

Refusal of Radioiodine Ablation in a Patient with Inoperable Locally Advanced Metastatic Papillary Thyroid Carcinoma: A Case Report

¹Tanvir Ahmed , ²Fatima Begum, ³Jasmin Ferdous , ⁴Urnas Islam, ⁵Khadijatul Tushra, ⁶Sirajum Munira

¹ Senior Medical Officer & MD Resident (Nuclear Medicine), ²Director & Chief Medical Officer, ³Principal Medical Officer, ⁴Senior Medical Officer, ⁵MD Resident (Nuclear Medicine), National Institute of Nuclear Medicine & Allied Sciences (NINMAS), Dhaka

Correspondence Address : Dr. Tanvir Ahmed, Senior Medical Officer & MD Resident (Nuclear Medicine), NINMAS, Block-D, BSMMU Campus, Dhaka-1000. E-mail: tanvir.rangon@gmail.com

ABSTRACT

Radioiodine ablation therapy (RAIT) with ¹³¹Iodine is indicated in patients with differentiated thyroid carcinoma (DTC), done after total or near total thyroidectomy. RAIT is administered in repeated small doses in cases of inoperable DTC, as radioiodine may cause local tissue inflammation and edema. So, in some cases where thyroid carcinoma involves important surrounding or distal vital structures like the trachea, vessels, and brain tissue, radioiodine ablation is refused to avoid potential medical hazards. In this case report, a patient with inoperable, metastatic, locally advanced thyroid carcinoma has been discussed, as we had to refuse RAIT even after referral for ablation at National Institute of Nuclear Medicine & Allied Sciences (NINMAS).

Keywords: Differentiated Thyroid Carcinoma, Radioiodine Ablation, Metastasis.

Bangladesh J. Nucl. Med. Vol. 26 No. 2 July 2023

DOI: <https://doi.org/10.3329/bjnm.v26i2.71495>

INTRODUCTION

Radioiodine ablation is a post-surgical adjuvant modality that aims to eliminate thyroid remnants, increasing the sensitivity

and specificity of follow-up testing for DTC persistence or recurrence by assaying serum thyroglobulin (Tg) and diagnostic whole-body scintigraphy (dxWBS). Radioiodine ablation decision is made after considering several factors like operability, iodine avidity, disease site, tumor characteristics, patient age, health status, potential risk of the procedure etc. (1). The reported case of papillary thyroid carcinoma was refused radioiodine ablation due to unfavorable clinical factors.

CASE REPORT

A 52-year-old male patient with papillary thyroid carcinoma was referred to NINMAS, Dhaka for radioiodine ablation on January, 2024. The patient has history of swelling of neck for 3 years. 3 years back ultrasound of neck revealed multiple hypochoic solid nodules in left thyroid lobe. The patient didn't take any treatment after that. In the year 2023 the patient came to ENT department, BSMMU with a large left sided neck mass. FNAC from the neck mass revealed that the mass is suspicious for papillary thyroid carcinoma (Bethesda category V).



Figure 1: Fairly big, irregular shaped, visible and palpable neck mass (yellow arrow) in a papillary thyroid carcinoma patient of 52 years.

A CT scan of neck was done and it showed an enhancing large lobulated soft tissue density mass (measuring 5.0 cm x 8.2 cm x 10.2 cm) in left side of the neck with retrosternal extension and cervical lymphadenopathy at level III of left side of neck. Incisional biopsy from the neck mass was performed and histopathology revealed metastatic papillary adenocarcinoma with the primary source being suspected as lung, thyroid or gastrointestinal tract. Immunohistochemistry revealed papillary thyroid

carcinoma (CK7+ve, CK20-ve, TTF1+ve, CDX2-ve, PAX8+ve, Thyroglobulin +ve). Serum thyroglobulin level was raised (200 ng/ml). A CT scan of chest was done and showed the mass was in left thyroid lobe with retrosternal extension compressing and displacing trachea to right side. Two tiny nodules (one in middle lobe of right lung and another one in lower lobe of left lung) were also noted and was suspected metastases. Ultrasonography of whole abdomen showed no significant findings. A contrast MRI

