

Retrosternal Thyroid Tissue Extension after Total Thyroidectomy: A Case Report

Sajid Hussain and Muhammad Numair Younis

Department of Nuclear Medicine, INMOL Hospital, Lahore, Pakistan

ABSTRACT

Thyroid enlargement, a common disorder, which is more prevalent in hilly regions of Pakistan and can be found in 10-20% of the population living in iodine-deficient areas. Goitres tend to grow slowly and may reach the anterior mediastinum over many years. In most cases, retrosternal goitre is an extension of the cervical portion of the thyroid gland. Patients may remain symptom-free; however, if symptoms arise, they typically consist of respiratory problems. Other symptoms that patients may experience include neck swelling, weight loss, and palpitations, *i.e.*, signs and symptoms related to thyrotoxicosis. The symptoms of thyrotoxicosis also included heat intolerance, excessive sweating, and anxiety. Different causes of thyrotoxicosis included Graves' disease (70%), toxic multinodular goitre (5%), and thyroiditis (20%). Diagnosis of retrosternal goitre includes the evaluation of thyroid function tests, chest computed tomography, and radio-iodine scan. Fine needle aspiration cytology (FNAC) is usually avoided due to the presence of vital structures in the anterior mediastinum. The authors present a case of a male patient who presented with symptoms of weight loss and orthopnoea. CT scan showed retrosternal mass extending up to the aortic arch. The patient was given iodine therapy with a steroid cover.

Key Words: Retrosternal goitre, Anterior mediastinum, Thoracic inlet.

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INTRODUCTION

In Pakistan, retrosternal goitre is found in 2-5% of patients presenting with nodular goitre. Imaging can be performed using radioactive isotopes of stable iodine (^{127}I), such as ^{131}I or ^{123}I . These isotopes are trapped by the thyroid gland and form thyroid hormones, due to which they are excellent radiopharmaceuticals for evaluating thyroid physiology. ^{131}I emits gamma rays of 364 KeV, which are used for imaging. ^{131}I also emits beta rays, which can be used therapeutically.¹

Hyperthyroidism describes thyrotoxicosis due to the excessive release of thyroid hormones.² Examples of hyperthyroidism not caused by toxic multinodular goitre (MNG) or Graves' disease are subacute thyroiditis and thyroiditis factitia.

CASE REPORT

A 63-year male patient presented with complaints of weight loss, cough, and orthopnoea. A total thyroidectomy was performed 20 years ago due to MNG, causing gross neck swelling, and he was currently on thyroid hormone replacement therapy.

Correspondence to: Dr. Sajid Hussain, Department of Nuclear Medicine, INMOL Hospital, Lahore, Pakistan
E-mail: ssjidhere@gmail.com

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On contrast-enhanced computed tomography (CT), no pulmonary mass was noted; however, a 110 x 50 x 120 mm (CC x AP x TR) anterior and superior mediastinal mass was noted. The mass appeared to be continuous with residual thyroid tissue, likely representing retrosternal goitre and causing mild narrowing of the intrathoracic trachea.

Diagnostic whole body scan with Iodine-131 showed goitre with physiological tracer uptake. Correlative single photon emission computed tomography (SPECT/CT) showed retrosternal goitre with extension up to the anterior mediastinum and aortic arch, showing internal specs of calcification displacing trachea (Figure 1).

Thyroid function tests showed biochemical euthyroidism. Surgery was denied due to a past history of ischaemic heart disease (IHD) and diabetes. ^{131}I treatment was chosen based on the non-invasive nature of the treatment and no blood loss that can complicate IHD.

An electrocardiogram (ECG) showed a normal sinus rhythm. Two-dimensional echocardiography revealed normal biventricular function. Pulmonary function tests showed moderate resistance to airflow.

Based on the ^{131}I uptake, we decided on radioiodine ablation with 29 mCi along with pre-therapy and post-therapy steroid cover. Post-therapeutic scan after 10 days showed good uptake in mediastinal goitre (Figure 2).

