Journal of
Cardiovascular Development and Disease

MDPI

Communication

Staged Rotational Atherectomy-Assisted Multivessel PCI with a Cumulative 293 mm Drug-Eluting Stent Burden: Technical Strategy and Clinical Follow-Up

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Abstract

Extensive multivessel drug-eluting stent (DES) implantation is infrequently reported with longitudinal follow-up. We describe a 77-year-old man with Canadian Cardiovascular Society class III angina, insulin-treated diabetes, an LVEF of 30%, and heavily calcified multivessel disease (SYNTAX score 34). Coronary artery bypass grafting (CABG) was recommended after Heart Team review, but the patient declined surgery; diffuse distal disease also compromised potential graft targets. Staged PCI comprised rotational atherectomy and five DES (172 mm) for ostial/proximal LAD disease with contiguous distal-left-main plaque extension and a separate distal-Cx lesion, followed seven months later by four overlapping DES (121 mm) from the RCA crux/PL branch to the ostium. Total nominal stent length was 293 mm across separate coronary territories, not a continuous single-vessel construct. Antiplatelet therapy required temporary modifications for prostatic artery embolization, major gastrointestinal bleeding, and right hemicolectomy. Follow-up extended 913 days after the index PCI and 687 days after completion of both stages. No cardiovascular death, nonfatal myocardial infarction, repeat coronary revascularization, or definite or probable stent thrombosis was documented; LVEF was 55%. The report highlights staged technical decision-making and coordinated management of competing ischemic and bleeding risks. This single-patient observation cannot establish safety, durability, or equivalence to CABG.

Keywords: complex PCI; rotational atherectomy; drug-eluting stent; calcified coronary lesion; multivessel coronary disease; guideline-directed medical therapy; long stenting

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Academic Editor: Krishnaraj Sinhji Rathod

Received: 18 October 2026
Revised: 26 October 2026
Accepted: 27 October 2026
Published: 30 October 2026

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1. Introduction

Complex percutaneous coronary intervention (PCI) encompasses a spectrum of adverse clinical, anatomical, and procedural features. Multivessel treatment, unprotected left main or bifurcation disease, severe calcification, atherectomy, multiple overlapping stents, and extensive total stent length increase procedural complexity and may increase subsequent ischemic risk. Contemporary revascularization guidelines therefore emphasize Heart Team assessment, anatomical complexity, comorbidity, the likelihood of complete revascularization, and informed patient preference when PCI and coronary artery bypass grafting (CABG) are considered [1,2].

Available evidence on extensive stenting warrants caution. In a pooled contemporary drug-eluting stent (DES) registry, total stent length exceeding 40 mm was associated with higher rates of target-lesion failure and definite or probable stent thrombosis [3]. Stent

overlap may confer additional mechanical and biological risk, although outcomes vary according to device generation and lesion substrate [4]. Severe calcification further complicates lesion crossing, balloon expansion, device delivery, and stent apposition; current expert guidance supports lesion-specific calcium modification and intravascular assessment when feasible [5].

This communication describes the technical strategy and longitudinal clinical course of staged, rotational atherectomy-assisted multivessel PCI in a patient with insulin-treated diabetes, reduced LVEF, diffuse calcification, and a baseline SYNTAX score of 34. Its educational value lies not in cumulative stent length alone, but in staged procedural decision-making, management of failed device delivery, integration of revascularization with guideline-directed medical therapy, and coordinated management of competing ischemic and bleeding risks over 913 days.

2. Materials and Methods

2.1. Design and Source Records

This retrospective, descriptive clinical communication concerns a single patient treated in routine practice. The observation period extended from the index PCI on 16 January 2024, to the latest documented assessment on 17 July 2026 (913 days). Source material comprised catheterization and procedural reports, device logs, stored coronary angiograms, echocardiographic reports, discharge and outpatient medication lists, records from noncoronary admissions and procedures, laboratory results, and outpatient follow-up documentation. Procedural images and supplementary videos were selected to illustrate distinct decision points: baseline anatomy, calcium modification, final angiographic results, and interval left-system assessment.

2.2. Definitions and Descriptive Assessment

Cumulative DES length was defined as the sum of the manufacturers' nominal stent lengths across both procedures and therefore reflected total multivessel metal burden rather than a continuous 293 mm segment. Three-point major adverse cardiovascular events (MACE) were defined for this report as cardiovascular death, nonfatal myocardial infarction, or repeat coronary revascularization. Stent thrombosis, stroke, and hospitalization for heart failure were recorded separately when documented. Bleeding was classified retrospectively using the Bleeding Academic Research Consortium (BARC) framework when sufficient objective information was available. Baseline and pre-Stage 2 SYNTAX scores were obtained from the clinical assessment. Medication names and doses were reported as documented, without inferring unrecorded initiation or titration. All analyses were descriptive; no independent angiographic core-laboratory analysis or clinical-event adjudication was performed.

