CASE REPORTS
PRIKAZI SLUČAJEVA

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Case report
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AN INCIDENTAL FINDING OF THYMIC CARCINOMA DURING ELECTIVE CORONARY ARTERY BYPASS GRAFTING

SLUČAJAN NALAZ KARCINOMA TIMUSA TOKOM ELEKTIVNE HIRURŠKE REVASKULARIZACIJE MIOKARDA

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Summary

Introduction. Thymoma is a rare malignant tumor of the anterior mediastinum. Thymic squamous cell carcinoma has been recognized as an aggressive form of thymoma with different behavior. It is associated with paraneoplastic syndromes, variety of clinical presentations, different way of treatment and complex prognosis. Improved imaging techniques show that an early diagnosis of thymoma is possible, which makes thymoma a potentially dangerous but preventable disease. **Case Report.** In this report, we describe the clinical and histological findings of a patient with incidental finding of squamous cell thymic carcinoma presented during elective coronary artery bypass grafting surgery.

Key words: Thymoma; Mediastinal Neoplasms; Elective Surgical Procedures; Myocardial Revascularization; Coronary Artery Bypass; Thymectomy; Immunohistochemistry; Carcinoma, Squamous Cell; Early Diagnosis; Morphological and Microscopic Findings

Sažetak

Uvod. Timomi su retki maligni tumori prednjeg medijastinuma. Skvamocelularni karcinom timusa tretira se kao agresivna forma timoma sa značajnom patološkom nepredvidljivošću. U čestoj je korelaciji sa paraneoplastičkim sindromom, varijabilne je kliničke prezentacije, zahteva kompleksno lečenje koje prati nepredvidiva prognoza. Savremene dijagnostičke tehnike ukazuju na to da je rana dijagnoza timoma moguća. Na taj način povećava se verovatnoća za uspešnijim lečenjem timoma, kao potencijalno smrtonosnog oboljenja. **Prikaz slučaja.** U ovom prikazu opisana je klinička slika, patohistološki i imunohistohemijski nalaz skvamocelularnog karcinoma timusa koji je slučajno identifikovan kod pacijenta tokom elektivne hirurške revaskularizacije miokarda.

Ključne reči: karcinom timusa; karcinomi medijastinuma; elektivne hirurške procedure; miokardijalna revaskularizacija; bajpas koronarnih arterija; timektomija; imunohistohemija; skvamozni karcinom; rana dijagnoza; morfološki i mikroskopski nalazi

Introduction

All thymomas are malignant tumors [1]. They are rare with an incidence of 0.15 cases per 100,000 adults. However, thymoma is one of the most frequent mediastinal tumor accounting for 21% of all mediastinal tumors [2]. Thymomas occur as encapsulated formations, locally invasive tumors or thymic epithelial carcinomas [3, 4]. While most of thymic epithelial tumors are easily classified into one of these groups, the new immunohistochemical and genetic knowledge redefined the "4th edition of the World Health Organization Classification of Tumors of the Lung, Pleura, Thymus and Heart" as a valuable tool for pathologist, cytologist and clinical oncologists [5]. In this report, we present a case of a Caucasian man with an incidental finding of thymic carcinoma during elective coronary artery bypass grafting (CABG) surgery.

Case Report

A 54-year-old man was transferred from an outside hospital for elective CABG surgery. Preoperative posteroanterior (PA) chest radiography did not show any mediastinal mass, and electrocardiogram confirmed regular sinus rhythm (heart rate=68/min). Transthoracic echocardiogram revealed a slightly decreased left ventricular systolic function (ejection frac-

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Abbreviations

RCA – right coronary artery
LAD – left anterior descending coronary artery
Cx – circumflex coronary artery
CABG – coronary artery bypass grafting
CK – cytokeratin

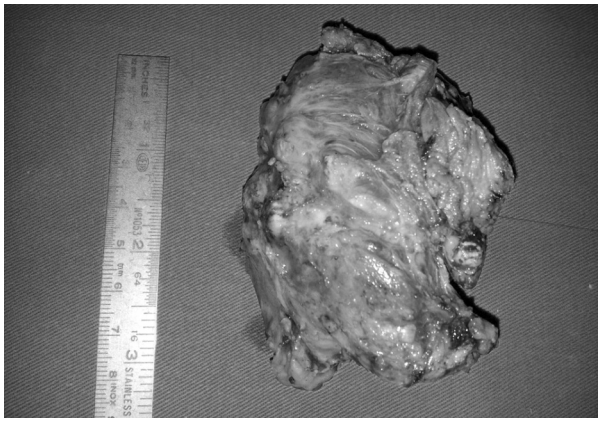

Figure 1. Gross view of resected mediastinal mass (7 x 3 x 3 cm)
Slika 1. *Makroskopski prikaz resecirane medijastimalne tumefakcije (7 x 3 x 3 cm)*

tion≈50%). Coronary angiography showed a chronic occlusion of the right coronary artery (RCA), and significant stenosis (≥ 75%) of the left anterior descending artery (LAD) and circumflex artery (Cx). A day after the patient had been admitted, he was scheduled for elective CABG surgery.

