

Endarteritis of coarctation of the aorta diagnosed with PET-CT

PET-BT ile tanısı konan aort koarktasyonu endarteriti

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Summary– Infective endocarditis (IE) is an infectious disease that affects the endothelium of the large intrathoracic vessels, heart valves, and intra-cardiac foreign body material. A 20-year-old woman was admitted to the cardiology department with complaints of fever and palpitations. Transthoracic echocardiography revealed a bicuspid aortic valve, aortic root enlargement, and aortic coarctation. Transesophageal echocardiography revealed a bicuspid aortic valve, but there was no vegetation. Methicillin-sensitive *Staphylococcus aureus* was identified on a blood culture. 18F-fluorodeoxyglucose positron emission tomography-computed tomography (18F-FDG PET-CT) revealed increased intensive glucose uptake on the dilated aortic segment adjacent to the distal coarctation zone. Several reports have shown promising results for radio-labelled white blood cell single-photon emission computed tomography and 18F-FDG PET-CT imaging in IE. To our knowledge, this is the first described case in which PET-CT revealed endarteritis of the descending aorta in a patient without prosthetic material.

Infective endocarditis (IE) is an infectious disease that affects the endothelium of the large intrathoracic vessels and structures exposed directly to the blood flow, including heart valves and intra-cardiac foreign body material.^[1] IE is an uncommon complication of aortic coarctation. Presently described is a case in which the diagnosis of endarteritis was made with positron emission tomography-computed tomography (PET-CT) in a patient with aortic coarctation.

CASE REPORT

A 20-year-old woman was admitted to the cardiology department with complaints of fever and palpitations.

Özet– Enfektif endokardit (EE) büyük intratorasik damarların endotelini, kalp kapaklarını ve intrakardiyak yabancı materyalleri etkileyen bir enfeksiyon hastalığıdır. Yirmi yaşında kadın hasta ateş ve çarpıntı şikayetiyle acil servisimize başvurdu. Transtorasik ekokardiyografi (TTE) incelemesi sırasında biküspit aort kapak, aort kökünde genişleme ve aort koarktasyonu saptandı. Transözofajiyal ekokardiyografi (TEE) biküspit aort kapak tanısını doğruladı ve kapak üzerinde vejetasyon saptanmadı. Kan kültüründe metisiline duyarlı *Staphylococcus aureus* (MSSA) saptandı. 18F-fluorodeoksiglukoz, pozitron emisyon tomografi, bilgisayarlı tomografi (18 FDG PET-BT) distal aort koarktasyon bölgesinde yoğun glukoz tutulumu olduğunu gösterdi. Radyoaktif işaretli lökosit ile yapılan SPECT/BT'nin ve 18 FDG işaretli glukozla yapılan PET-BT'nin EE tanısında duyarlılığı arttırdığına dair çeşitli yayınlar mevcuttur. Bizim olgumuz, protez materyali olmayan bir hastada inen aortda endarterit tanısının PET-BT ile koyulduğu ilk olgudur.

Her background included iron deficiency anemia and aortic coarctation. On physical examination, she looked pale. There was nothing remarkable, other than a systolic murmur suggestive of aortic coarctation. Biochemistry tests indicated iron deficiency anemia, a high erythrocyte sedimentation rate, and an elevated white blood count (WBC) and C-reactive protein (CRP) level. On transthoracic echocardiography (TTE), a bicuspid aortic valve, aortic root enlargement, and aortic coarctation were seen. Transesophageal echocardiography (TEE) confirmed the TTE findings but no vegetation was observed. Methicillin-sensitive *Staphylococcus aureus* (MSSA) was

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identified on a blood culture. A decision was made to perform 18F-fluorodeoxyglucose positron emission tomography-computed tomography (FDG PET-CT) to confirm the diagnosis of IE according to the 2015 European Society of Cardiology/European Respiratory Society (ESC/ERS) IE guidelines, since no vegetation was seen on TEE. PET-CT (standardized uptake value=7.23) revealed increased intensive glucose uptake on the dilated aortic segment adjacent to the distal coarctation zone (Fig. 1). There was no increased glucose uptake on the bicuspid aortic valve or on the other cardiac valves. The final diagnosis was endarteritis of the descending aorta. Antimicrobial therapy was initiated according to susceptibility testing results. After 6 weeks of antibiotherapy, the clinical condition of the patient was good (no fever or other signs of infective endocarditis), and the inflammation markers (CRP, WBC) were within the normal range.

DISCUSSION

Since the publication of current IE guidelines, which emphasize the importance of nuclear imaging modalities in diagnosis, use of 18F-FDG PET-CT and radio-labelled WBC SPECT-CT is becoming more common.^[1] Here we present a case of IE of the descending aorta. This case is a good example of the usefulness of PET-CT, since the diagnosis could not be confirmed with TEE. We believe the coarctation zone was the localization of the IE as observed in the PET-CT, which was performed according to the 2015 ESC/ERS IE guidelines and showed increased inten-

sive glucose uptake on the dilated aortic segment adjacent to the distal coarctation zone.^[1] It might be speculated that in our patient the bicuspid aortic valve may have caused endarteritis of the coarctation through seeding of the infection. However, there

was no increased glucose uptake on the bicuspid aortic valve or on the other cardiac valves. Furthermore, we excluded IE of the bicuspid aortic valve with TEE.

Congenital heart diseases account for 6% to 24% of cases of IE.^[2] Although endocarditis and endarteritis with aortic coarctation is uncommon, it is one of the most seen congenital heart defects complicated with IE. In a study where the pathological alterations in 34 patients with IE complicating congenital heart defects were studied, the overall incidence of IE with major congenital cardiac defects was 4.7% (34/728 patients). Tetralogy of Fallot (10 patients, 17%) and coarctation of the aorta (6 patients, 8%) were found to be the most common cardiac anomalies.^[3] Endocarditis affecting an associated bicuspid aortic valve seems to be more frequent than infection on the coarctation itself.

