

## Thymic hyperplasia in a patient with Grave's disease: MRI findings.

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**Section:** Chest imaging

**Area of Interest:** Mediastinum

**Procedure:** Diagnostic procedure

**Imaging Technique:** MR

**Imaging Technique:** MR-Angiography

**Special Focus:** Pathology Case Type: Clinical Cases

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**Patient:** 27 years, female

### Clinical History:

A 27-year old woman presented with diabetes mellitus type I and Grave's disease. An ultrasound examination of the thyroid gland revealed enlargement of the thyroid gland with suspicion of extension of the gland to the upper mediastinum. MRI examination was performed for further investigation.

### Imaging Findings:

MRI revealed a diffuse symmetrical thyroid gland enlargement extending into the upper mediastinum until the level of the aortic arch. Additionally, in the retrosternal anterior upper mediastinum, the thymus gland was homogenous hyperplastic with normal shape, a hyperintense signal on STIR images and almost the same signal with the muscles on plain T1 TSE images (Fig.1-4). MR-Angiography revealed the enlarged thyroid gland and the hyperplastic thymus gland with the mediastinum vessels (MRA-source images Fig. 5, 6).

### Discussion:

Grave's disease is an autoimmune condition commonly associated with other autoimmune conditions such as myasthenia gravis, Addison disease, type 1 diabetes mellitus, and vitiligo [1]. There is also a rare but well-documented association between Grave's disease and thymic hyperplasia [2]. The association between Grave's disease and thymic hyperplasia was first recognized in 1968 by Franken [3]. Thymic involvement may range from microscopic abnormalities in the thymus consisting of medullary lymphoid follicles [4] to massive enlargement of the thymus [5]. The exact pathophysiology of thymic hyperplasia in Grave's is not well understood. The thymic hyperplasia is more likely due to Grave's disease. Earlier literature suggested that the hyperplastic thymus played an etiologic role in Grave's disease as it does in myasthenia gravis by playing a central role in determining self versus non-self recognition by T cells [6]. However, most patients with Grave's disease do not have obvious immune dysfunction except predisposition to autoimmunity.

Treatment with antithyroid drugs (ATDs) can induce rapid, although often incomplete, thymic involution. Murakami et al. [7] studied thymic size and density in 23 untreated patients with Grave's disease with use of computerized tomography. In comparison with 38 age-matched controls, both thymic size and density were higher in patients with Grave's disease. After treatment with ATDs, both thymic size and density were significantly reduced [8]. The decrease in thymic size and density by ATD could be produced, partly due to decreased circulating thyroid hormone levels by ATD and also by immunosuppressive effects of the drugs [9].

About 91 cases of thymus hyperplasia and Grave's disease association have been reported in the literature, of

which about 20 were histologically confirmed. Among these 91 cases, 35 cases showed a thymic mass regression under medical treatment alone [9, 10].

It is important that radiologists are able to distinguish thymic hyperplasia from neoplasm. Diffuse symmetric enlargement of the gland is the key morphologic feature of hyperplasia, whereas neoplasm tends to manifest as a focal mass, as in thymoma. However, differentiation may be difficult on the basis of morphologic features alone. Chemical shift MR imaging was recently used to distinguish normal thymus from thymic hyperplasia, with the latter demonstrating homogeneously decreased signal intensity on opposed-phase images. This finding suggests that chemical shift imaging may be used to differentiate normal and hyperplastic thymus from neoplastic involvement of the thymus (11). However, further investigation with large study population will be needed.

**Differential Diagnosis List:** Thymic hyperplasia associated with Grave's disease., Thymoma, Thymolipoma, Lymphomas, Intrathoracic thyroid tissue

