Pulmonary thromboembolism and coronary thrombosis after chemotherapy with cisplatin: simultaneous diagnosis with non-ECG gated computed tomography

Dear Editor,

A 74-year-old male with a history of hypertension and smoking diagnosed with squamous cell carcinoma of the lung in 2017. Due to the advanced stage of the neoplasm at diagnosis (T4N2M0, stage IIIB), the patient was not considered for surgical resection. He was treated with a combination of radiation therapy and platin-based chemotherapy (cisplatin and etoposide). Five days after starting the second cycle of chemotherapy, the patient presented to the emergency department with a several-hour history of cough, nausea, and persistent, nonspecific retrosternal chest pain, together with worsening dyspnea. Physical examination revealed asymmetric femoral pulses and aortic dissection was suspected. The electrocardiogram showed a 1 mm ST segment elevation in the inferior leads. To rule out aortic dissection and the potential involvement of the right coronary artery, computed tomography angiography (CTA) of the chest and abdomen was performed. The CTA showed pulmonary embolism, an occluded right coronary artery, and no aortic dissection (Figure 1A). Hypoperfusion of the inferior wall of the left ventricle was also observed (Figure 1B). The patient was immediately transferred to the catheterization laboratory. Conventional coronary angiography revealed acute thrombotic occlusion of the right coronary artery, and percutaneous balloon angioplasty and stenting of the right coronary artery was performed (Figure 2). The patient was initially maintained on anticoagulation and dual antiplatelet therapy. Subsequently, the patient developed respiratory complications and sepsis, evolving to death two weeks later.

Cisplatin is one of the most effective cytotoxic chemotherapeutic agents and is widely used in the treatment of solid tumors[1]. Despite its beneficial effects, cisplatin has been associated with acute thrombosis, occasionally in multiple vascular territories, the incidence of cisplatin-associated thrombosis ranging from 0.2% to 12%[2–4]. The major mechanisms involved in the development of such thrombosis are endothelial damage, thromboxane production, platelet activation, and platelet aggregation[5]. In addition, thromboembolic events, such as pulmonary thromboembolism and deep venous thrombosis, have been shown to be potential side effects of cisplatin use[6]. Although the underlying neoplasia itself confers a higher risk of thromboembolic events, the reported incidence of such events among patients treated with cisplatin, during the course of treatment and up to four weeks after the last dose, is over 18%[7]. In addition, cisplatin has been detected in the blood 20 years after

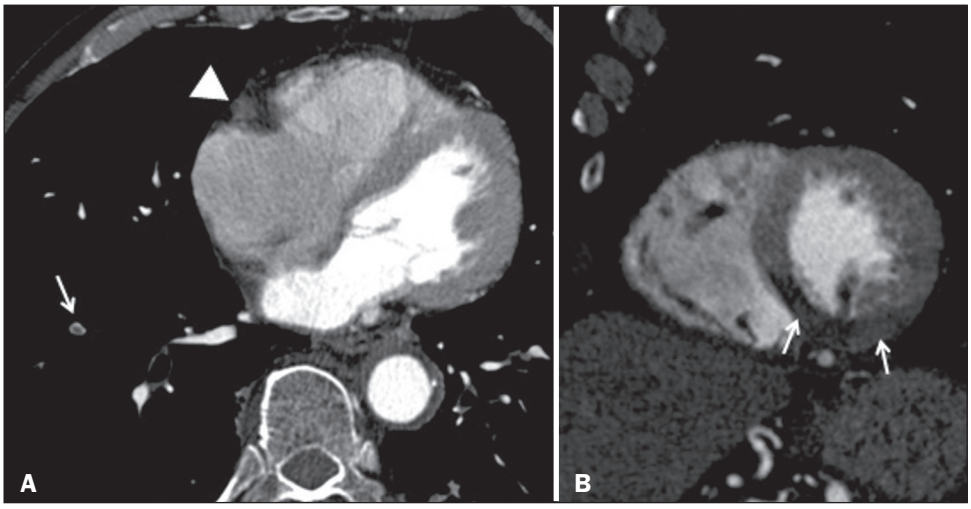

Figure 1. A: Axial CTA at the level of the heart, showing a lack of contrast enhancement of the right coronary artery (arrowhead) and a central filling defect in a subsegmental branch of the right pulmonary artery supplying the lower lobe (arrow), consistent with acute pulmonary embolism. **B:** CTA reconstruction in the short axis plane of the left ventricle, showing hypoperfusion of the inferior, inferolateral, and inferoseptal segments of the left ventricle.