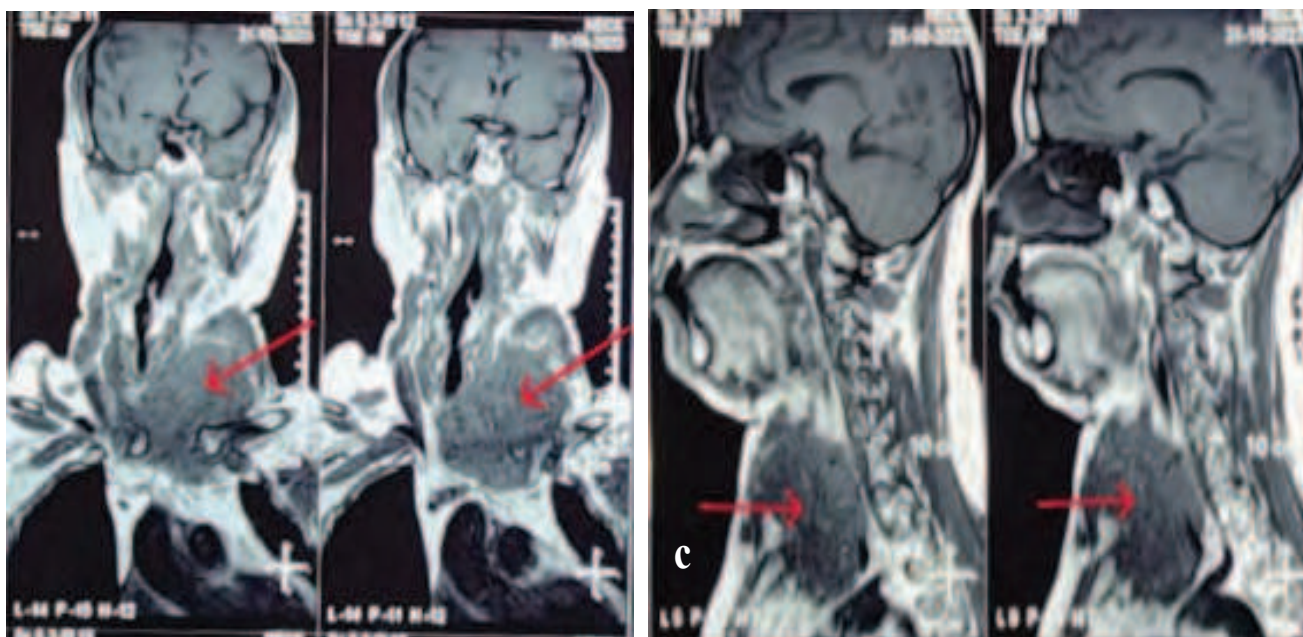
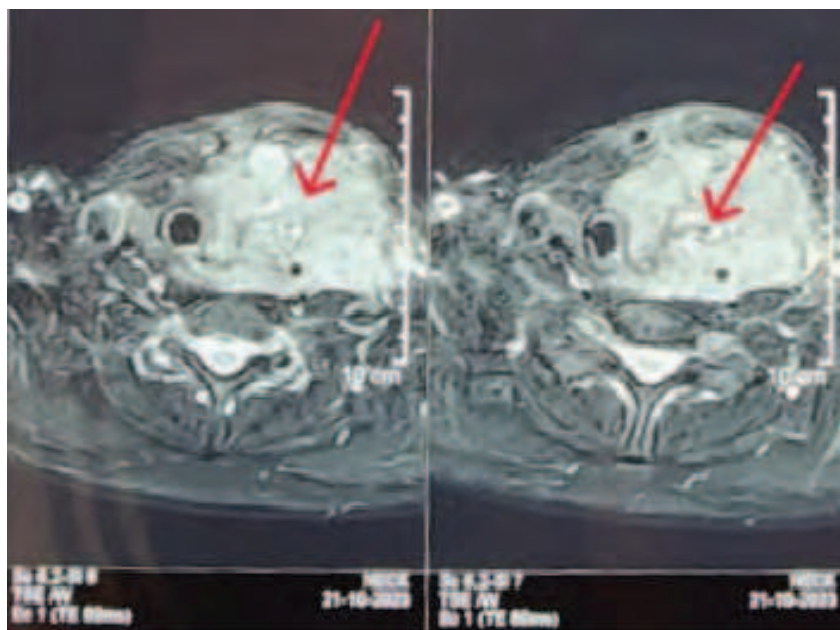


Figure 2: Axial (A), coronal (B) and sagittal (C) views of T1 weighted MRI image of neck showing large lobulated soft tissue mass in the left side of the neck (red arrows), having post-contrast homogenous enhancement (Image A), which is compressing & shifting the trachea towards right (Image A, B).