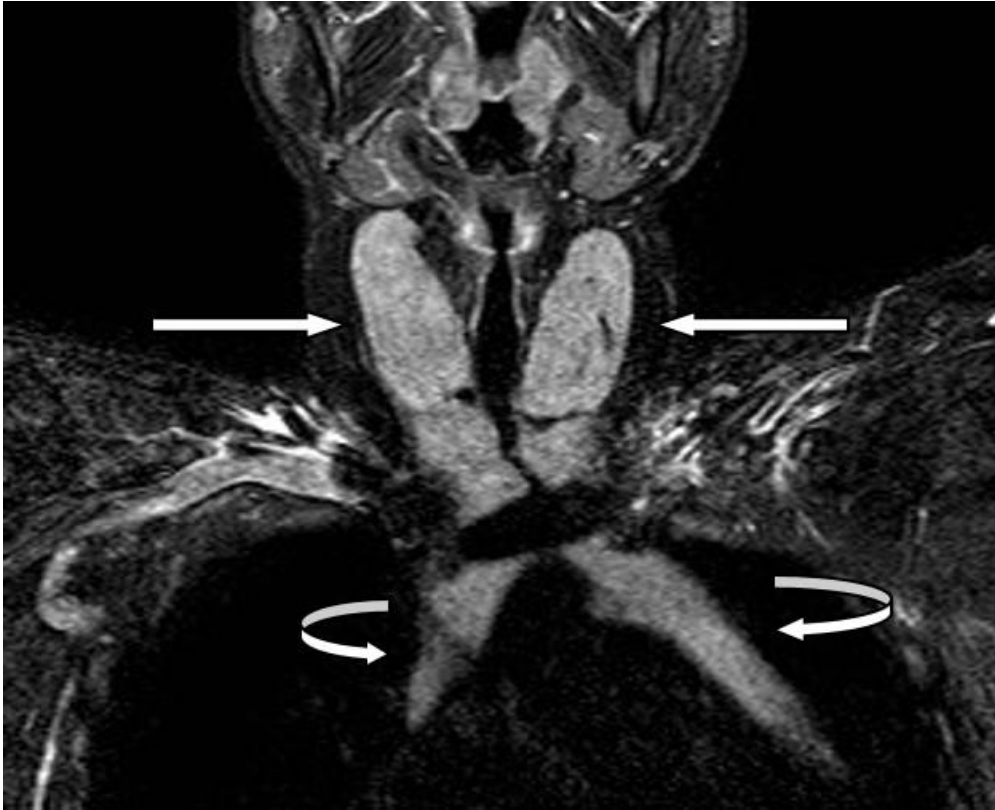
**Final Diagnosis:** Thymic hyperplasia associated with Grave's disease.

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**Figure 1**

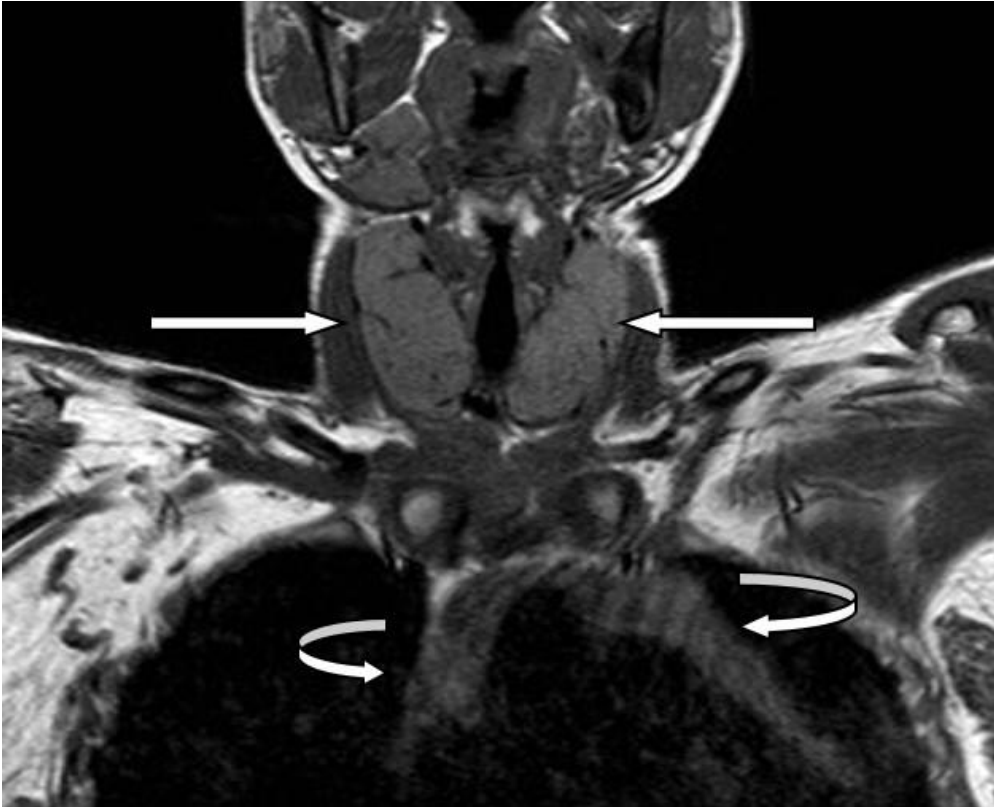
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**Description:** STIR coronal image shows a diffusely and symmetrically enlarged thyroid gland extending in the upper mediastinum (arrows) and a homogenous normal shaped hyperplastic thymus gland (curved arrows). **Origin:** Department of Clinical Radiology, University hospital of Ioannina, Greece.

