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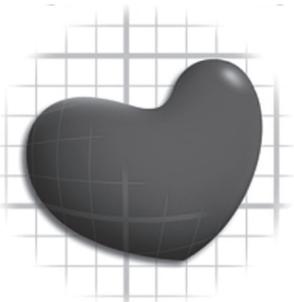
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16.^a Reunião Anual da APIC

PRÉMIO JOVEM CARDIOLOGISTA DE INTERVENÇÃO

Casos Clínicos:

Desafios em Intervenção Coronária & Estrutural

À Comunidade Cardiológica,

Em 2025, celebrámos a 16.^a Reunião Anual da APIC. Este encontro, que nesta edição teve como mote a inovação, continua a ser o espaço privilegiado de partilha entre os profissionais que dedicam o seu quotidiano à Cardiologia de Intervenção, permitindo-nos debater os temas mais prementes da nossa especialidade.

Mantendo o nosso olhar no futuro e na inovação, apresentamos a segunda edição deste suplemento. Após o sucesso do seu lançamento no ano transato, esta iniciativa consolida-se agora como um pilar fundamental da Reunião Anual da APIC. O objetivo permanece firme: complementar a tradição da apresentação de casos clínicos, garantindo o registo e a memória de intervenções de elevada complexidade e qualidade técnica.

Acreditamos que a continuidade desta publicação potencia o valor didático dos casos partilhados, servindo de referência e inspiração para as novas gerações de cardiologistas. Esta segunda edição reafirma o compromisso da APIC com a produção científica de excelência e com a divulgação do conhecimento que nasce nos nossos centros.

Certo de que este suplemento será, uma vez mais, valorizado por todos, faço votos de que a sua leitura seja proveitosa e que este registo perdure como uma marca indelével do mérito da nossa cardiologia nacional.

João Silva Marques
Presidente da 16.^a Reunião Anual da APIC



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16th Annual Meeting of APIC

YOUNG INTERVENTIONAL CARDIOLOGIST PRIZE

Clinical Cases: *Challenges in Coronary & Structural Intervention*

To the Cardiology Community,

In 2026, we celebrate the 16th Annual Meeting of APIC. This meeting remains the premier space for knowledge-sharing among professionals dedicated to Interventional Cardiology, allowing us to debate the most pressing topics in our field. With our focus firmly on the future and innovation, we are proud to present the second edition of this supplement. Following its successful launch last year, this initiative has now established itself as a fundamental pillar of the APIC Annual Meeting. Our objective remains steadfast: to complement the long-standing tradition of clinical case presentations by ensuring the record and future memory of interventions characterized by high complexity and technical excellence.

We believe that the continuity of this publication enhances the educational value of the shared cases, serving as a reference and inspiration for the new generations of cardiologists. This second edition reaffirms APIC's commitment to high-quality scientific production and to the dissemination of the expertise generated within our centers.

Convinced that this supplement will once again be highly valued by all, I trust that it will be a rewarding read and that this record will endure as a lasting mark of the merit of our national cardiology.

João Silva Marques
16th Annual Meeting of APIC President



COMUNICAÇÕES

16.^a Reunião Anual da APIC

20 a 22 de Novembro de 2025

1. CHEST PAIN AFTER CORONARY ANGIOGRAM - NOT YOUR USUAL COMPLICATION

Ana Rita Bello, Miguel Domingues, Rita A. Carvalho, João Presume, Francisco Albuquerque, Eduardo Infante Oliveira

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Introduction: Transradial access offers many potential advantages over femoral approach, including faster recovery, fewer complications, and improved clinical outcomes. Despite these benefits, severe vascular complications may still occur, necessitating prompt diagnosis and expert management. We report a case of a small branch perforation of the axillary artery that occurred during an elective procedure.

Case report: A 90-year-old man, with an excellent functional status, was admitted for a planned percutaneous coronary intervention. His medical history included hypertension, type 2 diabetes and hyperlipidaemia. He was referred for persistent typical angina following optimal medical therapy, due to a significant lesion (-70-80%) in the middle left anterior descending (LAD) artery.

A 6 Fr right radial access was obtained. A straight tip 0.035" hydrophilic coated guidewire was used to reach the ascending aorta due to tortuous

anatomy, under fluoroscopic guidance. An EBU 3.5 catheter was used for selective LAD catheterization; a Runthrough wire reached the distal vessel. Balloon pre-dilation (NC 2.0 x12) was performed with catheter extension support. Drug eluted balloon angioplasty was performed, with a good result. At the end of the procedure, the patient complained of persistent chest pain. The sterile drapes were removed, revealing a noticeable pectoral asymmetry and tenderness on palpation of the right hemithorax. Angiography of the right axillary artery revealed contrast extravasation from a perforated small branch (Figure 1). Coil embolization (Coil Bare Platinum Helix - Axiom Prime 1.5 mm x 2 cm) via a microcatheter was performed to achieve hemostasis (Figure 2). The patient was admitted in coronary unit for surveillance. He remained hemodynamically stable with an insignificant drop in hemoglobin and no evidence of hematoma growth. The patient was discharged on dual antiplatelet therapy with no further complications. Angina symptoms improved after the procedure, and the hematoma showed slow reabsorption over time (Figure 3).

Discussion: Subclavian/axillary artery injury during coronary catheterization is a rare but severe procedural complication. It can be fatal due to potential airway obstruction or hypovolemic shock. Several approaches are feasible. Compression may be attempted; however, it is often deemed to fail in this location. Coil or other material embolization (pe fat) is often a fast and effective approach. Balloon inflation and covered stent implantation may



Figure 1. Axillary branch rupture.



Figure 2. Coil inserted in ruptured vessel.



Figure 3. Hematoma extension.

also be considered; ultimately when these strategies fail, surgery may be required. This case highlights a successful management approach while underscoring the risks of access complications in elderly patients.

2. UNDER PRESSURE: ACQUIRED VENTRICULAR SEPTAL DEFECT IN THE SETTING OF A CATECHOLAMINERGIC STORM

Mafalda Griné, Manuel Oliveira-Santos, Luís Paiva, José Martins, João Borges-Rosa, Ana Botelho, Marco Costa

ULS Coimbra/Hospitais da Universidade de Coimbra (HUC), Coimbra, Portugal.

A 58-year-old man was admitted to the cardiac intensive care unit following an episode of acute chest pain and severe hypertension (277/110 mmHg) during haemodialysis. The electrocardiogram showed intermittent left bundle branch block, and high-sensitivity troponin I rose to 27,582 ng/L. Physical examination was remarkable for a loud holosystolic murmur. Transthoracic echocardiography identified a septal pseudoaneurysm with a 15 mm defect

(Figure 1A-B). Cardiac catheterization revealed normal coronary arteries and a significant left-to-right shunt (Qp:Qs 2.2). Further evaluation with cardiac magnetic resonance imaging showed no late gadolinium enhancement (Figure 1D-E). Given the recurrent nature of such episodes and his markedly labile blood pressure, plasma metanephrines were measured and found to be elevated. ¹⁸F-DOPA positron emission tomography revealed a right adrenal lesion consistent with pheochromocytoma (Figure 1F), which was resected. At follow-up, signs of left ventricular volume overload and increasing pulmonary pressures prompted consideration for ventricular septal defect (VSD) closure. Due to significant comorbidities, the Heart Team opted for percutaneous closure with surgical backup. To guide procedural planning, a patient-specific 3D-printed model was created based on cardiac computed tomography imaging (Figure 2), allowing for comprehensive anatomical assessment. The procedure was performed in a hybrid operating room under general anaesthesia and guided by fluoroscopy and transoesophageal echocardiography, using a 6-F left femoral artery access and an 8-F right femoral vein access. A 0,035'' hydrophilic guidewire, supported by a 5-F multipurpose catheter, was advanced from the left ventricle through the septal defect into the right ventricle, traversing the tricuspid valve into the inferior vena cava, where it was snared and externalized, forming an arteriovenous rail (Figure 3A). A second guidewire was advanced through the venous access across the VSD as a backup in case re-crossing was needed (Figure 3B). The venous sheath was then upsized to a 14-F sheath to accommodate the 9-F TorqVue™ delivery system (Abbott, Santa Clara, CA, USA; Figure 3C). An 18 mm Amplatzer™ Post-infarct Muscular VSD Occluder (Abbott) was successfully deployed, with proper positioning and stability confirmed by fluoroscopy and echocardiography (Figure 3D-H). The post-procedural course was uneventful, and the patient was discharged the following day. Re-evaluation at two months showed significant clinical and hemodynamic improvement, with Qp:Qs reduction to 1.2.

To the best of our knowledge, this is the first report of an acquired VSD in the setting of a pheochromocytoma. Percutaneous closure proved to be a feasible, safe, and effective alternative in this scenario. Patient-specific 3D printing was instrumental in procedural planning to test and determine optimal device type and implantation technique, as well as to anticipate potential complications.

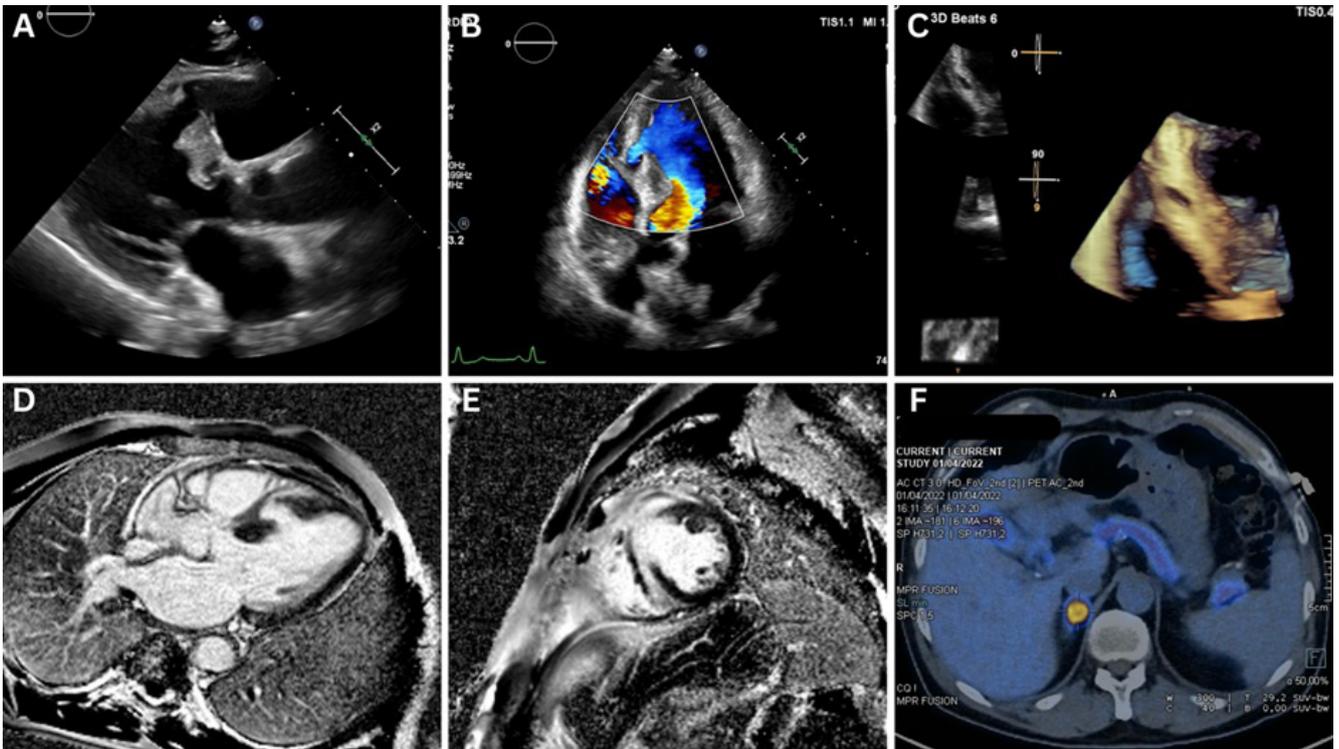


Figure C2 1. Diagnostic imaging: echocardiography (A-C), magnetic resonance imaging (D-E) and ¹⁸F-DOPA positron emission tomography (F).

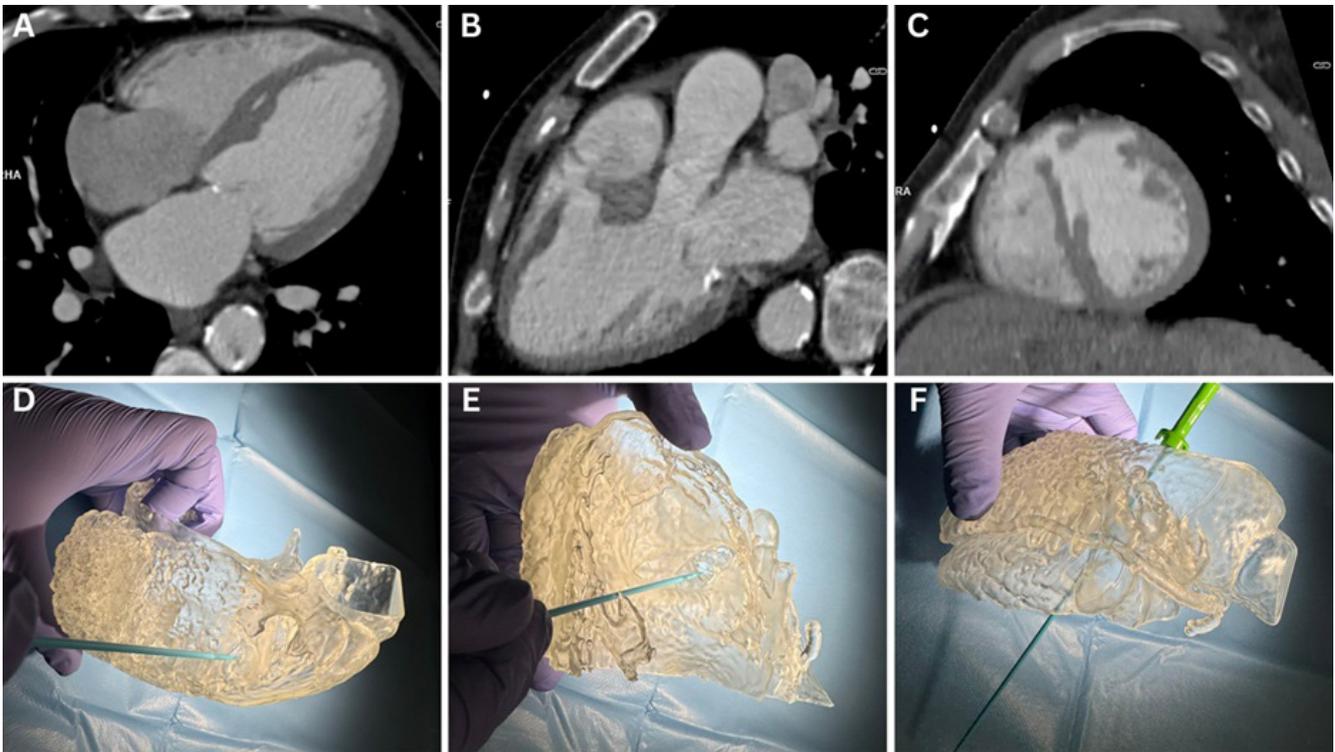


Figure 2. Procedure planning: computed tomography (A-C) and three-dimensional model (D-F).

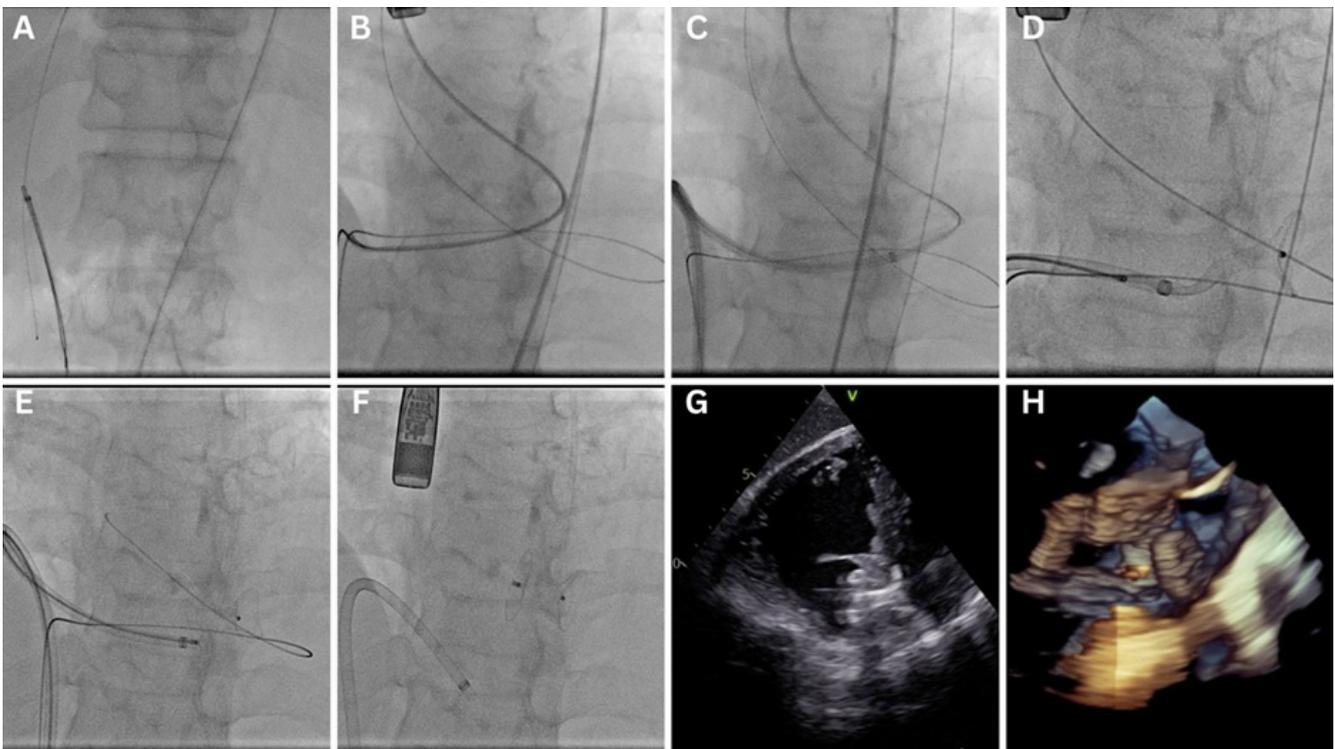


Figure 3. Procedure steps: retrograde approach to establish the arteriovenous rail (A); safety wire placement (B); anterograde delivery sheath advancement (C); device deployment (D); stability test before detachment and safety wire removal (E); final result (F-H).

3. BENT OUT OF SHAPE: RESCUE OF AN INFOLDED TAVI

Inês Ferreira Neves, Ruben Ramos, António Fiarresga, Inês Rodrigues, Ricardo Carvalheiro, Miguel Marques Antunes, Vera Ferreira, Rui Cruz Ferreira, Duarte Cacela

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A 69-year-old male patient was admitted for urgent transcatheter aortic valve implantation (TAVI) following multiple hospitalizations due to heart failure decompensation and acute pulmonary edema. In addition to aortic valvopathy, with severe aortic stenosis (AS) and moderate aortic regurgitation (AR), he had paroxysmal atrial fibrillation (AF), a previously implanted DDDR pacemaker, peripheral artery disease with prior toe amputations, and obstructive sleep apnea (OSA). He also had multiple cardiovascular risk factors, including type 2 diabetes, obesity 120 kg, hypertension, dyslipidemia, and a history of smoking.

His regular medication included furosemide 40 mg twice daily, lisinopril 5 mg, bisoprolol 5 mg, nifedipine 30 mg, edoxaban 60 mg, atorvastatin 40 mg, dapagliflozin/metformin 50/1000 mg, insulin, and bronchodilators.

Given his medical history and surgical risk, particularly due to obesity and multiple comorbidities, he was declined for surgical aortic valve replacement. He underwent TAVI with a Navitor Titan 35 mm valve after pre-dilation with a 24/45 mm True Dilatation balloon. A partial resheath was performed to optimize positioning before final deployment. Immediately after implantation, infolding of the prosthetic valve struts was observed, resulting in significant regurgitation. Despite further dilation with a 28/45 mm True Dilatation balloon, severe intra- and paravalvular regurgitation persisted (Figure 1). Transesophageal echocardiography (TEE) performed during the procedure demonstrated moderate intravalvular regurgitation. Given the patient's hemodynamic stability and concern regarding potential coronary obstruction, valve-in-valve implantation was not immediately performed. The procedure was therefore terminated, with a plan to repeat TEE and further evaluate with computed tomography (CT).

Despite favorable clinical progress during the first five days post-procedure, the patient subsequently deteriorated and developed cardiogenic shock. TEE confirmed torrential AR (both intraprosthetic and periprosthetic) and severe mitral regurgitation (MR). MR worsened during the intensive care unit (ICU) stay and was functional, related to left ventricular dilatation secondary to severe AR. CT provided further details regarding the valve deformation and positioning (Figure 2).

A second percutaneous intervention was performed. The patient underwent TAVI with a 29 mm Edwards Sapien 3 valve. Pre-dilation was performed with four 12 mm Powerflex balloons (two antegrade via transseptal access and two retrograde across the aortic valve), followed by a second pre-dilation with a 28 mm True Dilatation balloon. The valve was successfully implanted, followed by post-dilation with the valve balloon (+1 cc) (Figure 3). Angiographic and hemodynamic outcomes were favorable, with no residual leak. Although the team had prepared for MitraClip™ implantation during the same procedure, continuous TEE monitoring during valve-in-valve implantation demonstrated resolution of MR, making additional intervention unnecessary.

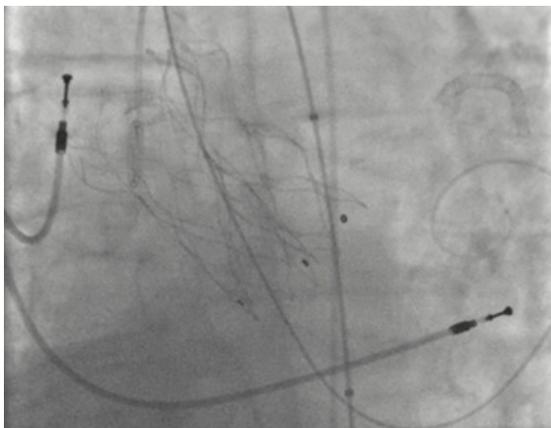


Figure 1. Valve infolding at the end of the procedure.



Figure 2. CT evaluation of the valve deformation and location.



Figure 3. Valve-in-Valve result.

The patient had an uneventful recovery and was transferred back to his original hospital in stable condition.

Prosthetic valve infolding refers to an asymmetric expansion of the prosthesis, resulting in inward folding of a portion of its circumference. This is a rare complication, characteristic of self-expanding valves.^{1,2} Most often, it occurs after resheathing of large self-expanding TAVI devices.² On fluoroscopy, valve infolding may appear as one or two vertical lines along the partially or fully deployed frame, indicating inward folding of the stent and a reduced transverse diameter.³ Early recognition is essential to reduce the risk of acute hemodynamic collapse. Management options include post-dilatation and/or implantation of a second balloon-expandable valve within the infolded prosthesis.^{2,4}

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4. DUAL OBSTRUCTION RESOLVED: PRE-TAVI MAVACAMTEN TO PREVENT LEFT VENTRICULAR OUTFLOW TRACT OBSTRUCTION IN A PATIENT WITH SEVERE AORTIC STENOSIS AND OBSTRUCTIVE HYPERTROPHIC CARDIOMYOPATHY

Joana Certo Pereira, Rita Bello, Sérgio Maltês, Eduardo Infante de Oliveira, Rui Campante Teles, Manuel Almeida, Bruno Rocha, Luís Raposo

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Introduction: The coexistence of obstructive hypertrophic cardiomyopathy (HOCM) and severe aortic stenosis (AS) poses a complex therapeutic dilemma. Treating the fixed component of obstruction with transcatheter aortic valve implantation (TAVI) may precipitate acute hemodynamic collapse due to unrelieved dynamic left ventricular outflow tract obstruction (LVOTO). Surgical aortic valve replacement with septal myectomy remains the gold standard but is often high-risk or prohibitive in elderly patients. Pharmacological modulation of LVOTO prior to valve implantation could represent a novel and safer strategy.

