Clinical Case Report

Medicine®

OPEN

Hepatic angiosarcomatous transformation of a mediastinal germinal cell tumor

A care case report

Giuseppe Corrias, MD[a,b], Joanna G. Escalon, MD[a,c,d], Laura Tang, MD[e], Serena Monti, PhD[f], Luca Saba, MD[b], Lorenzo Mannelli, MD, PhD[a,c,*]

Abstract

Rationale: Mediastinal nonseminomatous germ cell tumor (NSGCT) is an uncommon entity. Metastatic hepatic sarcomatous transformation is rare.

Patient concerns: We report a 24-year-old man with no previous related medical history presented with chest pain and left arm numbness.

Diagnoses: The x-ray showed an anterior mediastinal mass. The chest computed tomography (CT) confirmed the presence of a mildly enhancing mass in the same location, without invasion of any vascular structure. A CT-guided biopsy was performed, revealing a primary mediastinal nonseminomatous germ cell tumor (NSGCT), yolk sac histology, with areas of somatic transformation to malignant nerve sheath tumor. After surgery patient was followed-up with imaging. Two years later a CT scan showed a new hepatic hyper vascular lesion, confirmed by a subsequent magnetic resonance imaging (MRI) and positron emission tomography (PET) scan. A CT-guided biopsy revealed a hepatic metastatic transformation to angiosarcoma of the primitive NSGCT.

Interventions: The patient went on to received palliative chemotherapy.

Outcomes: The patient is being followed-up regularly at the outpatient department.

Lessons: Because of the potential of metastatic sarcoma arising from germ cell tumors, these patients should undergo periodical follow-up, with periodical scans. PET\CT scan might have a role in the follow-up of these patients.

Abbreviations: CT = computed tomography, EKG = electrocardiogram, FDG = fludeoxyglucose, GCT = germ-cell tumors, MRI = magnetic resonance imaging, NSGCT = nonseminomatous germ cell tumor, PET = positron emission tomography, TIP = (paclitaxel-Taxol; ifosfamide, cisplatin) chemotherapy.

Keywords: 18F-FDG PET/CT, angiosarcoma, germ cell tumor, mediastinal, metastasis, transformation

1. Introduction

Mediastinal and testicular germ cell tumors (GCT) can contain sarcomatous elements which have high malignant potential and can transform to high-grade neoplasms.[1] Angiosarcomatous transformation is nearly exclusively found in mediastinal germ cell tumors. We present a rare case of mediastinal non-seminomatous germ cell tumor, which underwent somatic transformation to angiosarcoma in the liver, few years after the first presentation of disease.[2,3]

2. Case presentation

A 24-year-old man presented at the emergency department with chest pain, left arm numbness, and minimal dry cough. He had no dyspnea or other respiratory symptoms. There was no finding on physical examination. Blood tests, cardiac enzymes, and electrocardiogram (EKG) were normal. He had a past medical history of obesity, lower extremity deep vein thrombosis, and intermittent headaches for the last several years. An anterior mediastinal mass was noted on a chest x-ray and a chest CT scan was ordered, revealing a heterogeneous anterior mediastinal mass (Fig. 1A, white arrowheads) and mediastinal lymphadenopathy. Biopsy was consistent with a primary mediastinal nonseminomatous germ cell tumor (NSGCT), yolk sac histology, with areas of somatic transformation to malignant nerve sheath tumor (Fig. 1B, hematoxylin and eosin stain, magnification

Editor: Chun Gao.

Work by GC was partially supported by 2 scholarships awarded by ISSNAF Imaging Science Chapter and by European Union's Globusdoc Program.

The authors GC, JE, LT, SM, LS, and LM were equally involved in acquisition of data, analysis, and interpretation of data, drafting of the manuscript, critical revision of the manuscript for important intellectual content, statistical analysis, technical, and material support of this study.

Grant support was provided by MSK Cancer Center Support Grant/Core Grant P30 CA008748.

The authors have no conflicts of interest to disclose.

