

# Two thymus-related autoimmune disorders: a case report and review of the literature

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**Abstract:** Thymoma is the most common tumor in the anterior mediastinum. A 56-year-old man presented unremitting and periodic chronic diarrhea of 9 weeks duration, and clinical examination revealed a huge nonhomogeneous mass lesion in the right lung and leukocytosis. He was treated with CHOP regimen (cyclophosphamide 1,200 mg/m<sup>2</sup>, doxorubicin 50 mg/m<sup>2</sup>, vincristine 1.5 mg/m<sup>2</sup>, and prednisolone 75 mg/m<sup>2</sup> × 5 days) based on lung mass computed tomography-guided biopsy, but he was reevaluated because neither symptom improved. Surprisingly, celiac disease was documented with increased titer of immunoglobulin antibodies to gliadin and tissue transglutaminase. Lung mass rebiopsy and thymectomy demonstrated thymoma. After surgery, the patient showed aplastic anemia that responded well to cyclosporine. At 2-year follow-up, the patient's hematologic status and diarrhea were completely recovered and no symptom and/or sign of thymoma recurrence was seen.

**Keywords:** thymus, thymoma, celiac, aplastic anemia, autoimmune disorder

## Introduction

Thymoma is the most common tumor in the anterior mediastinum<sup>1</sup> and originates from thymus epithelial cells.<sup>2</sup> It seems that paraneoplastic syndromes associated with thymoma have an underlying autoimmune characterization.<sup>3</sup> Here we describe a patient with thymoma who complained of multiple paraneoplastic diseases occurring in sequence before and after the treatment of the tumor.

## Case report

A 56-year-old man presented (February 2008) with unremitting and periodic chronic diarrhea of 9 weeks duration and with a huge nonhomogeneous mass lesion in the right lung, with aorta and chest wall involvement and minimal right side pleural effusion (Figure 1 and 2). Stool exam was completely normal and testing to measure amount of stool fat was unremarkable. Physical examination was normal. No significant abnormalities were detected in the routine serum biochemistry, immunology studies, and complete blood count, except for leukocytosis (white blood cells = 17,810 cells/μl, neutrophils = 15%, lymphocytes = 76%). All rheumatologic tests were normal (urinalysis, collected 24-hour urine for calculation of creatinine, quantities of proteinuria and protein/creatinine ratios, antinuclear antibodies, anti-double stranded DNA, antiphospholipid antibody, anti-Smith antibodies, and C3 and C4). Rectosigmoidoscopy revealed only slight inflammation of mucosa. Computed tomography-guided biopsy of the right lung mass revealed pulmonary involvement by lymphoid neoplasm, T-cell type (immunohistochemistry was positive for leukocyte common antigen and CD3).