DISCUSSION

Retrosternal or intrathoracic goitres are described when the mediastinal portion of the thyroid gland crosses the thoracic inlet by two fingers below or by at least 3 cm.^{2,3}

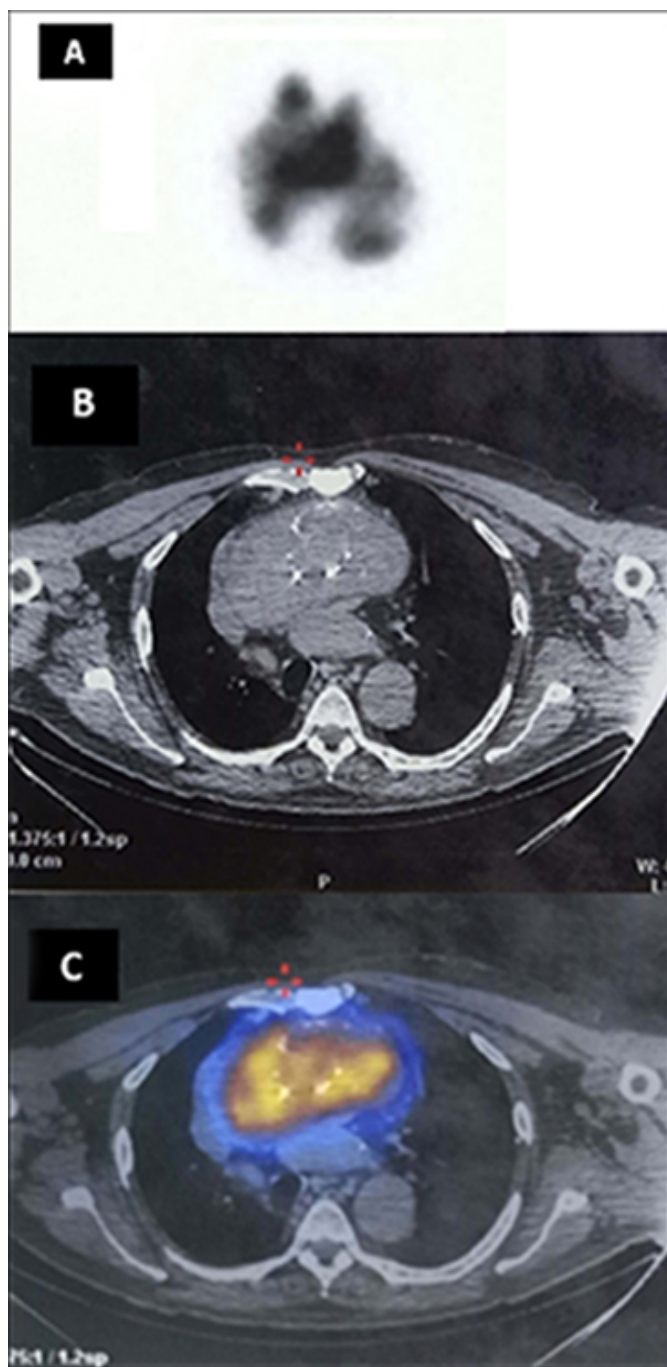


Figure 1: (A) Intense uptake of Iodine-131 in mediastinal mass on whole body scan. (B) Soft tissue density retrosternal mass in axial CT. (C) Iodine-131 uptake in retrosternal mass on axial fused SPECT/CT.

Contributing factors included iodine deficiency, genetic predisposition, and environmental exposures such as radiation and goitrogenic substances in the diet.

The global incidence of MNG is 3-7%, while it can be found in 10-20% of the population living in iodine-deficient regions.^{4,5} In Pakistan, retrosternal goitre is found in 2-5% of patients presenting with nodular goitre, and toxic MNG is a significant cause of hyperthyroidism, found in 31.9% of cases presenting with MNG.