[a] Department of Radiology, Memorial Sloan Kettering Cancer Center, York Avenue, New York, NY, USA, [b] Department of Radiology, University of Cagliari, via Università, Cagliari, Italy, [c] Department of Radiology, New York-Presbyterian/ Weill Cornell Medical Center, New York, NY, [d] Department of Radiology, University of Colorado, Aurora, CO, [e] Department of Pathology, Memorial Sloan Kettering Cancer Center, New York, NY, USA, [f] IRCCS SDN, Naples, Italy.

[*] Correspondence: Lorenzo Mannelli, 300 East 66th Street, New York, NY, 10021, USA (e-mail: mannellilorenzo@yahoo.it).

Medicine (2017) 96:51(e9152)

Received: 11 August 2017 / Received in final form: 15 November 2017 / Accepted: 16 November 2017

http://dx.doi.org/10.1097/MD.0000000000009152

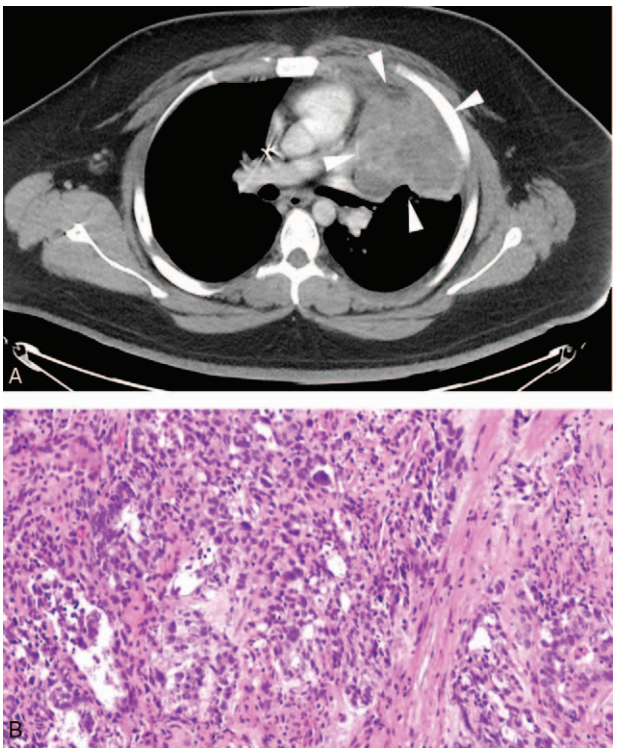

Figure 1. Chest CT with contrast (A). Heterogeneous anterior mediastinal mass (white arrowheads) and mediastinal lymphadenopathy. Pathology slice, hematoxylin and eosin stain, magnification 200× (B) Biopsy of the mass was consistent with a primary mediastinal nonseminomatous germ cell tumor (NSGCT), yolk sac histology, with areas of somatic transformation to malignant nerve sheath tumor. CT = computed tomography, NSGCT = nonseminomatous germ cell tumor.

200×). He underwent 4 cycles of chemotherapy with Cisplatin, Ifosfamide with Mesna and Paclitaxel, followed by resection with clear surgical margins.[3] He was then followed-up with imaging for recurrence and at 1 year after resection he was disease free as shown by a positron emission tomography (PET)/ computed tomography (CT) scan performed (Fig. 2); follow-up body CT and MRI scans were also negative for disease recurrence. A CT scan performed approximately 2 years after initial surgery, demonstrated 2 new arterially enhancing hepatic lesions appeared on an abdominal CT scan (Fig. 3A, white arrows). Subsequent MRI showed the same lesions with prominent perilesional arterial phase hyperenhancement (Fig. 3B, arterial phase subtraction images, white arrows) and moderate diffusion restriction (Fig. 3C, diffusion weighted image, white arrows). A PET/CT scan was performed showing 2 areas (Fig. 3D, black and white arrows) of mildly increased FDG uptake in the central liver (lesion in hepatic segment 4 SUV max: 4.52, lesion in hepatic segment 8 SUV max: 3.43; liver background SUV mean 1.8). These lesions correspond to the ones seen on contrast-enhanced CT and MRI. No sites of extrahepatic disease were identified. A CT-guided biopsy of one of the liver lesions was performed and demonstrated (Fig. 3E, hematoxylin and eosin stain, magnification 200×) a hepatic metastatic transformation to angiosarcoma of the primitive NSGCT. Palliative chemotherapy was initiated with the scope of controlling the disease. On a follow-up abdomen CT scan performed 2 months later for diffuse abdominal pain an epiploic appendagitis was noted, and the liver lesions were confirmed to be stable in size.