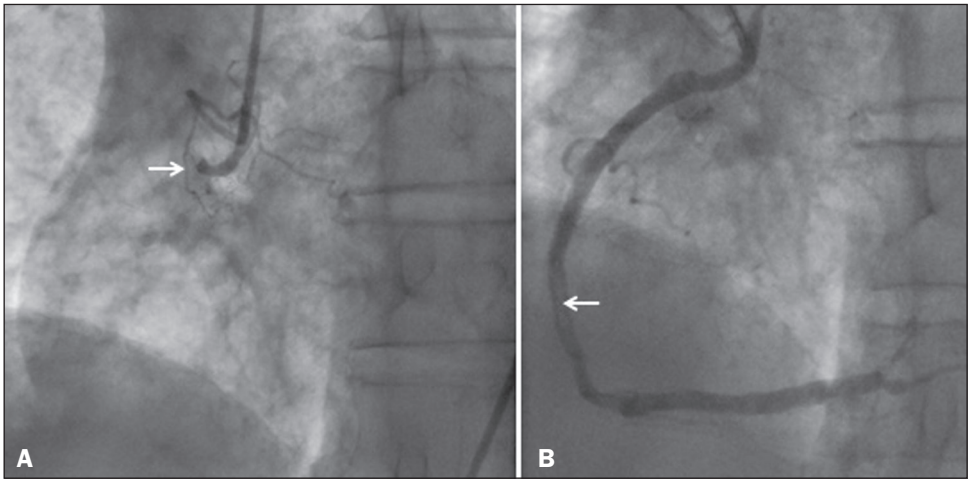

Figure 2. Left anterior oblique coronary angiography **A:** Image showing proximal occlusion of the right coronary artery (arrow). **B:** Reperfusion of the vessel, with a residual luminal thrombus (arrow), after balloon angioplasty and stenting.

its use, suggesting that it also increases the risk of cardiac and thromboembolic events in the long term[8].

In the case presented here, thrombosis was identified by CTA in two different vascular territories—in the lung (pulmonary embolism) and heart (coronary thrombosis). Our finding of hypoperfusion of the left ventricular myocardium, which is supplied by the right coronary artery, reflects acute coronary occlusion and corresponds to ST segment changes on the ECG. Although ECG-gated CT is usually the noninvasive method of choice for evaluating coronary artery disease, non-ECG-gated CT of the chest may suffice as a means of providing diagnostic information regarding the patency of the coronary arteries in some cases. In addition, CTA is a widely available method of evaluating the pulmonary arteries and thoracic aorta, highlighting the unique role of CT in patients who are treated with cisplatin and suspected of having experienced a vascular event.

REFERENCES

1. Dasari S, Tchounwou PB. Cisplatin in cancer therapy: molecular mechanisms of action. Eur J Pharmacol. 2014;740:364–78.
2. Berliner S, Rahima M, Sidi Y, et al. Acute coronary events following cisplatin-based chemotherapy. Cancer Invest. 1990;8:583–6.
3. Karabay KO, Yildiz O, Aytekin V. Multiple coronary thrombi with cisplatin. J Invasive Cardiol. 2014;26:E18–20.
4. Herrmann J, Yang EH, Iliescu CA, et al. Vascular toxicities of cancer therapies: the old and the new—an evolving avenue. Circulation. 2016;133:1272–89.
5. Iliescu CA, Grines CL, Herrmann J, et al. SCAI Expert consensus statement: evaluation, management, and special considerations of cardio-oncology patients in the cardiac catheterization laboratory (endorsed by the Cardiological Society of India, and Sociedad Latino Americana de Cardiología Intervencionista). Catheter Cardiovasc Interv. 2016;87:E202–23.
6. Zahir MN, Shaikh Q, Shabbir-Moosajee M, et al. Incidence of venous thromboembolism in cancer patients treated with cisplatin based chemotherapy – a cohort study. BMC Cancer. 2017;17:57.
7. Moore RA, Adel N, Riedel E, et al. High incidence of thromboembolic events in patients treated with cisplatin-based chemotherapy: a large retrospective analysis. J Clin Oncol. 2011;29:3466–73.
8. Gietema JA, Meinardi MT, Messerschmidt J, et al. Circulating plasma platinum more than 10 years after cisplatin treatment for testicular cancer. Lancet. 2000;355:1075–6.

Bruna Miers May[1,a], Matheus Dorigatti Soldatelli[1,b], Felipe Soares Torres[1,c]

1. Hospital de Clínicas de Porto Alegre (HCPA), Porto Alegre, RS, Brazil.

a. https://orcid.org/0000-0001-9670-8748; b. https://orcid.org/0000-0002-1544-4398; c. https://orcid.org/0000-0002-3110-588X.

