18F-FDG PET/CT for Detecting Sarcoma of the Aorta in a Patient with Takayasu Arteritis

Tomoko Takahashi¹ · Naoto Watanabe¹ · Minoru Wakasa² · Kouji Kajinami² · Hisao Tonami¹

Received: 9 February 2015 / Revised: 27 May 2015 / Accepted: 15 June 2015 / Published online: 30 June 2015
© Korean Society of Nuclear Medicine 2015

Sarcoma of the aorta is extremely rare; however, 18F-fluorodeoxyglucose positron emission tomography/computed tomography (18F-FDG PET/CT) imaging is a useful modality for detecting malignant tumors, including various sarcomas. We report on a case of sarcoma of the aorta associated concomitantly with Takayasu arteritis. The 18F-FDG PET/CT detected an abnormal increased uptake in an aortic mass of the descending thoracic aorta, thoracic vertebra, and ilium. The standardized uptake value (SUV) of 18F-FDG in the aortic mass was 21.7, suggesting that 18F-FDG PET/CT imaging may be useful for detecting sarcoma of the aorta associated concomitantly with Takayasu arteritis and bone metastases during treatment (Figs. 1 and 2).

Fig. 1 Before (a) and after (b) contrast enhanced computed tomography (CT). Primary malignancies such as angiosarcoma of the aorta are extremely rare. They occur more frequently in men with a male-to-female ratio of 2:1 [1–3]. The average age of those affected is in their 60s [1–3]. At the time of initial presentation, >50 % of patients have metastatic disease [3–5]. Sarcomas of the aorta are classified into intimal angiosarcomas of endothelial origin, intimal myofibroblastic sarcomas of mesenchymal origin, and mural sarcomas of medial or adventitial origin of the aorta, depending on the immunohistochemical pattern of the tumors [3]. The majority of cases are believed to arise in the intima as an intraluminal growth, which forms a plaque-like structure along the intima or presents with a polypoid intraluminal growth [5, 6]. Mural sarcomas are defined as extra-aortic soft tissue sarcomas [3]. Mural sarcomas behave less aggressively than intimal sarcomas, despite the very similar overall and average survival (mean range, 8–14 months) [3, 6, 7]. A 32-year-old woman with Takayasu arteritis during treatment presented with persistent fever, general fatigue, and elevated inflammatory blood markers. The CT demonstrated a heterogeneous enhanced mass surrounding the distal portion of the thoracic aorta. No portion of the mass extended into the aorta. A thoracoscopic biopsy was performed, and the tumor was histopathologically confirmed as a sarcoma of the aorta (intraluminal and mural type)

✉ Tomoko Takahashi
tomoko-t@kanazawa-med.ac.jp

¹ Department of Radiology, Kanazawa Medical University, 1-1 Daigaku, Uchinada, Kahoku, Ishikawa 920-0293, Japan

² Department of Cardiology, Kanazawa Medical University, 1-1 Daigaku, Uchinada, Kahoku, Ishikawa 920-0293, Japan

Fig. 2 The 18-fluorodeoxyglucose positron emission tomography/computed tomography (18F-FDG PET/CT): Maximum intensity projection image (**a**) and PET/CT fusion images (**b**). We also performed 18F-FDG PET/CT imaging for suspected disease activity of the Takayasu arteritis and in the aortic mass. The patient was instructed to fast for 6 h beforehand. A whole-body acquisition was started 60 min after injecting 185 MBq of the 18F-FDG. Takayasu arteritis is a form of large vessel granulomatous vasculitis often affecting young or middle-aged women, especially of Asian descent. It mainly affects the aorta and its main branches. The 18F-FDG PET or PET/CT has been reported to be useful in the diagnosis of vascular diseases such as atherosclerosis and large vessel vasculitis. Several studies have shown the value of 18F-FDG PET or PET/CT during the active stage of Takayasu arteritis [8–11]. However, few reports have discussed the tumor uptake of 18F-FDG in

