Rare Presentation of an Intrathoracic Goiter

Lt Col RA George*, Col SC Godara⁺, Col H Singh[#], Col HK Bhagat^{**}

MJAFI 2007; 63 : 77-79

Key Words : Goiter; Mediastinal mass

Introduction

Intrathoracic (mediastinal) goiter constitutes almost 5% of all resected mediastinal masses and is commonly found in the pretracheal space, as a retrosternal extension of the thyroid goiter in the neck [1]. A thyroid mass may occasionally extend behind the trachea and esophagus, presenting as a posterior mediastinal mass which poses a diagnostic dilemma [2,3]. We present a case of an intrathoracic goitre presenting as a posterior mediastinal mass in an asymptomatic adult without any noticeable thyroid swelling in the neck region.

Case Report

A 69 year old asymptomatic male reported for a chest radiograph as part of an investigation for systemic hypertension. The chest radiograph postero-anterior view revealed a homogenous superior mediastinal mass with lobulated margins extending laterally on both sides. The mass was displacing the trachea towards the right side. No obvious calcification was identified on the chest radiograph. No lung parenchymal lesion or pleural effusion was evident. Chest radiograph lateral view revealed anterior displacement of the trachea. The lesion was provisionally considered as enlarged mediastinal lymph nodal mass, with a differential diagnosis of aneurysm of the aortic arch. Plain and contrast enhanced helical computed tomography (CT) scan of the neck and chest was done using a CT protocol of 5mm helical CT sections in the axial plane at table speed of 5 mm/sec (pitch 1.0). Breath-hold period was kept at 15 seconds with intervening breathing time of 8 seconds. 100 ml of non-ionic iodinated contrast medium containing 300 mg iodine/ml was administered intravenously at the rate of 3 ml/sec using a pressure injector at 150 psi using a scan delay of 20 seconds to commence imaging. Image reconstruction was performed in multiple planes using soft tissue and lung algorithms. The CT topogram (Fig.1) revealed a homogenous superior mediastinal mass with lobulated margins extending laterally on both sides as seen on the chest radiograph previously. On non-contrast images (Fig. 2a), a lobulated homogenous

mass with high attenuation value of 60-77 Hounsfield units(HU) and few internal regions of coarse calcification (CT attenuation value : 278 HU) were seen in the mediastinum, posterior to the trachea and esophagus extending from the left paratracheal region superiorly with the lesion crossing towards the right side posterior to the trachea and esophagus inferiorly. Post-contrast images (Fig. 2b) showed homogenous and prolonged enhancement of the mass lesion (CT attenuation value : 122 HU) . The mass in its lower half was predominantly right sided and postero-lateral to the trachea and oesophagus. Superiorly it extended towards the left side of the posterior mediastinum and occupied the left paratracheal region, compressing and displacing the trachea towards the right side. At its upper limits, the mass merged with the left lobe of the thyroid gland in the neck, indicating its origin from it (Fig. 3). Radio-nuclide scan was performed with Iodine-131, confirmed the thyroid origin. Intense homogenous uptake of the tracer was seen indicating functioning thyroid tissue (Fig. 4). The patient underwent

Fig. 1: CT Topogram showing a homogenous, well margined opacity in the superior mediastinum. The trachea is narrowed and displaced towards the right side

*Classified Specialist (Radiology), Command Hospital (Southern Command), Pune. ⁺Commanding Officer, AFMSD, Pune. [#]Senior Advisor (Radiology), Army Hospital (R&R), Delhi Cantt. ^{**}Senior Advisor (Medicine & Nuclear Medicine), Command Hospital (EC), Kolkata.

Fig 2 (a): Non-contrast enhanced CT chest shows a lobulated, well margined, posterior mediastinal mass of internal attenuation values ranging from 60-77 HU with foci of calcification. The trachea and esophagus are displaced anteriorly and to the right

Fig. 2 (b) : Contrast enhanced CT chest shows homogenous enhancement within the posterior mediastinal mass

thoracotomy and surgical excision of the mediastinal mass at a cardio-thoracic surgery centre and made an uneventful recovery. Histopathological examination of the resected specimen confirmed the thyroid origin of the mass with no features of neoplasia.