Routine medial sternotomy was performed. An irregular mass (7x3x3 cm) was found in the anterior mediastinum arising from the thymus. The mass was infiltrating the underlying pericardium at the level of aortic arch and distal ascending aorta and reflection of the pericardium to the aortic arch in diameter of 4 cm. The rest of the mediastinum, pericardium, heart and great vessels were without invasion and/or contact with the tumor tissue. Radical excision of the tumor was performed with resection of adjacent mediastinal fat

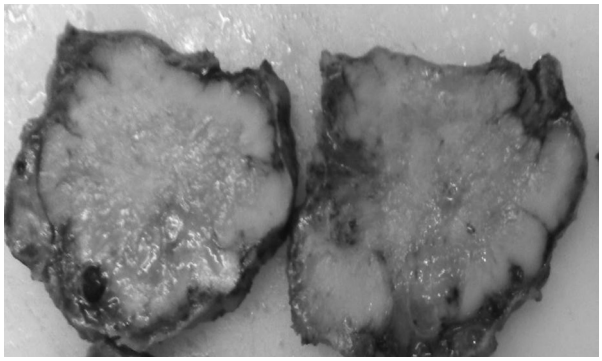

Figure 2. Cross-section of tumor tissue: whitish, homogeneous material with smaller yellowish areas of necrosis.
Slika 2. *Presek tumorskog tkiva: beličaste boje, homogene građe sa manjim žućkastim područjima nekroze*

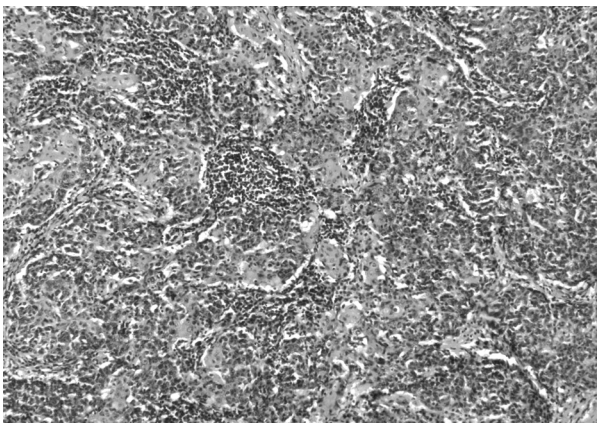

Figure 3. Histological section of the resected thymic carcinoma. Tumor presents with multiple tumor cells with keratinization and stroma infiltrating lymphocytes (H&E x10)
Slika 3. *Histološki prikaz reseciranog karcinoma timusa. Tumor prezentuju multiple atipične skvamocelularne ćelije sa disperzovanim hromatinom, celularna hiperplazija i atipična mitotska aktivnost (H & E x10)*

and pericardium **(Figure 1).** On cross-section the tumor node was whitish, homogeneous material with smaller areas of yellowish necrosis. Some of the material was cystic, and the cysts were filled with a gelatinous substance **(Figure 2)**. The macroscopically described cystic areas corresponded to the parenchyma of the thymus which was defined as an infiltrative tumor tissue. The heart was arrested and standard on-pump procedure was carried out. The LAD was grafted with the left internal mammary artery; and saphenous veins were used for grafting the RCA and Cx artery.

According to the microscopic examination the tumor node consisted of atypical squamous epithelial cells, with hyperchromatic irregular nuclei, and disturbed nucleo-cytoplasmic relationship with obvious pathological mitoses, arranged in irregular strips and nests. Some small areas of keratinization and necrosis of tumor tissue were also present. Desmoplastic stroma was partly hyalinized and focally filled with lymphocytes and giant cells with washed needle crystals of cholesterol **(Figure 3)**.

Immunohistochemical examination of the specimen was positive for cytokeratin (CK)18, CK19, CK5/6 and CD5 and CD117, and negative for CK7, TTF1, CD56 and CD20 markers **(Figure 4)**. Thus, the diagnosis of thymic squamous cell carcinoma stage III (Masaoka-Koga staging system) was confirmed [3].

Discussion

Thymic carcinoma is a rare primary tumor which is able to invade the local tissue aggressively and produce distant metastasis [1]. It originates from carcinoid neuroendocrine cells (Kulchitsky cells) usually present in the thymus gland [6]. The diagnosis of carcinoma of the thymus is sometimes very difficult. A differential diagnosis includes: metastatic cancer, thymoma, large cell lymphomas, metaplastic thymoma and ger-