The diagnosis is often made with echocardiography. TEE is a suitable tool for the diagnosis of endocarditis, and is superior to TTE. Several reports have shown

Abbreviations:

CRP	C-reactive protein
ESC/ERS	European Society of Cardiology/ European Respiratory Society
FDG	Fluorodeoxyglucose
IE	Infective endocarditis
MSSA	Methicillin-sensitive Staphylococcus aureus
PET-CT	Positron emission tomography- computed tomography
SPECT	Single-photon emission computed tomography
TEE	Transesophageal echocardiograph
TTE	Transthoracic echocardiography
WBC	White blood count

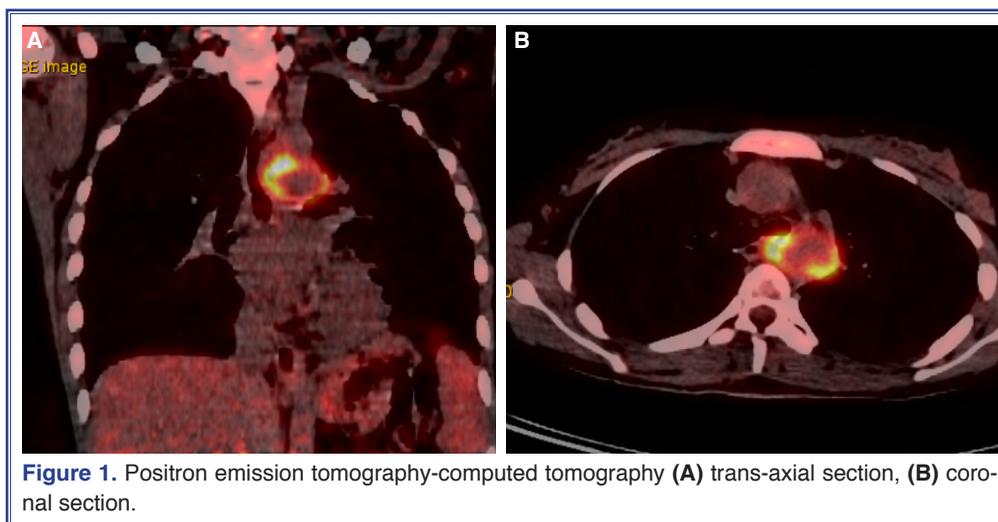


Figure 1. Positron emission tomography-computed tomography (A) trans-axial section, (B) coronal section.

promising results for radio-labelled WBC SPECT-CT and 18F-FDG PET-CT imaging in IE. Treglia et al.^[4] demonstrated the usefulness of 18F-FDG PET-CT in determining disease extent and treatment response assessment in a patient with syphilitic aortitis. Bruls et al.^[5] screened 428 consecutive patients with 18F-FDG PET-CT and diagnosed aortitis in 18 patients. Infection of aorta was the cause in 4 of 18 patients. They also reported normalization of FDG uptake with effective therapy in all patients. Aortitis can also occur due to non-infectious reasons (atherosclerosis, vasculitis, etc.). Especially with fever of undetermined origin, Takayasu arteritis should be considered. In our patient, MSSA reproduction in the blood culture excluded a non-infectious cause of aortitis. The primary added value of using these techniques is a reduction in the rate of misdiagnosed IE, classified in the “Possible IE” category using the Duke criteria, and the detection of peripheral embolic and metastatic infectious events.

To our knowledge, although there are several case reports defined as IE of homograft material after reconstruction of the aortic coarctation in the literature, this is the first described case in which PET-CT revealed endarteritis of the descending aorta in a patient without prosthetic cardiac material.

Informed consent: Written informed consent was obtained from the patient for the publication of the case report and the accompanying images.

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REFERENCES

1. Habib G, Lancellotti P, Antunes MJ, Bongiorni MG, Casalta JP, Del Zotti F, et al. 2015 ESC Guidelines for the management of infective endocarditis: The Task Force for the Management of Infective Endocarditis of the European Society of Cardiology (ESC). Endorsed by: European Association for Cardio-Thoracic Surgery (EACTS), the European Association of Nuclear Medicine (EANM). *Eur Heart J* 2015;36:3075–128.
2. Jaleldine Z, Sana C, Faker G, Adel K. Infective endarteritis and false mycotic aneurysm complicating aortic coarctation. *Ann Pediatr Cardiol* 2012;5:197–9. [CrossRef]
3. Rose AG. Infective endocarditis complicating congenital heart disease. *S Afr Med J* 1978;53:739–43.
4. Treglia G, Taralli S, Maggi F, Coli A, Lauriola L, Giordano A. Usefulness of (18)F-FDG PET/CT in disease extent and treatment response assessment in a patient with syphilitic aortitis. *Clin Nucl Med* 2013;38:e185–7. [CrossRef]
5. Bruls S, Courtois A, Nuscens B, Defraigne JO, Delvenne P, Hustinx R, et al. 18F-FDG PET/CT in the Management of Aortitis. *Clin Nucl Med* 2016;41:28–33. [CrossRef]

Key words: Aortic coarctation; aortitis; bacterial endocarditis; cardiac imaging; congenital heart disease; endarteritis; positron emission tomography-computed tomography.

Anahtar sözcükler: Aort koarktasyonu; aortit; bakteriyel endokardit; kardiyak görüntüleme; doğumsal kalp hastalığı; endarterit; pozitron emisyon tomografi-bilgisayarlı tomografi.