Case report: An 81-year-old man with symptomatic severe AS and HOCM was evaluated for intervention. Transthoracic echocardiography (Figure 1) revealed severe AS (mean transaortic gradient 55 mmHg), asymmetric septal hypertrophy (24 mm), systolic anterior motion of the mitral valve with moderate-to-severe regurgitation, and dynamic LVOTO with a peak gradient of 102 mmHg, as well as mid-ventricular obstruction (37 mmHg). On multimodality evaluation, the cardiac magnetic resonance confirmed showed typical HOCM morphological findings and scarring, while computed tomography showed a tricuspid severely calcified aortic valve (CaSc 3,671 AU). Invasive hemodynamic evaluation confirmed severe aortic stenosis (transvalvular gradient of 40 mmHg) revealed pulmonary hypertension (mean pulmonary artery pressure 44 mmHg), elevated capillary wedge pressure (28 mmHg), and reduced cardiac index (1.8 L/min/m²). Given the high-risk for surgical aortic valve replacement combined with myectomy - and the patient refused surgery - and given the anatomical unsuitability for alcohol septal ablation, the Heart Team considered a strategy combining off-label mavacamten (under compassionate use) prior to TAVI. The treatment was initiated at 2.5 mg/day and uptitrated to 5 mg/day, with close monitoring. After 12 weeks, LVOTO decreased from 102 to

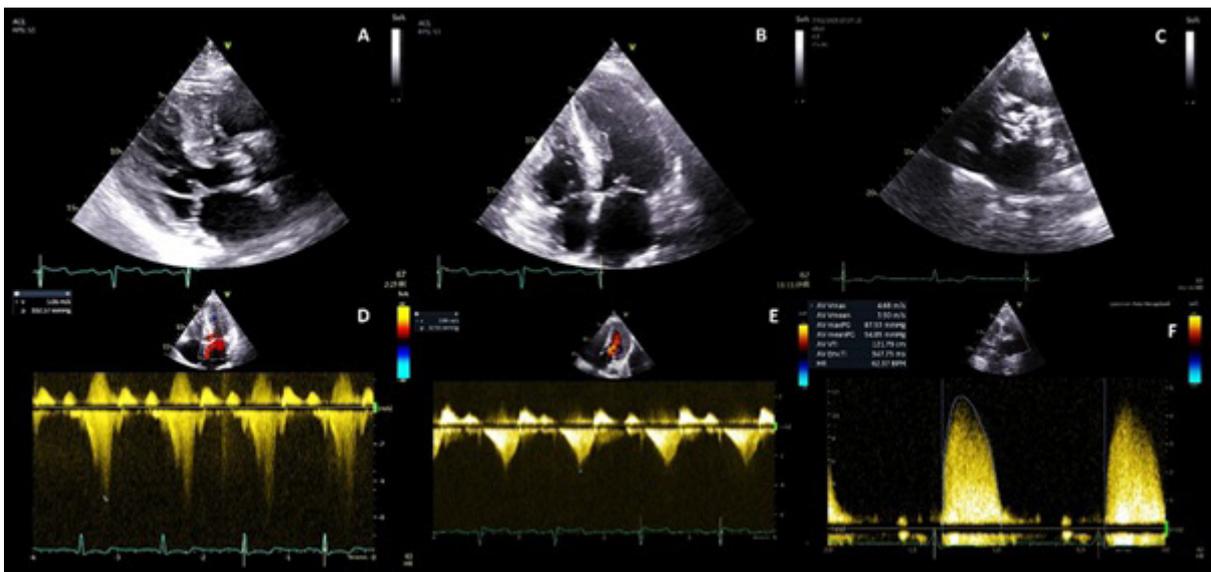


Figure 1. Transthoracic echocardiographic images illustrating HOCM combined with severe AS. (A) Parasternal long-axis view with asymmetric septal hypertrophy and a thickened and calcified aortic valve; (B) Apical four-chamber view demonstrating abnormal papillary muscle insertion; (C) Parasternal short-axis view depicting a severely calcified aortic valve (on cines with markedly reduced systolic opening); (D) Continuous-wave (CW) Doppler from an apical five-chamber view across the LVOT showing a peak gradient of 102 mmHg; (E) CW Doppler from the apical view demonstrating a meso-ventricular gradient of 37 mmHg; (F) CW Doppler at the right parasternal view showing hemodynamic parameters consistent with severe aortic stenosis (peak velocity 4.7 m/s, mean gradient 55 mmHg).

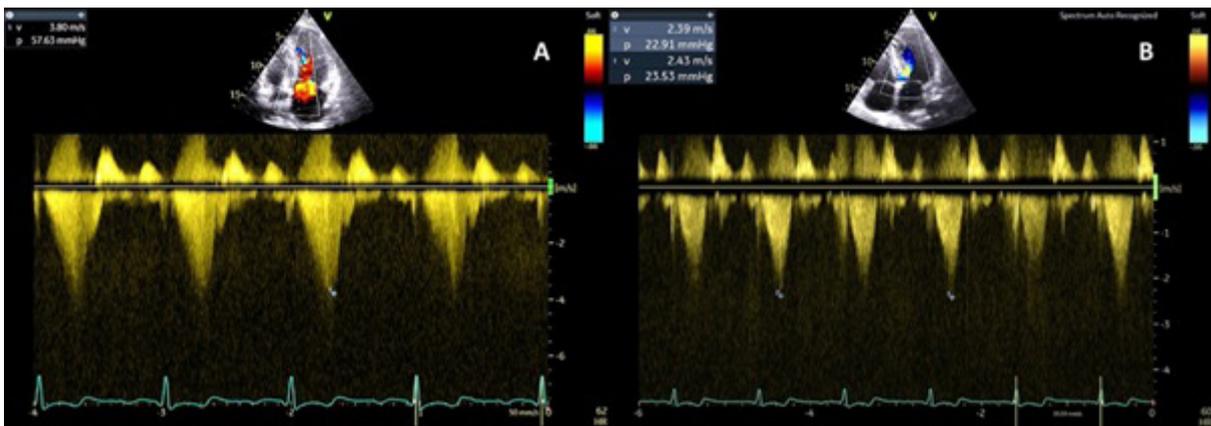


Figure 2. Transthoracic echocardiography with CW Doppler performed at 4 weeks (A) and 12 weeks (B) after the initiation of mavacamten, showing a progressive and clinically meaningful reduction in left ventricular outflow tract (LVOT) gradients: from 102 mmHg at baseline to 58 mmHg at 4 weeks and 25 mmHg at 12 weeks, consistent with a favorable therapeutic response.

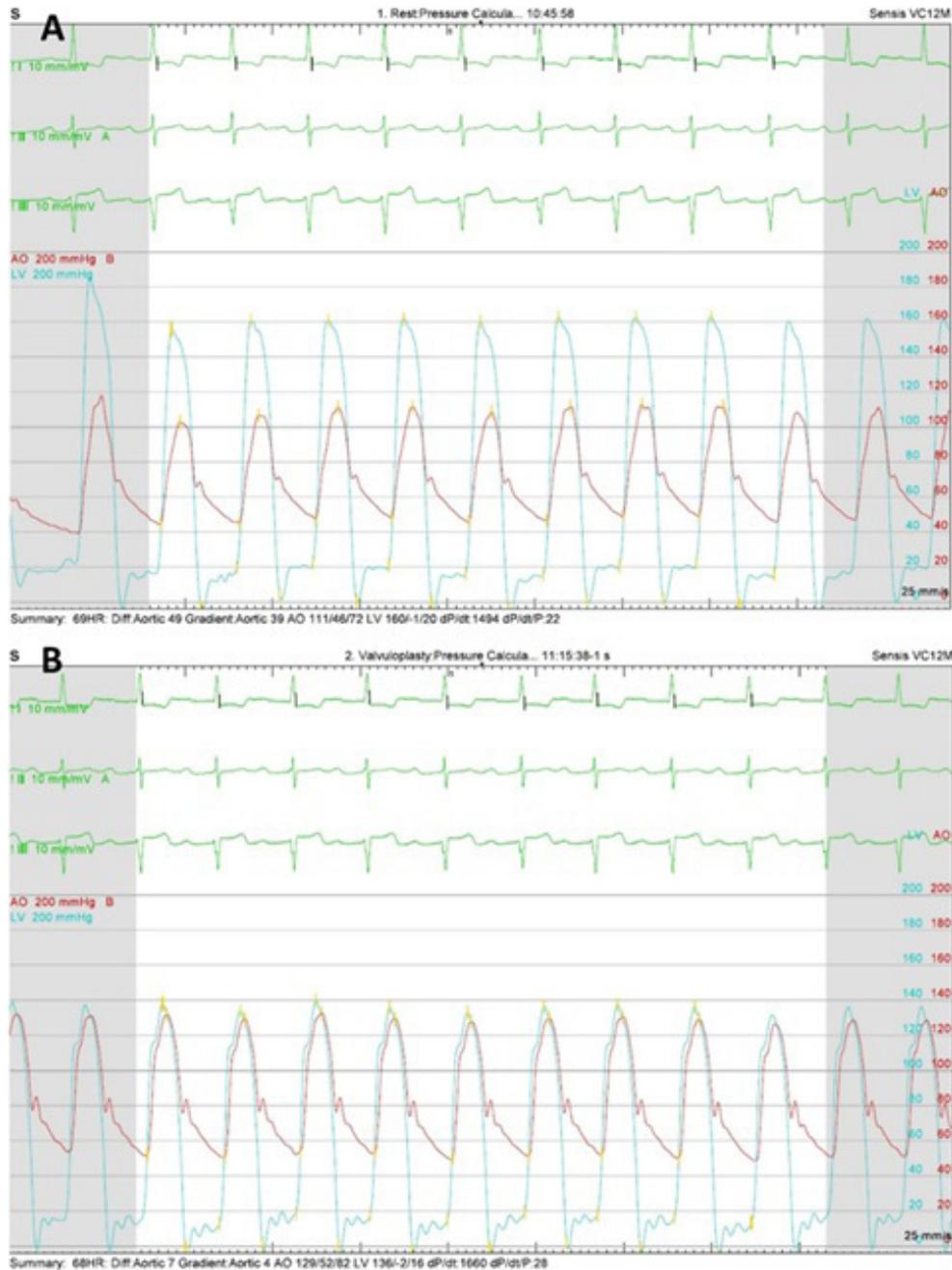


Figure 3. Invasive hemodynamic tracings obtained during TAVI. (A) Pre-implantation pressure tracing demonstrating severe aortic stenosis, with a peak-to-peak gradient of 40 mmHg; (B) Post-implantation pressure tracing showing a marked reduction in the transvalvular gradient, with a peak-to-peak gradient of 4 mmHg.

25 mmHg (Figure 2), mid-cavity gradient from 40 to 10 mmHg, and NT-proBNP from 2,314 to 323 pg/mL, with preserved left ventricular ejection fraction and marked symptomatic improvement.

At 5 months, TAVI was performed via right femoral access with 22 mm balloon pre-dilatation and successful implantation of a 29 mm Evolut FX+ valve, yielding optimal positioning, low residual gradient (4 mmHg) (Figure 3), no leak, and no new conduction disturbances. The patient was discharged on day 3 and, thus far, remains asymptomatic (NYHA I) at 2-month follow-up, with normal prosthetic function and no recurrence of obstruction.

Severe AS coexisting with HOCM is infrequent but associated with a high risk of post-TAVI hemodynamic collapse - e.g., “suicide left ventricle”. Conventional therapies for LVOTO –surgical myectomy or alcohol septal ablation– are often unsuitable in the elderly or high-risk patients.

Mavacamten, a first-in-class cardiac myosin inhibitor, has proven efficacy in HOCM but has not been studied in patients with coexisting severe AS. In this case, mavacamten safely reduced LVOTO and mitral regurgitation, optimized hemodynamics, and enabled a successful TAVI, without complications. This suggests that selective myosin inhibition may represent a feasible, non-invasive bridge strategy in selected high-risk patients.

Discussion: This case demonstrates the potential role of mavacamten as a bridge to TAVI in patients with severe AS and concomitant HOCM unsuitable for conventional septal reduction strategies. By reducing LVOTO and stabilizing hemodynamics, mavacamten may expand treatment options in this challenging clinical scenario. Nonetheless, careful patient selection, multidisciplinary decision-making, treatment planning, timing and close monitoring are essential.

5. ON THE WIRE: MANAGING A RARE PCI COMPLICATION

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Case report: A 70-year-old male with a history of hypertension, diabetes, and dyslipidemia presented to the emergency department with 12 hours of bilateral chest pain. ECG showed sinus rhythm at 73 bpm, with no other significant alterations. Blood analysis revealed elevated troponin T levels (0.092 → 0.164 ng/mL), confirming a Non-ST Elevation Myocardial Infarction (NSTEMI). Coronary angiography revealed a long, calcified critical stenosis in the mid-segment of the Left Anterior Descending (LAD) artery involving the mid-segment and the bifurcation with Dg2, a distal critical stenosis in the circumflex artery with sub-occlusive stenosis of the OM1, and a critical ostial stenosis in the Right Coronary Artery (RCA). The patient initially underwent a percutaneous coronary intervention (PCI) of the OM1 with 2 partially overlapping drug-eluting stent (DES) (3.0 × 30 mm and 3.5 × 22 mm). He was discharged without complications, with mild impairment of LVEF (49%) and outpatient PCI of the LAD and RCA was planned, aiming complete revascularization.

During a subsequent elective PCI of the LAD via right radial artery access, the calcified lesion was prepared with a 1.5 mm rotational atherectomy burr (Rotapro® system). The procedure was complicated by the fracture of the distal segment of the Floppy RotaWire®. The fractured wire was left in place while a 2.5 × 38 mm DES was implanted and post-dilated. The wire fragment was successfully retrieved using a combination of the twisting wire and balloon trapping techniques, facilitated by the ReCross® dual-lumen microcatheter with two guidewires. The final angiogram showed a good result with a distal LAD dissection. The patient was discharged without complications and is awaiting follow-up angiography and PCI of the RCA.

Discussion: This case serves as an important reminder that while rotational atherectomy is essential for treating heavily calcified lesions, clinicians must be prepared to manage rare complications. RotaWire® fracture is an uncommon event, and successful retrieval is even less frequently reported. Repeated stress on the same segment, kinks, and severe calcification are key predisposing factors for wire fracture. In such situations, the available options include percutaneous retrieval, surgery, or conservative management. Also, the use of a dual lumen microcatheter is an alternative strategy that can facilitate successful wire retrieval. Ultimately, this case demonstrates that a combination of careful technique, early recognition, and technical skill is crucial for managing this rare but serious complication.

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6. ANGINA BEYOND CORONARY ATHEROSCLEROSIS: A RARE PRESENTATION

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We present the case of an 85-year-old patient who presented to the emergency department in January 2025 with a three-month worsening exertion angina. His past medical history was remarkable for surgical bioprosthetic aortic valve replacement in 2018, complicated with hypovolemic shock requiring surgical revision for haemostasis, and a hospitalization in August 2024 for fever of unknown origin with blood cultures positive for Streptococcus mitis requiring antibiotic treatment with ceftriaxone. Serial cardiac biomarkers on admission were. The patient was admitted in the Cardiology ward for etiologic study and treatment.

During hospitalization, the patient underwent invasive coronary angiography which demonstrated extrinsic dynamic compression of left circumflex artery (Figure 1), without evidence of other significant vessel obstruction. Transthoracic echocardiography revealed possible prosthetic aortic valve dysfunction, with increased left ventricle - aortic gradients (maximum 38 mmHg, mean 24 mmHg), and left ventricular systolic dysfunction with an ejection fraction (LVEF) of 40%. Due to these findings, associated with his previous hospitalization, we opted to perform transoesophageal echocardiography (TOE) and cardiac computed tomographic (CT) scan. TOE excluded the presence of valvular vegetations but demonstrated a 3 × 2 cm heterogeneous mass situated between the aorta and the left atrium. The lesion involved the origin of the left coronary artery and extended along the course of the left circumflex artery, with communication to the left ventricular outflow tract (LVOT). Cardiac CT scan demonstrated a pseudoaneurysm containing thrombotic and calcific material (Figure 2), indicative of a chronic process, as well as dynamic stenosis of the left circumflex artery. Notably, this mass was absent prior to the surgical intervention, although a smaller lesion was already visible on a thoracic CT scan performed two years earlier. ¹⁸F-fluorodeoxyglucose positron emission tomography (PET) CT showed no abnormal radiotracer uptake at the lesion

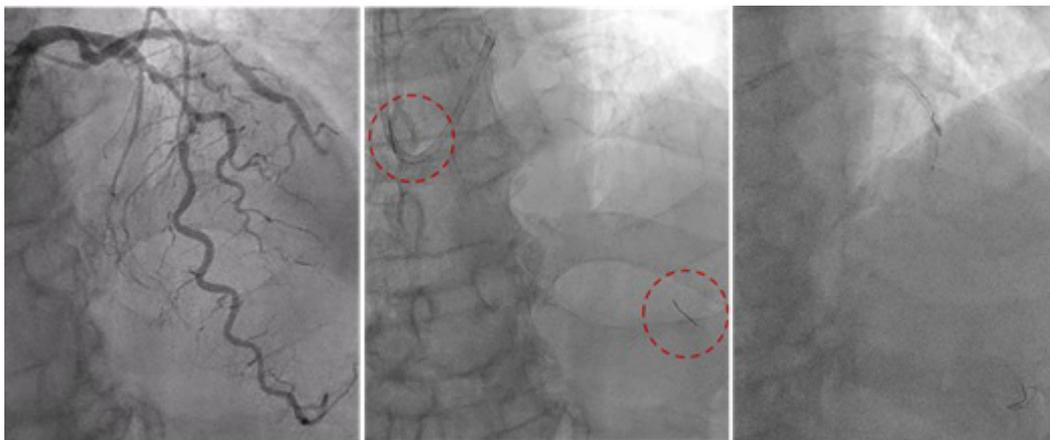


Figure C5. Left to right: 1, critical stenosis in the mid-segment of the left anterior descending artery; 2, fracture of the distal segment of the rotational atherectomy guidewire (Rotawire®); 3, guidewire retrieved en-bloc with guide extension assisted balloon trapping technique.



Figure 1. Invasive coronary angiography demonstrating left circumflex artery stenosis.

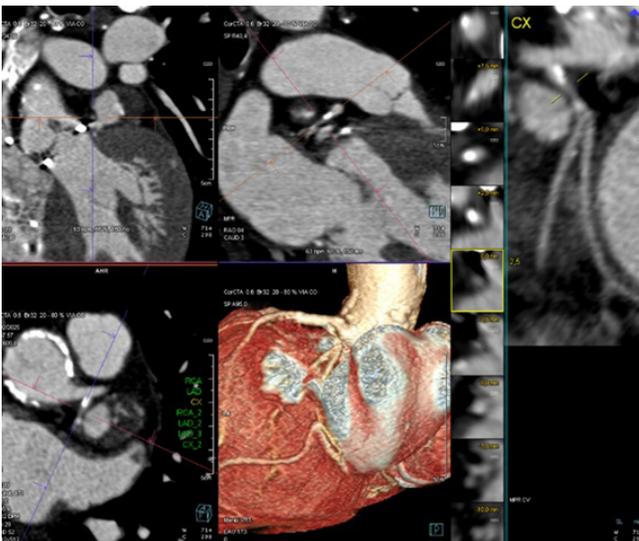


Figure 2. Cardiac computed tomography scan illustrating the spatial relationship between the lesion and the circumflex artery.

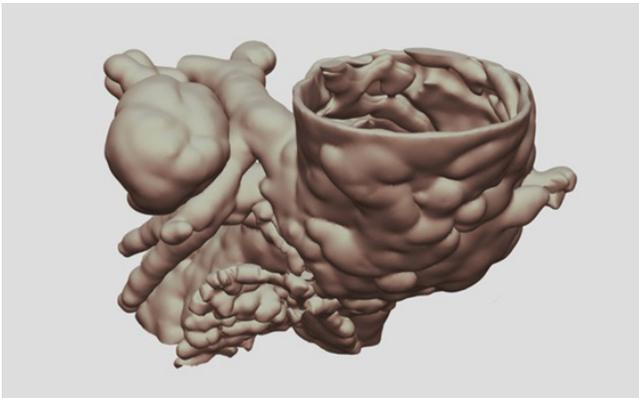


Figure 3. Patient-specific 3D-printed model of the lesion.

site, which along with serial negative blood cultures, made an infective process unlikely. A contained left ventricular rupture with pseudoaneurysm formation, leading to dynamic left circumflex artery compression, was considered the most plausible diagnosis - a rare but serious late complication of cardiac surgery.

Despite optimized medical therapy, the patient remained symptomatic with angina on minimal exertion. Following Heart Team discussion, percutaneous closure of the LVOT origin of the pseudoaneurysm was attempted using patient-specific 3D printed modelling (Figure 3) but proved unsuccessful. Subsequently, an Onyx Frontier 2.0 × 18 mm stent was implanted in the left circumflex artery, resulting in complete resolution of angina during the remainder of the hospitalization and at three-month follow-up.

This case highlights the diagnostic challenges of late cardiac surgery complications, including contained left ventricular rupture with pseudoaneurysm and dynamic coronary compression. Multimodal imaging was essential to exclude infection, define the anatomy and prepare future interventions.

7. POST-SURGICAL INFERIOR STEMI DUE TO EXTRINSIC COMPRESSION

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Introduction: Myocardial infarction is a serious and feared complication following cardiac surgery, particularly after coronary revascularization, where graft failure is typically suspected as the primary cause. However, less common etiologies must also be considered in the differential diagnosis. We present a rare case of postoperative inferior ST-elevation myocardial infarction caused by iatrogenic extrinsic coronary compression from a pericardial drain.

Case report: A 74-year-old male, with past medical history of hypertension, dyslipidemia, type II diabetes mellitus, previous smoking habits and chronic kidney disease, was admitted for cardiac surgery due to symptomatic severe aortic stenosis and significant left main coronary artery disease (90% distal stenosis; right coronary artery showed no significant lesions). He underwent surgical aortic valve replacement (with a Perimount 23 bioprosthesis) and revascularization with a left internal mammary artery graft to the left anterior descending artery and a saphenous vein graft to the first obtuse marginal branch.

The procedure was uneventful. The patient was extubated on day-1 post-op and vasoactive support was discontinued within 24 hours. Despite hemodynamic stability and absence of angina symptoms, a persistent rise in biomarkers of cardiac necrosis was observed 48 hours postoperatively (hs-TnT from 508 to 9,066 ng/L). An electrocardiogram was performed demonstrating ST segment elevation in inferior leads (Figure 1). Transthoracic echocardiogram revealed hypokinesia of the inferior wall and posterior interventricular septum.

An emergent coronary angiogram was performed. Both bypass grafts were patent with good distal flow. However, a new sub-occlusion of the posterior descending artery (PDA), which was not present in the preoperative angiogram, was identified (Figure 2A). The location of the supposed lesion coincided with the pericardial tube (Figure 2A, arrow), with underfilling of the distal vessel and decreased flow (TIMI I). The hypothesis of extrinsic coronary compression was raised, which was confirmed angiographically immediately after removal of the drain by the surgical team in the cathlab (Figure 2). A repeat angiography demonstrated complete restoration of PDA flow (TIMI III) (Figure 2B) followed by resolution of ST-segment elevation. Subsequent echocardiography showed partial improvement in wall motion abnormalities. The patient had a full recovery and was discharged 12 days after surgery.

Discussion: This case underscores the importance of maintaining a broad differential when evaluating myocardial infarction in the postoperative setting. Atypical causes such as extrinsic coronary compression should be considered, as timely recognition can prevent complications and obviate the need for unnecessary angioplasty.



C 7. Figure 1. Post-surgical ECG showing ST segment elevation in inferior leads.

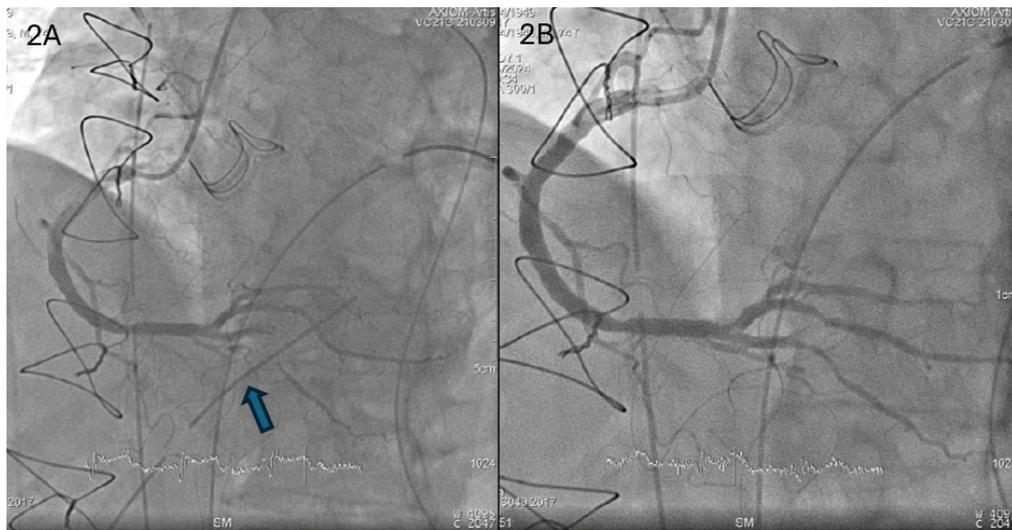


Figure C7 2. A. External compression causing posterior descending sub-occlusion. B. Repeat angiogram after drain removal, confirming the diagnosis of STEMI due extrinsic compression.

