Intrathoracic Goiter Visualized on iodine-123 and technetium-99m Single-Photon Emission Computed Tomography/Computed Tomography

ABSTRACT
Goiter with an intrathoracic component is relatively common; however, it is less common to see extent outside the anterior or posterior mediastinum. We present a case of intrathoracic goiter of significant size and abnormal placement which is examined using both $^{99m}$Tc-pertechnetate and iodine-123 single-photon emission computed tomography/computed tomography.

Keywords: Iodine-123, single-photon emission computed tomography/computed tomography, substernal goiter, $^{99m}$Tc-pertechnetate, thyroid scintigraphy

INTRODUCTION
Thyroid tissue outside the normal position in the anterior part of the neck is not uncommon. Often the thyroid tissue can be located in the anterior or posterior mediastinum. We present here a case with unusually located thyroid tissue.

CASE REPORT
Twenty years ago, a 66-year-old woman underwent thyroidectomy due to pressure symptoms. Over the next decade she developed thyrotoxicosis and an intrathoracic goiter measuring 5 cm × 8 cm × 8.5 cm was identified and later verified thyroid tissue through computed tomography (CT)-guided biopsy. Thyrotoxicosis was successfully managed with antithyroid therapy. However, moderate thoracic discomfort arose leading to further investigation of the goiter using $^{123}$I single-photon emission computed tomography (SPECT) combined with CT to estimate the efficacy of potential radioiodine therapy. This treatment was, however, refrained from because of spontaneous relief from pressure symptoms. Nine years later, the patient was re-examined using $^{99m}$Tc-pertechnetate SPECT/CT due to return of the pressure symptoms.

Images show $^{123}$I iodine on SPECT/CT [Figure 1], and Tc-99m pertechnetate on SPECT/CT acquisitions [Figure 2]. Uptake of both tracers is similar corresponding to activated sodium-iodine transporters in a state of thyrotoxicosis.

DISCUSSION
Goiter with an intrathoracic component is relatively common.[1] However, it is less common to see extent outside the anterior or posterior mediastinum.[2] When
the goiter extends further into the thorax the path of least resistance is towards the right.\[3\] Thyroid masses found after thyroidectomies are not common, and are most often the result of incomplete removal of a descending goiter or, more rarely, isolated congenital mediastinal thyroid tissue unconnected to the cervical portion that becomes hypertrophic after removal of functioning cervical thyroid tissue.\[4\] Such a condition is suspected when Thyroid Stimulating Hormone remains suppressed after surgery.\[5\] When presenting with obstructive symptoms, surgery is the first-choice treatment. Alternatively, radioiodine ablation can be used.\[6\] It has been reported that intrathoracic goiter does not always show on planar imaging.\[7-9\] Our images show strong consistency between activity distribution of both radiotracers in the intrathoracic thyroid tissue in as well SPECT imaging and planar imaging (image not shown). Considerations regarding the choice of the radiotracer have also been made and the $^{123}$I has been preferred over $^{99m}$Tc for intrathoracic goiter due to its higher target-to-background activity, greater tissue specificity, and lower blood pool activity.\[10\] The $^{123}$I imaging is, however, often unavailable and more costly, and therefore not performed. Furthermore, as presented here, $^{99m}$Tc imaging is usually sufficient, particularly in patients presenting with thyrotoxicosis.

Declarations of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

REFERENCES