CASE REPORTS

SUCCESSFUL RADICAL RESECTION OF MASAOKA III SQUAMOUS CELL THYMIC CARCINOMA INVADING SUPERIOR VENA CAVA AND RIGHT ATRIUM –CASE REPORT

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Abstract

Introduction: *Complete radical resection is crucial for successfully treating thymic carcinomas. However, when the invasion of the great vessels or the heart in Masaoka III and IV stages occurs, the management poses more challenges. The R0 resection often requires neoadjuvant treatment. We present an example of a debatable case in which a treatment decision was guided by an imminent risk to the patient's life.*

Case description: *We report the case of a 74-year-old female with a mediastinal mass invading the superior vena cava (SVC) and the right atrium (RA), which was successfully treated with radical resection. The procedure under the femoro-femoral CardioPulmonary Bypass (CPB) included resection of the right intra-auricular mass and the SVC followed by the interposition of a Gore-Tex conduit between the left innominate vein and RA and also wedge resection of the upper left (LUL) and right lobes (RUL). A final histopathological examination confirmed the diagnosis of squamous cell carcinoma.*

Conclusions: *Complete radical resection is essential for successful treatment and represents the most significant prognostic factor.*

Keywords: *case report, invasive thymic squamous cell carcinoma, intraauricular mass, cardiopulmonary bypass support, superior vena cava resection*

INTRODUCTION

Thymic neoplasms are relatively rare, accounting for approximately 1% of all malignancies. The largest subgroup consists of thymic epithelial neoplasms, including thymoma and thymic carcinoma.[i] Thymic carcinoma is distinct from thymoma due to its cytologic atypia, more invasive nature, and malignant behavior. It can be further categorized into low-grade and high-grade carcinomas, with low-grade squamous cell carcinoma being the most common, comprising 80% of all thymic carcinomas.[ii]

They are classified based on the Masaoka-Koga staging system initially developed for thymomas.[3] However, this may not always accurately predict prognosis due to the heterogeneity of thymic carcinomas and their higher malignancy compared to thymomas. An alternative is the TNM staging system which may be more accurate.

CLINICAL CASE

We report the case of a 74-year-old Caucasian female patient who developed progressively severe lower limb edema, and tiredness, and later exhibited subcutaneous collateral circulation in the anterior abdominal and thoracic walls. Upon investigation, a chest CT scan revealed a retrosternal solid mass suggestive of a thymic neoplasm, measuring approximately 68x42x60mm. Further examinations, including contrast CT scans, MRI, and an echocardiogram concluded that the mass

invaded and completely occluded the SVC and innominate vein, protruding and occupying most of the RA, reaching the tricuspid valve. However, there was no invasion of the RA wall, atrial septum, tricuspid valve, aorta, or pulmonary arteries. A bilateral invasion of the adjacent lung parenchyma was observed. Nevertheless, the performance status was 1.

The patient underwent a surgical procedure performed by a joint team of cardiac surgeons and thoracic surgeons. Due to the occlusion of the SVC, the large mass inside the RA, and difficult access to the ascending aorta, femoro-femoral CPB was chosen. Because of extensive collateral venous circulation, a second venous cannulation was deemed unnecessary.

The initial step was a right atriotomy to ensure complete tumor removal. The tumor had not invaded the atrium wall; it protruded freely from the SVC, occupying almost the entire atrium.

The procedure included the en-bloc resection of the thymus, anterior pericardium, SVC, innominate vein, and wedge resection of RUL and LUL, attempting to preserve the phrenic nerves. The intra-atrial mass was resected through the right atriotomy. The junction of the right jugular, subclavian vein, and innominate vein was resected, and the veins were sutured at a high level. The only remaining junction was that of the left jugular and subclavian veins, which was connected to the right atrium using a PTFE conduit. Recovery and closure proceeded without complications, despite prolonged hemostasis.

The final histopathological examination favored the diagnosis of squamous cell carcinoma with thymic origin. Noteworthy, the surgical margins were free of tumor. The TNM staging, according to the AJCC 8th Edition, indicated pT3 N0 R0, placing it at Masaoka Stage III. For this stage, the 5-year disease-free survival and overall survival rates are approximately 56.8% and 61.5%, respectively[iii].

Neither of the phrenic nerves were affected. Probably due to the level of SVC section, the right recurrent nerve suffered a lesion, resulting in vocal cord paresis. However, this only manifested as dysphonia with good overall progress.

The patient has been under regular monitoring with TC scanning at the Outpatient Clinic. As of now, 18 months after surgery, her condition remains stable with the use of anticoagulant therapy, and adjuvant chemotherapy has been initiated.