8. LEFT MAIN CORONARY ARTERY EMBOLIC OCCLUSION IN A YOUNG PATIENT: A RARE COMPLICATION OF WARFARIN INTERRUPTION

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Case report: A 26-year-old male with a history of aortic valve replacement at the age of 14 due to congenital aortic stenosis presented to emergency department with acute chest pain and hemoptysis. His last echocardiogram documented a normally functioning mechanical aortic prosthesis and normal left and right ventricle function. He was under warfarin but had been non-compliant for the last two months. Additionally, he reported dyspnea and fatigue with progressively decreasing exercise tolerance over the past week. He presented with signs of respiratory distress requiring non-invasive mechanical ventilation and signs of peripheral tissue hypoperfusion. ECG revealed left ventricular hypertrophy with widespread ST depression and ST

elevation in aVR. A bedside echocardiogram showed a normally functioning mechanical aortic prosthesis and moderate depression of left ventricle ejection fraction with hypokinesia of the anterior and anterolateral wall. Fluoroscopy confirmed normal movement of prosthetic discs and an emergent invasive coronary angiography revealed thrombotic occlusion of the left main coronary artery. Multiple attempts of aspiration thrombectomy of the left main were performed with minimal success. Intracoronary and peripheral boluses of tenecteplase were administered and multiple balloon angioplasties were made at the left main, then at the left anterior descending artery and circumflex with progressive distal embolization of the thrombus. Finally, a TIMI 3 flow was achieved on the left coronary artery after a 2h procedure. The patient evolved with Killip Kimball class III heart failure, with a peak troponin level of 1,388,851 ng/L. The echocardiogram revealed severe left ventricular hypertrophy, mostly due to edema, and severe left ventricle function depression. Concomitantly an RSV infection was diagnosed with bacterial co-infection. Following pulmonary infection and fibrinolysis, the patient developed alveolar hemorrhage managed conservatively. After 13 days he was discharged under warfarin and aspirin on top of standard heart failure prognosis therapy.

Patients with mechanical valves require lifelong anticoagulation with vitamin K antagonist. The incorrect dosage or non-adherence to treatment can lead to serious life-threatening thrombotic events, not only prosthesis-related but also other catastrophic embolic occlusions. Emergent percutaneous revascularization in massive thrombus embolization to the left coronary artery is a rare but challenging scenario.

9. NAVIGATING ANATOMICAL BARRIERS: SUCCESSFUL AMPLATZER CLOSURE OF A HIGH-RISK PATENT FORAMEN OVALE AFTER FAILED NOBLESTITCH

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Introduction: Patent foramen ovale (PFO) is a common interatrial communication that, while frequently asymptomatic, has been implicated in cryptogenic stroke through paradoxical embolism. High-risk anatomical features, such as atrial septal aneurysm (ASA), large defect size, and substantial right-to-left shunting, increase the likelihood of causal association. Careful diagnostic work-up and multidisciplinary evaluation are essential to guide management. Closure is recommended in selected patients to prevent recurrent cerebrovascular events^{1,2}.

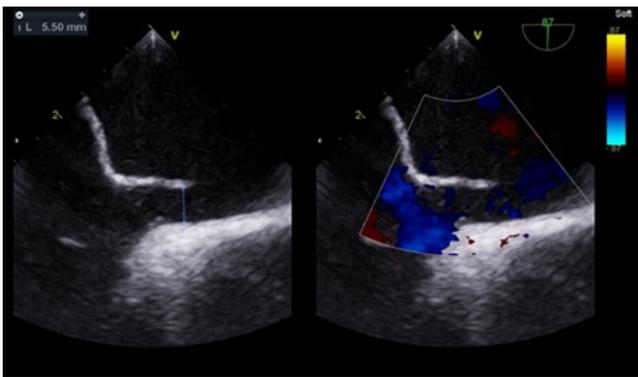


Figure 1. High-risk PFO with a diameter of 5.5 mm with small rims.

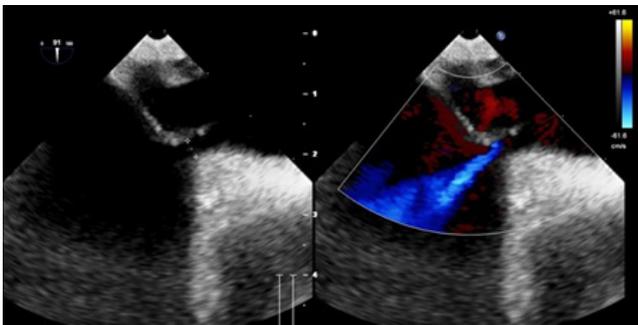


Figure 2. Persistent high-risk PFO.

Case report: A 40-year-old woman, with a history of smoking and ischemic stroke in the territory of the left posterior cerebral artery, was treated with intravenous thrombolysis using tenecteplase followed by mechanical thrombectomy. As part of the etiological investigation, transthoracic echocardiography revealed a patent foramen ovale (PFO). Transesophageal echocardiography was subsequently performed for further characterization, demonstrating a high-risk PFO with an ASA measuring 20 mm, a PFO diameter of 5.5 mm with small rims, and a moderate right-to-left shunt (Figure 1). The

Risk of Paradoxical Embolism (RoPE) score was 8, corresponding to an 84% probability of causal relationship with PFO, and the PASCAL classification indicated a *probable* association. The case was discussed in a multidisciplinary team meeting, and closure of the PFO was recommended. Considering the absence of aortic rim, dilation of the aortic root and hypermobile ASA, closure was initially performed using a suture-based method (NobleStitch system with three sutures). Follow-up echocardiography, however, revealed a significant residual shunt. A repeat transesophageal echocardiogram confirmed incomplete closure, with persistence of a high-risk PFO (ASA and interatrial passage of > 20 microbubbles) (Figure 2). Since the sutures created a new aortic rim, a second procedure was therefore undertaken, and the PFO was successfully closed with an 18 mm Amplatzer PFO occluder (Figure 3), achieving complete closure without residual shunt.

Discussion: This case illustrates the clinical importance of recognizing high-risk PFO anatomy in a patient presenting with ischemic stroke. Initial closure with a suture-based method was unsuccessful, but it altered the anatomy of the PFO, allowing its closure with a double-disc device with complete elimination of the shunt and favorable clinical outcome. At follow-up, the patient remains stable and asymptomatic, highlighting not only the effectiveness of tailored interventional strategies in secondary stroke prevention, but also that hybrid approaches may offer a viable solution in challenging cases otherwise unsuitable for percutaneous closure.

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10. COMPLEX REVASCULARIZATION AFTER BYPASS SURGERY: STAGED CORONARY INTERVENTION AND MANAGEMENT OF DISTAL VESSEL PERFORATION

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Introduction: Advanced multivessel coronary artery disease poses significant therapeutic challenges, particularly in patients with complex anatomy and extensive calcification. Management often requires a combination of surgical and percutaneous revascularization, tailored to the individual patient.

Case report: A 66-year-old male patient was admitted through the emergency department with typical acute chest pain. His history included untreated dyslipidemia and hyperuricemia. The ECG on arrival showed non-ST elevation, however the patient had persistent pain. Transthoracic echocardiogram also revealed moderate aortic stenosis.

Emergent coronary angiography revealed severe calcification of the left main (LM) coronary artery and three-vessel disease. The circumflex artery (CxA) was identified as the culprit lesion, and balloon angioplasty was performed. The patient was subsequently referred to a surgical center, where he underwent biologic aortic valve replacement and coronary artery bypass grafting (CABG) with two grafts: left internal mammary artery (LIMA) to the anterior descending (AD) artery, and a saphenous vein graft (SVG) to the first and second obtuse marginal arteries (OM1/OM2).

During follow-up he was readmitted electively for recurrent angina and a positive stress test. Reassessment angiography demonstrated patency of the LIMA-AD graft, but occlusion of the SVG to OM1/OM2, with collateral supply through native vessels. The left main showed 75% stenosis, and the CxA had an ostial subocclusive lesion compromising distal flow. The right coronary artery (RCA) showed severe diffuse disease. Successful angioplasty of the LM and Cx arteries was performed.

Staged angiographic revision and RCA PCI showed previous Cx stent restenosis using intravascular ultrasound (IVUS). A drug-eluted balloon angioplasty was

performed after successful lithoplasty. Regarding the RCA, rotational atherectomy was performed, followed by cutting balloon application and implantation of 4 drug-eluted stents (3 Xience Skypoint and 1 Synergy XD). The procedure was complicated by rupture of the distal posterior descending artery. Prolonged balloon (Firefighter) inflation was attempted but unsuccessful, and the complication was ultimately managed with coil embolization (Azure 3 mm × 8 cm) and occlusion using a cut balloon.

The patient was admitted to the cardiology ward, where echocardiography revealed no pericardial effusion. ECG and cardiac biomarkers were also reassuring. He remained clinically stable and was discharged after two days.

Discussion: This case highlights the complexity of revascularization in patients with three-vessel disease, often requiring multiple interventions over time and careful reassessment of outcomes. In this patient, persistent symptoms after CABG necessitated further treatment. Despite graft failure and severe calcification, complete revascularization was achieved with staged PCI. The distal perforation during RCA intervention illustrates the risks of complex procedures, but rapid bailout ensured a safe outcome. Careful planning and preparedness for complications remain essential in such scenarios. Patients with prior CABG and diffuse coronary disease often require repeat revascularization. This case underscores the importance of tailored strategies, advanced PCI techniques, and vigilance in complication management to achieve successful outcomes.

11. DOUBLE TROUBLE: NAVIGATING SIMULTANEOUS PULMONARY EMBOLISM AND ACUTE ISCHEMIC STROKE

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Case report: A 63-year-old woman with a history of hypertension, obesity, relapsing-remitting multiple sclerosis, and immune thrombocytopenic purpura, as well as a recent bimalleolar fracture managed with immobilization without thromboprophylaxis, presented to the emergency department with prostration. Brain computed tomography revealed a complete infarction of the left anterior cerebral artery. She was deemed ineligible for thrombolysis and considered for mechanical thrombectomy, and so she was transferred to our centre. However, diagnostic cerebral angiography demonstrated distal migration of the thrombus, precluding endovascular intervention.

She also presented with rapidly progressive severe respiratory failure, and a computed tomography pulmonary angiography demonstrated a saddle pulmonary embolism extending into both main pulmonary arteries. Despite hemodynamic stability, she remained profoundly hypoxemic, with a PaO₂/FiO₂ ratio of 102, necessitating high-flow nasal cannula support. Transthoracic echocardiography revealed moderate tricuspid regurgitation, an estimated pulmonary artery systolic pressure of 50 mmHg, and dilation and dysfunction of the right ventricle (TAPSE 17 mm). Laboratory testing revealed elevated cardiac biomarkers, and electrocardiography showed evidence of right ventricular strain. Given the recent ischemic stroke, systemic fibrinolysis was contraindicated, and catheter-directed thrombectomy was pursued.

Pre-procedural hemodynamic assessment revealed a mean pulmonary artery pressure of 26 mmHg. Selective pulmonary angiography identified thrombus at the ostium of the right pulmonary artery and a smaller thrombus burden at the origin of the left pulmonary artery. Aspiration thrombectomy of the main right branches was performed using the Penumbra Indigo® 12F system, retrieving a large volume of fresh thrombus. Residual thrombus in the right upper lobe was removed with a 7F catheter and manual aspiration. Post-procedure, anticoagulation was initiated with unfractionated heparin and later transitioned to apixaban. Respiratory function improved rapidly, with the PaO₂/FiO₂ ratio rising from 102 to 290 within four hours, and she was weaned to room air at 72 hours without vasopressor support. Follow-up echocardiography confirmed resolution of right ventricular strain.

The simultaneous presentation of acute pulmonary embolism and ischemic stroke raised suspicion of paradoxical embolism. Contrast echocardiography

demonstrated early right-to-left shunting through a patent foramen ovale (PFO). After multidisciplinary discussion, percutaneous closure of the PFO was decided. Passage across the PFO was achieved using a high-support guidewire and a multipurpose catheter, followed by deployment of a 25-mm Amplatzer™ Talisman™ occluder. The procedure resulted in complete closure, with no significant residual shunt and no immediate complications. The patient was discharged on day eight to her referring hospital on apixaban and clopidogrel.

Discussion: This case illustrates the successful integrated management of paradoxical embolism with catheter-directed thrombectomy and percutaneous PFO closure in an intermediate-high risk patient in whom systemic fibrinolysis was contraindicated. The simultaneous occurrence of acute pulmonary embolism and ischemic stroke should prompt consideration of paradoxical embolism, particularly in patients with a PFO, in whom stroke risk is significantly elevated. Fibrinolysis in this setting carries a high risk of haemorrhagic transformation, whereas catheter-directed therapies offer a safer alternative. Additionally, patients with a PFO who experience ischemic stroke due to paradoxical embolism should be considered for percutaneous closure after multidisciplinary evaluation, as formal guideline recommendations are lacking.

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12. COMPLEX MITRAL TEER: OVERCOMING ANATOMICAL AND PROCEDURAL HURDLES

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Case report: A 74-year-old male Jehovah's Witness with chronic myeloid leukemia and benign prostatic hyperplasia, previously treated for infective endocarditis, was followed for moderate-to-severe mitral regurgitation. His last transthoracic echocardiogram showed mitral annular dilatation, systolic restriction of the anterior leaflet and posterior leaflet prolapse, resulting in an eccentric regurgitant jet and at least moderate-to-severe mitral regurgitation (MR), and mild left ventricular dilatation with preserved biventricular function.

He presented with NYHA II heart failure symptoms. Transoesophageal echocardiography confirmed primary severe MR (EROA 0.4 cm²; regurgitant volume 63 mL), Carpentier type II. Morphology suggested conditional suitability for percutaneous therapy, given prolapse localized to P3 and transeptal puncture height less than 4 cm. The patient refused surgery, and, after Heart Team discussion, transcatheter edge-to-edge repair (TEER) with MitraClip® was planned despite anatomical limitations.

During the procedure, transeptal puncture reached 3.5 cm. Leaflet grasping with an XTW clip was performed at the A3/P3-A2/P2 transition, without complications, significantly reducing regurgitation and improving hemodynamics. Residual regurgitation jets were observed -one medial eccentric and one central dispersive- with overall regurgitation graded as mild-to-moderate (II/IV). The team discussed whether this should be accepted as the final result or whether the clip should be repositioned more medially. Arguments in favour of accepting this result included the advantage of avoiding further manipulation of the diseased leaflet, the achievement of a reasonable outcome, and a transmitral gradient of 3 mmHg. Arguments in favour of repositioning the clip included the potential technical difficulty of placing an additional medial clip, if needed, and the possibility of partial detachment in the prolapsing segment. Significant MR improvement in previously infected leaflets led the team to accept the result.

After release of the clip, posterior leaflet prolapse worsened, becoming excessively mobile and leading to severe regurgitation. A decision was then

made to implant a second clip, medially to the first. The challenge at this stage was to achieve adequate leaflet grasping while avoiding excessive prolapse and minimizing the amount of leaflet tissue left between the two clips. Despite multiple attempts at optimization, residual posterior leaflet prolapse persisted between the clips, causing an eccentric regurgitant jet. Nonetheless, prolapse stabilization of the entire P3 segment was obtained, with overall improvement. Following clip release, further reduction was observed due to relief of tension from the delivery system. An eccentric jet between the two clips, directed anterolaterally, and a second central dispersive jet lateral to the first clip were identified. Overall residual regurgitation was graded as moderate (II/IV). Final mean transvalvular gradient was 3-4 mmHg. The rest of the procedure was uneventful. The patient was discharged the following day with moderate mitral regurgitation, no complications, and no evidence of significant post-procedural mitral stenosis.

Discussion: This case highlights the need for a comprehensive approach to M-TEER. Patient selection should integrate anatomy, aetiology, and comorbidities. Anatomical complexity -including annular and ventricular dilatation, leaflet abnormalities, and prior endocarditis- raises the risk of failure or recurrent MR. Careful planning with TEE guidance and a multidisciplinary Heart Team are essential to optimize outcomes.

13. STENTING EM DUPLA CHAMINÉ EM CENÁRIO DE ALTO RISCO DE OCLUSÃO CORONÁRIA

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Introdução: A oclusão coronária é uma complicação pouco frequente, mas grave na implantação de válvulas aórticas percutâneas. A sua prevalência é < 1% embora o risco aumente nos procedimentos *valve-in-valve* (ViV) para cerca de 2.5%.^{1,2}

Caso clínico: Sexo masculino, 82 anos com história prévia de substituição cirúrgica da válvula aórtica e implantação de válvula biológica mitroflow 21 por estenose aórtica em 2014. Foi internado em março de 2025 no contexto de insuficiência cardíaca descompensada. Doente já com o diagnóstico prévio de prótese aórtica degenerada com regurgitação intraprotésica grave (EROA 0,57 cm²; Volume Regurgitante 100 ml) apesar de estenose apenas ligeira EOA 1,0 cm² (valor de referência 1,2 ± 0,3), função sistólica do ventrículo esquerdo preservada sem outra valvulopatia significativa.

Previamente ao internamento o doente já tinha realizado os exames complementares do estudo pré implantação de válvula aórtica percutânea (VAP). A Coronariografia mostrou dominância direita e ausência de lesões angiograficamente significativas. Estudo dedicado por Angio TAC revelou um diâmetro médio da câmara de saída do ventrículo esquerdo de 22,5 mm, diâmetros dos seios Valsalva (SoV) (direito 28,9 mm; esquerdo 25,4 mm; não coronário 26,5 mm) e *Valve to coronary distance* (VTC) de 2,5 mm. A altura da coronária direita (CD) era de 6,4 mm e coronária esquerda (CE) 4,3 mm. Relativamente aos acessos vasculares, a artéria femoral e ilíaca direitas apresentavam um calibre adequado e pouca tortuosidade, elevada tortuosidade da artéria femoral esquerda mas com calibre adequado. Eletrocardiograma mostrava fibrilhação auricular com resposta ventricular controlada e hemibloqueio anterior esquerdo.

Tendo em conta a presença de fatores preditores de elevado risco de oclusão coronária (ViV); baixa implantação das coronárias < 10 mm, pequeno calibre dos SoV e VTC < 4 mm) foi feita a opção de um “Chimney procedure” de forma a prevenir uma possível oclusão coronária²³. O procedimento ocorreu ao 3º dia de internamento, foram usados como acesso principal a artéria femoral direita e acessos secundários na cateterização coronária da CE a artéria radial esquerda e para a CD a artéria femoral esquerda. Colocação de fio-guia e avanço de stent Megatron 3.5 × 28 mm para a porção médio-proximal da CD e Megatron 4,0 × 32 mm para a artéria descendente anterior médio-proximal. Abertura da válvula *Evolute Pro 23* até aos 80%, com avaliação angiográfica de resultado parcial e visualização de artérias coronárias. Após comprovativo de resultado (parcial) satisfatório, realizada implantação de stent no óstio/proximal com exteriorização de parte do

stent (Chimney technique) e o mesmo foi a realizado a nível do tronco comum. Abertura do remanescente da válvula, pós-dilatação de ambos os stents com o próprio balão que foi deixado in situ na mesma posição intrastent. Bom resultado angiográfico final com fluxo coronário adequado e sem leak significativo (PVL = 0) da válvula.

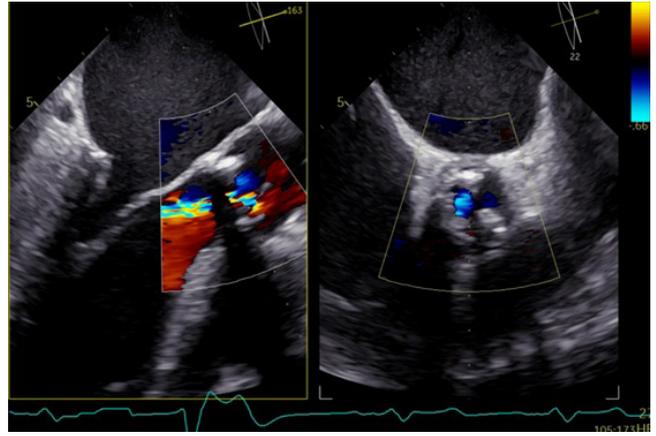


Figura 1. Ecocardiografia Transesofágica: Prótese biológica em posição aórtica degenerada.

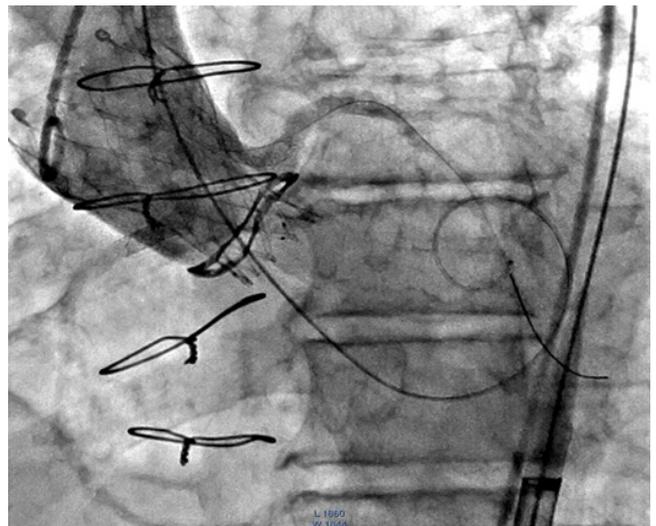


Figura 2. Resultado angiográfico de VAP (EVOLUT Pro 23) e procedimento Chimney.

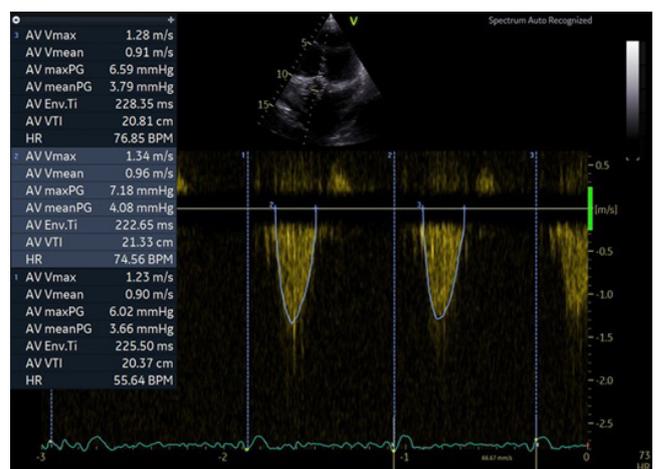


Figura 3. Ecocardiografia transtorácica fluxo anterógrado protésico.

Alta clínica e *follow up*: Não se registaram complicações no pós procedimento, nomeadamente do ritmo, dos acessos vasculares ou enfarte peri-procedimento. A avaliação ecocardiográfica mostrou uma válvula normofuncionante sem jatos regurgitantes e fluxo anterógrado adequado (gradiente médio 4 mmHg; tempo de aceleração 83 ms e Ratio VTIs 0,58). O doente teve alta 6 dias após a implantação da VAP, até à data sem necessidade de novos internamentos, mantém cansaço para esforços de intensidade moderada a elevada (NYHA II).

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14. FIBRINOLYSIS AS BRIDGE TO PERCUTANEOUS CORONARY INTERVENTION IN OSTIAL RCA OCCLUSION

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Case report: A 57-year-old man with no significant past medical history, presented to the emergency department with syncope associated with epigastric and left arm pain. On admission, he was hypotensive (BP 60/54 mmHg), bradycardic (HR 45-50 bpm), pale and diaphoretic. Initial management with intravenous fluids and vasopressors resulted in suboptimal hemodynamic response.

Electrocardiogram demonstrated ST-segment elevation in leads II, III, and aVF, consistent with inferior STEMI, complicated by complete atrioventricular block. Bedside echocardiography revealed right ventricular dysfunction and mildly reduced left ventricular systolic function (LVEF 45-50%).

A temporary transvenous pacemaker was implanted and set at 80 bpm. Urgent coronary angiography revealed normal left coronary arteries, but selective engagement of right coronary artery (RCA) was unsuccessful, despite multiple attempts with different catheters and non-selective aortography (Figure 1). Only distal RCA was observed through left-to-right collaterals, strongly suggesting an ostial RCA occlusion.

