The prognosis of angiosarcoma depends on the site of origin and on the tumor size but generally is grave.¹³ The origin of the angiosarcoma could not be diagnosed antemortem, but this is the first cardiac angiosarcoma in association with a Dacron graft in the aortic root.

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Thymolipoma with high production of carbohydrate antigen 19-9

Shinichi Maekawa, MD,^a Kan Okabayashi, MD,^a Masafumi Hiratsuka, MD,^a Masakatsu Hamada, MD,^b and Takayuki Shirakusa, MD,^c Fukuoka, Japan

Clinical Summary

During routine examination at school, a 16-year-old girl displayed an abnormal mass shadow on chest radiography and abnormal electrocardiographic results, indicating incomplete right bundle-branch block. The patient was referred to us for further evaluation. Chest radiography revealed a large mass in the mid-lower mediastinum that silhouetted bilateral heart borders and conformed to the shape of the heart, simulating cardiomegaly (Figure 1). Physical examination revealed no abnormalities. Laboratory data were within normal ranges, except for an incidental finding of increased serum carbohydrate antigen 19-9 (CA19-9) levels at 102.44 U/mL (normal, <37.0 U/mL). Computed tomography (CT) of the chest identified a massive heterogeneous mass with fat attenuation mingled with soft tissue extending widely into the bilateral inferior hemithoraces (Figure 2). Magnetic resonance imaging (MRI) of the chest displayed whorls of signal hyperintensity intermixed with areas of intermediate intensity on T2-weighted imaging (Figure 3).

From the Department of Thoracic Surgery,^a National Fukuoka-Higashi Hospital, Fukuoka, Japan; the Department of Cardiovascular Surgery,^b Wajiro Hospital, Fukuoka, Japan; and The Second Department of Surgery,^c Fukuoka University, School of Medicine, Fukuoka, Japan.

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Address for reprints: Shinichi Maekawa, MD, 1-1-1, Chidori, Koga-City, Fukuoka 811-3195, Japan (E-mail: maekawas@fukuoka2.hosp.go.jp).

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Figure 1. Chest radiography showing a large mediastinal mass extending into both the right and left hemithoraces.

Finally, CT-guided fine-needle aspiration biopsy revealed thymolipoma.

The tumor was approached through a median sternotomy. The mass was spread expansively anterior to the pericardium, stretching both phrenic nerves posteriorly and extending inferiorly into both hemithoraces. Both lobes of the tumor were resected en bloc.

Figure 2. Axial chest CT scan demonstrating a massive heterogeneous mass occupying the bilateral inferior hemithoraces.

Figure 3. T2-weighted MRI (coronal view) showing a mediastinal mass with whorls of signal hyperintensity indicating fatty components of the tumor.

No invasion of adjacent structures was observed, and the tumor was relatively easily freed by using blunt dissection. Care was taken to identify and preserve both phrenic nerves.

The tumor was yellow and tan-pink, soft, and well encapsulated, measuring $27 \times 22 \times 15$ cm and weighing 890 g. Microscopically, the tumor comprised thymic parenchyma and mature adipose tissue admixed in various proportions. Moreover, immu-

Figure 4. Immunoperoxidase staining with anti-CA19-9 monoclonal antibody demonstrating positive reactions of surface epithelial cells within the thymolipoma.

nohistochemical staining revealed CA19-9 in epithelial cells (Figure 4).

The postoperative course was uneventful, and serum CA19-9 levels normalized within 4 weeks. At the time of this writing, the patient remains in good health and has maintained normal serum CA19-9 levels for 6 months postoperatively.

Discussion

Thymolipoma is a rare, benign, and slow-growing tumor accounting for 2% to 9% of all thymic neoplasms.¹ The tumor occurs most frequently in young adults, with no sex predilection. Most patients with thymolipoma are asymptomatic and display large anterior mediastinal masses on chest radiography. Other imaging modalities, such as CT and MRI, provide important information for assessing the lesion. Although definitive diagnoses can only be reached through histopathologic evaluations, such as fine-needle biopsy, CT and MRI can narrow the differential diagnoses to thymolipoma or teratoma.

