Sclerosing thymoma followed up for eight years as mediastinal goiter: A case report

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ABSTRACT

INTRODUCTION: Sclerosing thymoma (ST) is an extremely rare disease with less than 20 cases ever been described. Here, we present a case of sclerosing thymoma that was followed up as mediastinal goiter for eight years.

PRESENTATION OF CASE: A 77-year-old man was presented with a superior mediastinal tumor. The patient was asymptomatic and not affected by myasthenia gravis. Computed tomography showed a well-defined superior mediastinal tumor whose size had regressed over time. Ultrasonography-guided core-needle biopsy revealed type B1 to B2 thymoma, and total-thymectomy was performed. Histopathologically, most of the tumor showed hyalinization and sclerosis, and slight signs of type A8 thymoma were found at the tumor’s periphery. The patient was diagnosed with ST. No evidence of recurrence was observed 12 months following surgery.

DISCUSSION: Since sclerosing thymoma is mostly composed of fibrous tissue, small specimens such as needle biopsies do not contain tumor cell nests and are difficult to confirm. Complete resection is currently the most common treatment for ST. Spontaneous regression of ST has been reported; however, the mechanisms involved have not yet been elucidated.

CONCLUSION: This rare case of sclerosing thymoma is an unusual case since it has follow up information for an eight year period due to the misdiagnosis of goiter. The follow up visits showed significant regression of the tumor over the eight year period without treatment; however, the etiology of sclerosis and regression remain unknown. The patient was treated by thymectomy with no recurrence after 12 months.

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1. Introduction

Thymoma originates within the epithelial cells of the thymus and is the most common anterior mediastinal neoplasm. The incidence of thymoma is 1.5 cases per million and comprises about half of the anterior mediastinal tumors. We present an extremely rare variant of thymoma, known as sclerosing thymoma (ST), which was first reported in 1994 by Kuo [1]. ST is defined as a thymoma that exhibits features of conventional thymoma, with abundant collagen-rich stroma [2]. ST is synonymous with “ancient thymoma”[3] and accounts for less than 1% of all thymomas; only 18 cases have been reported so far, including our case (16 cases in English and 2 cases in Japanese articles. See Table [1,3,4]. Age of the patients ranged from 10 to 77 years (mean 50.1 years). Twelve subjects were males and six females. Myasthenia gravis was observed in four cases, three of whom were women [1,3,4]. Here, we present a case of ST that was followed up as mediastinal goiter for eight years in a 77-year-old man. The work has been reported in line with the SCARE criteria [5].

2. Presentation of case

A 77-year-old man was diagnosed with a superior mediastinal tumor while undergoing a tongue cancer examination and was referred to our division. He had a history of stomach cancer and myocardial infarction, and this mediastinal tumor had been followed up at the otolaryngology department of another hospital for eight years as a mediastinal goiter. Although he was asymptomatic and had no myasthenia gravis, an elastic hard mass was observed on the dorsal side of the left clavicular head. Chest X-ray revealed that the trachea was slightly shifted to the right side. Laboratory tests for tumor markers, including carcinoembryonic antigen, squamous cell carcinoma antigen, carbohydrate antigen 19-9, alpha-fetoprotein, neuron-specific enolase, and soluble interleukin-2 receptor were all within

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Abbreviations: ST, sclerosing thymoma; CT, computed tomography.

