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Concomitant tissue aortic valve replacement and double-vessel coronary artery bypass grafting in an elderly patient with severe aortic regurgitation and multivessel coronary artery disease: A case report

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Abstract

Background: Combined Aortic Valve Replacement (AVR) and Coronary Artery Bypass Grafting (CABG) is a well-established procedure in patients with coexisting valve disease and coronary artery disease, but each case presents a unique surgical challenge, particularly in elderly patients with comorbidities. **Case presentation:** A 76-year-old man with a history of benign prostatic hyperplasia, bronchitis, varicose veins, total hip replacement, and known coronary arteriosclerosis presented with progressive exertional dyspnoea, peripheral oedema, exercise intolerance, and fatigue. Preoperative echocardiography demonstrated a severely dilated Left Ventricle with Preserved systolic Sunction (LVEF 80%), dilated left atrium, and severe eccentric aortic regurgitation without stenosis. Coronary angiography revealed significant proximal LAD and diagonal branch stenoses. Following multidisciplinary discussion, he underwent median sternotomy with implantation of a 27 mm Edwards Inspiris Resilia tissue aortic valve and two-vessel coronary artery bypass grafting (LIMA–LAD, saphenous vein graft–D1). Cardiopulmonary bypass and aortic cross-clamp times were uneventful. Postoperative course was complicated by a transient pneumothorax and new-onset atrial fibrillation with rapid ventricular response, treated successfully with amiodarone. The patient was discharged home on postoperative day 7 in sinus rhythm. At 4-week follow-up, the patient was asymptomatic apart from mild pedal edema. **Conclusion:** This case highlights the feasibility of combined tissue AVR and CABG in elderly patients with severe AR and preserved LV function, with good early postoperative outcome despite minor complications

Keywords: Aortic valve replacement; Tissue valve; CABG; Severe aortic regurgitation; Multivessel coronary artery disease.

Introduction

Severe Aortic Regurgitation (AR) requiring valve replacement often coexists with Coronary Artery Disease (CAD) especially in elderly patients with cardiovascular comorbidities, necessitating combined surgical intervention. While mechanical prostheses are durable, tissue valves may be preferred in older patients to avoid lifelong anticoagulation and reduce bleeding risk. Combined Aortic Valve Replacement (AVR) and Coronary Artery Bypass Drafting (CABG) carries increased operative complexity, yet offers the advantage of definitive single-stage correction. Here we present a case of severe eccentric AR with multivessel CAD managed with simultaneous tissue AVR and CABG, emphasising the operative considerations and early postoperative course.

Case Presentation

Patient information

A 76-year-old male with a history of benign prostatic hyperplasia, bronchitis, varicose veins, and previous total hip replacement presented with worsening exertional breathlessness, peripheral edema, exercise intolerance, fatigue, and reduced daily activity. He denied chest pain or syncope.

Clinical findings

On examination, the patient was afebrile with normal oxygen saturation. Cardiovascular examination revealed a collapsing pulse and a high-pitched early diastolic murmur along the left sternal border. Mild bilateral ankle oedema was present and no evidence of pulmonary congestion.

Diagnostic assessment

Chest X-ray (09/04/2025): Lungs and pleural spaces clear, normal heart size, evidence of old right rib fractures.

Carotid Doppler (09/04/2025): Bilateral calcified atheromatous plaques without significant luminal narrowing; no hemodynamically significant stenosis. intima-media thickness increased (right 1.1 mm, left 0.9 mm).

Transthoracic echocardiogram (07/04/2025): Severely dilated LV cavity (LVEDVI 107 mL/m^2), mild concentric hypertrophy, preserved LVEF at 80%, normal RV function, GLS −17.2% with apical sparing, severe eccentric AR with PISA 0.9 cm, mild MR, trivial-to-mild TR and estimated RVSP 35 mmHg.

Pulmonary function tests (07/04/2025): Normal spirometry and gas transfer. Coronary angiogram (31/03/2025): Mild LMS atheroma (≤30%), proximal LAD 60% stenosis with severe ostial stenosis of large D1, OM 60% stenosis, mild LCx disease, RCA unobstructed. iFR measurements confirmed hemodynamically significant LAD and D1 lesions.

Preoperative planning

Given symptomatic severe AR and significant coronary lesions, combined AVR and CABG was indicated. A tissue valve was chosen due to patient age and to avoid lifelong anticoagulation. The surgical plan included two grafts (LIMA–LAD and SVG–D1).