**Figure 2**

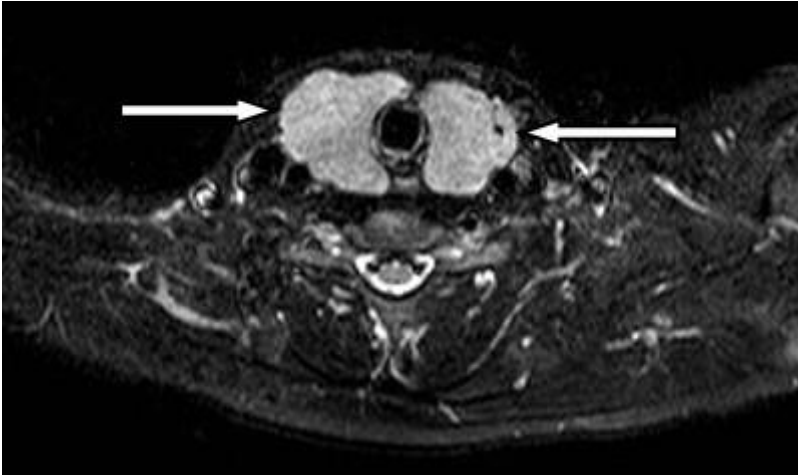
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**Description:** T1 TSE coronal image shows a diffusely and symmetrically enlarged thyroid gland extending in the upper mediastinum (arrows) and a homogenous normal shaped hyperplastic thymus gland (curved arrows). **Origin:** Department of Clinical Radiology, University hospital of Ioannina, Greece.

**Figure 3**

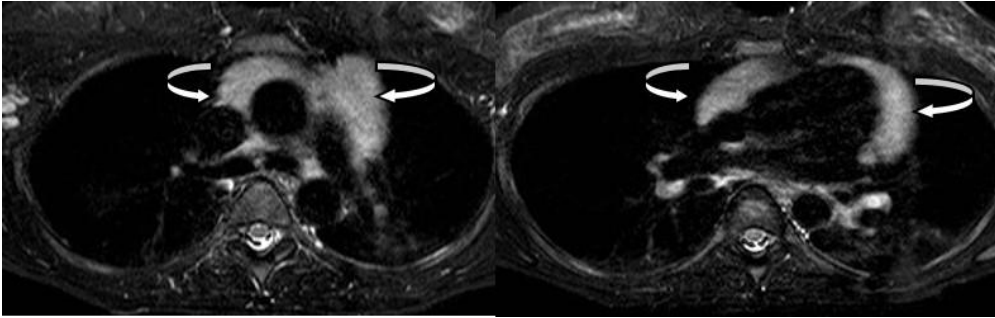
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**Description:** STIR axial image shows the enlarged thyroid gland (arrows). **Origin:** Department of Clinical Radiology, University hospital of Ioannina, Greece.