3. Case discussion

Written informed consent for this case report series was not required, as established by our institutional review board polices. Primary nonseminomatous germ cell tumor (NSGCT) of the mediastinum is a rare pathology accounting for 1 to 10% of the

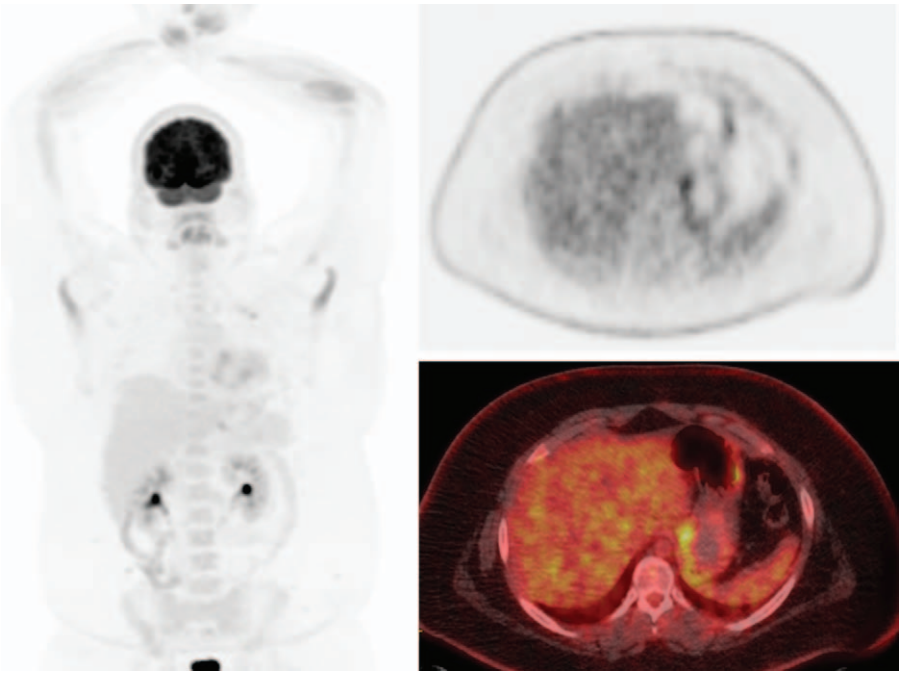

Figure 2. PET/CT scan 1 year after resection. Disease free state. CT = computed tomography, PET = positron emission tomography.

