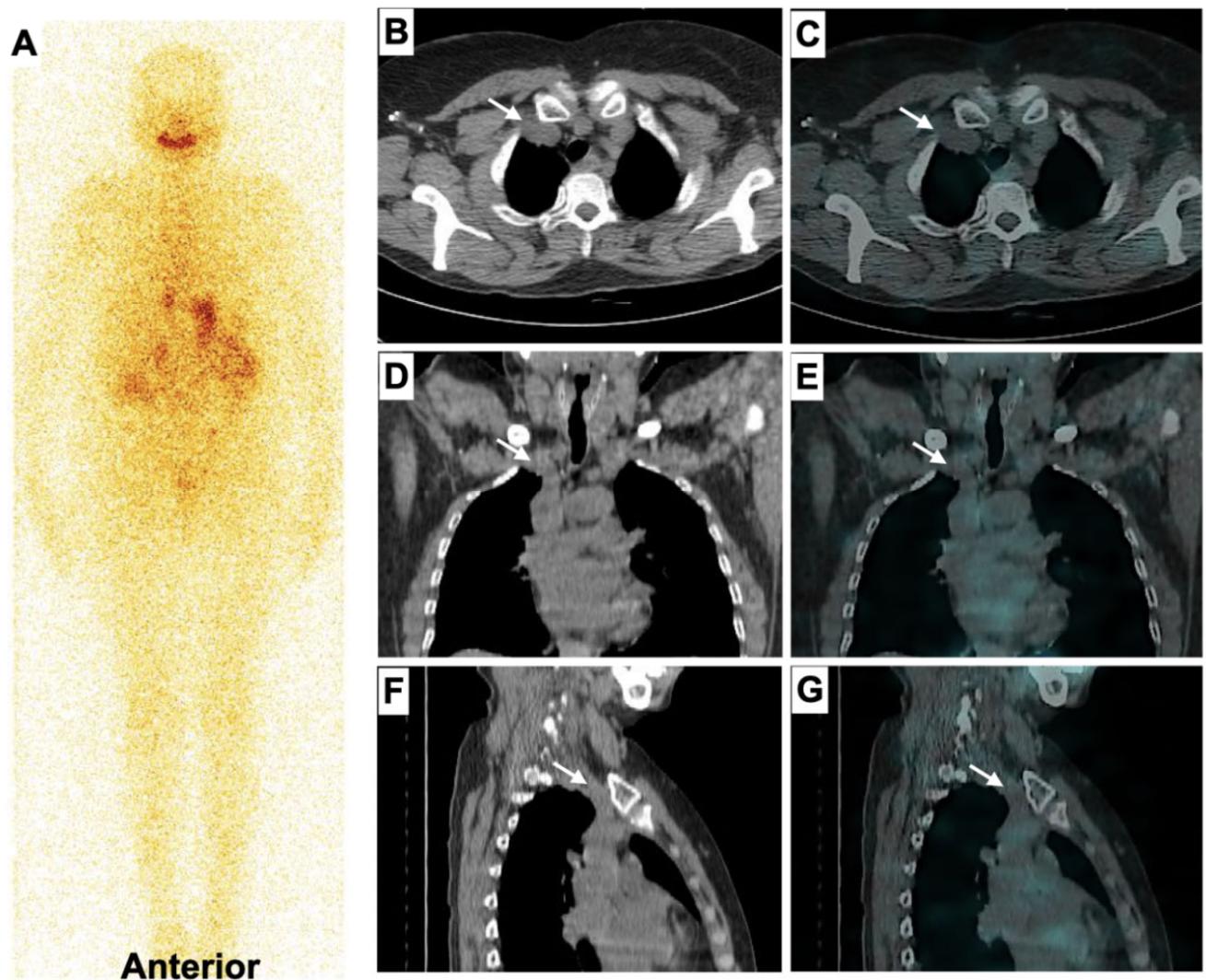


Figure 2: (A) Follow-up whole-body ^{131}I planar images, (B-G) CT and fused images on GE-Discovery 670-DR, showing complete resolution of tracer uptake and hyperdense lesion within the right brachiocephalic vein (arrows).