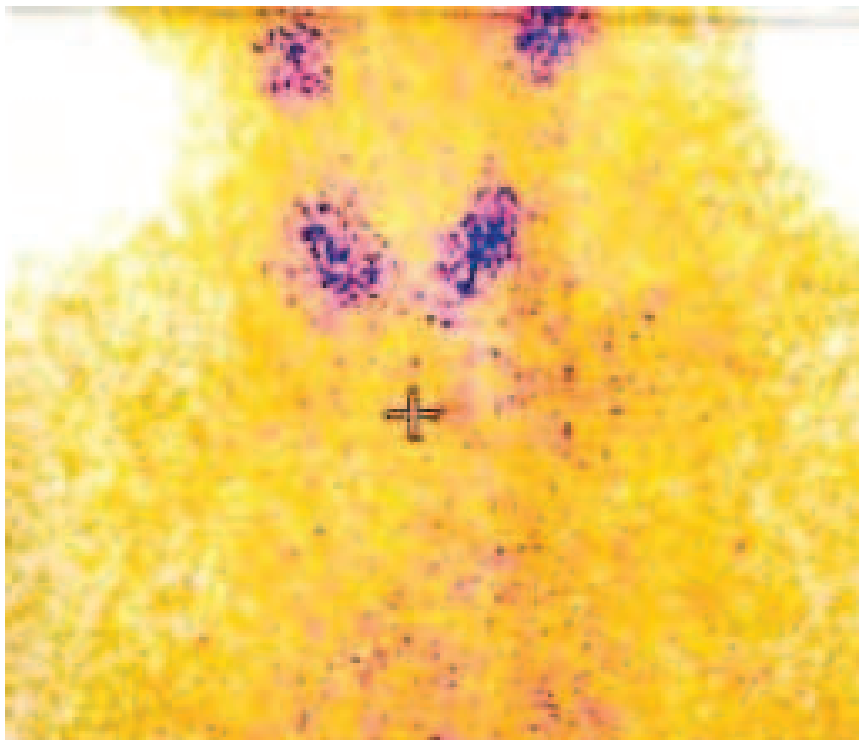


Figure 3: ^{99m}Tc Thyroid scan showing mildly enlarged thyroid gland with non-uniform radiotracer concentration.

of neck was also done showing a malignant soft tissue mass (5.5 cm x 8.3 cm x 11 cm) at lower part of left side of neck with involvement of left lobe of thyroid gland and extension into lower cervical, supraclavicular and bilateral retro clavicular regions. The retrosternal extension of the mass is inseparable from superior and anterior mediastinal structure abutting arch of aorta and with regional vascular encasement. Left cervical lymphadenopathy at level II, III and IV were also noted.

The head neck surgeons refused further surgery as the mass was involving surrounding structures and referred the patient to radiation oncologist for radiotherapy. Radiation oncologist refused radiotherapy as there was possibility of soft tissue edema and tracheostomy was not possible for the mass being low lying. Oncologist referred the patient to NINMAS for performing a thyroid scan which revealed a mildly enlarged thyroid gland with non-uniform radiotracer concentration. The patient was also referred to NINMAS for opinion regarding radioiodine ablation. Our department evaluated the patient and decision was made not to give radio-iodine ablation as the mass was large and involved surrounding structures encasing vessels, shifting trachea and

mediastinal structures as well. Tissue inflammation and edema may result in potential medical hazards like compression of trachea or aorta. So, radiation oncologists finally gave opinion for an EBRT in neoadjuvant setting.