Given the impossibility of primary percutaneous coronary intervention and the absence of contraindications, systemic fibrinolysis with alteplase was administered. One hour after, the patient achieved hemodynamic stabilization with improvement of right ventricular function and normalization of the ST segment. He was admitted to the intensive coronary care unit and maintained on dual antiplatelet therapy plus intravenous heparin. Serial echocardiography confirmed progressive recovery of biventricular systolic performance without pericardial effusion.

Coronary angiography at 12 hours revealed a dominant RCA with severe ostial stenosis (Figure 2) and a 50% stenosis of the posterolateral branch. Percutaneous coronary intervention of the RCA ostium was successfully performed with balloon predilatation, deployment of 3.5 × 15 mm Xience Skypoint stent, and post-dilatation with a 4.0 × 12 mm NC Euphora balloon, achieving an optimal angiographic outcome with TIMI 3 flow (Figure 3).

Clinical course was uneventful, and the patient was discharged three days later. At one-year follow-up, echocardiography demonstrated preserved biventricular function (LVEF 62%, TAPSE 24 mm), no significant valvular disease, and only a small anterior pericardial effusion without clinical impact. This case highlights the importance of fibrinolysis as a life-saving bridging therapy in very selected STEMI patients with ostial coronary occlusion, when primary PCI is not feasible.



Figure 1. Non-selective aortography failing to visualize the right coronary artery.

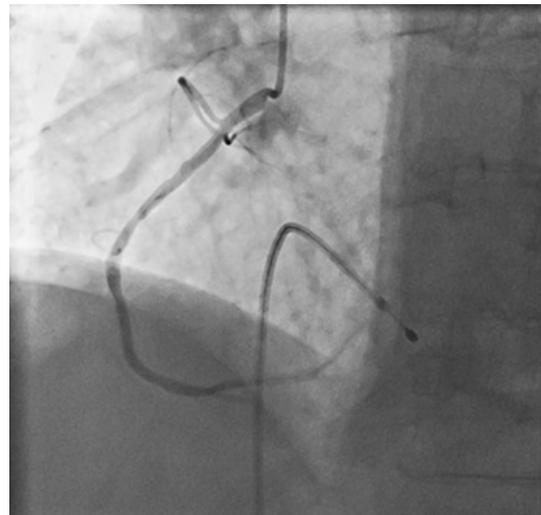


Figure 2. Severe ostial stenosis of the right coronary artery (75-90%).

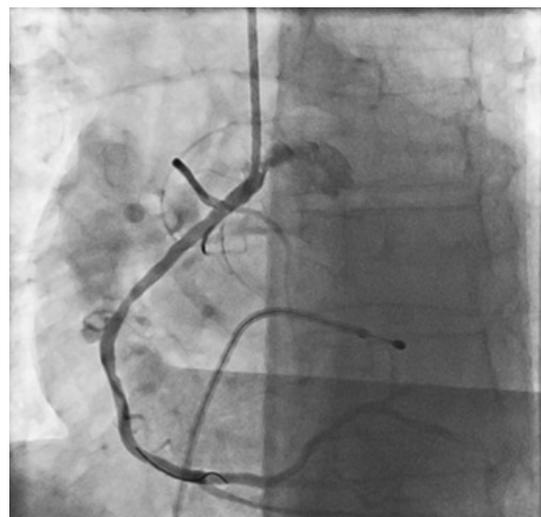


Figure 3. Final angiographic result after percutaneous coronary intervention.

15. WHEN THE VALVE BITES BACK: CIRCUMFLEX OCCLUSION AFTER MITRAL VALVE SURGERY

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Case report: A 27-year-old man from Cape Verde with rheumatic mitral stenosis had undergone mitral valve repair in childhood. Two months prior to the current admission, he underwent mechanical MVR and tricuspid annuloplasty. Postoperative echocardiography showed mildly reduced systolic function (LVEF 40-50%).

He presented with malaise, palpitations, dyspnea, and nausea. ECG showed atrial flutter with ventricular response ~150 bpm. Echocardiography demonstrated severe biventricular dysfunction (LVEF ~10%) with preserved prosthetic function. Cardiogenic shock ensued, progressing to pulseless electrical activity. After resuscitation and prolonged CPR, venoarterial extracorporeal membrane oxygenation (VA-ECMO) was instituted. ECMO was removed after five days, with LVEF improvement to 15-20%.

Coronary angiography was performed, at this time, to exclude ischemic etiology. It revealed left dominance and complete occlusion of the mid-Left Circumflex (LCx) with distal reperfusion, without other lesions (Figure 1). PCI was attempted: a hydrophilic wire achieved distal re-entry after subintimal tracking, but aspiration thrombectomy was ineffective. Stepwise predilatation with noncompliant balloons up to 3 mm/26 atm failed to achieve adequate expansion (Figure 2), precluding safe stent implantation. Final angiography confirmed persistent LCx occlusion.

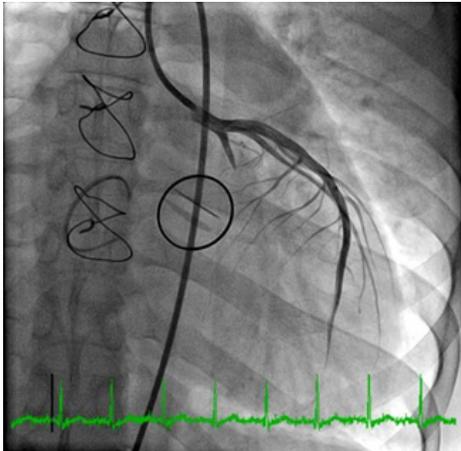


Figure 1. Complete occlusion of the mid-Left Circumflex.

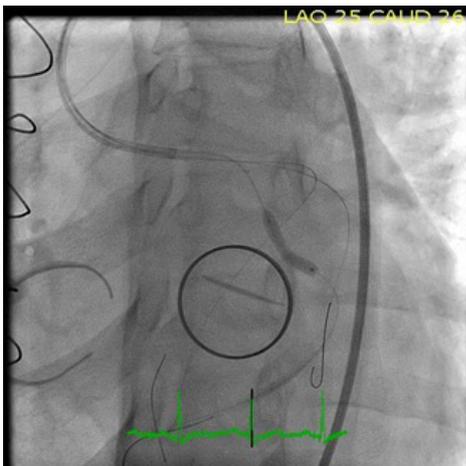


Figure 2. NC balloon 3 mm/26 atm failed to achieve adequate expansion.

Cardiac MRI showed subendocardial late gadolinium enhancement in the inferior and inferolateral walls (LCx territory) with viable myocardium. CT coronary angiography demonstrated close proximity of the LCx to the mechanical mitral valve, supporting mechanical distortion as the occlusion mechanism (Figure 3).



Figure 3. CT coronary angiography: close proximity of the LCx to the mechanical mitral valve.

Heart Team discussion deemed surgical correction or bypass. The patient underwent cavotricuspid isthmus ablation for recurrent flutter. At discharge, he was asymptomatic with optimized heart failure therapy.

Circumflex (LCx) artery injury is a rare but serious complication of mitral valve surgery, particularly in left-dominant circulation due to the close anatomical relation between the LCx and mitral annulus.^{1,2} Most cases present acutely.³ In this case, PCI was unsuccessful due to fixed vessel kinking. Awareness of this complication is crucial, as management options are limited and outcomes remain challenging.¹⁻³

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16. OVERCOMING A SMALL ANNULUS: CORONARY PROTECTION AND VALVE EXPANSION IN HIGH-RISK VALVE-IN-VALVE TAVI

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Introduction: Valve-in-valve (ViV) TAVI in small surgical bioprostheses is associated with elevated transvalvular gradients and a higher risk of coronary obstruction. Optimal procedural planning is essential to ensure both hemodynamic and safety outcomes.

Case report: An 84-year-old woman with prior surgical aortic valve replacement (Trifecta 19 mm, implanted in 2013) was admitted for acute heart failure due to prosthetic valve degeneration. Transthoracic echocardiography revealed severe prosthetic stenosis (mean gradient 56 mmHg, VTI ratio 0.17) and mildly reduced left ventricular systolic function (EF

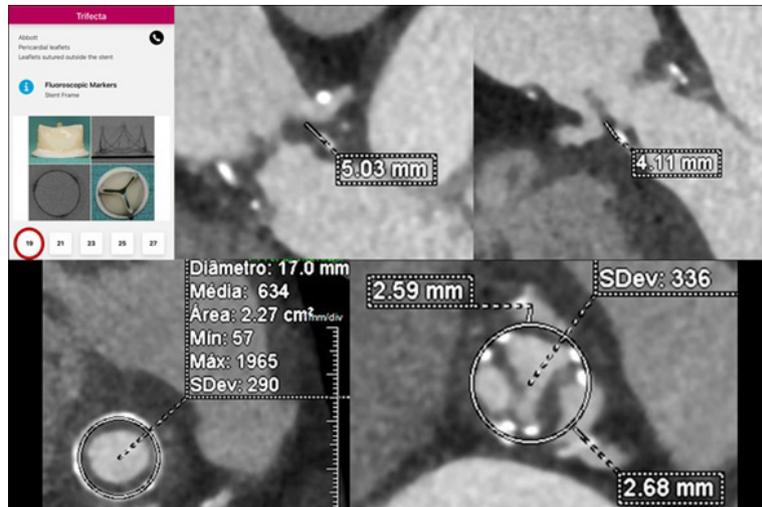


Figure C16 1. Cardiac CT angiography demonstrating a degenerated 19 mm Trifecta surgical aortic bioprosthesis with a true internal diameter of ~17 mm and circumferential pannus, without significant calcification or thrombus. The virtual valve-in-valve (ViV) simulation (20 mm) showed a virtual-to-right coronary distance of 4-5 mm (intermediate risk of coronary obstruction) and a virtual-to-left coronary distance of 2-3 mm (high risk of coronary obstruction).

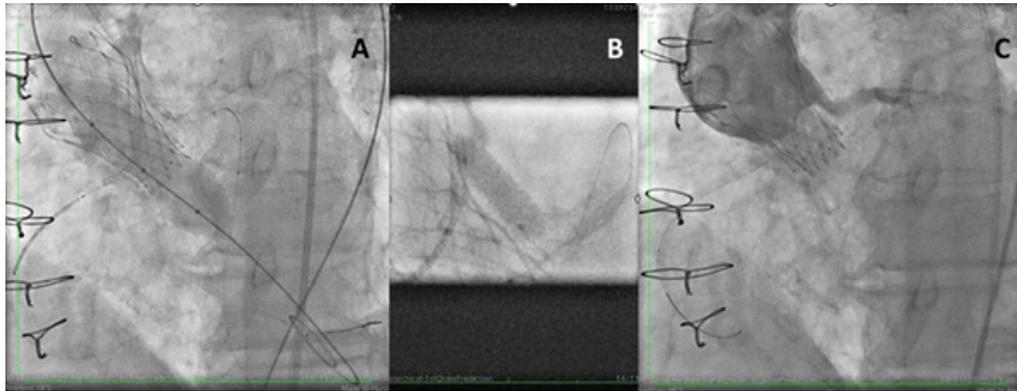


Figure C16 2. Angiographic images showing post-dilatation of the transcatheter valve with a Nucleus 18/40 mm balloon (A), left main coronary stent post-dilatation after TAVI with a 5.0/12 mm balloon at 16 atm (B), and the final result demonstrating optimal valve expansion, preserved coronary flow, and absence of immediate complications (C).

47%, GLS -11%). CT angiography demonstrated a small true internal diameter (~17 mm), circumferential pannus, and a high risk for coronary obstruction with virtual valve-to-left coronary distance of 2-3 mm. Coronary angiography confirmed a right-dominant system and a moderate eccentric ostial left main stenosis.

Given the prohibitive surgical risk and unfavorable anatomy, ViV TAVI was planned with a CoreValve Evolut FX 23 mm prosthesis. Because of the high risk of coronary obstruction, a double chimney stenting strategy was employed. The left main coronary artery (LM) was protected and stented with an Onyx 4.5/22 mm due to moderate ostial lesion and pressure ventricularization, while the right coronary artery (RCA) was wired and a 4.5/30 mm stent was positioned but left undeployed as standby protection. Following valve deployment, post-dilatation with an 18/40 mm balloon was performed to optimize valve expansion. The LM stent was further post-dilated with a 5.0/12 mm balloon at high pressure.

The procedure resulted in a well-expanded prosthesis, absence of paravalvular leak, preserved coronary perfusion, and improved AR Index (30% → 34%). The patient recovered uneventfully and was discharged without complications. The patient remained asymptomatic at 1-year follow-up, with improved functional status (NYHA I, CCS 0), normalized Doppler gradients, and improved EF (to 56% and GLS (to -15%).

Discussion: This case underscores the importance of individualized Heart Team decision-making, detailed CT-based procedural planning, and coronary protection techniques in high-risk ViV TAVI. In small annuli, aggressive post-dilatation and selective use of chimney stenting may be key to optimizing

both valve performance and coronary safety, ensuring durable outcomes in complex structural interventions.

17. SEAL AND PROTECT: COVERED STENT FOR A PROXIMAL LAD ANEURYSM*

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Introduction: Coronary artery aneurysms (CAA) are uncommon findings, often incidental during coronary angiography, and may be associated with acute coronary syndromes (ACS). This association is primarily due to their tendency to promote thrombus formation –resulting from altered flow dynamics and endothelial dysfunction– leading to either *in situ* thrombosis or distal embolization. Management remains challenging, particularly when aneurysms coexist with obstructive coronary artery disease. Covered stent implantation represents a potential therapeutic strategy in selected cases.

Case report: We report a 70-year-old male with cardiovascular risk factors (hypertension, dyslipidemia, former smoker) and a history of two previous anterior myocardial infarctions:

Six years ago, he presented with an inferior STEMI. Coronary angiography revealed an LAD with a 7 mm aneurysm and distal occlusion (successfully recanalized with guidewire only, without balloon angioplasty or stenting).

Five years later, he experienced an anterior STEMI. Coronary angiography showed progression of the LAD aneurysm to > 8 mm, with a thrombotic occlusion in the mid-segment. This was treated with implantation of a 3.5 × 24 mm drug-eluting stent (DES).

One year later, the patient presented with a non-ST elevation myocardial infarction (NSTEMI). Coronary angiography confirmed a large fusiform aneurysm in the LAD, near the origin of the first diagonal branch. The previously implanted mid-LAD stent was patent with no restenosis, and no acute culprit lesion was identified. Clinically, the patient remained stable (Killip I), without recurrent chest pain or arrhythmias.

Due to suspicion of embolic phenomena originating from the LAD aneurysm as the underlying cause of the ACS, elective catheterization was planned for aneurysm exclusion.

Intravascular ultrasound (IVUS) revealed a wide-necked proximal LAD aneurysm (vessel diameter 4.5-5.0 mm), with adequate landing zones but located close to the origin of the first diagonal branch. To preserve flow to this branch, a 2.0 mm balloon was placed in the diagonal and inflated at low pressure during the deployment of a 4.5 × 15 mm Papyrus covered stent, successfully excluding the aneurysm while maintaining side branch patency. Final angiography and IVUS confirmed an optimal result. The patient was discharged uneventfully. At 3-year follow-up, the patient remained free of recurrent ACS events.

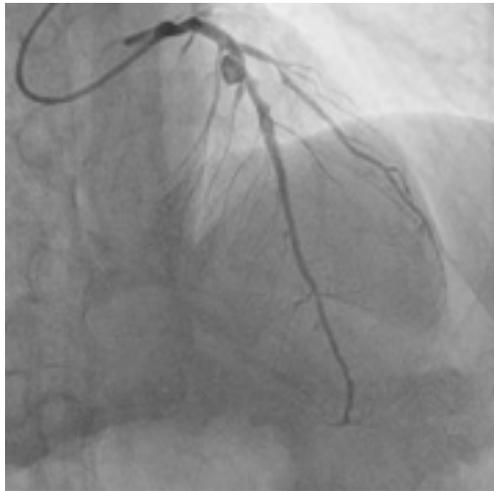


Figure 1. Anterior descending artery with a saccular aneurysm, apparently associated with a lesion at the beginning of the mid segment.

Discussion: 1. Coronary artery aneurysms are rare but clinically significant findings in the context of acute coronary syndromes. 2. Intravascular imaging is essential for characterizing aneurysm anatomy and assessing procedural feasibility. 3. Covered stent implantation can effectively exclude aneurysms while preserving side branch perfusion. 4. Careful procedural planning, including side branch protection strategies, may optimize outcomes and reduce the risk of complications.

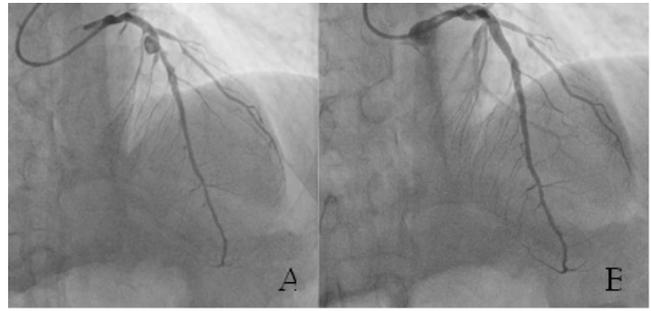


Figure 3. Initial (A) and final (B) angiographic results.

18. FROM FRACTURE TO DISSECTION: A PCI BALLOON COMPLICATION

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Introduction: Balloon fracture during percutaneous coronary intervention (PCI) is an uncommon but potentially serious complication. It may result in device entrapment, coronary artery dissection, and procedural failure. Although rare with modern devices, fracture can occur particularly in heavily calcified lesions or during high-pressure inflations. Recognition and timely management are essential to prevent severe clinical consequences.

Case report: We report the case of a 70-year-old woman with a history of hypertension and dyslipidemia. She previously underwent surgical treatment for rheumatic mitral valve disease, including coronary artery bypass grafting (CABG; LIMA-LAD), mitral valve replacement, and tricuspid annuloplasty. A single-chamber pacemaker was also implanted due to atrial fibrillation with a slow ventricular response.

Recently, she was diagnosed with severe aortic stenosis. Pre-TAVI cardiac catheterization revealed a 70-90% lesion in the mid-left anterior descending artery (LAD), a patent LIMA-LAD graft, and a subocclusive lesion in the mid-right coronary artery (RCA).

During predilatation of the RCA, a non-compliant balloon (NC Firefighter 3.25 × 20 mm) experienced a shaft fracture with balloon entrapment. The patient developed loss of distal flow, and the ECG showed ST-segment elevation in the inferior leads, consistent with RCA dissection. A long iatrogenic RCA dissection was observed.

Multiple attempts were made to retrieve the trapped device. A mechanical trapping technique was successfully employed: Placement of a second guidewire; Advancement of a guide extension catheter over both guidewires and the fractured balloon; Trapping using a 2.0 × 10 mm balloon; *En bloc* removal of all equipment (Figures 1 and 2).

Addressing the dissection, a guidewire was advanced, correct positioning in the true lumen was confirmed using a microcatheter with distal contrast injection. Intravascular ultrasound (IVUS) revealed a long dissection extending from the proximal RCA to the crux, with distal re-entry.

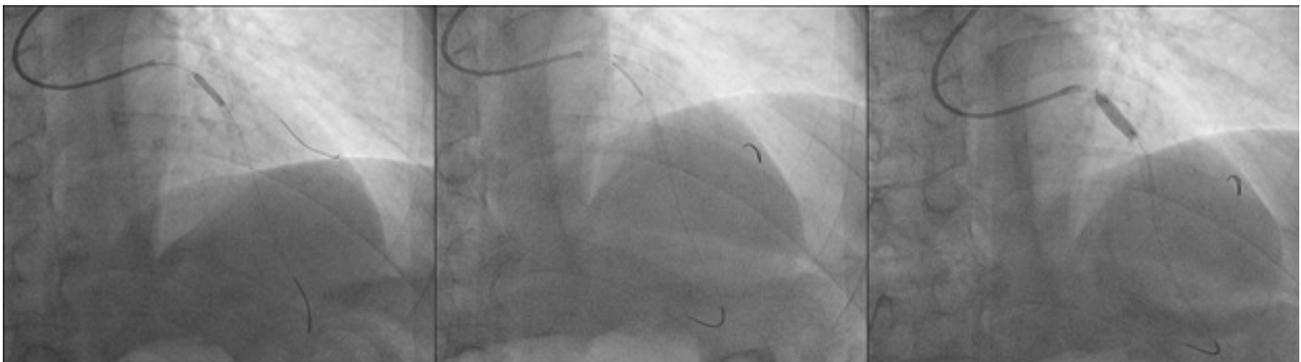


Figure C17 2. Pre-dilation followed by simultaneous inflation of two balloons to protect side branches, and subsequent stent implantation.

Balloon angioplasty was performed along the RCA using a non-compliant Raiden 3.0 × 20 mm balloon. Final angiography demonstrated preserved distal TIMI 3 flow. Given the patient's hemodynamic stability and absence of symptoms, the procedure was concluded without stent implantation. At two-month follow-up, angiography showed a calcified RCA with a double lumen extending from the proximal segment to the crux, consistent with chronic dissection. Despite this, TIMI 3 flow persisted in all branches. As the patient remained asymptomatic with excellent distal perfusion, no further PCI was attempted.

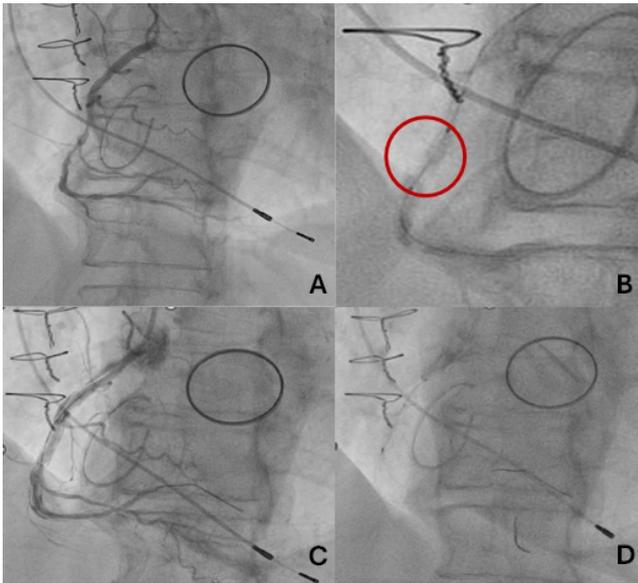


Figure 1. A: Dominant atheromatous right coronary artery (RCA) with a subocclusive lesion in the mid segment. B: Predilatation with an underexpanded non-compliant balloon. C: RCA dissection with second guidewire being positioned. D: Second guidewire in distal position and second balloon advanced into place.



Figure 2. Distal portion of the fractured balloon, after retrieval.

Discussion: 1. Balloon shaft fracture and entrapment, while rare in the era of modern PCI devices, can still occur. 2. Prompt recognition and careful retrieval techniques, such as using a guide extension catheter and trapping balloon technique, are critical to avoid procedural failure and emergency surgery. 3. Intravascular imaging (e.g., IVUS) is essential to: confirm true lumen wire position, assess vessel injury such as dissection, guide treatment decisions. In clinically stable patients with preserved distal flow, a conservative approach without further stenting may be appropriate.

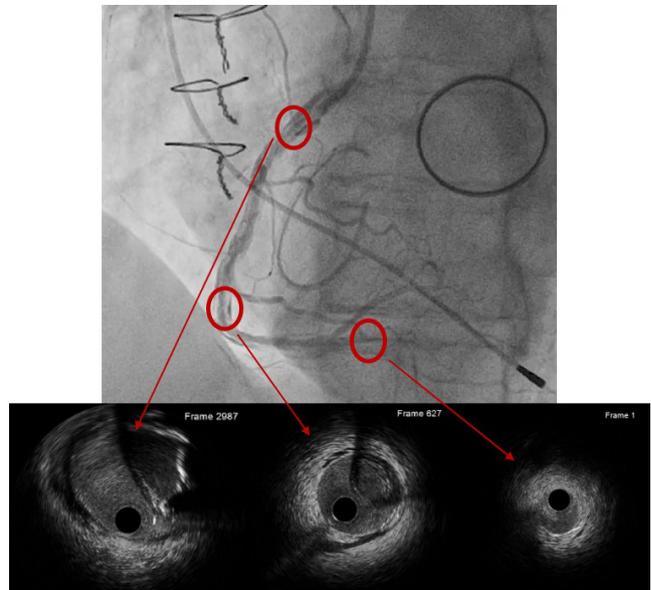


Figure 3. Intravascular ultrasound (IVUS) reveals a long dissection starting from the proximal segment, with the guidewire coursing through a false lumen from the proximal segment and reentering the true lumen distally at the level of the crux.