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normal ranges and the anti-acetylcholine receptor antibody was negative. Computed tomography (CT) of the chest revealed a well-circumscribed mass measuring $5.7 \times 2.7 \times 4.0$ cm in the superior mediastinum that extended to the dorsal side of the left clavicular head (Fig. 1). A whole-body scan using 2-deoxy-2-($^{18}$F)-fluorodeoxyglucose-positron emission tomography/CT showed a maximum standardized uptake value of 2.87 by the mediastinal tumor. The tumor had regressed over the eight years, the original tumor size was $7.3 \times 4.3 \times 5.2$ cm according to a CT taken eight years ago, $6.5 \times 3.0 \times 5.0$ cm four years ago, with the current presentation at $5.7 \times 2.7 \times 4.0$ cm (Fig. 1). An ultrasonography-guided core-needle biopsy was performed and revealed type B1 to B2 thymoma. Thus, it was diagnosed as clinically T1aN0M0 stage I (Masaoka stage I) thymoma and thymectomy through a median sternotomy was performed. The well-defined yellowish-white tumor measuring $60 \times 55 \times 30$ mm was in the upper left pole of the thymus. Histological examination showed type AB thymoma mainly at the periphery of the tumor that consisted of a component of type A thymoma with short spindle cells and oval cells and a component of type B1-2 thymoma, which was abundantly infiltrated with immature T lymphocytes (Fig. 2). Although fibrosis was prominent in the peripheral area, there was a high degree of fibrosis accompanied by hyalinization in the central area and a region where the epithelial component had nearly disappeared. No hemorrhage or necrosis was detected. Immunohistochemistry results were as follows: epithelial cells were positive for AE1/AE3, weakly positive for Bcl-2, and negative for CD5 and c-kit; lymphocytes were positive for CD5, TdT, MIC2, and CD1a. This tumor exhibited rich collagenous fibrous stroma compared to a normal thymoma and was diagnosed as a ST; he showed no signs of recurrence 12 months following surgery.

3. Discussion

The tumor was dominated by a hyalinized, fibrosclerotic stroma that had expanded the septa, perivascular spaces, and tumor periphery; hence, specimen collection using techniques such as needle biopsy, typically does not yield a large volume of tumor cells, thus complicating the diagnosis. This case was diagnosed as thymoma by percutaneous needle biopsy, but the former doctor, who had also performed aspiration cytology, could not produce a conclusive diagnosis because tumor cells were not collected. Thus, the patient was initially diagnosed with goiter, which was followed-up for eight years. According to Kim et al., ST should be considered as a differential diagnosis when only fibrous tissue is collected during biopsies of the anterior mediastinal tumors [6]. However, Moran reported that 60% of patients who underwent a biopsy could not be diagnosed before their operation [3]. The biological behavior of ST remains mostly unknown. Follow-up information on reported cases showed no evidence of recurrence or metastasis and no tumor-
Table 1

Case reports: sclerosing thymoma.

| Case | Sex | Age (years) | Size (cm) | Clinical symptom | Myasthenia gravis | Thymoma subtype of WHO classification | Description of thymoma components and immunohistochemistry |
|------|-----|-------------|-----------|-----------------|------------------|---------------------------------------|-----------------------------------------------------------|
| 1    | F   | 39          | 3.0       | Palpitation, Dyspnea | muscle weakness, difficulty in taking | + | Type B3 | epithelial type thymoma |
| 2    | F   | 23          | 2.5       |                     |                  | + | Type B1 | lymphocytic type thymoma |
| 3    | F   | 34          | 5.0       | -                  |                  | 7 type B2 tumors and 3 type A tumors |
| 4    | F   | 62          | 8.0       | -                  |                  | 3 tumors: the cellular aggregates were characterized by spindle cells with scant eosinophilic cytoplasm and absence of cellular atypia and mitotic activity. |
| 5    | F   | 37          | 6.0       | SOB, Chest pain    | -                | 7 tumors: the cellular aggregates composed of a dual cell population of epithelial cells and lymphocytes, no cellular atypia or mitotic activity. |
| 6    | M   | 27          | 5.0       | -                  |                  | 7.0 tumors | medullary type, slightly lymphocytes infiltration, nonmalignant activity, BHC: spindle cells; Keratin+, EMA+, Leu7+ scattered, small aggregation of spindle to oval cells, mild lymphocytes infiltrate, no mitotic activity, BHC: AE1/AE3+ type A; HIC: spindle cells; AE1/AE3+, CD54+, lymphocytes; TdT+ |
| 7    | M   | 58          | 6.0       | -                  |                  | 5.0 tumors | BHC: Keratin+, p63+, Ki-67(20%), TdT+, CD1a+ |
| 8    | M   | 44          | 5.0       | -                  |                  | 10.0 tumors | BHC: epithelial cell; AE1/AE3+, CD54+, CD10+, - | |
| 9    | M   | 56          | 10.0      | -                  |                  | SOB, Chest pain |
| 10   | M   | 69          | 7.0       | SOB, Chest pain    | -                | 6.0 tumors | |
| 11   | M   | 69          | 7.0       | SOB, Chest pain    | -                | 6.0 tumors | |
| 12   | M   | 73          | 10.0      | SOB, Chest pain    | -                | 10.0 tumors | |
| 13   | M   | 60          | 2.0       | muscle weakness, difficulty in taking | +                  | Type A | medullary type, slightly lymphocytes infiltration, nonmalignant activity, BHC: spindle cells; Keratin+, EMA+, Leu7+ scattered, small aggregation of spindle to oval cells, mild lymphocytes infiltrate, no mitotic activity, BHC: AE1/AE3+ type A; HIC: spindle cells; AE1/AE3+, CD54+, lymphocytes; TdT+ |
| 14   | M   | 47          | 2.0       | -                  |                  | Type AB | |
| 15   | M   | 62          | 3.1       | -                  |                  | Type A | medullary type, slightly lymphocytes infiltration, nonmalignant activity, BHC: spindle cells; Keratin+, EMA+, Leu7+ scattered, small aggregation of spindle to oval cells, mild lymphocytes infiltrate, no mitotic activity, BHC: AE1/AE3+ type A; HIC: spindle cells; AE1/AE3+, CD54+, lymphocytes; TdT+ |
| 16   | M   | 10          | 7.0       | Chest pain         | -                | N/A |
| 17   | M   | 65          | 4.9       | -                  |                  | Type B3? |
| 18   | M   | 77          | 5.7       | -                  |                  | Type AB |