Discussion

Most patients with an intra-thoracic goiter are asymptomatic with abnormality detected incidentally on a routine chest radiograph. Occasionally symptoms of airway or esophageal compression are experienced. Intra-thoracic goiters are commonly found in the pretracheal or retrosternal space but can occur anywhere in the mediastinum. On chest radiograph,

Fig. 3 : Coronal reformat CT image reveals the oblong shape of the mass and its continuity with the left lobe of the thyroid gland in the neck

Fig.4 : Iodine-131 radio-isotope scan shows increased uptake below the sternal notch marker

retrosternal goiter appears as well-defined round or oval soft tissue mass in the superior part of the anterior or middle mediastinum, which tapers off into the neck [1]. About 20% of the mediastinal goiters are retro-tracheal, separating the trachea and esophagus, and such separation by a localized mass rising into the neck is virtually diagnostic of thyroid origin [1]. Rarely thyroid masses may extend behind the esophagus and present as a posterior mediastinal mass. Rapid increase in the size of the mass usually indicates haemorrhage [2]. Malignancy developing within a heterotopic thyroid gland in the mediastinum is rare [4,5]. Continuity between the cervical and mediastinal components of the mediastinal goiter is usually present, though in some cases the

connection may only be a narrow fibrous band [5]. CT scan can accurately detect and diagnose aberrant thyroid tissue because of the initial high CT density of the mass ranging from 60 - 120 HU. The combination of features on CT which are characteristic for a diagnosis to be made in most patients are heterogenous attenuation with areas of both high and low attenuation, punctate, coarse or curvilinear calcifications on non-contrast-enhanced images, rapid and prolonged enhancement of the mass by at least 25 HU following intravenous contrast administration, internal homogeneity with nonenhancing low density areas, and typical location in the pretracheal space [1,2].

Radio-Iodine data acquisition is a sensitive and specific method of determining the thyroid origin of an intrathoracic mass [1]. In most cases aberrant thyroid tissue is biologically active, concentrating thyroid-seeking radioisotopes such as Iodine-123, Iodine-131 or Technetium 99m pertechnetate. Iodine-123 is the radionuclide of choice for imaging of mediastinal thyroid masses because of its high degree of specificity and the facility for delayed imaging to overcome the otherwise high surrounding blood pool activity [5].

On magnetic resonance imaging (MRI) the mass

exhibits intermediate signal intensity on T1-weighted images (which may be lower than the normal thyroid gland) and high signal intensity on T2 weighted images. High signal intensity on T1 weighted images may be seen in areas of subacute haemorrhage, colloid cysts and adenomas. The cystic and adenomatoid composition of the goitre result in heterogenous appearance on both T1 and T2 weighted MR images.

Conflicts of Interest

None identified

References

1. Armstrong P, Padley S. The mediastinum. In: Grainger R G, Allison D J, Adam A, Dixon AK, editors. *Diagnostic Radiology*. 4th ed. Edinburgh:Churchill Livingstone, 2001; 354-5.
2. Roger HS. The mediastinum. In : David Sutton, editor. *Textbook of radiology and imaging*. 7thed. Edinburgh: Churchill Livingstone, 2002; 57-86.
3. Chong CF, Cheah WK, Sin FL, Wong PS. Posterior mediastinal goiter. *Asian Cardiovasc Thorac Ann* 2004;12:263-5.
4. Buckley JA, Stark P. Intrathoracic mediastinal thyroid goiter: imaging manifestations. *Am J Roentgen* 1999; 173: 471- 5.
5. Martin WH, Sandler MP. Thyroid Imaging. In: Sandler MP, Coleman RE, Patton JA, Wackers FJT, Gottschalk A, editors. *Diagnostic Nuclear Medicine*. 4th ed. Philadelphia: Lippincott, Williams & Wilkins, 2003; 633-4.