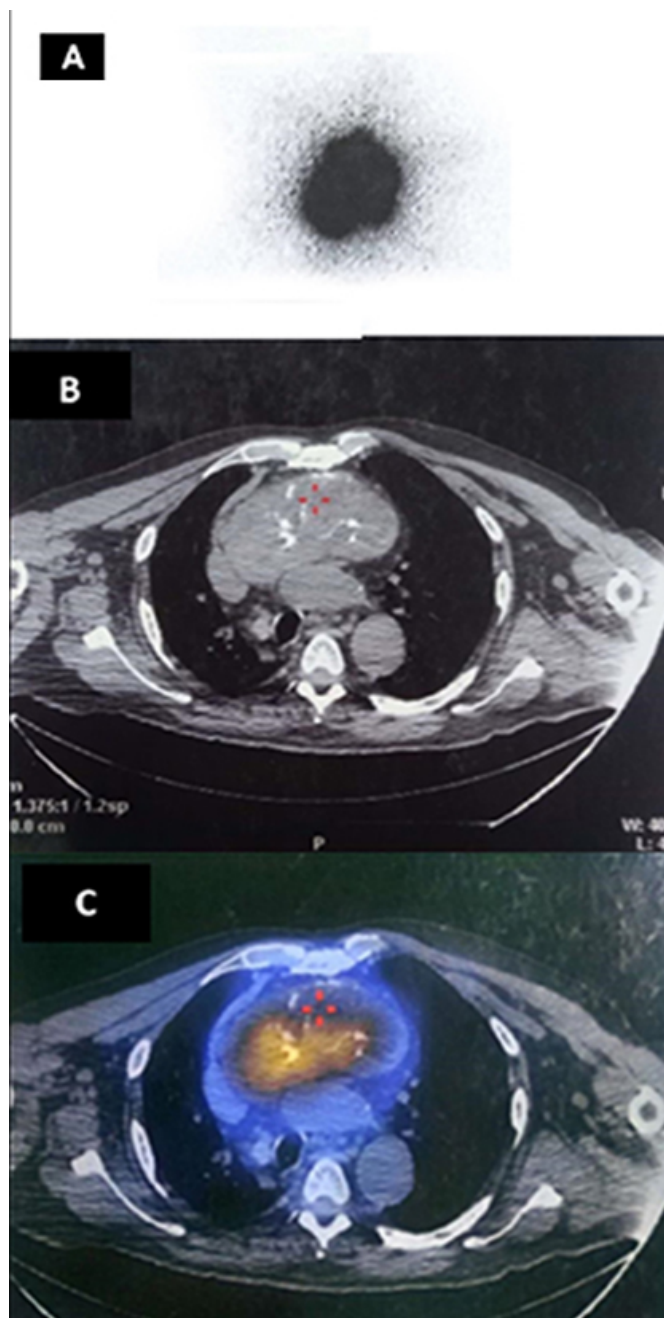


Figure 2: (A) Intense uptake of ^{131}I in mediastinal mass on post-therapy whole body scan. (B) Soft tissue density retrosternal mass in axial CT. (C) Iodine-131 uptake post-therapy scan showing retrosternal mass on axial fused SPECT/CT.

In a study by Altaf *et al.*, they showed that among patients with MNG, 90% had retrosternal extension of goitre.⁶

SPECT/CT imaging gives a detailed view, combining functional and anatomical information, thereby enhancing diagnostic accuracy in ^{131}I scans.

The ^{131}I treatment is a non-invasive method of treatment, and no hospital stay is required. The dose range is usually 15-30 mCi. Beta radiation from ^{131}I causes the thyroid tissue to shrink and becomes less active, thereby decreasing the production of excessive thyroid hormones.

Treatment of retrosternal goitre with antithyroid medicines, ethanol ablation, radioiodine therapy, or thyroidectomy must meet the goals of therapy *i.e.* relief of symptoms, durability of cure, and reduced risk of disease complications. Toxic MNG poses various challenges to surgeons, endocrinologists, and nuclear physicians.⁴

Anti-thyroid medicine therapy is usually not preferred for the treatment of toxic MNG but may be given before iodine therapy when serum free thyroxine (fT4) level is higher than normal. Patients should be treated with radioiodine when toxicity is controlled. Surgery and radioactive iodine ablation therapy are two treatment options, and the method of therapy is determined by symptoms and comorbidities.

When patients are experiencing compressive symptoms *i.e.* dyspnoea or stridor, thyroidectomy is performed for symptom relief. Occult malignancies have been found in 2-3% of thyroidectomy specimens. If these symptoms are not present and the patient is in the hyperthyroid state, then after control of hyperthyroidism, radioactive iodine ablation is followed.

PATIENT'S CONSENT:

Informed consent was taken from the patient.

COMPETING INTEREST:

The authors declared no conflict of interest.

AUTHORS' CONTRIBUTION:

SH: Performed patient procedure, collected data, and prepared the manuscript.

MNY: Evaluated the patient, prescribed the procedure, and supervised the treatment.

Both authors approved the final version of the manuscript to be published.

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