This case underscores the importance of preparedness for rare complications, and the value of advanced retrieval techniques and imaging tools.

19. FROM CALCIUM TO CLARITY: A STENTLESS SOLUTION WITH ORBITAL ATHERECTOMY AND DCB

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Introduction: Percutaneous coronary intervention (PCI) in the setting of heavily calcified multivessel coronary artery disease remains challenging with higher risk of immediate complications, late failure due to stent underexpansion and malapposition, and consequently poor clinical outcome. Good characterization of calcium distribution with multimodal imaging is important to improve the successful treatment of these lesions. Optimal outcomes might increase with a combination of plaque-modification techniques, and drug-coated balloons (DCB), sometimes allowing excellent results without the need for further stent implantation.

Case report: A 72-year-old male, autonomous, with past medical history of hypertension, dyslipidemia, overweight, hepatic steatosis, and former smoking habit, was admitted with inferior ST-segment elevation myocardial infarction (Killip I). Initial coronary angiography demonstrated three-vessel disease: significant proximal left anterior descending artery (LAD) stenosis (70-90%), intermediate obtuse marginal stenosis (50%), and a subocclusive lesion in the mid right coronary artery (RCA). RCA treated with implantation drug-eluting stent, yielding good results.

The patient was readmitted one month later for elective angiographic reassessment. Coronary angiography revealed:

RCA: patent mid-stent with diffuse calcification and significant underexpansion in the proximal segment.

LAD: severe calcified proximal lesion and an additional 50-70% calcified mid-LAD stenosis, with preserved distal vessel.

LAD, intravascular ultrasound (IVUS) confirmed extensive circumferential and eccentric calcification, with reference diameters ranging from 3.5 mm distally to 4.5-5.0 mm proximally. Orbital atherectomy with the Diamondback system was performed throughout the proximal and mid segments. Subsequent lesion preparation was achieved using non-compliant balloons (3.5 and 4.0 mm). Angioplasty was then completed with two paclitaxel-

coated balloons (3.5 × 30 mm and 4.0 × 30 mm), leading to excellent luminal gain and angiographic result, without complications.

For the RCA, IVUS demonstrated underexpansion of the previously implanted stent within a severely calcified segment. Post-dilatation was carried out using non-compliant balloons up to 4.0 mm at high pressure with good result. Outcome: The patient was discharged in good clinical condition, under dual antiplatelet therapy, statin, beta-blocker, and ACE inhibitor. 5 month follow-up has been uneventful to date.

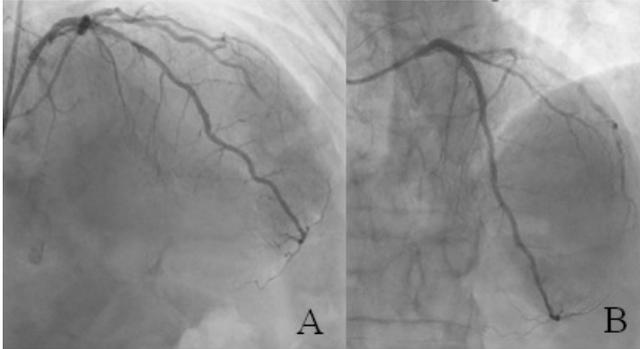


Figure 1. A: LAD pre PCI with a severely calcified lesion in the proximal segment and a 50-70% calcified lesion in the mid segment. B. LAD post PCI, showing a good result of stent free DCB intervention.

Discussion: 1. This case illustrates the successful management of multivessel, heavily calcified coronary artery disease using a stentless approach in the LAD. 2. Orbital atherectomy proved crucial in adequately preparing a severely calcified LAD, enabling optimal drug-coated balloon angioplasty without stent implantation. 3. IVUS played a central role in guiding lesion preparation and optimizing previous DES PCI. 4. Drug-coated balloons represent an increasingly valuable tool in the treatment of complex calcified coronary lesions, particularly when avoidance of additional stent implantation is desirable. 5. Comprehensive use of advanced PCI techniques can achieve excellent clinical and angiographic outcomes even in challenging multivessel disease.

20. ICE-GUIDED FLOWTRIEVER THROMBECTOMY OF RIGHT ATRIAL AND PULMONARY EMBOLI

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Case report: A 74-year-old woman, with a past medical history of arterial hypertension and obesity, was admitted to the emergency department due

to progressive dyspnea over the previous two weeks. On admission, she presented with tachypnea and diaphoresis, with hypoxemia requiring oxygen therapy at 10 L/min. Blood pressure was within normal limits and she was tachycardic.

Laboratory tests revealed elevated troponin (52 ng/L) and NT-proBNP (13,600 pg/mL). A CT pulmonary angiogram revealed a central pulmonary embolism involving the pulmonary artery bifurcation extending into both the right and left main branches.

Transthoracic echocardiography showed mild right ventricular dilatation with slight impairment of systolic function. The left ventricle displayed a subtle D-shape configuration. A markedly heterogeneous mass was observed in the right atrium, prolapsing through the tricuspid valve into the right ventricle. No masses were identified in vena cava.

The diagnosis of intermediate-high risk pulmonary embolism and right heart chambers thrombus in transit was established, and anticoagulation therapy was initiated.

For further clarification, a cardiac magnetic resonance imaging (CMR) was performed, which confirmed the presence of a mobile mass measuring 31 mm within the right branch of the right pulmonary artery with tissue characterization suggestive of thrombus. In addition, a mobile mass with the same tecticular features was identified at the junction of the inferior vena cava and the right atrium. The CMR also demonstrated bilateral central pulmonary embolism, dilatation of the pulmonary artery (33 mm), and right ventricular enlargement with systolic interventricular septal flattening (D-shaped septum).

Our PERT and Heart team decided to proceed with percutaneous intervention using the FlowTrieve system under intracardiac echocardiography (ICE) guidance. Femoral venous access was obtained on the right side for the thrombectomy device (24F); on the left side (9F) for ICE, along with right femoral arterial access (6F) as standby for potential extracorporeal membrane oxygenation (ECMO) support. Back-up, on-site, cardiac surgery was assured.

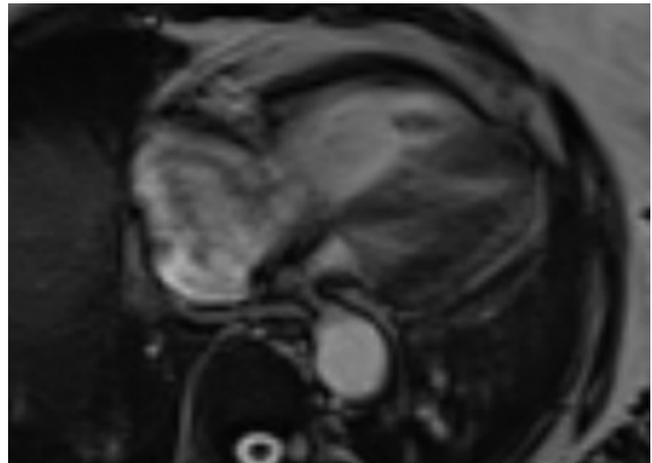


Figure 1. Mobile mass at right atrium in cardiac MRI.

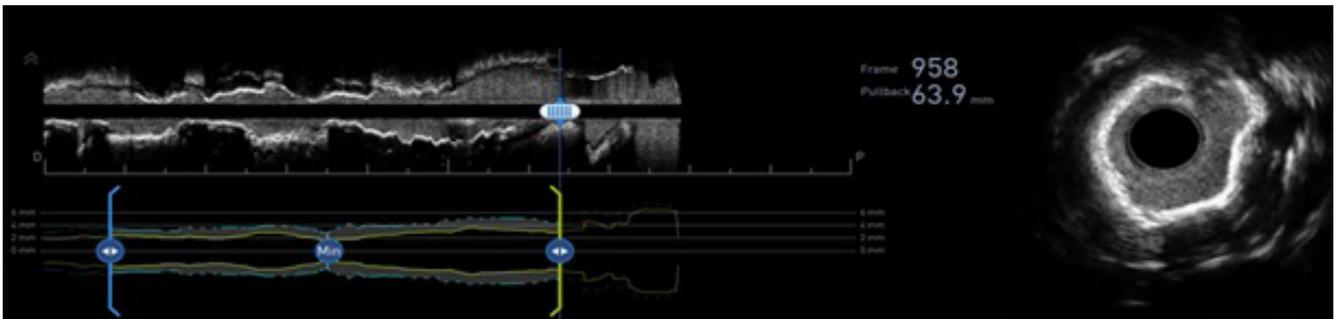


Figure C19 2. IVUS - extensive calcification of the proximal and mid segments with multiple areas of circumferential calcification and other areas of eccentric calcium.

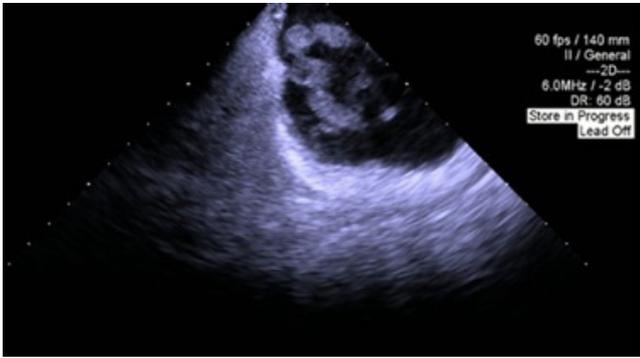


Figure 2. Intracardiac echocardiography image of right atrium thrombus.

Hemodynamic assessment revealed pulmonary hypertension (mean pulmonary artery pressure of 30 mmHg, pulmonary vascular resistance 3.1 Wood units) and normotensive shock (cardiac index 2.2 L/min/m²). ICE confirmed the presence of a mobile thrombus within the right atrium, and allowed real time guidance for the aspiration device. Thrombus aspiration with the *FlowTriever* system (24 F) was successfully performed on the first attempt. Subsequent pulmonary angiography demonstrated severe perfusion defects in the right pulmonary arteries due to a large thrombus burden. Aspiration thrombectomy was then carried out with successful result. The patient was admitted to the intensive care unit for monitoring. She showed favourable clinical progression allowing discontinuation of oxygen therapy, in less than 24 hours. Laboratory tests demonstrated normalization of natriuretic peptide levels. A follow-up echocardiogram 3 days after the procedure revealed resolution of right ventricular dilatation, along with improvement in right ventricular systolic function. This case challenges standard care of pulmonary embolism ad thrombus in transit assessment. We reinforce the need for multimodality imaging evaluation, complications anticipation, and multidisciplinary discussion, to guarantee success and safety.



Figure 3. Aspirated thrombi from the right pulmonary artery and right atrium using *FlowTriever*.

21. BORN THIS WAY: A PEDIATRIC CASE OF CONGENITAL CORONARY FISTULA MANAGED PERCUTANEOUSLY

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CAFs are rare vascular anomalies between a coronary artery and a cardiac chamber or great vessel, bypassing the myocardial capillary bed. In children, these are often diagnosed incidentally. Some may require closure, particularly if large or hemodynamically significant. When anatomically feasible, percutaneous closure provides a less invasive alternative to surgery.

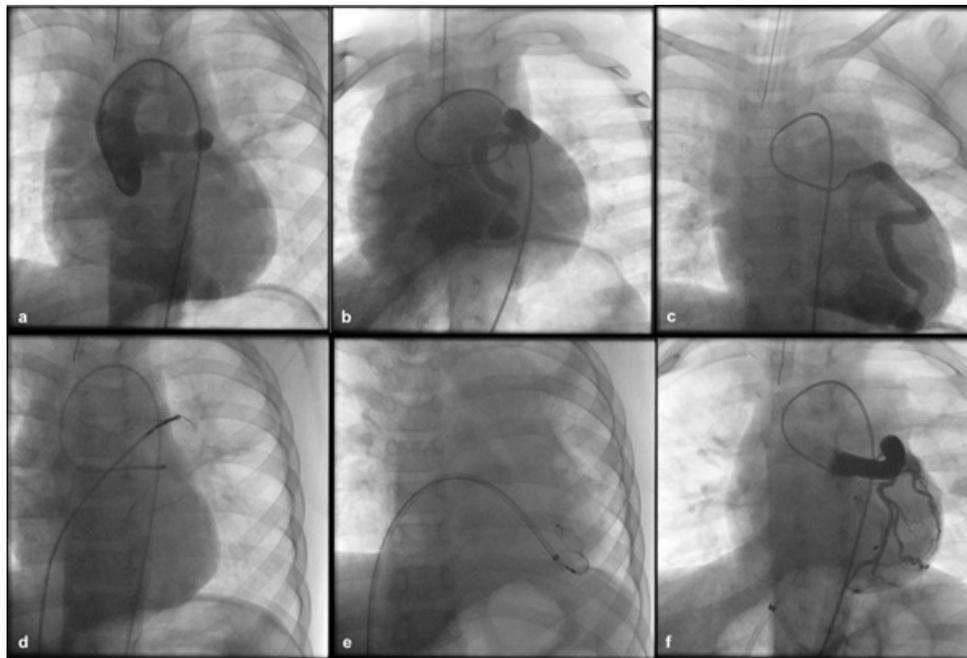


Figure C21 1. Fluoroscopic images demonstrating percutaneous closure of a large coronary artery fistula in a 7-year-old boy using an arteriovenous loop: (a) Left anterior oblique (LAO)-cranial projection shows, on an unselective aortic root angiogram, a markedly dilated left main coronary artery giving rise to a fistulous tract; (b) LAO-caudal projection, selective left coronary angiography demonstrates a large, tortuous fistula draining into the right ventricle; (c) Right anterior oblique (RAO)-caudal projection provides enhanced visualization of the fistula's tortuosity and more clearly delineates the drainage site into the right ventricle; (d) LAO-cranial projection shows establishment of an arteriovenous loop via snaring in the pulmonary trunk; (e) LAO projection, deployment of a 12 x 9 mm Amplatzer™ Vascular Plug II in the distal fistulous segment; (f) LAO-caudal final angiography demonstrates complete occlusion of the fistula, absence of flow within the blind-ended pouch, and improved perfusion of the left anterior descending and circumflex arteries.

The authors report the case of a previously healthy 7-year-old boy who was referred due to a heart murmur. On examination, a continuous murmur was evident. The patient reported no chest pain, palpitations, or syncope. Diastolic blood pressure was mildly reduced, with normal systolic pressure. The electrocardiogram was unremarkable; however, transthoracic echocardiography revealed a large 7 mm coronary fistula arising from the left main coronary artery, which was markedly dilated, draining into the apex of the right ventricle. The left ventricle was mildly dilated, but systolic function was preserved, and no mitral regurgitation was observed.

Selective left coronary angiography confirmed a large fistula with a maximal diameter of 8 mm and a distal stenotic segment of 4 mm (Figure 1a-c). Given the large diameter and high flow rate, an Amplatzer™ Vascular Plug II was selected for its capacity to adapt to variable vessel sizes, allow controlled deployment, and reduce the risk of embolization. Closure was achieved via an aortic approach, using an arteriovenous loop (Figure 1d). A 12 × 9 mm plug was successfully deployed (Figure 1e), with post-procedural angiography demonstrating complete occlusion of the fistula, absence of flow within the blind-ended pouch, and improved perfusion of the left anterior descending and circumflex arteries (Figure 1f). The patient was discharged on low-dose aspirin (5 mg/kg/day) for 6 months to reduce thrombotic risk within the residual blind pouch. Follow-up echocardiography showed no device protrusion into the right ventricle, and at 3 months confirmed normalization of left ventricular size and preserved biventricular systolic function, with no evidence of thrombus formation or residual shunt.

This case highlights the importance of percutaneous closure as an effective alternative to surgery for the treatment of large CAFs in pediatric patients.

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22. UPSIDE DOWN: AN OFF-LABEL USE OF VENA CAVAL FILTER IN THE SVC

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Vena caval filters are devices primarily used for the prophylaxis of pulmonary embolism in patients with absolute contraindications to anticoagulation therapy. These filters have been routinely deployed in the inferior vena cava (IVC) of adult patients. More recently, the use of IVC filters in the superior vena cava (SVC) has emerged as a safe and effective alternative in select cases.

We present the case of a 15-year-old boy with Philadelphia chromosome-positive acute lymphoblastic leukaemia (Ph+ALL), who developed a central

venous catheter-thrombi involving the right subclavian and jugular veins. Concomitantly, he had invasive pulmonary aspergillosis refractory to antifungal treatment, likely due to a catheter-related infection. Diffuse alveolar haemorrhage contraindicated anticoagulation therapy. Given the urgent need for central venous catheter removal and the high risk of pulmonary embolism during the procedure, a Cordis OPTEase™ filter, typically used for the IVC, was successfully deployed in the SVC via the right femoral vein, with its hook oriented caudally. Following filter placement, the central catheter was safely removed under angiographic guidance. The patient subsequently showed rapid clinical improvement from his systemic infection. After confirming the absence of significant thrombi within the filter, it was successfully retrieved 19 days post implantation with a 15-mm ONE Snare™ through a 12Fr sheath.

This case demonstrates that placement and retrieval of IVC-designed filters in the SVC is technically feasible and safe in carefully selected paediatric patients with catheter-related upper deep vein thrombosis who cannot receive anticoagulation.

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23. ALTERNATIVE ACCESS STRATEGIES FOR IMPELLA SUPPORT: A CASE OF AXILLARY ARTERY IMPLANTATION

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Introduction: The Impella CP device has become an important tool in providing temporary mechanical circulatory support for patients with cardiogenic shock or undergoing high-risk percutaneous coronary intervention (PCI). Although femoral artery access is the standard approach, alternative routes are required in patients with significant peripheral vascular disease. This report describes a successful high-risk PCI using Impella CP via left axillary access.

Case report: A 58-year-old man with severe multivessel coronary artery disease (chronic total occlusions of the first diagonal branch and the right coronary artery) and reduced left ventricular ejection fraction presented with an out-of-hospital cardiac arrest, preceded by acute chest pain. The arrest was witnessed by emergency medical services; he was found in a

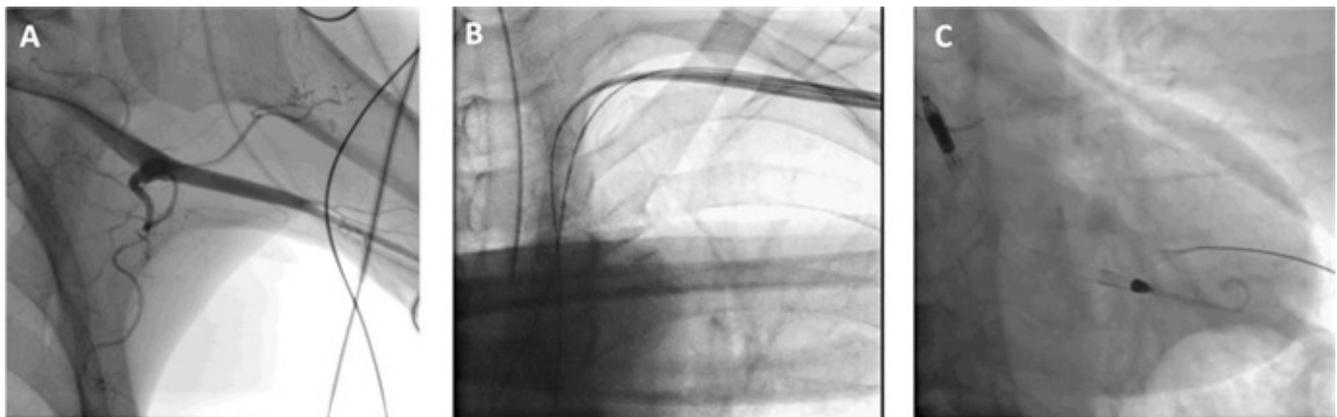


Figure 1 Impella CP via left axillary artery. **A** Contrast injection and evaluation of the left axillary artery course. **B** Impella insertion through the left axillary artery. **C** Impella CP positioned in place.

Figura C23 1

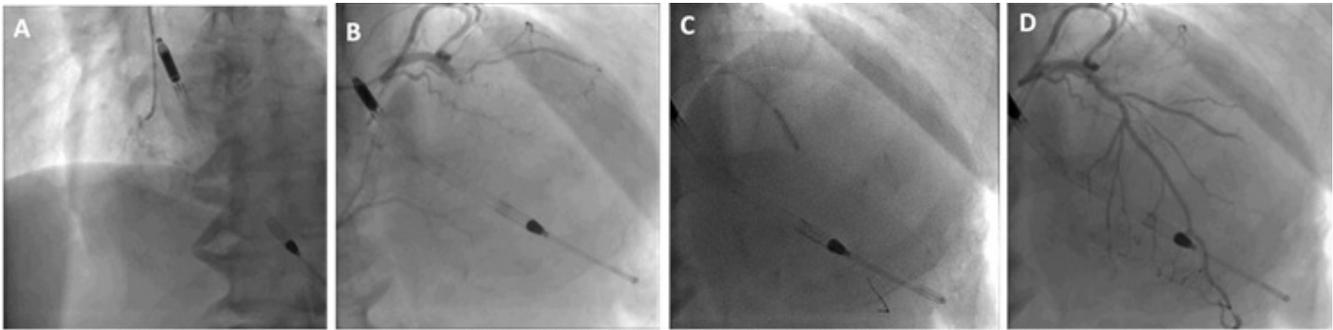


Figure 2 Coronary angiography. **A** Chronic total occlusion of the right coronary artery. **B** Acute proximal left anterior descending artery occlusion with chronic total occlusion of the first diagonal branch. **C** Guidewire crossing the left anterior descending artery. **D** Left anterior descending artery angioplasty with successful revascularization of the left anterior descending artery and partial recovery of the right coronary artery territory.

Figura C23 2

shockable rhythm, received five defibrillation shocks, and was intubated on site (no-flow 0 minutes, low-flow 32 minutes).

On admission, he exhibited signs of peripheral hypoperfusion and electrical instability, with frequent ventricular ectopy. Post-return of spontaneous circulation electrocardiogram showed ST-segment elevation in the inferior leads and V5-V6. Laboratory testing revealed severe metabolic acidosis (pH 7.15) and marked hyperlactatemia (10.5 mmol/L). Bedside echocardiography demonstrated severe biventricular dysfunction with diffuse hypokinesia, without significant valvular disease or pericardial effusion.

He was started on norepinephrine for circulatory support and amiodarone for electrical instability. In the emergency room, he sustained another cardiac arrest in a shockable rhythm, successfully terminated after two defibrillation shocks. Attempted veno-arterial extracorporeal membrane oxygenation (VA-ECMO) cannulation was unsuccessful due to extensive calcification of both femoral arteries.

Given severe femoral artery disease, the left axillary artery was used for Impella CP implantation to provide circulatory support during high-risk PCI. Ultrasound-guided puncture of the left axillary artery was performed, and the Impella CP device was successfully inserted via a 14 Fr sheath with percutaneous closure (Figure 1). Coronary angiography revealed acute occlusion of the proximal left anterior descending artery, chronic total occlusion of the first diagonal branch, and proximal right coronary artery with limited collateralization (Figure 2) consistent with a combined anterior and inferior myocardial infarction. Primary PCI of the proximal LAD was performed with successful stent deployment and optimal angiographic result. The procedure was complicated by recurrent ventricular tachycardia and fibrillation, requiring 11 defibrillation shocks and lidocaine administration.

Post-procedurally, the patient initially stabilized hemodynamically, without further malignant arrhythmias. However, he subsequently developed refractory cardiogenic shock with multiorgan failure.

Discussion: The Impella device provides valuable mechanical circulatory support in cardiogenic shock and high-risk PCI. While femoral access is standard, severe peripheral vascular disease may preclude its use, making axillary access a feasible and safe alternative. Advantages include avoidance of calcified femoral arteries, preserved mobility, and potential for prolonged support.

Our patient presented a high-risk scenario with out-of-hospital cardiac arrest, severe biventricular dysfunction, and multivessel coronary disease. Failed VA-ECMO cannulation further highlighted the utility of axillary Impella access. This case underscores the clinical utility of axillary artery access as a safe and feasible alternative for Impella-assisted PCI in patients with advanced peripheral vascular disease, expanding therapeutic options in advanced interventional cardiology.