F: female, M: male, SOB: shortness of breath, N/A: not available, IHC: immunohistochemistry.

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Ethical approval: This study was approved by the institutional review board in June 2019 (approval number: H19-0121), and the need to obtain informed consent was waived.

Consent: Written informed consent was obtained from the patients for publication of this case report and accompanying images.

4. Conclusion: We reported a case of ST. Although the tumor spontaneously regressed, the etiology of regression and stenosis remain unknown. We confirmed the natural regression of this tumor over eight years by image analysis. Long-term follow-up, therefore, supporting the authors’ suggestions [1].

The incidence of type B2 was not available, respectively (see Table 1). We summarized type B2 and type B3 tumors in these previous studies: type A: two cases, type B: two cases, type C: two cases, type D: one case, type E: none, type F: none. ST has been reported in type B2 tumors [1]. Further, it has been proposed that the mechanisms underlying this phenomenon may be related to the immune and endocrine systems, differentiation, and regenerative mechanisms [2]. Moreover, type B2 tumors could arise from thymic fibroblasts or fibroblasts. The pathogenesis of type B2 tumors is unclear. Further, it has been proposed that the mechanisms underlying this phenomenon may be related to the immune and endocrine systems, differentiation, and regenerative mechanisms [2].

The natural history of ST is not well understood. Further, it has been proposed that the mechanisms underlying this phenomenon may be related to the immune and endocrine systems, differentiation, and regenerative mechanisms [2].

As a long-time treatment, complete resection is currently the most common related death. Complete resection of ST is usually performed for thoracic spine involvement. While complete resection of ST is usually performed for thoracic spine involvement.

Related literature: Using the World Health Organization classification, this tumor was classified as type B2 tumors [1]. Although STs are rare, these tumors are occasionally observed. STs are occasionally observed, and they are the most common type of thymic tumors, followed by thymic carcinomas. In our experience, we have also observed STs in thymic carcinomas [3].
Author contribution

Yoshihito Iijima carried out the operation, wrote this manuscript and carried out data collection. Yuki Nakajima, Hiroyasu Kinoshita, Yasuyuki Kurihara, Yu Nishimura, Toshihiko Lizuka, Hirohiko Akiyama and Tomomi Hirata carried out the revision of the manuscript.

Registration of research studies

N/A.

Guarantor

Yoshihito Iijima.

Availability of data statement

All of the data generated by this case is contained within the article.

Provenance and peer review

Not commissioned, externally peer-reviewed.

Declaration of Competing Interest

All authors report no conflict of interest.

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