Therapeutic intervention

Operative details (Date: 16/07/2025):

Under general anaesthesia, a median sternotomy was performed.

The Left Internal Mammary Artery (LIMA) was harvested as a pedicle and the saphenous vein harvested from the right leg. Standard central aortic and right atrial cannulation was performed, with a right superior pulmonary vein vent. After cross-clamp application, antegrade cardioplegia was administered, followed by aortotomy and direct ostial cardioplegia. The native valve was excised; annulus sizing permitted implantation of a 27 mm Edwards Inspiris Resilia bioprosthesis using semicontinuous 2-0 Prolene sutures. The aortotomy was closed with double-layer 4-0 Prolene pledgeted stitches and de-aired.

A reversed saphenous vein graft to D1 was performed with 7-0 Prolene (1.75 mm target vessel). Subsequently, LIMA-to-LAD anastomosis was constructed with 8-0 Prolene (2.0 mm target vessel). The cross-clamp was removed, ventricular fibrillation occurred and was successfully cardioverted to sinus rhythm. The proximal SVG anastomosis was completed with 6-0 Prolene. The patient was weaned from cardiopulmonary bypass with minimal inotropic support; heparin was reversed. Three drains (mediastinal, left and right pleural) and temporary ventricular pacing wires were placed. The sternum was closed with four boxed wires and the skin in layers.

Postoperative course

Early postoperative complications included a bilateral pneumothorax that resolved spontaneously and new-onset atrial fibrillation with rapid ventricular response, successfully managed with intravenous then oral amiodarone, restoring sinus rhythm. No neurological or renal complications occurred.

He was discharged home on postoperative day 7 in stable condition on amiodarone, aspirin, clopidogrel, furosemide, lansoprazole, dihydrocodeine, paracetamol, and sennosides.

At 4-week follow-up, the patient was asymptomatic (and in sinus rhythm) apart from mild pedal edema. Amiodarone was discontinued, and he was encouraged to increase ambulation and elevate the leg when supine. Cardiovascular examination was unremarkable; vitals were stable. Repeat ECG and cardiology review were scheduled, with referral to vascular clinic.

Timeline of key events

Date	Event
31/03/2025	Coronary angiogram: significant proximal LAD and ostial D1 stenosis; OM stenosis; RCA unobstructed
7/4/2025	Transthoracic echocardiogram: severe eccentric AR, preserved LVEF (80%), LV dilatation
7/4/2025	Lung function tests: normal
9/4/2025	Chest X-ray: clear lungs, normal heart size; carotid Doppler: bilateral calcified plaques, no significant stenosis
16/07/2025	Surgery: Median sternotomy; 27 mm Edwards Inspiris Resilia AVR; LIMA–LAD; SVG–D1
17–23/07/2025	Postoperative course: pneumothorax (resolved spontaneously); atrial fibrillation (converted with amiodarone)
23/07/2025	Discharged home on amiodarone, aspirin, clopidogrel, diuretics, analgesia, gastroprotection
13/08/2025	4-week follow-up: asymptomatic except mild pedal edema; amiodarone discontinued; continued on other medications

Discussion

Combined AVR and CABG is common in elderly patients with coexisting valvular and coronary pathology. The decision to implant a tissue valve was based on the patient's age, the desire to avoid long-term anticoagulation, and preserved LV function. The operative sequence—vein graft first, followed by valve implantation, then LIMA graft—was chosen to optimize myocardial protection and graft patency.

This patient's preserved LV function, despite severe AR, likely contributed to his good postoperative recovery.

Postoperative atrial fibrillation is a frequent complication after combined procedures, with incidence rates up to 40%; early pharmacologic rhythm control, as in this case, can prevent hemodynamic compromise. The patient's recovery was favorable, with resolution of complications and good early functional status.

This case underscores that with appropriate patient selection and perioperative management, combined tissue AVR and CABG can be performed safely in elderly patients, achieving satisfactory short-term outcomes.

Conclusion

Elderly patients with severe AR and significant CAD can undergo successful combined tissue AVR and CABG with good early outcomes, provided that meticulous operative and postoperative management is undertaken.

Patient perspective

The patient reported satisfaction with symptom relief and expressed confidence in his recovery process, particularly after resuming normal daily activities.

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

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