DISCUSSION

There is a consensus that complete radical resection is crucial for successful treatment and is the most significant prognostic factor,iv, particularly in Masaoka stage I and II where it is typically feasible. Stage III and IV can pose more challenges, especially when the great vessels or the heart are involved, while pulmonary or pericardium resections are usually less technically demanding.[4] Ressections involving the heart or major vessels are associated with increased perioperative morbidity and often require CPB support.[v]

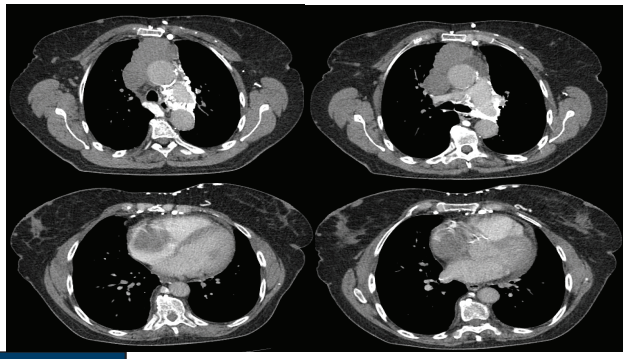

Figure 1 *Preoperative CT scan – axial view.*

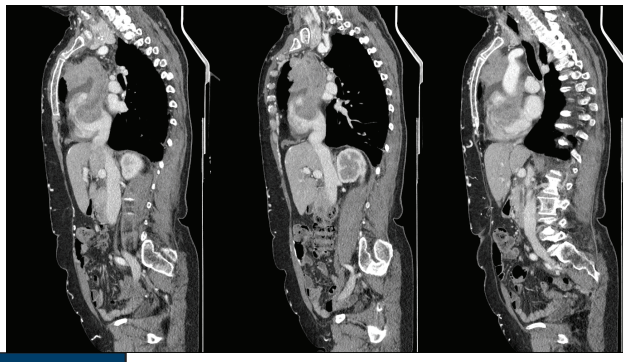

Figure 2 *Preoperative CT scan – axial view.*

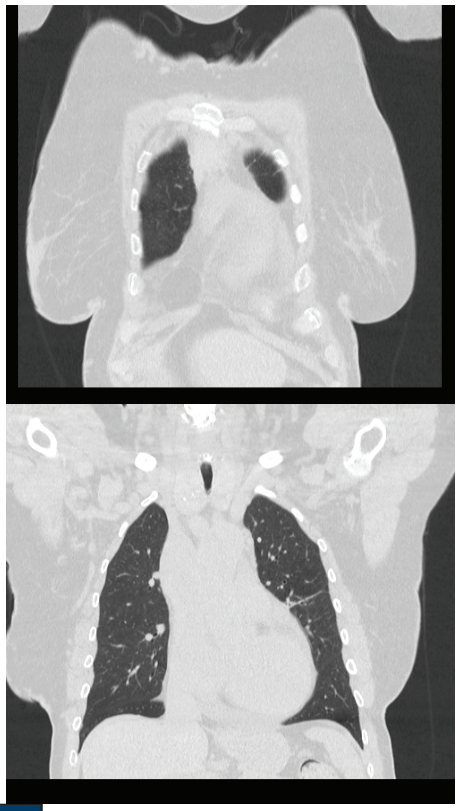

Figure 3 *Preoperative CT scan – coronal view.*

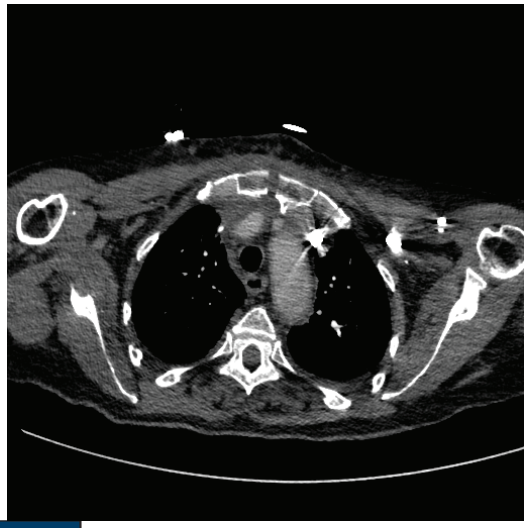

Figure 4 *Postoperative CT scan - axial view.*

Innominate vein invasion is typically managed with simple resection, however, in cases involving the SVC, reconstruction is necessary.[5] When the SVC is involved, there is often a concurrent compromise of the phrenic nerve. It is worth noting that SVC resection does not significantly increase perioperative morbidity or mortality[5].

These cases are frequently categorized as having marginal resectability. Although there is no consensus on the best neoadjuvant treatment, some studies suggest survival benefits with neoadjuvant chemotherapy, making it a recommended approach as it increases the likelihood of achieving an R0 resection.[4]

Due to the intracardiac component and the associated risks of tricuspid valve obstruction and potential fatality, we reached a joint decision for upfront surgery instead of induction treatment. It is debatable if the decision was the most optimal solution regarding oncological treatment but it was definitely a life-saving choice.

CONCLUSIONS

Thymic squamous carcinomas are indeed rare, and there is a lack of comprehensive data and published studies on them. Based on current medical knowledge, the recommended treatment approach for these cases is radical resection. In situations where the tumors have advanced to Masaoka III or IV, it is advisable to consider neoadjuvant treatment. This approach can increase the likelihood of achieving an R0 resection, potentially improving overall survival. However, in these complex cases, a personalized approach is required to achieve the best oncological results.

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