Minimally Invasive Thymoma with Extensive Intravascular Growth

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A 70-year-old male with grossly non-invasive thymic tumor associated with myasthenia gravis was subjected to thymothymectomy. Microscopic examination showed extensive intravascular tumor extensions into veins of thymic tissue and surrounding muscles and a minute direct invasion of the thymic tissue. Histologically, the tumor showed mixed-type thymoma with polygonal epithelial cells. These pathological findings indicated that the tumor cells extended mainly into vessels beyond the tumor capsule via tumor drainage veins rather than invading neighboring structures. After chemotherapy and mediastinal irradiation, the patient is now in complete remission of myasthenia gravis and is recurrence-free 15 months after surgery.

Key words: thymoma - intravascular growth - tumor thrombosis - myasthenia gravis - metastasis

INTRODUCTION

Invasive thymoma is characterized by infiltrative growth into neighboring structures but rarely invades the superior vena cava or right atrium with intravascular polypoid extension (1-4). We present a case of grossly non-invasive thymoma showing extensive intravascular extensions into veins of thymus and surrounding muscles. This is, as far as we know, the first such case to be reported.

CASE REPORT

A 70-year-old male complained of eyelid ptosis in October 1997 and was admitted to our hospital with a diagnosis of myasthenia gravis in November 1997. The serum level of anti-acetylcholine receptor (Ach-R) antibody was 12 nmol/l (normal range: <0.2 nmol/l). An anti-cholinesterase drug, pyridostigmine, was prescribed at 180 mg/day. A chest CT showed a well-demarcated mass 3 cm in diameter in the upper anterior mediastinum on the left side (Fig. 1). The tumor was resected with total thymectomy via median sternotomy on December 19, 1997. The tumor was located at the head of the left brachiocephalic vein, with the bottom of the tumor 2 cm from the vein. Intraoperative findings showed slight tumor adhesion to the sternothyroid and sternohyoid muscles but no invasion of surrounding tissues.

The resected tumor was 5.2 x 3.0 x 1.5 cm and, grossly, had a well-demarcated capsule (Fig. 2). Microscopic examination, however, showed minute tumor invasion in the thymic tissue and numerous tumor thrombi in vascular lumina in the surrounding organs, including the left thymus lobe and sternothyroid and sternohyoid muscles (Fig. 3). Immunostaining using an anti-factor VIII antibody demonstrated that the cells lining the channel with tumor thrombi were endothelial. The surgical margin of the thymic vein, which was incised at the brachiocephalic vein, also showed intravascular tumor extension. All vessels with tumor thrombi were veins, not arteries. No extravascular extension was seen. Histologically, the tumor was a thymoma with moderate infiltration of lymphocytes and polygonal epithelial cells; the findings were identical throughout the tumor, including tumor thrombi (Fig. 4). Based on these findings, numerous tumor thrombi in surrounding organs were diagnosed as being caused by extensive intravascular tumor growth extending from the primary site. From the...
tumor position to the left brachiocephalic vein, the tumor extended radiating from the primary site into the surrounding veins at least 2 cm from the primary site. Lymph nodes surrounding the tumor showed no metastasis.

The postoperative course was satisfactory and the patient underwent two courses of systemic chemotherapy (adriamycin, 40 mg; cisplatinum, 50 mg; vincristine, 0.6 mg; cyclophosphamide; 700 mg) followed by mediastinal irradiation at 50 Gy. The symptoms of myasthenia gravis disappeared 3 months after surgery. Fifteen months after surgery, the patient is well and is local recurrence- and metastasis-free, enjoying complete myasthenia gravis remission, with a serum level of anti-Ach-R antibody decreasing to 5.2 nmol/l.

DISCUSSION

Renal cell and hepatocellular carcinoma occasionally show intravascular extension into the inferior vena cava and right atrium (5,6). Invasive thymomas also have been reported very rarely to extend into the superior vena cava and right atrium with polypoid growth (1-4). Extensive intravascular extensions into surrounding organs in grossly non-invasive thymoma such as the present case have not been reported, to our knowledge.

Extensive intravascular tumor growth in our case should be distinguished from the usual vascular invasion because (1) numerous tumor plugs within veins extended beyond the primary tumor, (2) extravascular tumor extension was not seen and (3) the surgical margin of the thymic vein also showed intravascular tumor growth.

Despite extensive intravascular growth, the present case showed only slight thymic tissue invasion. We conclude that these tumor cells extended mainly into vessels rather than invading neighboring structures and therefore that the tumor cells advanced beyond the tumor capsule via tumor drainage veins.
References