**Figure 4**

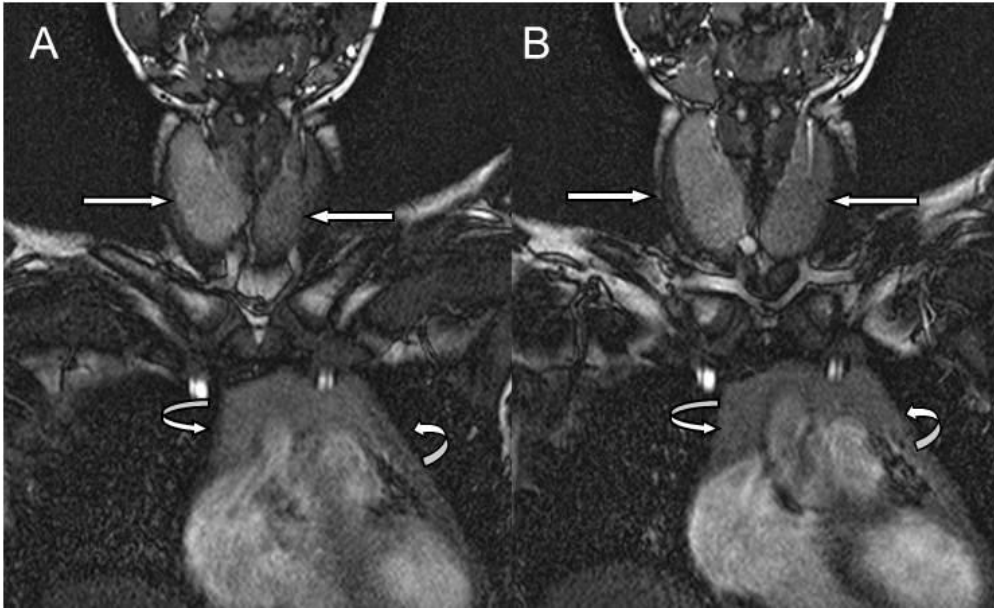
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**Description:** STIR axial images shows the retrosternal thymus hyperplasia in the upper mediastinum (curved arrows). **Origin:** Department of Clinical Radiology, University hospital of Ioannina, Greece.

**Figure 5**

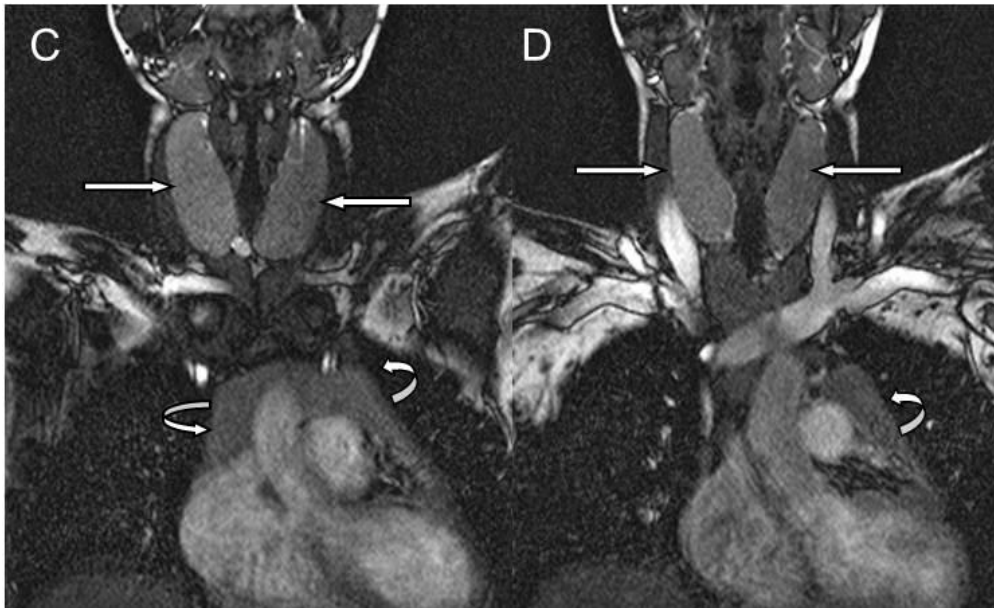
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**Description:** Coronal images (A,B) from the angiographic program reveal the enlarged thyroid gland (arrows) and the hyperplastic thymus gland (curved arrows). **Origin:** Department of Clinical Radiology, University hospital of Ioannina, Greece.

**Figure 6**

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**Description:** Coronal images (C,D) from the angiographic program reveal the enlarged thyroid gland (arrows) and the hyperplastic thymus gland (curved arrows). **Origin:** Department of Clinical Radiology, University hospital of Ioannina, Greece.