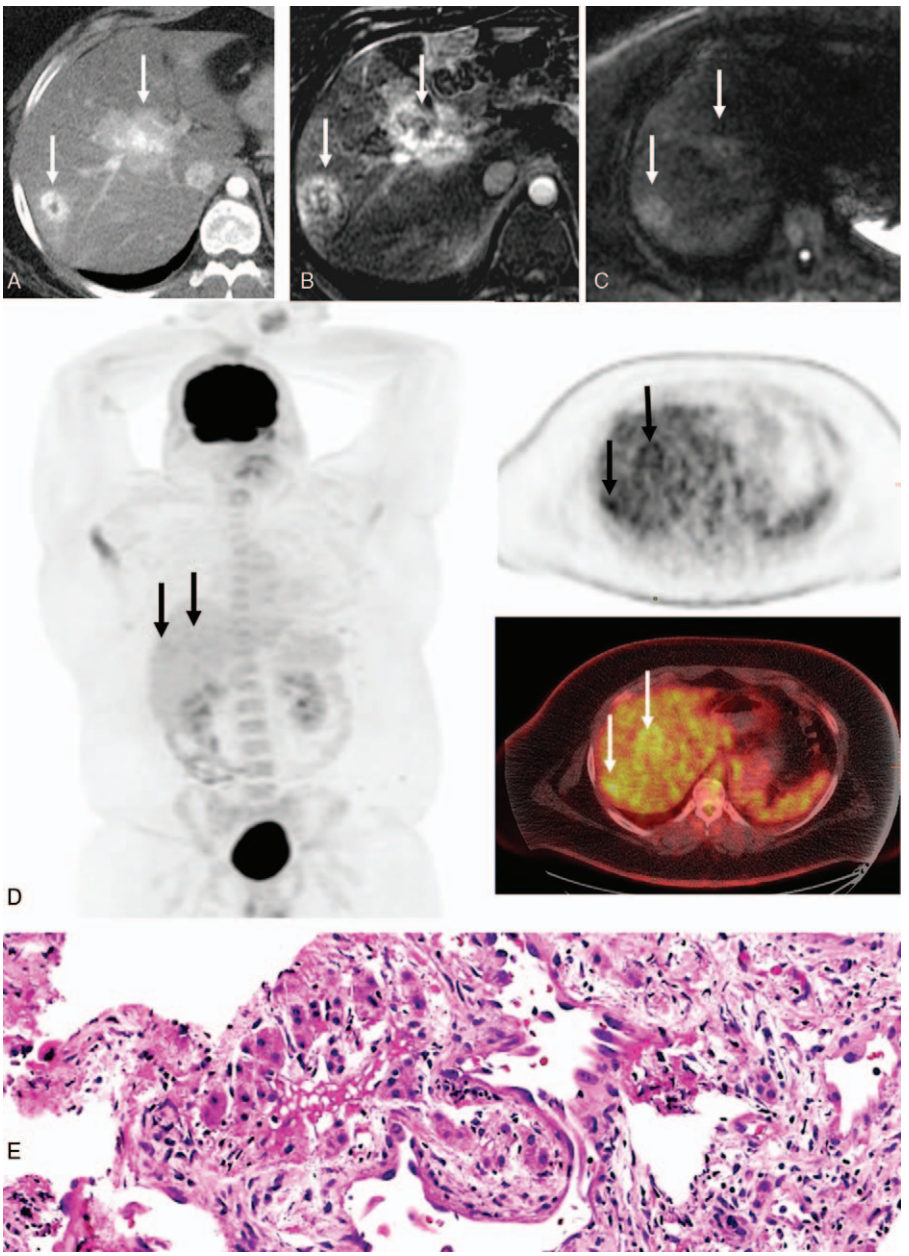

Figure 3. CT scan, post contrast, arterial phase (A) 2 years after surgery. Two new arterially enhancing hepatic lesions. MRI, arterial phase subtraction images. (B) Hepatic lesions with prominent peri-lesional arterial phase hyperenhancement (white arrows). MRI, diffusion weighted images (C). Hepatic lesions with diffusion restriction (white arrows). FDG-PET/CT scan. (D) Two areas (black and white arrows) of mildly increased FDG uptake in the central liver (lesion in hepatic segment 4 SUV max: 4.52, lesion in hepatic segment 8 SUV max: 3.43; liver background SUV mean 1.8). H&E stain, magnification 200×. (E) A CT-guided biopsy of one of the liver lesions was performed and demonstrated a hepatic metastatic transformation to angiosarcoma. CT = computed tomography, FDG = fludeoxyglucose, MRI = magnetic resonance imaging, PET = positron emission tomography.

NSGCT. The cause of the unusual anatomical site for these tumors is a germ cells displacement ridge during embryogenesis.[1–3] The prognosis in this group of patients is really poor.[4,5] A first line TIP (paclitaxel-Taxol; ifosfamide, cisplatin) chemotherapy has been proposed.[6] The occurrence of sarcomatous changes in germinal cell tumors is a rare event. However, when this transformation occurs, it seems to happen predominantly in mediastinal arising masses.[7–9] Sarcomatous foci have high malignant potential and can transition to high grade with specific differentiation, most commonly embryonal rhabdomyosarcoma, followed by angiosarcoma and leiomyosarcoma. Vascular neoplasms such as angiosarcoma are nearly exclusively found in mediastinal germ cell tumors.[8,9]

Because of the potential of metastatic sarcoma arising from germ cell tumors, these patients should undergo periodical follow-up,[10–12] with periodical CT or PET\CT. Diffusion MRI is a useful tool to diagnose and stage mediastinal cancers.[13] It combines the morphological and high resolution information of standard MRI with functional information.