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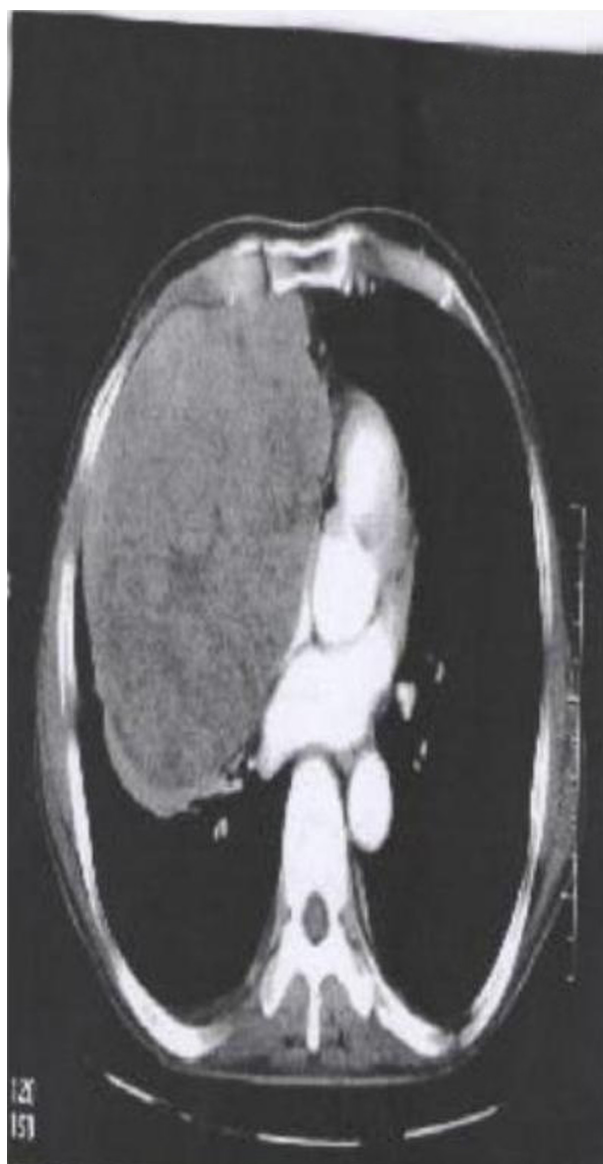
The patient received two cycles of chemotherapy with CHOP regimen (cyclophosphamide 1,200 mg/m<sup>2</sup>, doxorubicin 50 mg/m<sup>2</sup>, vincristine 1.5 mg/m<sup>2</sup>, and prednisolone 75 mg/m<sup>2</sup>; for 5 days).<sup>4</sup> At the end of the second course of treatment, there was no change in objective or subjective responses, and diarrhea had not ceased. To confirm the diagnosis, he was completely reevaluated. Rectosigmoidoscopy this time showed congestion of rectum, sigmoid, descending colon, splenic flexure, and transverse colon. Stool examination showed occult blood 2+, and serologic serum immunoglobulin (Ig) A was 647 mg/dl and both serum IgA-class tissue transglutaminase (tTG) and Ig anti-gliadin demonstrated increased titer (IgA enzyme immuno assay (EIA): >300 U/ml) and celiac disease was concluded, but duodenal biopsy was not performed. The patient was advised to follow a gluten-free diet. Right lung mass rebiopsy was performed, and surprisingly the pathologic exam revealed thymoma, type B2 according to the World Health Organization classification<sup>5</sup>. Finally, the lesion was radically resected through a median sternotomy and was determined by the Masaoka system to be stage IIB according to surgical findings. Two weeks after thymectomy, the patient showed the following laboratory values: platelet count of  $7 \times 10^3/\mu\text{L}$  and hemoglobin concentration of 8.6 g/dL. Bone marrow aspiration and biopsy was compatible with a marked decrease in erythrocytes and megakaryocytes. We treated the patient with cyclosporine 300 mg/day, and at 2-year follow-up, the patient's hematologic status and diarrhea were completely recovered and no symptom and/or sign of thymoma recurrence was seen. Repeat computed tomography scanning of the thorax showed no evidence of thymoma relapse.

## Discussion

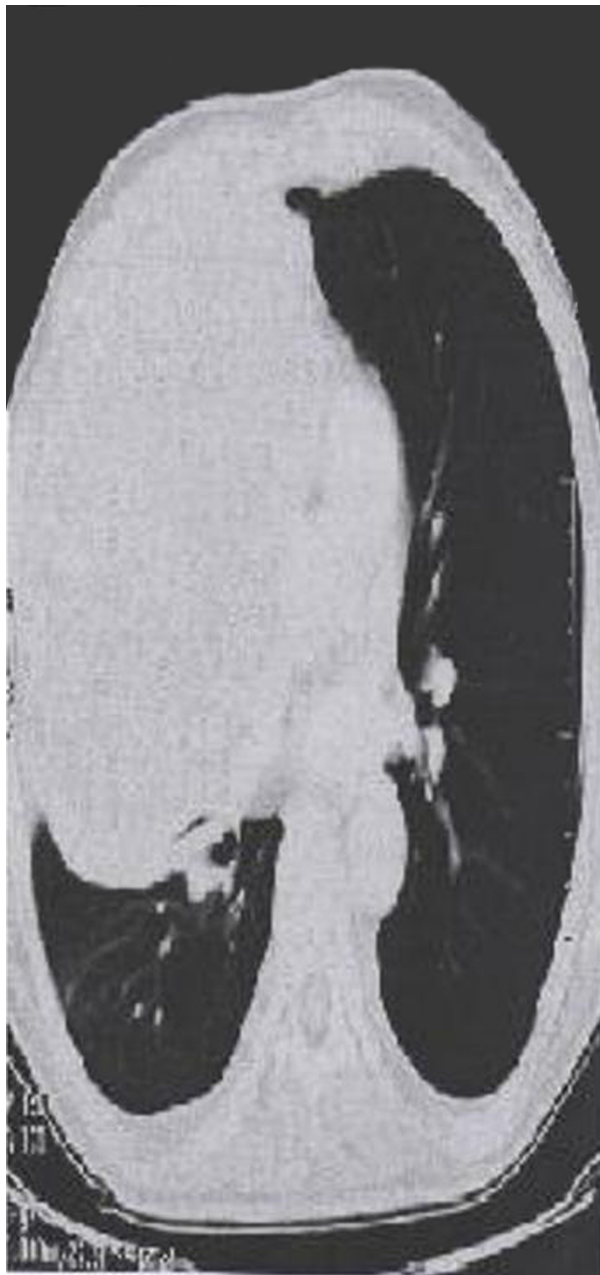
Many autoimmune phenomena have been reported in relation with thymoma, proposing an immunopathological association between thymoma and autoimmune disease.<sup>6,7</sup> As the site of maturation for T-(CD4+ and CD8) cells, the thymus plays a central role in adaptive immunity, and it can produce the autoreactive T-cell clones that are responsible for autoimmune disease.<sup>8,9</sup> It seems that thymoma may trigger either a unique immune tolerance defect (especially in myasthenia gravis and the cytopenias) or a general disturbance of immune regulation.