Pathologic features have been proposed on the basis of 4 theories.² The first considers thymolipoma as merely a lipoma involving thymic fat or a lipoma of multicentric origins and involution of the thymic gland. Second, the involuting hyperplasia theory proposes that diffuse thymic enlargement (true thymic

hyperplasia) is replaced by adipose tissue in the same manner as that in the normal thymus.^{3,4} Pathogenesis of the tumor in our case was consistent with this theory. Third, the mixed-tumor theory proposes a mixed neoplasm of mesenchymal and endodermal origins.⁵ This type is thought to represent typical thymolipoma with an island of noninvolved thymic tissue in adipose tissue. Finally, the involuting thymoma theory posits fatty degeneration of thymoma occurring in the same way as fatty replacement.⁶

Interestingly, the thymolipoma in our case seemed to produce CA19-9, a protein originally identified on the surface of colon cancer cells by using murine monoclonal antibodies.⁷ CA19-9 is a common tumor marker for gastrointestinal or pancreatic malignancy. Small amounts of CA19-9 are also present in normal cells, such as in the pancreatic, biliary, and salivary gland ducts and the prostate and bronchial glands.⁸ In our case the suspicion that CA19-9 was produced by the thymolipoma was confirmed on the basis of (1) preoperative absence of either gastrointestinal or pancreatic abnormalities, (2) postoperative normalization of serum CA 19-9 levels, and (3) immunoperoxidase staining with anti-CA 19-9 monoclonal antibody demonstrating CA19-9–positive epithelial cells, Hassall corpuscles, and normal thymic tissue.

Although the mechanisms behind CA19-9 production within the thymus remain unclear, production of CA19-9 within normal thymic tissue was suggested. Few reports have suggested a relationship between the thymus and CA19-9.⁹ In our case neoplastic growth of the thymus caused activation of CA19-9 production,

thus increasing serum CA19-9 levels. Studies of larger case series are necessary to elucidate the relationships between thymolipoma and CA19-9.

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The robotic, 2-stage, 3-field esophagolymphadenectomy

Kemp H. Kernstine, MD, PhD,^a Daniel T. DeArmond, MD,^a Mohsen Karimi, MD,^a Timothy L. Van Natta, MD,^a Javier C. Campos, MD,^b Mary R. Yoder, RN,^c and Jeffrey E. Everett, MD,^a Iowa City, Iowa

Minimally invasive esophagectomies have been performed with low morbidity and mortality.¹ Advancements in robotic engineering have allowed a robotic transhiatal esophagectomy to be performed.² We report our initial experience with the da Vinci Surgical System (Intuitive Surgical, Inc, Sunnyvale, Calif) to perform a thoracic esophagectomy with a cervical, wide thoracic, and

celiac axis lymphadenectomy; thoracic duct resection and ligation; creation of a gastric tube; and jejunostomy feeding tube placement with an esophagogastric anastomosis in the left side of the neck.

Clinical Summary

The patient is a 59-year-old man with a 2-month history of severe dysphagia, 40-lb weight loss, and a partially obstructing, ulcerated esophageal adenocarcinoma at 32 to 38 cm from the incisors with Barrett metaplasia. He had a smoking history of 80 pack-years and moderately reduced pulmonary function. The patient was preoperatively judged to have stage T3 N0 disease by computed tomography, fluorodeoxyglucose positron emission tomography, and endoscopic ultrasonography. The esophagus was dilated, and the patient was treated with a 5-week induction chemoradiation program of paclitaxel, carboplatin, and 40 Gy of radiation therapy. Five weeks after the last radiation dose, a robotic esophagectomy was performed.

Operative Technique

The operation was performed in 2 stages during the same period of anesthesia, first in the left-lateral-to-nearly-prone position and then

From the Division of Cardiothoracic Surgery,^a the Department of Anesthesia,^b and the Department of Nursing,^c The University of Iowa Hospitals and Clinics, Iowa City, Iowa.

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Address for reprints: Kemp H. Kernstine, MD, PhD, Division Cardiothoracic Surgery, Department of Surgery, The University of Iowa Hospitals and Clinics, 200 Hawkins Dr, Room 1616-B JCP, Iowa City, IA 52252 (E-mail: Kemp-kernstine@uiowa.edu).

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