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Outcomes after surgical resection of thymic carcinoma: A study from a single tertiary referral centre

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Abstract

Aims: Thymic carcinoma is a rare and invasive mediastinal tumor, with poor prognosis. The optimal treatment for thymic carcinoma is not well defined currently.
Methods: A single-institution retrospective study of patients operated for thymic carcinoma between 1996 and 2011 was conducted. Survival curves were plotted using the Kaplan–Meier method. The Cox proportional hazard model was used for multivariate analysis.
Results: Seventy-six patients underwent surgery for thymic carcinoma. Masaoka stage was I in 11 patients, II in 20, III in 32, IVa in 13. A complete resection (R0) was achieved in 59 patients. Adjuvant radio/chemotherapy was offered to 58 patients. The 5-year disease-free survival rate and overall survival rate for all the patients were 59.7% and 66.2%, respectively. Patients with incomplete resection had a significantly worse disease-free survival and overall survival as compared to complete resection with univariate analyses (both $p < 0.001$). Multivariate analysis revealed that complete resection and Masaoka stage were statistically associated with disease-free survival and overall survival ($p = 0.005$ and 0.013 with complete resection; $p = 0.006$ and 0.009 with Masaoka stage).
Conclusions: Our result indicated that complete resection and Masaoka stage could impact the disease-free survival and overall survival of patients with thymic carcinoma after surgical resection.

Keywords: Thymic carcinoma; Surgery; Masaoka staging system; Prognosis

Introduction

Thymic carcinoma is a rare, aggressive neoplasm of the anterior mediastinum that is morphologically and biologically distinct from thymoma.[1]

For the rarity of this tumor, studies focused on thymic carcinoma were limited.[2–4] A number of reports has identified factors that may be prognostic in thymic carcinoma, such as resectability, radiotherapy, chemotherapy, histology and stage.[5–9] Surgery was the main therapeutic modality for the early stage thymic carcinoma patients.[2] Postoperative adjuvant radiotherapy after complete surgical resection in patients with Masaoka stage I thymic carcinoma is not routinely recommended. The role of postoperative irradiation is controversial in stage II and III patients.[10,11] The data that evaluated the role of adjuvant chemotherapy is limited according to previous studies.[9]

In the present study, we retrospectively evaluated the treatment and prognosis in patients with resected thymic carcinoma, and to explore the role of different prognosis factors in this setting.

Patients and methods

Methods

A total of 76 patients had surgical resection for thymic carcinoma between January 1996 and January 2011 in Zhejiang Cancer Hospital. The Ethics Committee at Zhejiang Cancer Hospital approved the study. The inclusion criteria were as follows: (1) the stage of thymic carcinoma was classified based on the Masaoka staging system; (2)

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Table 1
Demographic characteristics of the study population.

Gender	Number (%)
Male	34 (44.7)
Female	42 (55.3)
Age	
Range	22–74
Median	48
<50	31 (40.8)
≥50	45 (59.2)
Histology	
Squamous cell carcinoma	49 (64.5)
Others	27 (35.5)
Resection	
Complete	59 (77.6)
Incomplete	17 (12.4)
Stage	
I	11 (14.4%)
II	20 (26.3%)
III	32 (42.1%)
IVa	13 (17.1%)
Treatment after surgery	
Only radiotherapy	20 (26.3)
Only chemotherapy	9 (11.8)
Radiotherapy + chemotherapy	29 (38.2)
No	18 (23.7)

histologic subtypes were determined by 2004 WHO histologic classification and central pathology review was performed to confirm diagnosis of all the thymic carcinoma; (3) all patients underwent operation; (4) disease recurrence was confirmed using chest computed tomography (CT), brain MRI and bone scan as well as ultrasound examination and/or CT of the abdomen. The exclusion criteria included: (1) lost to follow-up; (2) death from other disease not related to thymic carcinoma.

Follow-up and evaluation of recurrence

Surviving patients were followed every three–six months for the first five years, than annually. The follow-up included patient's physical examination, complete blood counts, serum biochemistry tests, computed tomography of thorax, ultrasound of upper abdomen. The last censoring date for survival was September 2013.

Recurrence was divided into three categories according to the definition of the ITMIG. A local recurrence was defined as disease appearing in the anterior mediastinum or tissues immediately contiguous with the resected thymus or thymic carcinoma. A regional recurrence was defined as intrathoracic recurrence that is not contiguous with the thymus or previous resected thymic carcinoma. A distant recurrence included extrathoracic recurrence and intraparenchymal pulmonary nodules.

Statistical analysis

The statistical analysis using the SPSS ver. 16 (SPSS Inc., Chicago, IL, USA) was performed, assuming that p-value less than 0.05 is statistically significant. The survival curves were generated using the Kaplan–Meier method. Disease-free survival (DFS) encompassed the time from the surgery to documented progression or death from any cause. The definition of overall survival (OS) was determined from the date of surgery and the last known follow-up or date of death.

Results

Patient characteristics

Table 1 showed the patient's clinical and histologic characteristics. The median age was 47 years in all of the patients (range, 22–71 years). Forty-nine patients were diagnosed with squamous cell carcinoma and 27 patients were other histology. The clinical stage distribution according to the Masaoka–Koga system was as follows: stage I, 11 (14.4%); stage II, 20 (26.3%); stage III, 32 (42.1%); and stage IVa, 13 (17.1%).

Treatment

All patients underwent surgical resection. Fifty-nine patients received complete resection and 17 with incomplete resection. Complete resection rate in stage III and IVa was lower than stage I and II (71.1% vs. 87.1%, $p = 0.173$). The positive margins in the R1 ($n = 8$) were as follows: pericardium in 2, superior vena cava in 2, mediastinal fat in 4. For positive margins in the R2 patients ($n = 9$), pericardium in 3, superior vena cava in 2, large arteries in 3, and 1 with pericardium and superior vena cava R2 positive margin.

The invasion of surrounding structures in stage III was as follows: lung in 6 patients, pericardium in 5, superior vena cava (SVC) in 4, large arteries in 3 and phrenic nerve

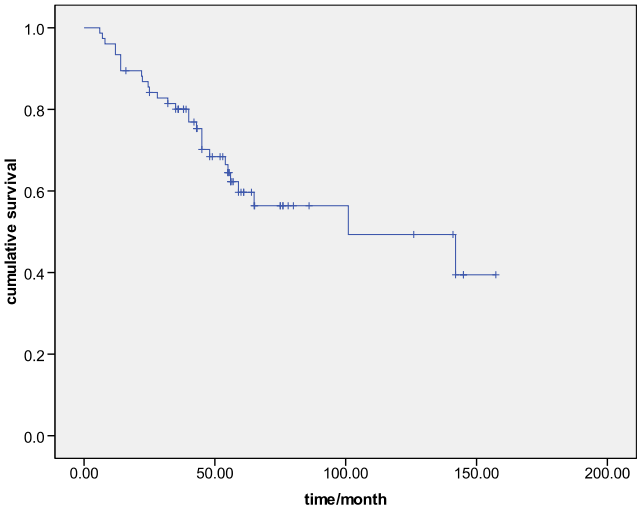

Figure 1. The Kaplan–Meier disease-free survival curves (5 year = 59.7%).