The list of autoimmune diseases associated with thymoma is long,<sup>6</sup> and some believe that this relation occurs more often with thymoma than with any other human tumors.<sup>7</sup> In our patient, thymoma was associated with various autoimmune diseases involving the gastrointestinal tract, red blood cells, and platelets.

Celiac disease is produced by a reaction to gluten, a storage protein found in wheat, and similar substances.<sup>10</sup> The prevalence of autoimmune diseases and malignancy is increased in celiac disease patients.<sup>11–14</sup> When intestinal cells are exposed to gluten, the enzyme tTG modifies the protein, and the immune response activates T lymphocytes to initiate the autoimmune process against the intestinal tissue, causing an inflammatory reaction. tTG is the known target in celiac disease, deaminating gliadin peptide, leading to increased presentation to T-cells, and thereby stimulating the immune system.<sup>10</sup> Some studies reported autoimmune enteropathy in association with thymoma, but there are few studies addressing the association of celiac disease and thymoma.<sup>15,16</sup> Also, association between aplastic anemia and



**Figure 1** Nonhomogeneous mass lesion was located in the right lung.



**Figure 2** Mass lesion was located in the right lung.

celiac disease have rarely been reported, and it is supposed that this relation to share an underlying immune pathological mechanism that destroys tissue with T-cell mediation.<sup>13,14,17</sup> It is important to know that a gluten-free diet is protective against the development of malignancy during celiac disease.<sup>13</sup> Immunophenotyping of peripheral blood T-cells expressing T-cell receptor  $\gamma\delta$  discriminated celiac disease from autoimmune enteropathy, which commonly expresses T-cell receptor  $\alpha\beta$ .<sup>18</sup> Megakaryocytic hypoplasia has been reported after resection of a thymoma in previous studies,<sup>2,19</sup> and the association of thymoma with pure red cell aplasia is

well known.<sup>20</sup> Amegakaryocytic thrombocytopenia following thymoma may represent an early presentation of impending aplastic anemia, with the time interval between thymoma resection and development of aplastic anemia between 3 and 48 months.<sup>2,21</sup> Aplastic anemia may be related with active thymoma or with thymoma in remission.<sup>22</sup> Our case showed anemia and thrombocytopenia with megakaryocytic hypoplasia 2 weeks after thymectomy, presenting symptoms of aplastic anemia. In the present case, aplastic anemia responded very well to cyclosporine, and hemoglobin and platelet recovery reached transfusion-independence by day 24 and day 27, respectively. Successful treatment with cyclosporine suggests an immunologic mechanism for this disorder. The thymus may make autoreactive T lymphocytes against stem cells, erythroid precursors, and megakaryocyte precursors.<sup>2</sup>

On the whole, association between aplastic anemia and other autoimmune disease such as thymoma or celiac disease with autoimmune disease have rarely been reported, and in our case, it appears that these three diseases were linked in our case.

## Conclusion

An interesting aspect of this case report may be that different paraneoplastic and autoimmune manifestation onset at different times and in sequence; this supports the hypothesis that an underlying autoimmune mechanism could have been in operation. It is advisable for clinicians to exclude thymoma-related syndromes in patients with thymoma diagnosis.

## Disclosure

The authors report no conflicts of interest in this work.

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