Melanoma metastasis of the heart: Case report of an atypical metastatic location

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Melanoma is an aggressive skin cancer that most commonly metastasizes to the lymph nodes, brain, and lungs. Due to its increasing incidence, it is projected to become the second most common malignancy in the United States by 2040 [1]. In recent years, the median survival of patients with melanoma has increased substantially due to improved treatment methods [2] and earlier, more accessible diagnosis [3].

We present the case of a 47-year-old female patient with a 7-year history of melanoma and a recent metastasis to the right atrium of the heart (RA). The primary cancer, a small skin lesion on the back of her thigh (Figure 1A), was excised in 2015. Histopathology confirmed melanoma (BRAF "–"). Between 2019 and 2022, the patient was diagnosed with skin, central nervous system (CNS), and pelvic lymph node metastases. The patient received pelvic lymphadenectomy and nivolumab monotherapy. In addition, CNS metastases were treated with seven separate courses of CyberKnife stereotactic radiosurgery for 4 years.

In September 2021, a PET scan showed increased glucose metabolism in the RA. Magnetic resonance imaging (MRI) confirmed a 15 × 16 × 18 mm tumor. The differential diagnosis included a thrombus and metastatic tumor, and anticoagulant therapy (low-molecular-weight heparin in therapeutical dose) was introduced. One year later, MRI showed a twofold increase in the tumor size (27.5 × 36 × 39.5 mm) and infiltration of the atrial wall and right coronary artery. A subsequent PET scan indicated a very high glucose metabolism (SUVmax — 20.4) (Figure 1B; Supplementary material, *Figures S1, S2*). A biopsy of the tumor and the AngioVac technique [4] were not performed due to concerns about intraprocedural rupture of the infiltrated RA wall. The patient reported only mild fatigue, and no rhythm abnormalities were observed. Echocardiography initially showed no flow obstruction into the right heart (Supplementary material, *Videos S1, S2, S3*). The multidisciplinary team consisting of an oncologist, cardiologist, cardiac surgeon, and radiation oncologist decided to continue the previous immunotherapy and postpone surgery due to the patient's high procedural risk and oligosymptomatic state.

Contrast-enhanced computed tomography (CT) was performed six weeks later to plan further treatment. Despite a significant increase in tumor size (37 × 41 × 44 mm) (Figure 1C–D) and an additional pedunculated, mobile mass in the LV (9 × 5 mm), combined immunotherapy (ipilimumab + nivolumab)