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24. CORONARY “DIRE STRAITS” - A SEQUENCE OF MISFORTUNES LEADING TO CORONARY PSEUDOANEURYSM AFTER COMPLEX PCI

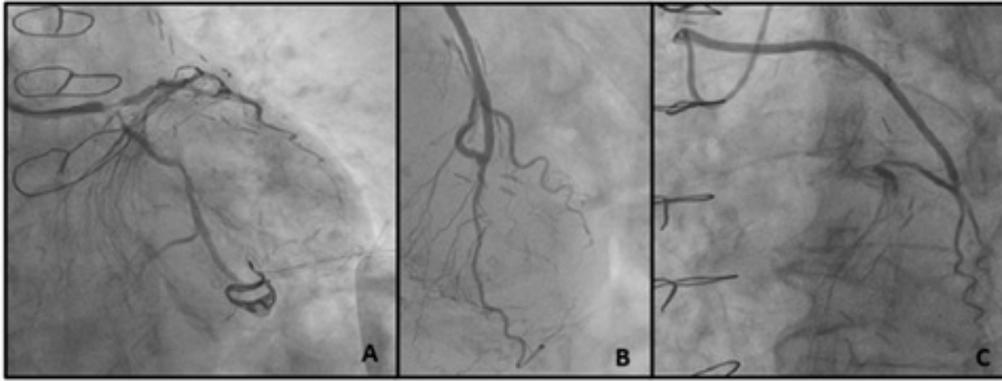
Mónica Amado, Joana Pereira, André Martins, Carolina Esteves, Adriana Vazão, Carolina Gonçalves, Tiago Teixeira, Margarida Cabral, Luís Graça Santos, Fátima Saraiva, Pedro Jerónimo Sousa, Francisco Soares, David Durão

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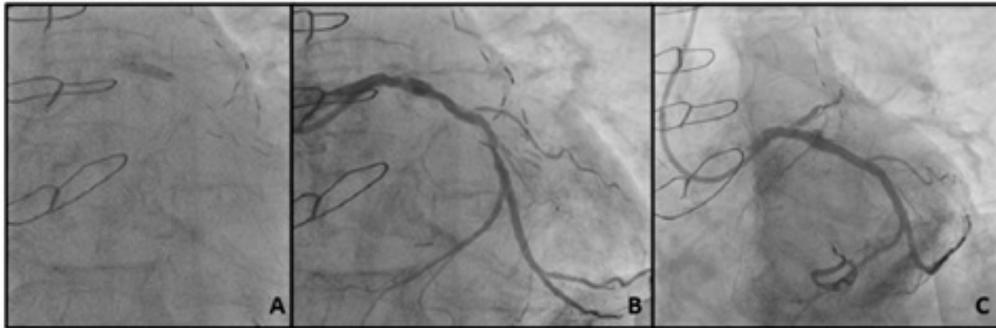
Introduction: Coronary angiography (CA) plays a central role in diagnosing and treating coronary artery disease. Despite advances in devices and techniques, potentially life-threatening complications can occur, including vascular perforation, dissection, pseudoaneurysm formation, among others.

Case report: A 72-year-old female with a history of arterial hypertension, dyslipidemia, diabetes *mellitus*, hypothyroidism and paroxysmal atrial fibrillation was referred to cardiology consultation due to fatigue and class 3 effort angina. Accordingly, CA was performed and revealed severe distal left main (LM) stenosis (90%), left descending artery (LAD) ostial stenosis (70-90%), left circumflex artery (LCX) 70-90% ostial and 50-70% distal stenoses, and right coronary artery (RCA) 50% stenosis. Thus, she was referred for coronary artery bypass grafting where, according to the surgical report, grafting of the left internal mammary artery to LAD and right internal mammary artery (RIMA) to the obtuse marginal (OM) branch was performed.

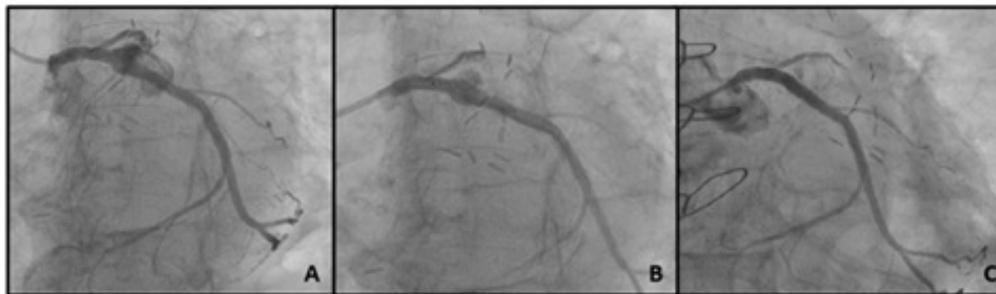
Few months later, the patient came complaining of effort angina, which remained despite optimal medical treatment. Resting electrocardiogram (ECG) showed V4-6 T-wave inversion and transthoracic echocardiography revealed preserved left ventricular function with basal interventricular septum and mid-basal inferior wall hypokinesia. Thus, myocardial perfusion scintigraphy was performed and suggested inferior and inferolateral necrosis with mild peri-necrotic ischemia. For further clarification, repeated CA was performed (Figure 1) showing persistent 90% LM distal disease, 70-90% ostial LAD stenosis and a 99% LCX stenosis; RCA was not selectively cannulated, but Rentrop 2 collaterals were visualized, consistent with a chronic total occlusion; both bypasses were patent, although this procedure revealed that the RIMA was actually grafted to first diagonal (not OM). Percutaneous Coronary Intervention (PCI) was performed (Figure 2) with lesion preparation using rotational atherectomy, non-compliant (NCB) and cutting balloons. Drug-eluting stents were implanted from distal to proximal LCX and from the LM to proximal LCX, with intravascular ultrasound demonstrating adequate stent expansion and apposition except for distal underexpansion, corrected with high-pressure dilatation. Proximal LM optimization was completed with



Panel 1. Diagnostic coronary angiography. (A) Native left coronary artery. Critical calcified stenosis of the left main and subocclusive ostial circumflex artery lesion. (B) Patency of the left internal mammary artery to the left anterior descending artery and (C) of the right internal mammary artery to first diagonal artery.



Panel 2. Percutaneous coronary intervention. (A) Subocclusive ostial circumflex artery lesion preparation using non-compliant balloon 3.5mm and (B) post dilation angiographic result. (C) Final result of the left main-left circumflex artery percutaneous coronary intervention using 2 consecutive drug-eluting stents from circumflex artery to left main, ending with proximal left main optimization with non-compliant balloon.



Panel 3. Coronary angiography and percutaneous coronary intervention in the context of non-ST-segment elevation myocardial infarction. (A) Saccular pseudoaneurysm at the proximal circumflex artery stent site, with active contrast leak. (B) Percutaneous coronary intervention with a covered stent 4.0x21mm, with persistence of residual leak. (C) Final result after post dilatation, with no leak.

NCB. The patient was discharged the following day, without procedure-related complications, on triple antithrombotic therapy.

Three days later, she presented to the emergency department with new-onset of chest pain and diaphoresis. No new ECG and echocardiography changes were evident, but laboratory testing revealed substantial troponin elevation, consistent with a non-ST-segment elevation myocardial infarction. She was admitted to the cardiology care unit and a new CA (Figure 3) revealed a pseudoaneurysm at the proximal LCX stent site with active contrast leak (contained rupture); the distal stent overlapped minimally with

the proximal one, with the rupture presumed to occur at the overlap zone. The leak site was successfully treated with a stent-graft, sealing the contained rupture origin. The patient was discharged the following day and remained clinically stable as of today.

Discussion: While PCI is usually safe, it may rarely lead to complications such as coronary pseudoaneurysm. Although in most cases these lesions remain stable, its size progression increases the risk of rupture and cardiac tamponade. In this case, rapid diagnosis and covered stenting were essential to achieve vessel sealing and, therefore, clinical stability.

25. “DON’T TOUCH ME” - A CASE OF EXTENSIVE LEFT CORONARY ARTERY DISSECTION FULLY HEALED AFTER CONSERVATIVE MANAGEMENT

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Introduction: Spontaneous coronary artery dissection is a rare non-atherosclerotic cause of acute coronary syndrome, most commonly affecting women without traditional cardiovascular risk factors. Diagnosis is primarily established by coronary angiography (CA) or advanced imaging modalities such as coronary computed tomography angiography (CCTA). Management strategies depend on hemodynamic stability and the extent of coronary involvement, with conservative therapy often preferred in stable patients.

Case report: A 52-year-old female with history of paroxysmal atrial fibrillation (AF) presented to the emergency department due to episode chest pain, palpitations and nausea that started 5 days before. She was medicated with bisoprolol 2.5 mg daily, edoxaban 60 mg daily and flecainide 50 mg twice daily. Resting electrocardiogram revealed sinus rhythm (62 bpm), with poor R-wave progression in the precordial leads and transthoracic echocardiography (TTE) revealed preserved biventricular

function, yet presenting mid-apical anterior and apical anterolateral wall hypokinesia. Laboratory testing showed significant troponin elevation, consistent with a non-ST-segment elevation myocardial infarction.

She was admitted to the cardiology intensive care unit and CA was performed (panel 1) which showed spontaneous left coronary artery dissection involving the left main (LM): left anterior descending artery (LAD) disease with 80% ostial stenosis, 90% mid stenosis and 80% mid-distal stenosis; 80% proximal left circumflex artery stenosis; with no other relevant changes, namely in the right coronary artery. The case was multidisciplinary discussed with cardiac surgery and conservative management was recommended. Acetylsalicylic acid 100 mg daily was added to bisoprolol 2.5mg daily and flecainide and edoxaban were suspended (CHADS-VA 0). The patient remained Killip class I, with no recurrence of chest pain, and maintained hemodynamic and electrical stability. TTE did not reveal any segmental wall motion abnormalities. The patient was discharged four days later and continued follow-up in the cardiology consultation.

For etiology evaluation, laboratory testing with complement levels, rheumatoid factor, ANA, ANCA and angiotensin-converting enzyme levels, serum protein electrophoresis and immunofixation and acetylcholine receptor antibodies were performed without relevant changes. Imaging studies including carotid Doppler, computed tomography angiography of the thorax, abdomen, and pelvis and contrast-enhanced brain magnetic resonance were also deemed unremarkable. For coronary reevaluation, CCTA was performed three months later and revealed good patency of all



Panel 1. Diagnostic coronary angiography. (A) Spontaneous dissection: left anterior descending artery disease (80% ostial stenosis, 90% mid stenosis and 80% mid-distal stenosis) involving the left main; (B, C) Proximal left circumflex artery stenosis (80%) and a second obtuse marginal with reasonable caliber.



Panel 2. Coronary computed tomography angiography performed three months after the index event with good patency of all coronary vessels, without evidence of persistent spontaneous coronary artery dissection. (A) Curved and straight multiplanar reconstructions (MPR) of the left anterior descending artery (LAD) and (B) left circumflex artery (LCX). (C, D) Three-dimensional volume-rendered reconstructions demonstrating normal coronary anatomy with only discrete irregularities in the mid LAD.

vessels with no angiographic evidence of persistent spontaneous coronary artery dissection, presenting only discrete irregularities involving the mid LAD (panel 2). The patient remains clinically stable under unchanged medication, without recurrent chest pain, heart failure or even clinical AF recurrence, as of today.

Discussion: This case illustrates the successful conservative management of spontaneous coronary artery dissection in a stable patient. Etiological assessment may help identify precipitating factors that can be addressed and treated, potentially reducing the risk of recurrence and adverse events, thereby improving prognosis. The optimal pharmacological management of spontaneous coronary artery dissection, both in the acute phase and long-term, remains a matter of controversy and ongoing investigation.

26. FROM ARDS TO ANEURYSM: WHEN COMPLICATIONS GUIDE THE SOLUTION

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Introduction: Primary angioplasty of the left anterior descending artery (LAD) in the setting of acute myocardial infarction with cardiogenic shock is among the most challenging scenarios in interventional cardiology. The need for mechanical circulatory support and the occurrence of structural complications such as coronary aneurysm or stent malapposition may significantly influence prognosis and require early reassessment. This case highlights the complexity of such an approach and the role of intracoronary imaging and unconventional devices in procedural optimization.

Case report: A 49-year-old male, truck driver, with hypertension, type 2 diabetes, dyslipidemia, and active smoking, presented to the emergency department after two hours of intense chest pain following exertion. On admission, he was anxious, diaphoretic, and tachypneic, requiring oxygen supplementation, with bibasilar crackles but preserved peripheral perfusion. ECG revealed sinus rhythm with ST-segment elevation in precordial and lateral leads. Echocardiography showed a dilated left ventricle with severe hypokinesia of the apex, septum, and anterior wall, and markedly reduced systolic function. A diagnosis of anterolateral STEMI (Killip III) was established, and non-invasive ventilation was initiated before urgent transfer to the catheterization laboratory.

Coronary angiography revealed an ostial LAD thrombotic occlusion. During the procedure, the patient developed hemodynamic instability refractory to escalating doses of norepinephrine and dobutamine. Angioplasty of the LAD was performed under support with an Impella CP device, which was maintained after the procedure. He was admitted to the coronary intensive care unit.

The hospital stay was prolonged and complicated by diabetic ketoacidosis, acute kidney injury (peak creatinine 4.8 mg/dL), hemolytic anemia related to the Impella requiring transfusion, sustained ventricular tachycardia requiring cardioversion, atrial fibrillation treated with amiodarone, and respiratory worsening. Chest CT confirmed ARDS.

Importantly, CT also revealed a calcified aneurysm adjacent to the stent. Antibiotic therapy led to clinical improvement. Given these findings, repeat angiography was performed, showing maintained angioplasty result in the mid-LAD, with a partially calcified aneurysm and post-stent dilatation. Intravascular ultrasound (IVUS) confirmed diffuse stent malapposition. Post-dilatation was carried out with a 7.0 × 20 mm Sterling Monorail peripheral balloon, followed by optimization of the distal stent edge with a 4.0 × 12 mm NC balloon, achieving a favorable angiographic result.

Clinical recovery ensued, enabling initiation of guideline-directed therapy. The patient was discharged after 31 days of hospitalization.

Discussion: This case illustrates the challenges of angioplasty in cardiogenic shock, particularly when complicated by coronary aneurysm and stent malapposition. Mechanical circulatory support was crucial in the acute phase, CT imaging played a key role in detecting complications, and IVUS guided reintervention. The off-label use of a peripheral balloon allowed for safe optimization, underlining the importance of technical flexibility and multimodal imaging in complex coronary interventions.

27. IATROGENIC AORTOCORONARY DISSECTION DURING EMERGENT RIGHT CORONARY ARTERY CATHETERISATION - CASE REPORT

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Case report: A 62 year-old woman, active smoker, with a past medical history of hypertension, dyslipidemia and obesity, was attended by pre-hospital emergency services for severe retrosternal chest pain radiating to the jaw and left arm, with 1 hour and 30 minutes of evolution. On hospital admission, the electrocardiogram showed ST-segment elevation in the inferior leads. She underwent emergent coronary angiography through right radial artery access. The right coronary artery was engaged with a 6 French JR 4 (Cordis, Miami, FL, USA) guiding catheter, revealing an acute occlusion of the mid-right coronary artery.

Percutaneous coronary intervention was performed with implantation of a Resolute Onyx 2.5 × 18 mm drug-eluting stent (Medtronic, Minneapolis, Mn, USA).

However, during passage of the guidewire, an ostial dissection flap of the RCA with retrograde progression extending to the aortic root was noticed (Figure 1). Two Resolute Onyx (Medtronic, Minneapolis, Mn, USA) drug-eluting stents were deployed on RCA ostium sealing the entry tear. An urgent thoracic computed tomography (CT) scan demonstrated an acute parietal hematoma of the ascending aorta, with a maximal thickness of 9 mm, extending to the aortic arch, consistent with an iatrogenic Dunning type II aortic dissection (Figures 2 and 3).

Transthoracic echocardiography was performed and revealed a very mild aortic regurgitation jet and no pericardial effusion. A repeat CT scan performed the same day excluded further progression of the parietal hematoma. The patient was admitted to coronary care unit where she remained hemodynamically and clinically stable. On the third day of hospitalization, a new CT showed a significant reduction of the aortic parietal hematoma dimensions, consistent with resolution in progress.

On the fourth day of hospitalization, the patient was discharged and remains under follow-up without recurrence of cardiovascular events.

Iatrogenic aorta ascending dissection is rare complication following cardiac catheterization procedures as it only occurs in 0.02 to 0.15% of the procedures.¹ The dissection may spread to the ascending aorta and aortic valve, leading to a life-threatening condition, potential surgery or death. It can occur during urgent or elective procedures and in young individuals without coronary relevant disease.

Aortocoronary dissection is more common during engagement of the RCA ostium than the Left Coronary Artery due to histological and structural differences.²

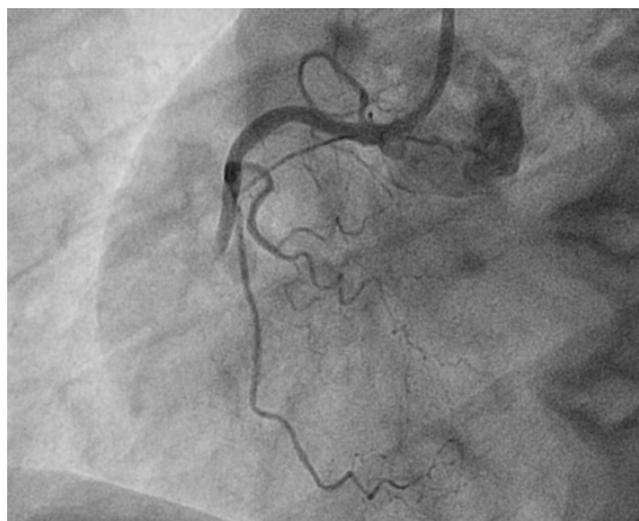


Figure 1. Coronary angiogram demonstrating RCA dissection with extension to the right coronary sinus/ascending aorta.

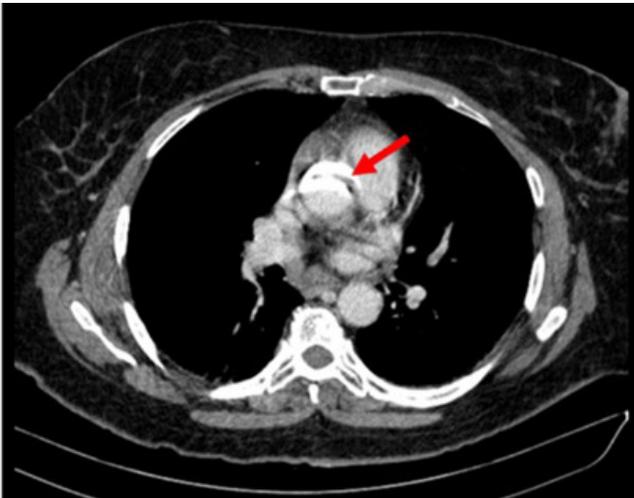


Figure 2. Axial plane of CT showing acute parietal hematoma of the ascending aorta.



Figure 3. Frontal plane of CT showing acute parietal hematoma of the ascending aorta, with a maximal thickness of 9 mm, extending to the aortic arch.

The mechanism of lesion is not fully understood; it can range from catheter manipulation, contrast injection to wiring or ballooning. Calcification of the aortic root and severely calcificated coronary arteries are other risk factors; the type of catheter can also be implicated.¹

The diagnosis can be made immediately using angiography and prompt identification is important to avoid contrast injection and further spread of the dissection. A dissection appears as an intimal tear with a filling defect within the coronary lumen or as an extraluminal cap with persistent contrast, sometimes with total occlusion of the coronary artery lumen.¹

The management of the aortocoronary dissection is challenging. Stenting the entry tear is crucial to protect the coronary artery and to stop the extension of the lesion. Using intracoronary imaging may play an important part in realizing the exact location of the entry tear. The decision to posteriorly proceed to surgery depends on clinical and hemodynamic stability. Good results with favorable long-term survival has been described with conservative approach in stable patients, like the present case.³

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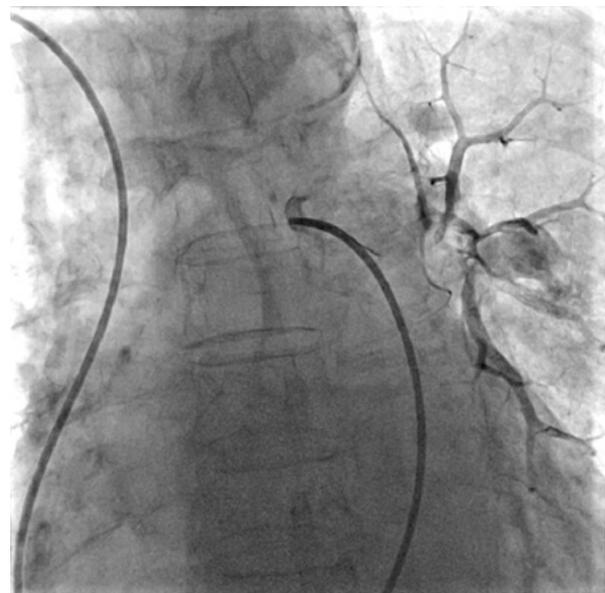
28. FROM DIAGNOSIS TO EMERGENCY: PULMONARY ARTERY RUPTURE DURING ELECTIVE RIGHT HEART CATHETERIZATION

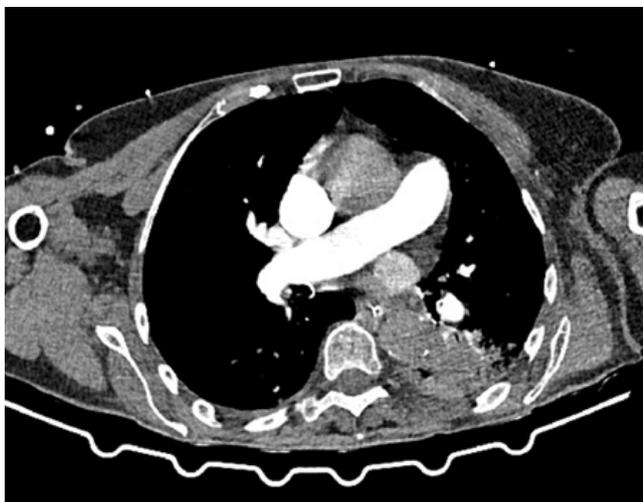
Raquel Fernandes da Silva, Marta Paralta de Figueiredo, Renato Fernandes, Ângela Bento, David Neves, Diogo Brás, Gustavo Sá Mendes, Rita Caldeira da Rocha, Lino Patrício

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Introduction: Pulmonary artery rupture is a rare but life-threatening complication of right heart catheterization (RHC), with an estimated incidence below 0.2% and high mortality. Risk factors include advanced age, pulmonary hypertension, right-sided chamber dilation, and severe tricuspid regurgitation. Although RHC remains the reference method for invasive hemodynamic evaluation in patients with right-sided valvular disease and pulmonary hypertension, the possibility of severe complications should always be recognized.

Case report: An 82-year-old female, independent in daily activities, with a history of severe tricuspid regurgitation, systemic hypertension, paroxysmal atrial fibrillation, and dyslipidemia, was admitted for elective right heart catheterization to characterize pulmonary circulation and to evaluate the feasibility of bicaval heterotopic valvular prosthesis implantation. The procedure was performed via right brachial venous access with a 7F Swan-Ganz catheter. Following post-capillary pulmonary pressure measurement, the patient developed sudden massive hemoptysis with severe desaturation. Immediate management included selective intubation of the right lung, reversal of anticoagulation with prothrombin complex concentrate, intravenous tranexamic acid, and transfusion of one unit of packed red blood cells. Pulmonary angiography demonstrated rupture of a segmental branch of the left pulmonary artery with residual low-flow hemorrhage. Given the patient’s hemodynamic stability and absence of high-flow bleeding, a conservative approach with close monitoring was chosen. The patient was transferred to the intensive care unit, where selective ventilation was maintained for 24 hours. A follow-up chest CT angiography showed no evidence of active bleeding, allowing safe extubation at 48 hours. She completed 7 days of prophylactic antibiotic therapy. Hemoptysis progressively resolved, with complete cessation by day 9, enabling reintroduction of oral anticoagulation without recurrence of bleeding. Clinical course was favorable, and discharge occurred on day 14.





Discussion: Iatrogenic pulmonary artery rupture during RHC is a rare but severe complication, with particularly high risk in elderly patients with severe tricuspid regurgitation, as in the present case. This case highlights the importance of early recognition of the complication through continuous monitoring, immediate intervention with ventilatory and hemostatic support, and a multidisciplinary approach involving Cardiology, Intensive Care, and Thoracic Surgery. It should also be emphasized that, in certain scenarios, the most appropriate strategy may be a conservative approach, avoiding further interventions that could worsen the injury. The favorable outcome demonstrates that a structured and timely response, which includes careful consideration of invasive versus conservative measures, can be crucial for the survival of these patients.