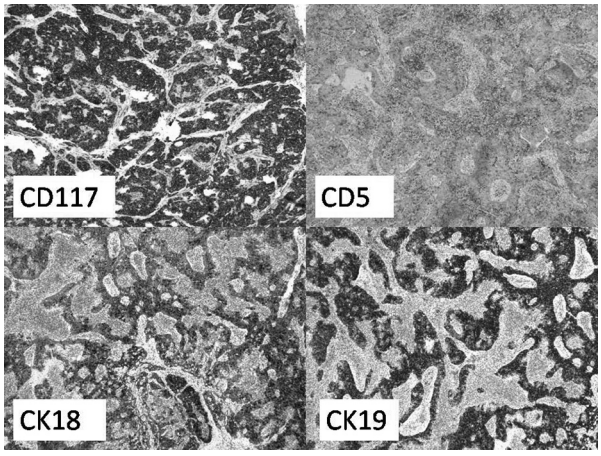

Figure 4. Immunohistochemistry of the tumor cells positive for CD117, CD5, CK18 and CK19 markers (H & E x 10)
Slika 4. *Imunohistohemijsko bojenje na CD117, CD5, CK8 i CK19 markere (H & E x10)*

mline cell thymoma. Therefore, the accurate diagnosis requires the basic clinical, radiological, morphological and immunohistochemical analysis of tumors [3, 7]. Although thymoma can be of any histological type, the tumor component is usually a well or poorly differentiated squamous cell carcinoma. This histological type is usually accompanied by expression of epithelial membrane antigen (EMA), CK 7, 8, 18 and 19 as well as the p53 protein [9]. Thymic carcinoma often expresses positivity on CD5 and CD117 markers that are normally negative in thymoma. CD5 is positive in 62 to 80% of all thymic carcinoma but is always negative in thymomas. CD117 is positive in 80% to 86% of all thymic carcinoma and only 0% to 4% in thymomas [9, 10]. In our case, the tumor was positive for CK18, 19 and CD5 and CD117 markers.

At present time, modern computed tomography makes it relatively easy to detect such tumors and to determine the staging of disease. However, incidental finding of thymic carcinoma during heart surgery is possible due to a great variety in clinical presentations [2, 6, 11].

In cases of incidental finding of thymic carcinoma during open heart surgical procedures both procedures (tumor excision and heart surgery) should be performed during the same surgery [2, 6]. A delay in cardiac procedure could result in an unpredictable clinical course with potentially fatal outcome. If a tumor is not resectable without sacrificing vital structures, total thymectomy with major tumor resection should be performed. This should be followed with cardiac procedure, and the rest of the tumor tissue should be marked for adjuvant radiotherapy [3, 11].

Conclusion

This is a very rare case of incidental finding of thymic carcinoma during an open heart surgical procedure. The postoperative course of the patient was unremarkable and the patient was discharged on the postoperative day 8. Later on, adjuvant radiotherapy was administered with a target dose of 60 Gy and he stayed well and without symptoms 8 months after surgery.

References

1. Detterbeck FC, Zeeshan A. Thymoma: current diagnosis and treatment. Chin Med J (Engl) 2013;126(11):2186-91.

2. Mirsadrae S, Shah SS, Kumar B, Kaul P. Incidental locally infiltrating malignant thymoma and coronary artery bypass surgery-excision should always be considered. J Card Surg 2005;20(3):291-2.

3. Suster S, Moran CA. Thymoma, atypical thymoma, and thymic carcinoma. A novel conceptual approach to the classification of thymic epithelial neoplasms. Am J Pathol 1999;111(6):826-33.

4. Ritter JH, Wick MR. Primary carcinomas of the thymus gland. Semin Diagn Pathol 1999;16(1):18-31.

5. Marx A, Chan JK, Coindre JM, Detterbeck F, Girard N, Harris NL, et al. The 2015 World Health Organization Classification of Tumors of the Thymus: Continuity and Changes. J Thorac Oncol 2015;10(10):1383-95.

6. Abdullah F, Loon LG. An incidental finding of thymic carcinoid during urgent CABG operation. Heart Surg Forum 2002;5(4):E35-6.

7. Moran CA, Suster S. Thymic carcinoma: current concepts and histologic features. Hematol Oncol Clin North Am 2008;22(3):393-407.

8. Stevic R, Jakovic R, Masulovic D, Nagorni-Obradovic L, Mujovic N, Jovanovic D. Ultrasonography in diagnosis of thoracic diseases. Med Pregl 2010;63(1-2):86-90.

9. Hayashi A, Fumon T, Miki Y, Sato H, Yoshino T, Takahashi K. The evaluation of immunohistochemical markers and thymic cortical microenvironmental cells in distinguishing thymic carcinoma from type b3 thymoma or lung squamous cell carcinoma. J Clin Exp Hematop 2013;53(1):9-19.

10. Khoury T, Chandrasekhar R, Wilding G, Tan D, Cheney RT. Tumour eosinophilia combined with an immunohistochemistry panel is useful in the differentiation of type B3 thymoma from thymic carcinoma. Int J Exp Pathol. 2011;92(2):87-96.

11. Wright CD, Kessler KA. Surgical treatment of thymic tumors. Semin Thorac Cardiovasc Surg 2005;17(1):20-6.

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