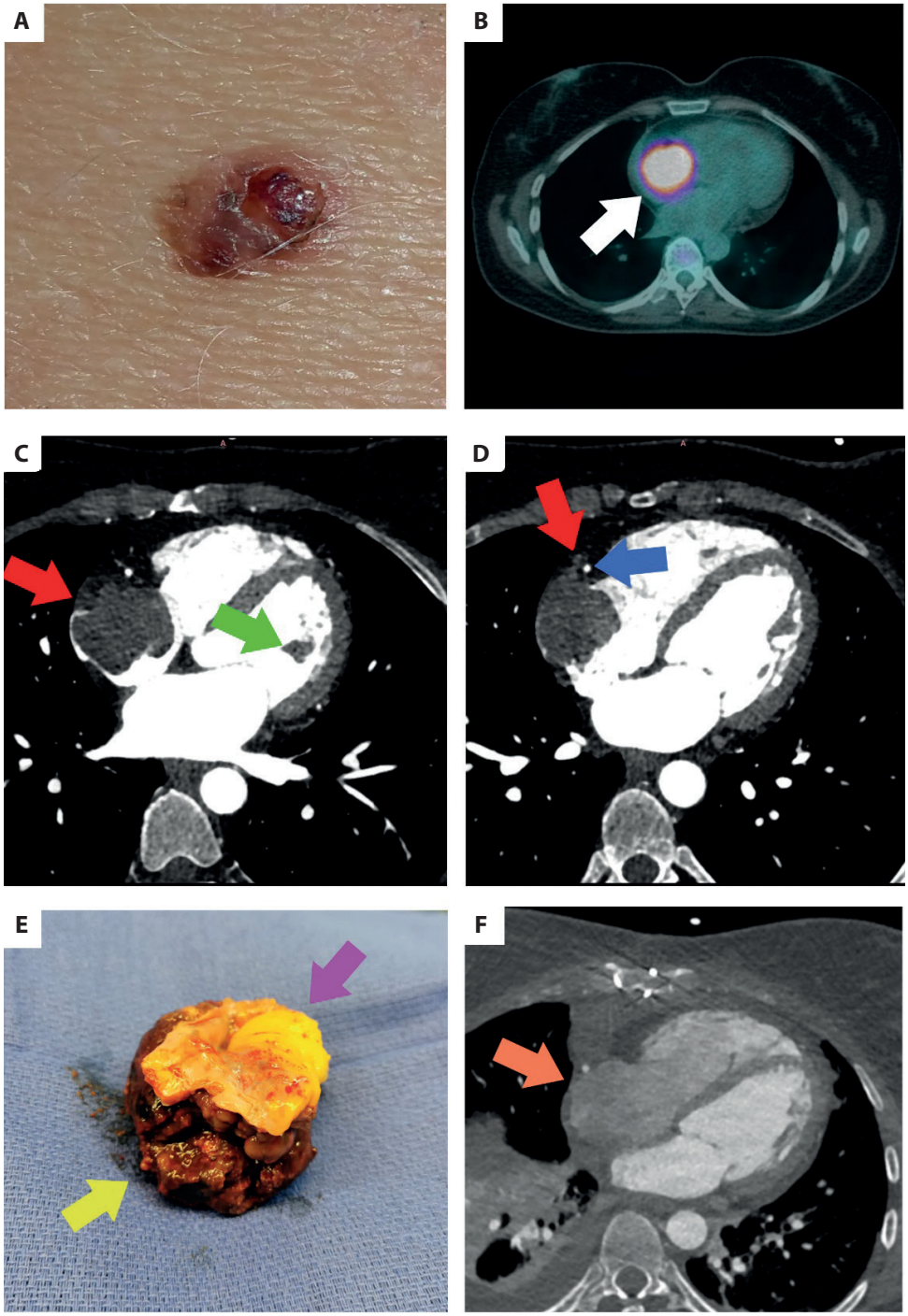

Figure 1. A. Initial skin lesion, excised surgically in 2015. **B.** 18F-FDG PET-CT scan (05.2023) with increased glucose metabolism in the right atrium (white arrow). **C.** and **D.** Contrast-enhanced CT of the heart. Red arrow points at the right atrium wall infiltration, the blue arrow points at the right coronary artery infiltration, green arrow points at the pedunculated, mobile LV mass (9 × 5 mm). **E.** Tumor after excision: tumor mass — yellow arrow, atrial wall — purple arrow. **F.** CT one week after surgery (orange arrow — RA)

Abbreviations: 18F-FDG PET-CT, positron emission tomography with 2-deoxy-2-[fluorine-18]fluoro-D-glucose integrated with computed tomography; CT, computed tomography; LV, left ventricle; RA, right atrium

was initiated. Radiotherapy was considered; however, due to the massive RA wall infiltration seen on cardiac CT, it was considered impossible to safely deliver sufficient RT dose considering the risk of atrial wall perforation. Given the gradually increasing fatigue and progressing RA obstruction observed on echocardiography (Supplementary material, *Videos S4, S5*), a radical surgical resection was performed (Figure 1E–F; Supplementary material, *Video S6*). A histopathological examination confirmed metastatic melanoma with inflammatory cell infiltration and necrosis inside the tumor. At a four-week follow-up, the patient presented with a significant reduction in fatigue

without surgical complications. An echocardiographic study showed moderate tricuspid regurgitation with normal ejection fraction and matched postoperative CT and echocardiography regarding the RA.

Considering the prolonged survival enabled by advanced systemic therapies [2] and advances in imaging techniques [3], the incidence of atypical-location metastases will probably increase, including cardiac metastases of melanoma that qualify for surgical intervention [5]. This change in the metastatic landscape calls for development of effective, standardized treatment for these patients.

Supplementary material

Supplementary material is available at https://journals.viamedica.pl/kardiologia_polska.

Article information

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