29. CUTTING BALLOON FENESTRATION DOCUMENTED BY OCT: A STRATEGY FOR CORONARY DISSECTION IN STEMI

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Introduction: Coronary artery dissection can be spontaneous or iatrogenic, and both entities pose major challenges in the setting of acute coronary syndromes. Spontaneous coronary artery dissection (SCAD) is increasingly recognized as a cause of acute myocardial infarction in young patients without traditional risk factors, while iatrogenic dissections remain rare but serious complications of PCI. Differentiating between the two can be difficult, especially when angiographic findings are ambiguous. Management is often complex, with risks of flow limitation, vessel loss, or propagation of the dissection. Cutting balloon angioplasty has been proposed as a strategy to fenestrate the intima, decompress the intramural hematoma, and restore true lumen flow without resorting to extensive stenting.

A frequent criticism of this approach is the absence of intravascular imaging evidence confirming true fenestration. As interventionalists note, OCT catheters are only 1 mm in diameter, and most published reports rely on angiographic flow improvement rather than direct visualization of longitudinal intimal cuts. To our knowledge, no previous case has shown sequential OCT imaging before PCI and immediately after cutting balloon angioplasty documenting both the presence of the hematoma and its fenestration.

We report the case of a 46-year-old man presenting with inferior STEMI in whom PCI of the right coronary artery was complicated by extensive iatrogenic spiral dissection. OCT imaging was obtained before and after cutting balloon angioplasty, providing unique documentation of hematoma fenestration and subsequent resolution on follow-up imaging.

Case report: A 46-year-old man with no known cardiovascular risk factors presented with an inferior STEMI. His medical history was notable only for cognitive deficit, without a formal diagnosis, though his sister reported probable autism. He was not on regular medication and denied drug allergies.

The patient was admitted to the emergency department of his local hospital with two hours of oppressive precordial pain radiating to the left arm, associated with diaphoresis. He reported no prior similar episodes. The admission electrocardiogram showed inferior ST-segment elevation. Transthoracic echocardiography revealed a nondilated left ventricle with preserved systolic function. Regional wall motion abnormalities were noted, with akinesia of the inferior basal septum and inferior wall, hypokinesia of the basal inferolateral wall, and mild functional mitral regurgitation. No pericardial effusion was present and the aortic root was of normal dimensions. The patient was transferred for emergent coronary angiography. This demonstrated a critical stenosis in the distal RCA, with diffusely small-caliber distal vessel, a finding that raised the possibility of a spontaneous dissection. After the lesion was crossed with a Runthrough guidewire, coronary flow was lost. Angiography documented a spiral dissection extending from the RCA ostium. Intravascular ultrasound was not available, and optical coherence tomography (OCT) was therefore performed. This confirmed the wire position in the true lumen, but also revealed an extensive intramural hematoma involving the entire course of the RCA.

Given the findings, an Ultimaster 3.5 × 38 mm drug-eluting stent was implanted from the RCA ostium to close the proximal flap, without restoring distal flow. Distal fenestration was performed with successive dilatations with a 3.0 mm cutting balloon in the mid and distal vessel restoring flow (TIMI 3). Final OCT demonstrated fenestrations between the true and false lumen. In light of clinical stability and the restoration of flow, the procedure was concluded.

The patient remained hemodynamically stable throughout hospitalization, without complications. He was transferred back to his local hospital and discharged uneventfully. At discharge, echocardiography confirmed a nondilated left ventricle with preserved systolic function (ejection fraction 59% by biplane method, GLS -19.2%), persistent hypokinesia of the basal inferior septum and mid-basal inferior wall, and mild functional mitral regurgitation. The aortic root remained nondilated. He was advised to undergo repeat angiography within four weeks, but did not attend.

Follow-Up: six months later, the patient was readmitted for reassessment. Coronary angiography demonstrated persistence of a dissection flap distal to the previously implanted stent, although no recurrent hematoma was present. OCT confirmed that the dissection had not healed. Given these findings, a Synergy 2.5 × 38 mm drug-eluting stent was implanted in the mid RCA, followed by post-dilatation with non-compliant 3.0 mm and 3.5 mm balloons. **Outcome:** The second intervention achieved angiographic success, with restoration of normal vessel architecture. The patient remained clinically stable and free of ischemic recurrence following the procedure.

Discussion: This case illustrates how OCT can provide critical insights in the management of coronary dissection. Beyond confirming true lumen position, it allowed real-time visualization of hematoma fenestration induced by cutting balloon angioplasty and its subsequent resolution. Unlike most reports that infer decompression from angiographic outcomes, our case offers direct mechanistic proof that this technique can be effective in restoring flow while limiting unnecessary stenting.

At later follow-up, a residual dissection flap with localized hematoma in a segment that had not been fully fenestrated required additional stent implantation. Nevertheless, the sequential OCT imaging remains unique in demonstrating the principle of cutting balloon-induced fenestration and supports its use as a safe, imaging-guided bailout strategy in selected cases of coronary dissection complicating acute coronary syndromes.

30. FROM ROUTINE TO CATASTROPHE: FATAL PULMONARY HEMORRHAGE FOLLOWING RIGHT HEART CATHETERIZATION

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Case report: A 79-year-old woman with mechanical mitral and aortic valve replacements, permanent atrial fibrillation, and long-standing hypertension was referred for progressive exertional dyspnea, fatigue, and peripheral edema over the past year. Despite intensified diuretic therapy, her functional status declined to NYHA class III with recurrent decompensated heart failure episodes. She was on chronic warfarin, furosemide, and antihypertensive therapy.

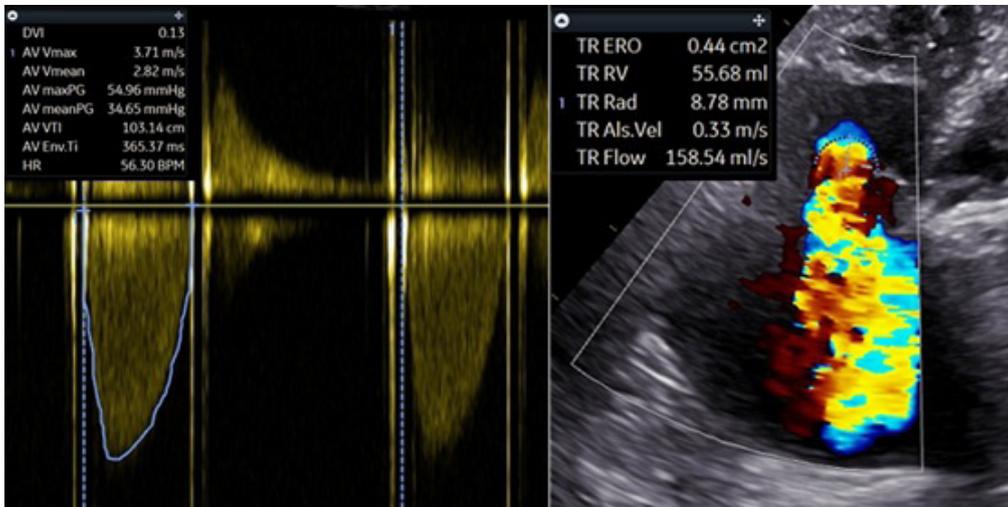


Figure 1. Transthoracic echocardiography showing elevated aortic transprosthetic gradients, suggestive of obstruction, and severe tricuspid regurgitation.



Figure 2. Pulmonary angiography showing contrast extravasation from the right inferior lobar artery (red arrow).

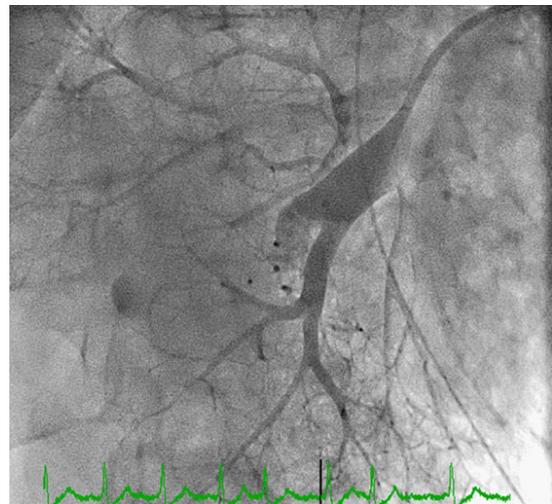


Figure 3. Pulmonary angiography after coil embolization in right inferior lobar artery.

Laboratory tests showed severe anemia (hemoglobin 7.2 g/dL), worsening renal dysfunction (creatinine 2.26 mg/dL), and elevated NT-proBNP (10,000 pg/mL). Electrocardiography revealed atrial fibrillation with complete left bundle branch block. Transthoracic echocardiography demonstrated a mildly dilated left ventricle with preserved systolic function, normally functioning mitral prosthesis, and elevated gradients across the aortic prosthesis, suggesting obstruction. Severe tricuspid regurgitation with systolic flow reversal in the hepatic veins and an estimated pulmonary artery systolic pressure of 57 mmHg were also noted. Cardiac computed tomography confirmed limited disc mobility of the aortic prosthesis due to pannus formation. Given the combination of severe tricuspid regurgitation, pulmonary hypertension, and progressive heart failure, outpatient right heart catheterization was planned to evaluate surgical operability. The procedure was performed via the right cephalic vein. Hemodynamic measurements revealed severe pulmonary hypertension (systolic and mean pulmonary artery pressures of 82 mmHg and 48 mmHg, respectively), alongside elevated left-sided filling pressures (pulmonary capillary wedge pressure 25 mmHg and transpulmonary gradient 23 mmHg). During inhaled nitric oxide administration for vasoreactivity testing, the patient developed acute cough and dyspnea, prompting interruption of the test. Immediately after catheter removal, she developed massive hemoptysis, requiring emergent endotracheal intubation, which was technically challenging due to ongoing airway bleeding.

Despite intubation, the patient experienced profound hypoxemia and severe respiratory acidosis, progressing to cardiac arrest. After approximately 30 minutes of advanced life support, spontaneous circulation was restored. Anticoagulation reversal was initiated with prothrombin complex concentrate, fibrinogen, platelet transfusion, and two units of packed red blood cells, alongside tranexamic acid and intratracheal epinephrine. Following stabilization, flexible bronchoscopy was performed, and large blood clots were aspirated from the airways. Despite these measures, bleeding persisted, and emergent pulmonary angiography was undertaken. A bleeding focus in a right inferior lobar artery was identified and successfully embolized with coils, achieving hemostasis. The patient was admitted to the intensive cardiac care unit but failed to regain neurological function. Brain imaging revealed an ischemic stroke due to left internal carotid artery occlusion. Despite maximal supportive care, she died three days later.

Discussion: Right heart catheterization is a valuable tool for assessing pulmonary hypertension in patients with complex multivalvular disease. Although generally considered a routine and low-risk procedure, this case demonstrates that rare but life-threatening complications, such as pulmonary artery rupture, can occur. Clinicians must remain vigilant and ensure immediate access to advanced airway management and interventional support, even for procedures that are usually perceived as straightforward.

31. TAVI IN PURE AORTIC REGURGITATION AND PREVIOUS TYPE A AORTIC DISSECTION

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Introduction: Surgical aortic valve replacement is standard treatment for native aortic regurgitation, but high-risk patients need alternatives¹⁻⁴.

Case report: A 78-year-old man with NYHA class II dyspnea due to severe aortic regurgitation was referred for intervention. His past history included type A aortic dissection repair with GelSeal26 and residual chronic descending aortic dissection, cerebral amyloid angiopathy precluding anticoagulation, left atrial appendage closure for paroxysmal atrial fibrillation, chronic kidney disease G3aA2, hypertension, and dyslipidemia. On physical examination, a decrescendo diastolic murmur, best heard along the left sternal border, was noted. No neurological deficit was observed. Initial diagnostic investigations revealed atrial fibrillation on electrocardiogram and the echocardiogram documented severe aortic regurgitation secondary to aortic root dilatation and non-coaptation between non-coronary and right coronary with a left ventricular (LV) dilation and preserved ejection fraction. Cardiac MRI confirmed LV dilation due to severe aortic regurgitation. Computed tomography angiography revealed a tricuspid aortic valve with mild calcification (500 AU) along with dilatation of the aortic root. The landing zone anatomy was tubular with an annulus perimeter of 82.9 mm and area of 537 mm², LV outflow tract perimeter (LVOT) was 85.5mm and area 572 mm², coronary ostia height 9.2 mm (left) and 13.8 mm (right). The aortic conduit, GelSeal26, was implanted 2 cm above the sinotubular junction. At the distal segment of the conduit, an intimal flap of dissection was identified, extending through the aortic arch into the supra-aortic trunks and further into the descending thoracic aorta. The descending thoracic aorta showed persistent chronic dissection

and two partially thrombosed saccular aneurysms at the thoraco-abdominal junction. Minimum femoral diameter were 10 mm (left) and 9 mm (right). There was no coronary artery disease.

A multidisciplinary Heart Team recommended transcatheter aortic valve implantation (TAVI) due to the high risk of hemorrhagic stroke, previous heart surgery and an estimated EuroScore II of 12.32%. A balloon-expandable valve, Myval OctaPro 24.5 mm with +3 cc volume, was selected for an appropriate oversizing at the annulus (-23%) and the LVOT (-16%).

TAVI was performed via a right transfemoral approach, with secondary access through the left radial artery for aortography, and a distal right femoral access for backup vascular intervention in case of closure failure. A long 26F DrySeal sheath was advanced over an Amplatz extra-stiff wire into the true lumen of the aorta to enhance stability and protect the aortic wall. The valve was deployed slowly under prolonged rapid pacing (200 bpm), targeting a high implant (90:10).

Final angiography showed no residual aortic regurgitation, and femoral access was closed with Manta 18F after failure of two Perclose ProStyle in achieving hemostasis.

Discussion: This case illustrates the possibility of achieving good procedural results in the treatment of pure aortic regurgitation with non-dedicated prosthesis. Careful assessment of the landing zone anatomy is of vital importance, as well as the appropriate oversizing and the management of vascular access.

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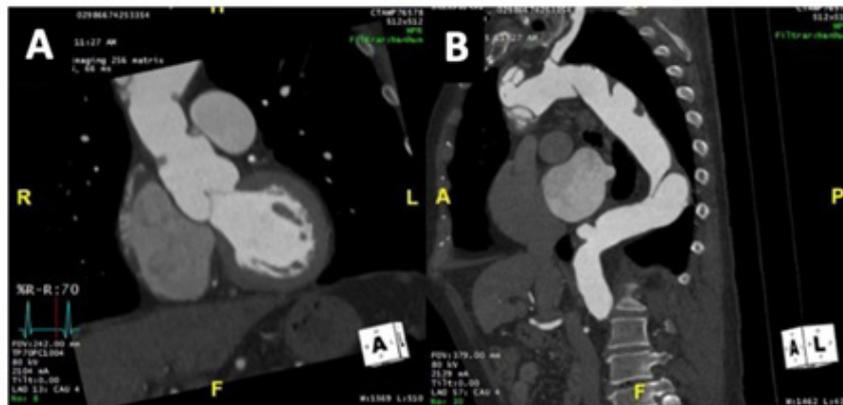


Figure 1. (A) CT scan showing dilatation of the aortic root and a stable implanted aortic conduit. (B) Intimal flap of dissection extending through the aortic arch into the supra-aortic trunks, with chronic dissection of the descending thoracic aorta.



Figure 2. (A) Fluoroscopy showing a long 26F DrySeal sheath advanced over an extra-stiff wire into the true lumen of the descending aorta. (B) Final angiography demonstrating no residual aortic regurgitation.

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32. HOSTILE FEMORAL ACCESS: CRACK OR CHANGE?

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Introduction: Growing evidence from experienced centers demonstrates that dedicated endovascular procedures can safely enable transfemoral transcatheter aortic valve implantation (TF-TAVI) even in challenging anatomy.^{1,3}

Case report: A 75-year-old man with a history of endovascular aneurysm repair (EVAR) with a right iliac percutaneous luminal angioplasty (PTA) in 2019, three-vessel coronary artery disease treated with PCI and end-stage chronic kidney disease on hemodialysis since 2017 was referred for cardiology consultation due to symptomatic severe aortic stenosis, NYHA class II. Electrocardiography showed sinus rhythm. Transthoracic echocardiography demonstrated severe aortic stenosis with moderate-to-severe regurgitation with preserved left ventricle ejection fraction. Coronary angiography confirmed patency of previously implanted coronary stents and no other significant lesions. Multi Slice CT (MSCT) revealed a tricuspid aortic valve with 8,623 AU, perimeter and area derived diameters of 27.2 and 26.6 mm. An endoprosthesis was present in the abdominal aorta, extending distally into both common iliac arteries, with a branch on the right involving the bifurcation of the internal and external iliac arteries. A right common iliac artery aneurysm, measuring 28 mm in maximum diameter, was noted. Stents were patent up to both external iliac arteries, although with minimal diameters of 4-5 mm. There was nearly circumferential calcification of both common femoral arteries, with minimal diameters of 8 mm (left) and 6 mm (right). EuroScore II was 2.74%, and the multidisciplinary Heart Team recommended TF-TAVI due to the patient's comorbidities and life expectancy. TAVI was performed under conscious sedation. Angiography confirmed vascular access findings demonstrated on MSCT. Primary access was through the left common femoral artery and secondary access via the right common femoral artery. Additional distal access through the left superficial femoral artery was prepared as a bailout strategy (4F). After double guidewire positioning (0.014 and 00.018), elective intravascular lithotripsy with a 7.0/60 mm balloon was performed, with six applications up to 6 atm, targeting the left external iliac artery and previously placed stent in the common iliac artery. Advancement of the 18F aortic valve sheath over an Amplatzer was still not possible. Balloon-assisted tracking (BAT) of the sheath with a 7.0/40 mm balloon up to 12 atm was attempted but was unsuccessful. Repeat lithotripsy with an 8.0/60 mm balloon, again with six applications, was then performed, followed by BAT with an 8.0/40 mm balloon up to 12 atm which was successfully advanced through the iliac branch of the EVAR. Pre-dilation of the

aortic valve was performed with a 24 mm valvuloplasty balloon. Following implantation of a 29.0 mm CoreValve Evolut, advanced through the 18F sheath, a moderate residual leak was observed requiring post-dilation with the previous balloon. Closure of the primary access was achieved with a Perclose ProStyle and an 8F Angio-Seal, while the secondary access was closed using a 6F Angio-Seal. Hemodynamic and angiographic success was achieved, with an aortic regurgitation index of 31% and no immediate complications.

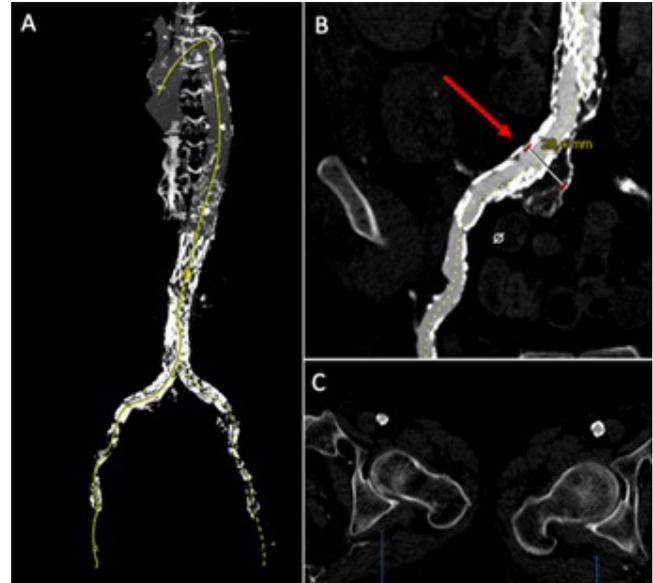


Figure 1. CT scan showing (A) an endoprosthesis in the abdominal aorta, extending distally into both common iliac arteries, with an iliac branch device on the right involving the bifurcation of the internal and external iliac arteries; (B) a right common iliac artery aneurysm, measuring 28 mm in maximum diameter and (C) nearly circumferential calcification of both common femoral arteries.

Discussion: We describe the use of intravascular lithotripsy and balloon-assisted tracking to enable TF-TAVR in a patient with severe calcified PAD and prior EVAR with PTA.

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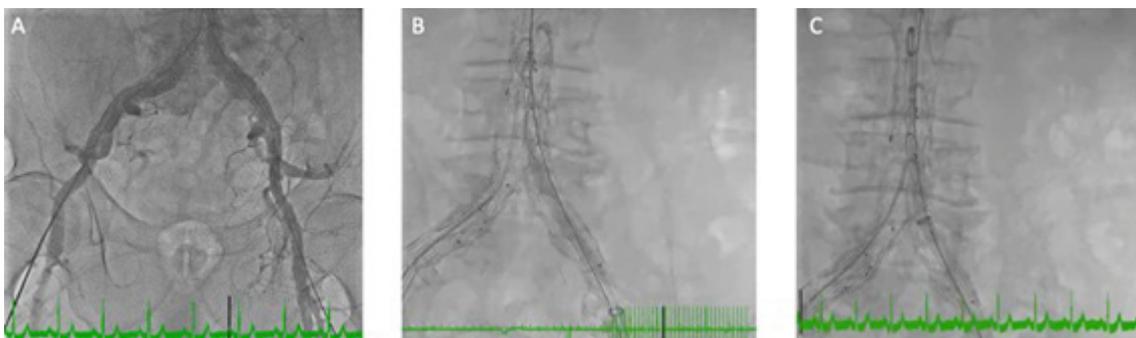


Figure C32 2. (A) First angiography of the iliofemoral axis; (B) lithotripsy with an 8.0 × 60 mm balloon; (C) balloon-assisted tracking with an 8.0 × 40 mm balloon.

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33. PERCUTANEOUS MANAGEMENT OF COMPLEX PULMONARY ARTERY STENOSIS IN A PATIENT WITH PRIOR LEFT PULMONARY ARTERY STENTING

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Case report: A 62-year-old female with a history of peripheral pulmonary stenosis, previously treated with left pulmonary artery (LPA) stenting in 2012, was referred for evaluation due to progressive fatigue consistent with NYHA functional class III. Transthoracic echocardiography revealed right atrial dilation (29 cm²), right ventricular enlargement (47 mm), reduced systolic function (TAPSE 12 mm, S' 8 cm/s), paradoxical septal motion with systolic flattening, and a right ventricle-right atrium gradient of 130 mmHg. Chest CT angiography demonstrated a 6 mm critical narrowing of the native right pulmonary artery and stent fracture at the origin of the LPA, resulting in restenosis. Following Heart Team discussion, pulmonary angioplasty was planned. Hemodynamic assessment showed right ventricle/RPA 90 mmHg. Pulmonary angiography via left femoral access confirmed severe LPA stent restenosis and ostial RPA stenosis (Figure 1). The LPA stent was successfully redilated with Armada 35 balloons (6 × 60 mm and 10 × 40 mm) without complications. The RPA lesion was treated with balloon dilatation (AltoSa 12 × 40 mm at 12 atm), restoring pressures. Advancement of a 14F 45° 85 cm APT medical sheath was unsuccessful over a Lunderquist wire; crossing was achieved with a 14F 75 cm Amplatzer Agilis sheath. An uncovered Optimus

stent (L 57 mm), mounted on a dual-balloon AltoSa XL Gemini 16 × 60 mm system was deployed in the RPA and dilated at 6 atm, followed by proximal optimization (POT) with the same balloon in a provisional strategy involving the RPA and main pulmonary trunk. Final angiography demonstrated optimal hemodynamic and angiographic results, with maintained patency of the LPA (Figure 2). The final RPA/main PA was 15 mmHg. The patient was discharged on dual antiplatelet therapy for one month, followed by single antiplatelet therapy. Post-procedural transthoracic echocardiography showed mild right atrial dilation (25 cm²), normal right ventricular size, improved systolic function (TAPSE 16 mm, S' 12 cm/s), and a reduced right ventricle-right atrium gradient of 58 mmHg. At one month follow-up, the patient reported improved fatigue and NYHA class II symptoms.

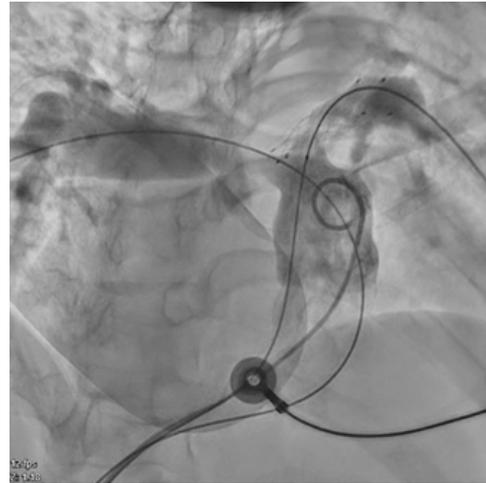


Figure 1. Restenosis of the previously implanted LPA stent and ostial stenosis of the RPA.