DISCUSSION

The long-term prognosis for differentiated thyroid carcinoma (DTC) is favorable. On the other hand, a distant metastatic illness or a locoregional recurrence could be fatal (2). The two most frequent sites of distant metastases are lungs and bones (3). Radiation therapy, residual thyroid ablation, and radical surgery all increase survival. Ablation may reduce long-term morbidity and mortality (4,5,6). For microscopic or tiny macroscopic tumors, RAIT produces better results than for bigger lesions (7). Therefore, Radioiodine ablation after total or near-total thyroidectomy is a standard procedure in patients with DTC except in cases of papillary microcarcinoma with no metastasis or capsular invasion. The decision of giving or not giving radioactive iodine therapy with the intention of cure or palliation should be individualized to the patient considering several factors. Among them operability is an important factor. Radioactive

iodine therapy should always be given as an adjuvant to surgery of persistent or recurrent DTC. Site of disease is another important factor. A locally advanced disease involving surrounding or distal vital structures are often proven inoperable. Radioactive iodine therapy is generally well-tolerated, but it has some potential short- and long-term toxicities. Some of the short-term toxicities include radiation thyroiditis with clinically apparent swelling, pain or other discomfort, tumor swelling sialadenitis, nausea, vomiting etc. In case of large tumor or remnant involving surrounding vital structures or in case of brain tissue involvement, Radioactive iodine therapy is contraindicated as inflammation and edema may result in compressive manifestations resulting in medical emergency. Pulmonary function restriction may also occur in case of significant pulmonary ^{131}I accumulation in lung metastases. In our reported case, the patient had a large left sided neck mass with retrosternal extension which was closely adherent with mediastinal structures and encasing surrounding vessels. For this reason, the mass was declared inoperable by surgeons. Radiation oncologists refused radiotherapy because the mass was closely adherent to trachea. Radiation induced edema may cause compression of trachea and even tracheostomy to overcome the compression is not possible owing to the low-lying position of the mass. Inoperable iodine-avid distant metastases are typically treated with multiple administrations, each 3.7–7.4 GBq or more (1). But in this case, radioactive iodine therapy is also refused for aforementioned reasons. Oncologists finally came to decision regarding EBRT in neoadjuvant setting for management of this patient. EBRT has been effective for the locoregional management of certain locally progressed or recurring nonanaplastic thyroid cancers (8).

CONCLUSION

In the reported case of papillary thyroid carcinoma with extensive local metastases, surgery and external radiation were refused. Radioactive iodine therapy could not also be given to avoid emergency situation from radiation

inflammation. So, EBRT will be reconsidered and palliative care must be given.

REFERENCES

1. Luster M, Clarke SE, Dietlein M, Lassmann M, Lind P, Oyen WJ, Tennvall J, Bombardieri E; European Association of Nuclear Medicine (EANM). Guidelines for radioiodine therapy of differentiated thyroid cancer. *Eur J Nucl Med Mol Imaging*. 2008 Oct;35(10):1941-59.
2. Haq M, Harmer C. Differentiated thyroid carcinoma with distant metastases at presentation: prognostic factors and outcome. *Clin Endocrinol (Oxf)*. 2005 Jul;63(1):87-93.
3. Bernier MO, Leenhardt L, Hoang C, Aurengo A, Mary JY, Menegaux F, Enkaoua E, Turpin G, Chiras J, Saillant G, Hejblum G. Survival and therapeutic modalities in patients with bone metastases of differentiated thyroid carcinomas. *J Clin Endocrinol Metab*. 2001 Apr;86(4):1568-73.
4. Dietlein M, et al. Procedure guidelines for radioiodine therapy of differentiated thyroid cancer (version 3). *Nuklearmedizin* 2007;46(5):213–9.
5. Sawka AM, et al. Clinical review 170: a systematic review and metaanalysis of the effectiveness of radioactive iodine remnant ablation for well-differentiated thyroid cancer. *J Clin Endocrinol Metab*. 2004;89(8):3668–76.
6. Pacini F, et al. Post-surgical use of radioiodine (^{131}I) in patients with papillary and follicular thyroid cancer and the issue of remnant ablation: a consensus report. *Eur J Endocrinol*. 2005;153(5):651–9.
7. Durante C, et al. Long-term outcome of 444 patients with distant metastases from papillary and follicular thyroid carcinoma: benefits and limits of radioiodine therapy. *J Clin Endocrinol Metab*. 2006;91(8):2892–9.
8. Terezakis SA, Lee KS, Ghossein RA, Rivera M, Tuttle RM, Wolden SL, Zelefsky MJ, Wong RJ, Patel SG, Pfister DG, Shaha AR, Lee NY. Role of external beam radiotherapy in patients with advanced or recurrent nonanaplastic thyroid cancer: Memorial Sloan-Kettering Cancer Center experience. *Int J Radiat Oncol Biol Phys*. 2009 Mar 1;73(3):795-801.