cases of sarcoma of the aorta [12]. To our knowledge, the tumor uptake of 18F-FDG in sarcoma of the aorta associated concomitantly with Takayasu arteritis has not been described. In our case, 18F-FDG PET/CT imaging revealed an abnormal increased uptake in an aortic mass of the descending thoracic aorta (arrow), thoracic vertebra (white arrow), and ilium (arrow head). However, 18F-FDG PET/CT imaging demonstrated no increased uptake of the aorta because of treatment. The standardized uptake value (SUV) of the 18F-FDG uptake in the aortic mass was 21.7. Furthermore, uptake in the thoracic vertebra and ilium was finally confirmed as metastasis on autopsy. We succeeded in demonstrating the tumor uptake by using 18F-FDG PET/CT imaging. This finding suggests that 18F-FDG PET/CT imaging may be a useful modality for detecting sarcoma of the aorta associated concomitantly with Takayasu arteritis during treatment

Acknowledgments We thank the anonymous reviewers for their helpful comments to improve this paper.

Conflict of interest Tomoko Takahashi, Naoto Watanabe, Minoru Wakasa, Kouji Kajinami, and Hisao Tonami declare no conflicts of interest.

Funding information This research was carried out without funding.

Informed consent Informed consent was obtained from all individual participants included in the study.

References

- Ramjee V, Ellozy S. Aortic angiosarcoma masquerading as a thoracic aortic aneurysm. *J Vasc Surg*. 2009;50:1477–80.
- Hagspiel KD, Hunter YR, Ahmed HK, Lu P, Spinosa DJ, Angle JF, et al. Primary sarcoma of the distal abdominal aorta: CT angiography findings. *Abdom Imaging*. 2004;29:507–10.
- Thalheimer A, Fein M, Geissinger E, Franke S. Intimal angiosarcoma of the aorta: report of a case and review of the literature. *J Vasc Surg*. 2004;40:548–53.
- Fatima J, Duncan AA, Maleszewski JJ, Kalra M, Oderich GS, Gloviczki P, et al. Primary angiosarcoma of the aorta, great vessels, and the heart. *J Vasc Surg*. 2013;57:756–64.
- Sebenik M, Ricci Jr A, DiPasquale B, Mody K, Pytel P, Jee KJ, et al. Undifferentiated intimal sarcoma of large systemic blood vessels: report of 14 cases with immunohistochemical profile and review of the literature. *Am J Surg Pathol*. 2005;29:1184–93.
- Winter L, Langrehr J, Hänninen EL. Primary angiosarcoma of the abdominal aorta: multi-row computed tomography. *Abdom Imaging*. 2010;35:485–7.
- Kato W, Usui A, Oshima H, Suzuki C, Kato K, Ueda Y. Primary aortic intimal sarcoma. *Gen Thorac Cardiovasc Surg*. 2008;56:236–8.
- Santhosh S, Mittal BR, Gayana S, Bhattacharya A, Sharma A, Jain S. F-18 FDG PET/CT in the evaluation of Takayasu arteritis: an experience from the tropics. *J Nucl Cardiol*. 2014;21:993–1000.
- Cheng Y, Lv N, Wang Z, Chen B, Dang A. 18-FDG-PET in assessing disease activity in Takayasu arteritis: a meta-analysis. *Clin Exp Rheumatol*. 2013;31:S22–7.
- Tezuka D, Haraguchi G, Ishihara T, Ohigashi H, Inagaki H, Suzuki J, et al. Role of FDG PET-CT in Takayasu arteritis: sensitive detection of recurrences. *JACC Cardiovasc Imaging*. 2012;5:422–9.
- Lee KH, Cho A, Choi YJ, Lee SW, Ha YJ, Jung SJ, et al. The role of (18) F-fluorodeoxyglucose-positron emission tomography in the assessment of disease activity in patients with Takayasu arteritis. *Arthritis Rheum*. 2012;64:866–75.
- Sibille L, Ilonca D, Oziol E, Gandilhon P, Micheau A, Vernhet-Kovacsik H, et al. FDG PET/CT in aortic angiosarcoma. *Clin Nucl Med*. 2010;35:134–7.