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Radiolucent Mechanical Valve: Chest Radiography Conundrum

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A 90-year-old man with dementia and subdural hematoma was admitted for altered mental status with recent fall. He had undergone aortic valve replacement (prosthesis type unknown) 27 years ago, with no medical records available. Admission INR was 1.0, consistent with warfarin noncompliance (indication unclear). ECG showed normal sinus rhythm. Anterior-posterior and lateral chest x-rays failed to demonstrate a cardiac prosthesis (A, B), which would favor a bioprosthesis, such as a homograft. Transthoracic echocardiogram confirmed presence of an aortic prosthesis; however, leaflet visualization was poor and prosthesis type could not be determined. Doppler hemodynamics demonstrated severe obstruction (C). Given the remote timing of prosthesis implant, unclear indication for warfarin in a patient with prior intracranial bleed, and obstructive prosthesis physiology on echocardiography, an ECG-gated cardiac CT angiogram was performed. Despite complete radiolucency on chest x-rays, CT demonstrated a bileaflet mechanical aortic prosthesis (D, E) with

thrombosis (F). Subsequently obtained historic records suggested prosthesis type to be a St. Jude mechanical bileaflet valve prosthesis. Although chest x-ray has long been heralded as a reliable way to define prosthesis location and type, this case highlights the need for a comprehensive approach of history, physical examination, and multimodality imaging for prosthesis assessment (see [Figure 1](#)).

Author contribution

Conception and design of Study: MSA, JBG. Literature review: MSA, GT, AMA, JBG. Acquisition of data: MSA, GT, AMA, JBG. Analysis and interpretation of data: AMA, JBG. Data collection: MSA, GT, JBG. Drafting of manuscript: MSA, JBG. Revising and editing the manuscript critically for important intellectual contents: MSA, GT, AMA, JBG. Data preparation and presentation: MSA, GT, AMA, JBG. Supervision of the research: JBG. Research coordination and management: MSA, JBG.

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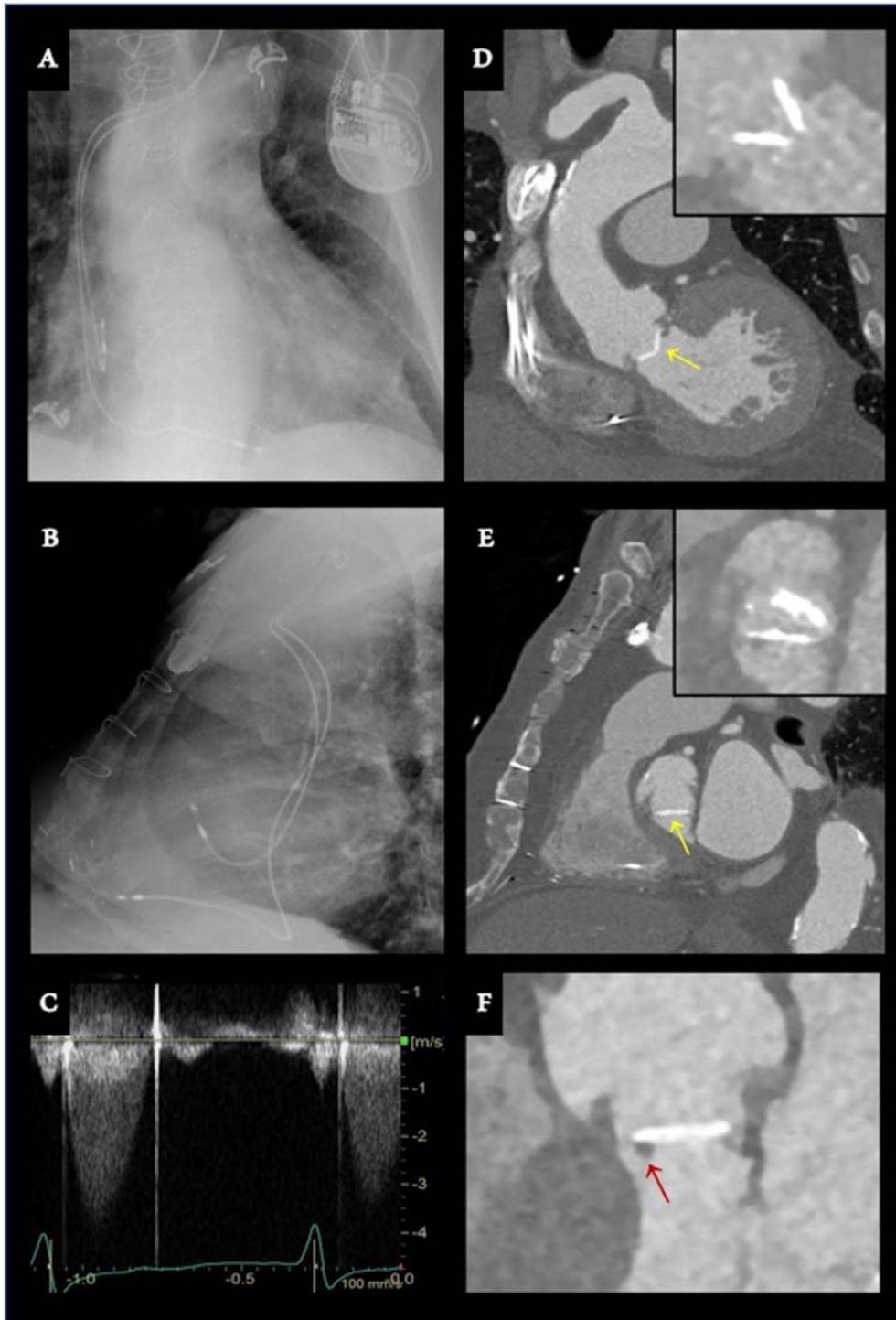


Fig. 1. Panels A and B, anterior-posterior and lateral chest x-rays with no visible cardiac prosthesis; Panel C, transthoracic echocardiogram continuous wave Doppler demonstrating evidence of aortic prosthesis obstruction (valve area of 0.84 cm^2 , mean gradient 33 mmHg , stroke volume index 31 ml/min/m^2); Panels D and E, ECG-gated cardiac CT angiography formatted into frontal and lateral views (to match chest x-ray), demonstrating presence of a bileaflet mechanical aortic prosthesis (yellow arrows), with systolic images (inset in panel right upper corners) demonstrating preserved bileaflet motion; Panel F, ECG-gated cardiac CT angiography demonstrating a 3 mm thrombus (red arrow) on the ventricular aspect of the mechanical aortic prosthesis.