Correspondence: Dra. Bruna Miers May. Avenida Independência, 510, Independência. Porto Alegre, RS, Brazil, 90035-071. Email: brunamiersmay@gmail.com.

Received 13 September 2017. Accepted after revision 3 November 2017.

http://dx.doi.org/10.1590/0100-3984.2017.0160

The Heidenhain variant of Creutzfeldt-Jakob disease

Dear Editor,

A 78-year-old man presented with a two-month history of progressive spatial disorientation and altered color perception, without significant behavioral changes or seizures. An ophthalmologic examination showed no alterations. Serological tests for HIV and syphilis were negative. On magnetic resonance imaging (MRI) of the brain, fluid-attenuated inversion recovery (FLAIR) sequences showed a hyperintense signal in the cortical region, most pronounced in the parietal and occipital lobes, together with restricted diffusion (Figure 1). There were no signs of involvement of the white matter or basal ganglia; nor was there any contrast enhancement. A diagnosis of Heidenhain variant of Creutzfeldt-Jakob disease (HvCJD) was suggested, and that hypothesis was corroborated by electroencephalography, which showed acute, periodic triphasic waves, predominantly in the posterior areas.

CJD, also known as transmissible spongiform encephalopathy or prion disease, is a rare, rapidly progressive neurodegenerative disease with no predilection for gender, preferentially affecting patients between the fifth and eighth decades of life. It can be sporadic, which is the most common form, accounting for 85% of cases; inherited, by various mutations in the prion protein gene; iatrogenic, caused by inoculation of prions with contaminated materials; or in a variant form, which usually results from the transmission of bovine spongiform encephalopathy to humans, usually through the consumption of contaminated meat[1–3]. The typical clinical findings include a rapid decline in cognitive function, followed by myoclonic jerks and akinetic mutism. However, in HvCJD, the classic manifestation is cortical blindness due to involvement of the parieto-occipital

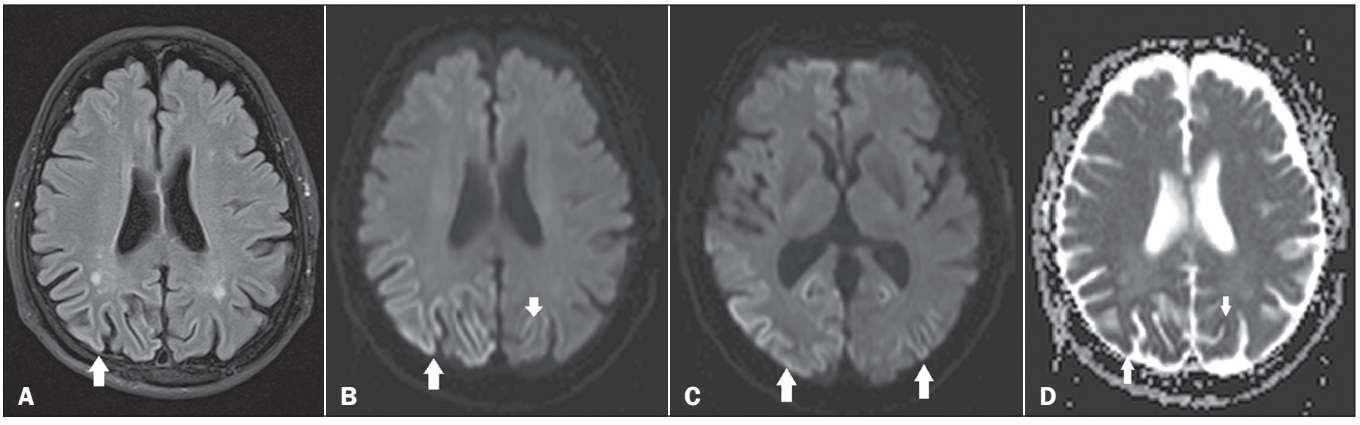

Figure 1. A: Axial FLAIR MRI sequence showing a hyperintense signal in the bilateral parieto-occipital cortex (arrow), more evident on the right, sparing the subcortical white matter. **B:** Axial diffusion-weighted MRI, at the same level depicted in **A**, showing restricted diffusion in the parieto-occipital cortex (arrow). **C:** Axial diffusion-weighted MRI, at the level of the basal ganglia and thalami, showing no changes in signal intensity. Note the restricted diffusion in the bilateral parieto-occipital cortex (arrows). **D:** Axial MRI, with apparent diffusion coefficient mapping, at the levels depicted in **A** and **B**, showing low signal intensity, confirming the restricted diffusion, in the cortical lesions.