Role of PET/CT scan in identifying late-onset graft infection following Bentall procedure

Akash Batta, Prashant Panda, Harpreet Singh, Yash Paul Sharma

DESCRIPTION

A 34-year-old man presented with fatigue for 3 months and fever for the last 1 month. His previous medical history was significant for Marfan syndrome and he had undergone Bentall procedure 10 years ago for type A aortic dissection. Postsurgery, he was lost to follow-up for the next 10 years until the current presentation. On examination, the pulse was good volume with a rate of 100/min, blood pressure was 110/70 mm Hg and the oral temperature was 102.3°F. General physical examination revealed a tall (193 cm), thin built individual with positive wrist and thumb sign and pectus carinatum deformity (figure 1A–C). Cardiac examination revealed a grade 4/6 pansystolic murmur over the apex, radiating to the axilla.

Chest X-ray revealed cardiomegaly and ECG showed left ventricular hypertrophy (figure 1D). His laboratory parameters showed elevated leucocyte count (14 000/mm³), raised C reactive protein (CRP) (34 mg/L) and procalcitonin (2.1 ng/mL). Transthoracic echocardiography (TTE) revealed dilated left atrium and left ventricle with a normally functioning prosthetic aortic valve. Additionally, there was anterior mitral leaflet prolapse with severe eccentric mitral regurgitation (figure 1E and F). As per the guidelines, transoesophageal echocardiography (TEE) is recommended for patients of suspected prosthetic valve endocarditis or in those with a high suspicion and an indeterminate TTE. Accordingly, TEE was performed to evaluate for mitral valve or prosthetic aortic valve endocarditis, but it was negative (figure 1G–I). Contrast-enhanced CT (CECT) chest and abdomen to look for other causes of fever was unremarkable (figure 2A and B).

However, when a pair of blood cultures grew methicillin-resistant Staphylococcus epidermidis, suspicion of graft/prosthetic valve infection was raised. Subsequently, positron emission tomography (PET)/CT revealed hypodense collection in the periaortic graft (maximum standardised uptake value—9.8) suggestive of active infection (figure 2C and D). This confirmed the diagnoses of infective endocarditis. He was started on intravenous vancomycin and gentamycin and oral rifampicin. Surgical intervention was offered, however, he refused. The fever responded by day 6. Antibiotics were given for a duration of 12 weeks. The laboratory parameters including leucocyte count, CRP and procalcitonin normalised. Currently, the patient is doing up, while on ramipril, 2.5 mg and metoprolol 50 mg/day. He has been recently referred for mitral valve repair in view of severe mitral regurgitation.

Infections are uncommon after the Bentall procedure, with an incidence of 1.4%. The diagnoses in these cases remain challenging and a variety of tests may be needed for confirmation. In general, CT and TEE have good accuracy for prosthetic valve and graft infections, but post-Bentall graft infection can be missed, like in the index case. PET/CT has shown to increase the sensitivity of the modified Duke criteria when combined with clinical, microbial and echocardiographic parameters. In the largest series on Bentall graft infection by Machelart et al, the sensitivity of CECT was 37.5% compared with PET/CT, which had a 100% sensitivity. The majority of infections are late onset and are caused by Gram-positive cocci. Surgery remains the preferred treatment option, however may not always be feasible given the complexity and high-risk nature of the procedure. Medical therapy with...
Images in...

Figure 2  Axial (A) and sagittal cuts (B) of CT of the chest failed to identify any periaortic infection. Prosthetic aortic valve and graft extending till descending thoracic aorta can be seen (white star). Corresponding positron emission tomography cuts showing periaortic, vascular graft infection in axial (C) (long white arrows) and sagittal cuts (D) (short white arrows).

Prolonged antibiotics (>3 months) is effective in those who are not surgical candidates. PET/CT correlates poorly with clinical response and, hence, it is not recommended at follow-up.4

Learning points

► Graft infection post-Bentall is a rare but serious complication.
► Most infections are late onset and caused by Gram-positive cocci.
► A high index of suspicion is needed and positron emission tomography/CT may provide the only clue.
► Surgery may not be feasible in many cases, and long-term treatment with appropriate antibiotics is a suitable alternative.

Contributors  AB: original draft preparation, conceptualisation, reviewing and editing. PP: conceptualisation, methodology, investigation, supervision, validation, reviewing and editing. HS: original draft preparation, reviewing and editing. YPS: supervision, validation, reviewing and editing.

Funding  The authors have not declared a specific grant for this research from any funding agency in the public, commercial or not-for-profit sectors.

Competing interests  None declared.

Patient consent for publication  Obtained.

Provenance and peer review  Not commissioned; externally peer reviewed.

ORCID iDs
Akash Batta http://orcid.org/0000-0002-7606-5826
Prashant Panda http://orcid.org/0000-0002-2420-5209

REFERENCES

Copyright 2021 BMJ Publishing Group. All rights reserved. For permission to reuse any of this content visit https://www.bmj.com/company/products-services/rights-and-licensing/permissions/

Become a Fellow of BMJ Case Reports today and you can:
► Submit as many cases as you like
► Enjoy fast sympathetic peer review and rapid publication of accepted articles
► Access all the published articles
► Re-use any of the published material for personal use and teaching without further permission

Customer Service
If you have any further queries about your subscription, please contact our customer services team on +44 (0) 207111 1105 or via email at support@bmj.com.

Visit casereports.bmj.com for more articles like this and to become a Fellow