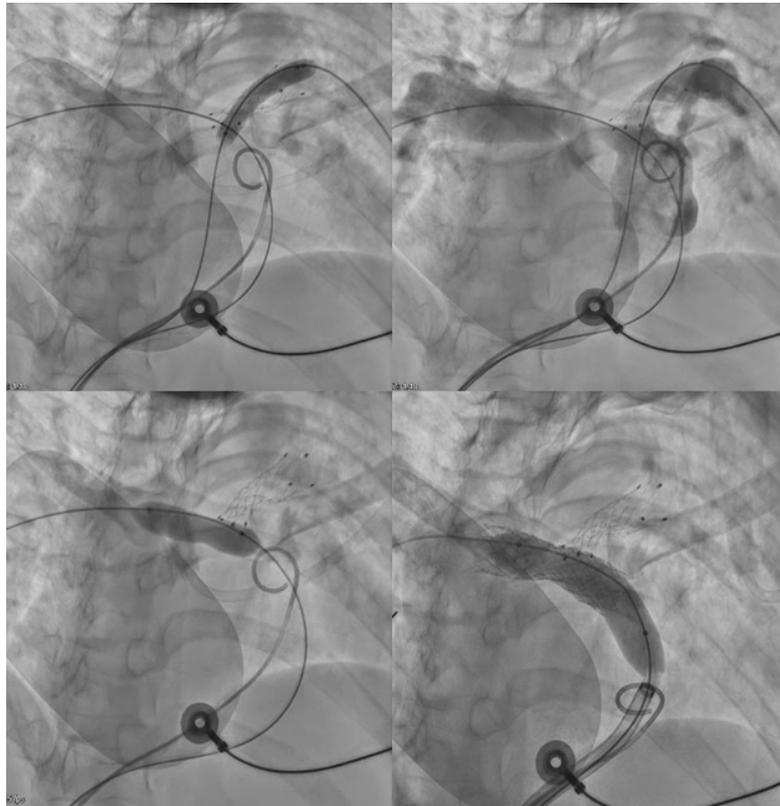


Figure C33 2. Pulmonary angioplasty. A) Dilation of the LPA stent. B) Angiographic result of the LPA stent dilation. C) Dilation of the RPA lesion. D) Angiographic result after the RPA stent implantation.

Discussion: This case illustrates the successful percutaneous management of complex pulmonary artery restenosis and concomitant native RPA stenosis using a combined balloon and stent approach. Careful procedural planning, stepwise equipment advancement, and vigilant hemodynamic monitoring were essential to achieve optimal angiographic and clinical outcomes, supporting the feasibility and safety of percutaneous strategies in challenging pulmonary vascular anatomy.

34. COMPLEX PERCUTANEOUS CORONARY INTERVENTION OF AN ANEURYSMAL LAD BIFURCATION IN A 14-YEAR-OLD WITH KAWASAKI DISEASE

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Introduction: Kawasaki disease is an acute, childhood vasculitis affecting medium-sized arteries, especially the coronaries. Coronary aneurysms are the major source of morbidity and mortality.^{1,2}

Case report: We present a 14-year-old male with Kawasaki disease diagnosed in early childhood, complicated by giant coronary aneurysms and chronic RCA occlusion. He previously underwent PCI of a diagonal branch lesion in 2020. He maintained regular follow-ups with Cardiology.



Figure 1. Diagnostic angiography.



Figure 3. Final angiography.

At the last follow-up appointment, the patient was asymptomatic. Echocardiography showed preserved systolic function, moderately enlarged LV, basal inferior wall akinesia, and mild-to-moderate aortic regurgitation. Treadmill stress testing was inconclusive due to submaximal effort. A 24-h Holter demonstrated significant arrhythmic burden (PVCs 9.2%). Given these findings, further investigations were performed. Coronary CT angiography revealed a proximal fusiform LAD aneurysm (9 × 19 mm) with intraluminal thrombus and distal neck stenosis, mild diagonal ostial stenosis, an ectatic circumflex, and the previously known proximal RCA occlusion. Exercise SPECT showed no perfusion defects, but interpretation was limited by submaximal effort. In view of these results, coronary angiography was performed.

Coronary angiography revealed a diffusely aneurysmal proximal LAD with a critical calcified stenosis at the LAD-D1 bifurcation (Medina 1.1.1) and chronic RCA occlusion (Figure 1). Additional evaluation with Optical Coherence Tomography (OCT) of the LAD confirmed aneurysmal dilatation, marked calcification, neovascularization, and a significant bifurcation stenosis (MLA 2.11 mm²) (Figure 2).

Intervention: PCI was performed via right radial access under general anesthesia, using an EBU 3.5 6F guide catheter. The LAD and D1 were wired with BMW Universal guidewires. Lesion preparation began with intravascular lithotripsy - Shockwave[®] 3.5 × 12 mm in the proximal and mid LAD. D1 was then predilated with a 2.75 × 20 mm SC balloon at 8 atm, followed by lithotripsy Shockwave[®] 3.0 × 12 mm. Additional preparation of the proximal and mid LAD was performed with a NC 3.5 × 30 mm (12 atm). A drug-eluting stent - Ultimaster[®] 3.5 × 44 mm was implanted in the LAD (12 atm). Proximal optimization (POT) was carried out with a SC 5 × 15 mm (10 atm), after which D1 was rewired. Sequential and simultaneous kissing balloon inflations were performed using a NC 3.5 × 20 mm in the LAD and a SC 2.75 × 15 mm in D1. This was followed by re-POT with a NC 6 × 15 mm. Post-stent OCT revealed incomplete expansion and malapposition, which were corrected



Figure C34 2. Diagnostic OCT.

with SC 4 × 20 mm (12 atm). The final angiographic result was excellent, with TIMI 3 flow in all vessels (Figure 3).

Outcome: The procedure was well tolerated, without peri-procedural complications. The patient was monitored in the Pediatric Intensive Care Unit and remained hemodynamically stable. He was discharged in good general condition on dual antiplatelet therapy. Follow-up included a scheduled coronary CT angiography at 3 months post-op.

Discussion: This case illustrates the management of a complex pediatric patient with Kawasaki's disease and severe coronary involvement. Advanced imaging and lesion preparation were key to procedural success. An excellent immediate outcome was achieved, and the patient was discharged with short-term follow-up.

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35. ENTRE O LÚMEN E O DESASTRE: UMA COMPLICAÇÃO RARA APÓS TENTATIVA DE ICP

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Introdução: As complicações mecânicas durante intervenção coronária percutânea (ICP) são raras, mas potencialmente fatais. A perfuração de artérias coronárias são complicações muito raras, que exigem diagnóstico precoce e abordagem urgente.

Caso clínico: Uma mulher de 54 anos, com antecedentes de hipertensão arterial e dislipidemia, medicada com olmesartan, rosuvastatina e fenofibrato. Recorreu ao serviço de urgência por dispneia de esforço, pré-síncope e opressão torácica com 3 dias de evolução. O eletrocardiograma evidenciava ritmo sinusal e inversão da onda T em DIII e aVF. Analiticamente destacava-se elevação de troponina I (2,132 pg/mL). O ecocardiograma transtorácico mostrou função sistólica global biventricular conservada, com hipocinésia basal da parede inferior. Foi realizada uma angio-TC para exclusão de TEP, que se revelou negativa. Com base na apresentação clínica, alterações analíticas e imagiológicas, o diagnóstico foi de enfarte do miocárdio sem supradesnívelamento do segmento ST. A coronariografia revelou: tronco comum com irregularidades; descendente anterior (DA) com estenose de 50% ostial e estenose de 50% no segmento médio; circunflexa (CX) com irregularidades difusas e estenose de 50% ostial; coronária direita (CD) dominante, com oclusão total no segmento proximal, com preenchimento distal por circulação colateral contralateral. Apesar da suspeita de lesão crônica, decidiu-se avançar para tentativa de revascularização da CD devido à persistência de dor torácica. Durante a tentativa de revascularização, observou-se extravasamento de contraste para a aorta ascendente na primeira injeção com cateter guia. Foram implantados dois stents (4 × 12 mm e 4 × 23 mm) no ostium e segmento proximal da CD, sem restabelecimento de fluxo, mas com redução da passagem de contraste para a falsa luz da aorta. A doente mantinha dor torácica e dorsal. A TC toraco-abdomino-pélvica revelou extravasamento de contraste envolvendo a aorta ascendente e crossa (hemorragia localizada) e derrame pericárdico com contraste. Foi transferida para centro de referência para realização de cirurgia cardíaca urgente. Na cirurgia, identificou-se laceração da CD, cerca de 1 cm após a sua emergência da raiz da aorta, com stent visível e hemorragia ativa. Realizou-se correção da rutura e revascularização miocárdica (CABG × 3).

Discussão: A perfuração coronária é uma das complicações mais temidas da ICP, com incidência reportada até 1,5% e associada a aumento significativo da mortalidade hospitalar. Pode resultar de múltiplos fatores, como *oversizing* de balões/stents, dissecções extensas, calcificação arterial e manipulação de guias rígidas. o entanto, pode também surgir com dispositivos de calibres adequados, especialmente em contexto de dissecção extensa, calcificação arterial ou perda de integridade da parede vascular, ou ainda devido à migração inadvertida da ponta do fio-guia. A severidade

varia de pequenas fugas a extravasamento com tamponamento cardíaco. A terapêutica inclui balonagem prolongada, reversão da anticoagulação, stents recobertos e, em casos refratários ou com instabilidade hemodinâmica, cirurgia de urgência.



Imagem angiográfica com extravasamento de contraste para a aorta ascendente.



Corte da TC torácica com extravasamento de contraste.



Fotograma do IVUS.

Neste caso, o IVUS auxiliou a decisão de nova tentativa de selagem com stent. A imagem multimodal (ecocardiograma e TC) foi essencial para confirmação da complicação e encaminhamento cirúrgico urgente. A suspeita precoce de complicações mecânicas, sobretudo em ostia calcificados, e a atuação coordenada entre cardiologia de intervenção, imagiologia e cirurgia cardíaca foram determinantes para o sucesso clínico.

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36. POP-OUT PREDICAMENT: PARADOXICAL PRESSURE RISE

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TAVI (Transcatheter aortic valve implantation) in nonagenarians patients is challenging due to their clinical frailty and comorbidities. We present the case of a 90-year-old female patient with hypertension, dyslipidaemia, chronic obstructive pulmonary disease and anaemia (Heyde Syndrome). She had a pacemaker since 2022 and was treated for single-vessel coronary disease with stent implantation in 2023. The patient was referred to our centre in NYHA III class for severe aortic stenosis. The transthoracic echocardiogram showed good left ventricular function with severe, high-gradient aortic stenosis (mean gradient 46 mmHg) and an area of 0.7 cm², as well as moderate-to-severe aortic insufficiency.

We used right femoral artery (14F) as principal access and left femoral artery (6F) as secondary access. The pre-planning 3-mensio showed a tricuspid aortic valve with moderate calcification but with calcium extension to the LVOT (left ventricle outflow tract). The annulus diameter was 23.6 mm (perimeter derived) and minimal Valsalva diameter was 28 mm. We didn't anticipate any problem regarding coronary height. The femoral arteries had a minimal diameter of 6.0mm, without circumferential calcification and no tortuosity.

During the procedure pre-dilation of the aortic valve was performed using an 18 mm/4.5 cm True® Dilatation Balloon and a 29 mm Evolut™ FX + THV was then implanted. However, the valve popped out into the ascending aorta due to incomplete detachment of one of the distal paddles after valve deployment (Figure 1). A snare was used via the left femoral artery for valve retrieval and a new 29 mm Evolut™ FX + valve was successfully placed, overlapping with the migrated valve at the level of the ascending aorta. Final control aortography showed no periprosthetic regurgitation at the valve level or coronary artery occlusion. At the end of the procedure, the patient was hemodynamically stable with good blood pressure values.

However, post-procedure echocardiogram (Figure 2) showed absence of periprosthetic leaks but a very turbulent systolic flow along the valve stent. This was compatible with possible stenosis at the level of ascending aorta, due to outflow obstruction. Cardiac CT (Figure 3) was done and showed overlapping of the two stents frames causing the closure of one leaflet of the first implanted valve. The 3D reconstruction was done, and we plan a future procedure to implant a covered stent in aortic position. The patient was discharged safely on day 6 of hospitalization.

This case highlights one of the principal causes of pop-out is incomplete detachment of the distal paddles. When snaring the valve, she must be pulled the maximum to the ascending aorta to not interfere with the new valve implantation. When pop-out happens, if feasible, a balloon expandable valve may be the best option. Careful pre and post-deployment assessment is critical to recognize and manage these complications.

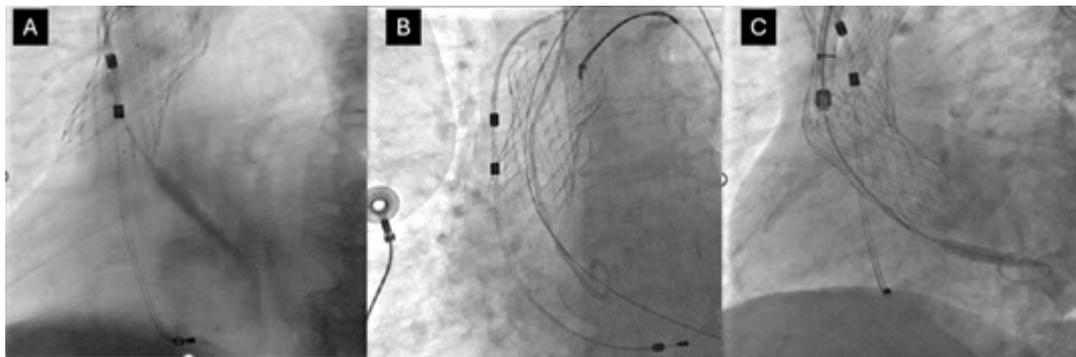


Figure C36 1. A - the valve popped out into the ascending aorta due to incomplete detachment of one of the distal paddles after valve deployment; B - a snare was for valve retrieval; C - a new 29 mm Evolut™ FX + valve was successfully placed, overlapping with the migrated valve at the level of the ascending aorta.

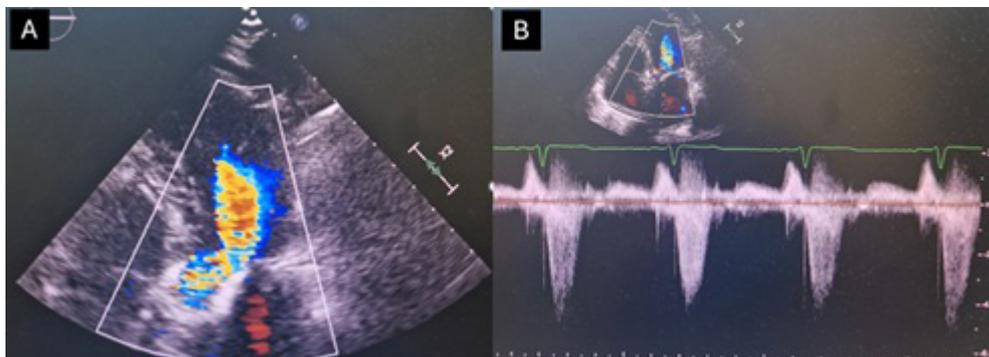


Figure C36 2. A - absence of periprosthetic leaks but a very turbulent systolic flow along the valve stent. B - with a late peak mean gradient of 45 mmHg; hemodynamic study was suggestive of severe fixed obstruction.



Figure C36 3. A; B; C - overlapping of the two stents frames causing the closure of one leaflet of the first implanted valve.

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37. THE TRIPLE VALVE JOURNEY: FROM ONE OBSTRUCTION TO ANOTHER

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Case report: We present the case of a 72-year-old male with several CV risk factors: hypertension, obesity and smoking. He had chronic obstructive pulmonary disease, chronic kidney disease stage 3 and a previous implanted dual chamber definitive pacemaker. In 2023 a coronary angiography in context of CCS showed a chronic total occlusion of the right coronary artery and a severe lesion in LAD that was treated with implantation of a DES. The patient has received the diagnosis of severe aortic stenosis (bicuspid valve)

in 2024 and was submitted to TAVR via axillar with EVOLUT™ FX + 34 mm in another centre. A severe paravalvular leak was described due to low valve implantation.

The patient was referred to our centre in NYHA IV class for prosthesis dysfunction. The transthoracic echocardiogram showed left ventricle with systolic function deterioration, now severely compromised with ejection fraction of 21%, and an aortic prosthesis with low implantation occupying the LVOT and moderate to severe regurgitation.

The pre-planning 3-mensio showed the femoral arteries had a minimal diameter of 7.8 mm, with the right common iliac artery occluded and the left iliac and femoral arteries with diffuse calcified disease but acceptable minimum diameters. Axillary artery was not suitable for use because of previous stent implantation. With help of the Redo TAVI app we planned a TAVI in TAVI procedure with a balloon-expandable Sapiens 3 Ultra 26 mm valve. As the coronary arteries were high, coronary protection was unnecessary.

We used left femoral artery (14F) as principal access with prior lithotripsy due to severe calcification using Shockwave 7.0 mm/60 mm and 8.0 mm/60 mm balloons, and right femoral artery (5F) as secondary access (Figure 1). We used a 5 Fr tertiary access in the superficial LFA as bailout access. A 26 mm Sapien 3 Ultra Resilia valve was placed; however, it popped out into the ascending aorta. This valve was over-dilated using a 29 mm balloon and remained anchored in the aortic arch near the brachiocephalic trunk. An attempt was made to place a new 26 mm Sapien 3 Ultra Resilia, which was successful (Tavi-in-Tavi) (Figures 2 and 3). Final control aortography showed no periprosthetic regurgitation at the valve level or coronary artery occlusion.

A few hours post-TAVI, the patient developed dysarthria. Brain CT showed no vascular occlusion, so no specific treatment was given. Symptoms improved. Echocardiogram confirmed good valve position without regurgitation. The patient was discharged. Twelve hours later the patient was readmitted due to a large hematoma in the leg, requiring vascular surgery for pseudoaneurysms. Oral anticoagulation was suspended, and the patient suffered a new stroke with aphasia and right hemiparesis. He

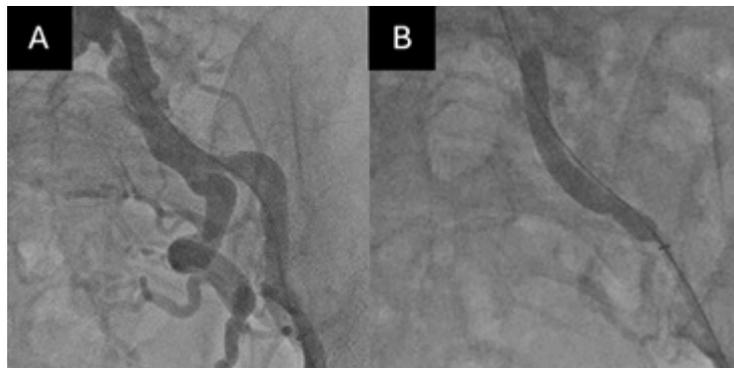


Figure C37 1. A - Diffuse calcified disease but acceptable minimum diameters; B - Prior lithotripsy due to severe calcification using Shockwave 7.0 mm/60 mm and 8.0 mm/60 mm balloons.

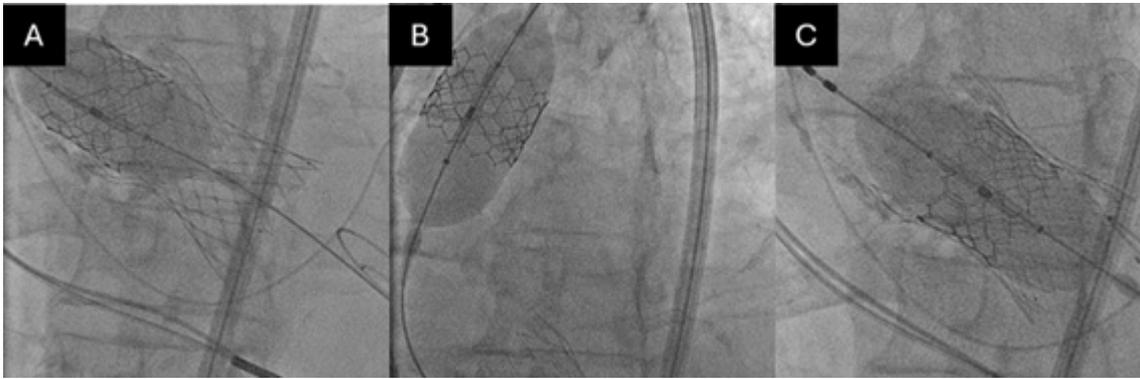


Figure C37 2. A - 26 mm Sapien 3 Ultra Resilia pop-out; B - This valve was over-dilated using a 29 mm balloon and remained anchored in the aortic arch; C - A new 26 mm Sapien 3 Ultra Resilia was placed.



Figure C37 3. A - Anchored in the aortic arch near the brachiocephalic trunk; B - Femoral access without extravasation.

remained hospitalized for monitoring but had multiple infectious interurrences.

Discussion: This challenging case highlights the complexities of TAVI in bicuspid valves, which carry a higher risk of deep implantation. Pop-out TAVI risk increases in valve-in-valve procedures, requiring meticulous planning, slow inflation, and very rapid pacing. When pop-out occurs, anchoring the prosthesis in the aorta is often best, though interference with supra-aortic vessels must be considered.

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38. FROM RASHES TO BUBBLES: UNEXPECTED CHALLENGES IN COMPLEX PCI

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Introduction: Emergency percutaneous coronary intervention in unstable patients is often associated with unexpected challenges that require prompt and effective solutions. We describe the case of a complex PCI in a patient

presenting with cardiogenic shock, which was further complicated by two unexpected challenges: hypersensitivity to acetylsalicylic acid and malfunction of a mechanical circulatory support device. This case illustrates the need for pragmatic solutions when managing complex patients.

Case report: A 71-year-old man with hypertension, type 2 diabetes, asthma, smoking, and aspirin hypersensitivity was admitted to the intensive care unit with community-acquired pneumonia and septic shock. He required intubation and invasive mechanical ventilation. Antibiotic therapy resulted in clinical improvement, and he was extubated on day three.

Soon after, he developed acute chest pain, dyspnea, and hypotension. Bilateral crackles were present. Echocardiography demonstrated significant mitral regurgitation, moderate to severe left ventricular systolic dysfunction, and apical/mid-ventricular hypokinesis. Troponin T was elevated, but ECG was unremarkable. A diagnosis of non-ST-segment elevation myocardial infarction (NSTEMI) was made. Emergency coronary angiography revealed a critical calcified stenosis of the left main (LM) extending into the proximal LAD and LCx, as well as a severe proximal RCA stenosis.

Aspirin hypersensitivity complicated antithrombotic therapy. While P2Y12 inhibitor monotherapy may be an option in chronic settings, dual therapy including aspirin is recommended for ACS. Given the patient's instability, a ticagrelor loading dose was administered, and an accelerated aspirin desensitization protocol was initiated intra-procedurally.

LM disease was initially treated with intracoronary lithotripsy, but only 30 pulses were delivered before profound hypotension developed. Stenting was performed with two drug-eluting stents (ORSIRO MISSION 3.0 × 30 mm and SYNERGY MEGATRON 3.5 × 24 mm) from proximal LAD to LM. The ostial LCx lesion was treated using the T and Protrusion (TAP) technique with an additional stent (ORSIRO MISSION 2.5 × 13 mm). Kissing balloon inflations optimized final results, achieving TIMI 3 flow.

Given persistent hemodynamic instability and biventricular dysfunction, an intra-aortic balloon pump (IABP, Arrow 40 cc) was inserted via the left femoral artery (7.5 F). Fluoroscopy revealed incomplete balloon inflation and IABP monitoring interface kept alarming for high pressure.

Follow-up: The next day, aspirin desensitization was completed without any allergic reaction. The patient status improved steadily. Bedside

echocardiography demonstrated intracardiac helium bubbles. Chest radiography showed the IABP distal marker in the descending thoracic aorta. Upon removal, a shaft fracture was noted. A manufacturing defect was then identified: the balloon had been overtisted, impairing inflation, causing blood reflux and helium leakage, and ultimately damaging the catheter. The device was subsequently recalled by the responsible companies 2 months thereafter.

Discussion: This case highlights the complexity of ACS management in unstable patients. In emergencies, aspirin hypersensitivity may require rapid desensitization protocols, as standard approaches are impractical. It also highlights the need to anticipate equipment malfunction as a cause of

unexpected procedural complications, mainly in centers with no alternative mechanical circulatory support devices. Emergency revascularization in critically ill patients requires flexibility and innovation. Teams must apply critical judgment, adapt beyond standard protocols, and remain vigilant for device-related complications to ensure optimal outcomes.

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