Evaluation for angiosarcoma and distinction from other hepatic lesions requires multiphase contrast-enhanced CT or MRI imaging. Primary liver angiosarcoma lesions demonstrate

heterogenous progressive enhancement. This is not to be confused with hemangiomas, which typically show progressive discontinuous nodular enhancement.[14,15] Furthermore, PET \CT scans are fundamental to differentiate these entities since angiosarcomas[13,15] are FDG avid.[16,17]

References

[1] Williamson SR, Thomas TM. Chapter 9: Germ cell tumors of the mediastinum. In: Marchevsky AM, Wick MR, editors. Pathology of the Mediastinum. New York: Cambridge University Press; 2014;146–68.

[2] Malagón HD, Valdez AM, Moran CA, et al. Germ cell tumors with sarcomatous components: a clinicopathologic and immunohistochemical study of 46 cases. Am J Surg Pathol 2007;31:1356–62.

[3] Koyama T, Fletcher JG, Johnson CD, et al. Primary hepatic angiosarcoma: findings at CT and MR imaging. Radiology 2002;222: 667–73.

[4] Bokemeyer C, Nichols CR, Droz JP, et al. Extragonadal germ cell tumors of the mediastinum and retroperitoneum: results from an international analysis. J Clin Oncol 2002;20:1864–73.

[5] International Germ Cell Collaborative Group. International germ cell consensus classification: a prognostic factor-based staging system for metastatic germ cell cancers. J Clin Oncol 2007;15:594–603.

[6] Kondagunta GV, Bacik J, Donadio A, et al. Combination of paclitaxel, ifosfamide, and cisplatin is an effective second-line therapy for patients with relapsed testicular germ cell tumors. J Clin Oncol 2005;23:6549–55.

[7] Dulmet EM, Macchiarini P, Suc B, et al. Germ cell tumors of the mediastinum. A 30-year experience. Cancer 1993;72:1894–901.

[8] Gonzales-Vela JL, Savage PD, Manivel JC, et al. Poor prognosis of mediastinal germ cell cancers containing sarcomatous components. Cancer 1990;66:1114–6.

[9] Manivel C, Wich MR, Abenoza P, et al. The occurrence of sarcomatous components in primary mediastinal germ cell tumors. Am] Surg Pathol 1986;10:711–7.

[10] Mannelli L, Nougaret S, Vargas HA, et al. Advances in diffusion-weighted imaging. Radiol Clin North Am 2015;53:569–81.

[11] Gluskin JS, Chegai F, Monti S, et al. Hepatocellular carcinoma and diffusion-weighted MRI: detection and evaluation of treatment response. J Cancer 2016;7:1565–70.

[12] Shimada K, Nakamoto Y, Isoda H, et al. FDG PET for giant cavernous hemangioma: important clue to differentiate from a malignant vascular tumor in the liver. Clin Nucl Med 2010;35:924–6.

[13] Razek AAKA. Diffusion magnetic resonance imaging of chest tumors. Cancer Imaging 2012;12:452–63.

[14] Vasanawala MS, Wang Y, Quon A, et al. F-18 fluorodeoxyglucose PET/CT as an imaging tool for staging and restaging cutaneous angiosarcoma of the scalp. Clin Nucl Med 2006;31:534–7.

[15] Bhargava P, Iyer RS, Moshiri M, et al. Radiologic-pathologic correlation of uncommon mesenchymal liver tumors. Curr Probl Diagn Radiol 2013;42:183–90.

[16] Contreras AL, Punar M, Tamboli P, et al. Mediastinal germ cell tumors with an angiosarcomatous component: a report of 12 cases. Hum Pathol 2010;41:832–7.

[17] Piciucchi S, Dubini A, Tomassetti S, et al. Angiosarcoma in the chest: radiologic-pathologic correlation: case report. Medicine 2016;95:e5348.