3. Results

3.1. Clinical Presentation, Coronary Anatomy, and Revascularization Decision

A 77-year-old man with insulin-treated diabetes mellitus, hypertension, dyslipidemia, and left ventricular systolic dysfunction presented with Canadian Cardiovascular Society class III angina characterized by increasingly frequent chest pain at lower levels of exertion. Transthoracic echocardiography on 16 January 2024, showed a left ventricular ejection fraction (LVEF) of 30%.

Baseline angiography demonstrated a co-dominant circulation and diffuse, heavily calcified multivessel coronary disease (Video S1). The left anterior descending artery (LAD) had 80% proximal stenosis, 90% stenosis beyond the first diagonal branch, an 80%

ostial first-diagonal lesion, and 70–80% distal disease. At the left main (LM) bifurcation, the angiographically significant stenosis pattern was consistent with Medina 0,1,0: the ostial/proximal LAD was involved without significant ostial circumflex artery (Cx) stenosis, although contiguous atherosclerotic plaque extended proximally into the distal LM. The distal Cx had 99% stenosis. The right coronary artery (RCA) had 95% proximal and 70% mid-vessel stenoses. The baseline SYNTAX score was 34.

The multidisciplinary Heart Team repeatedly reviewed CABG and discussed its anticipated benefits and risks with the patient. Despite this counseling, he consistently declined surgery. Advanced diffuse disease in the distal LAD, distal Cx, and posterior descending/posterolateral arterial beds limited the quality of potential distal graft targets and reduced confidence in complete surgical revascularization. After shared decision-making, staged complex PCI was selected to pursue the most complete technically achievable revascularization while distributing the procedural burden across separate sessions.

3.2. Stage 1: Left Main–LAD/Circumflex Revascularization

Stage 1 was performed on 16 January 2024, through right radial arterial access, with temporary transvenous pacing via femoral venous access. Given stable baseline hemodynamics and the absence of cardiogenic shock, prophylactic mechanical circulatory support was not used. The patient remained hemodynamically stable, while an intra-aortic balloon pump, extracorporeal membrane oxygenation, and on-site cardiac surgical support were immediately available for bailout use. After LAD wiring, rotational atherectomy was performed with a 1.5 mm burr, followed by balloon preparation including cutting-balloon angioplasty (Video S2). Despite this preparation, severe calcification and inadequate guide support prevented passage of the first DES.

A balloon-anchor technique in the first diagonal branch increased guide support and enabled delivery of a 2.25 × 28 mm sirolimus-eluting Ultimaster DES (Terumo, Tokyo, Japan) to the LAD segment distal to the diagonal bifurcation. The same anchoring maneuver facilitated delivery of a 2.75 × 38 mm everolimus-eluting Xience DES (Abbott, Santa Clara, CA, USA) to the mid-LAD; the diagonal balloon was withdrawn before stent deployment. A 3.0 × 34 mm zotarolimus-eluting Resolute Integrity DES (Medtronic, Minneapolis, MN, USA) completed proximal LAD coverage.

A suboptimal result after distal-Cx balloon dilatation prompted implantation of a 2.5 × 38 mm sirolimus-eluting Ultimaster DES. Although the angiographically significant bifurcation pattern was Medina 0,1,0, contiguous plaque extended from the ostial/proximal LAD into the distal LM. A 4.0 × 34 mm zotarolimus-eluting resolute integrity DES was therefore deployed from the LM into the LAD to cover the ostial LAD lesion and its distal-LM extension. Because no significant residual ostial Cx stenosis remained, additional ostial Cx metal was avoided; the distal-Cx stent was anatomically separate from the LM-LAD construct. Cx rewiring, final LAD-Cx kissing-balloon inflation, and proximal optimization completed the bifurcation procedure. Final angiography showed TIMI grade 3 flow in the LM-LAD and Cx without significant residual stenosis, dissection, or an angiographically apparent stent-edge complication (Video S3; Figure 1). Stage 1 comprised five DES (172 mm). IVUS and OCT were not used due to their lack of routine availability at the treating center, cost constraints, and the decision to proceed under angiographic guidance alone.

3.3. Stage 2: Right Coronary Artery Revascularization

Serial echocardiography showed an increase in LVEF to 35–40% in February and 40–45% in May 2024. Stage 2 had been scheduled for one month after the index procedure; however, the patient did not attend the planned admission and first returned in month 7. RCA intervention was planned and performed at that visit on 29 August 2024. No angina,

acute coronary syndrome, or other ischemic event was reported or documented during the interval, and no functional ischemia testing was performed. Control angiography of the left coronary system showed patent LM-to-LAD stents and preserved Cx flow, with approximately 40% ostial Cx narrowing (Video S4). The RCA had 90% proximal stenosis and a 99% calcified lesion at the crux; the posterior descending artery was occluded, and the posterolateral (PL) branch had diffuse 99% disease (Video S5). The pre-Stage 2 residual SYNTAX score was 24.

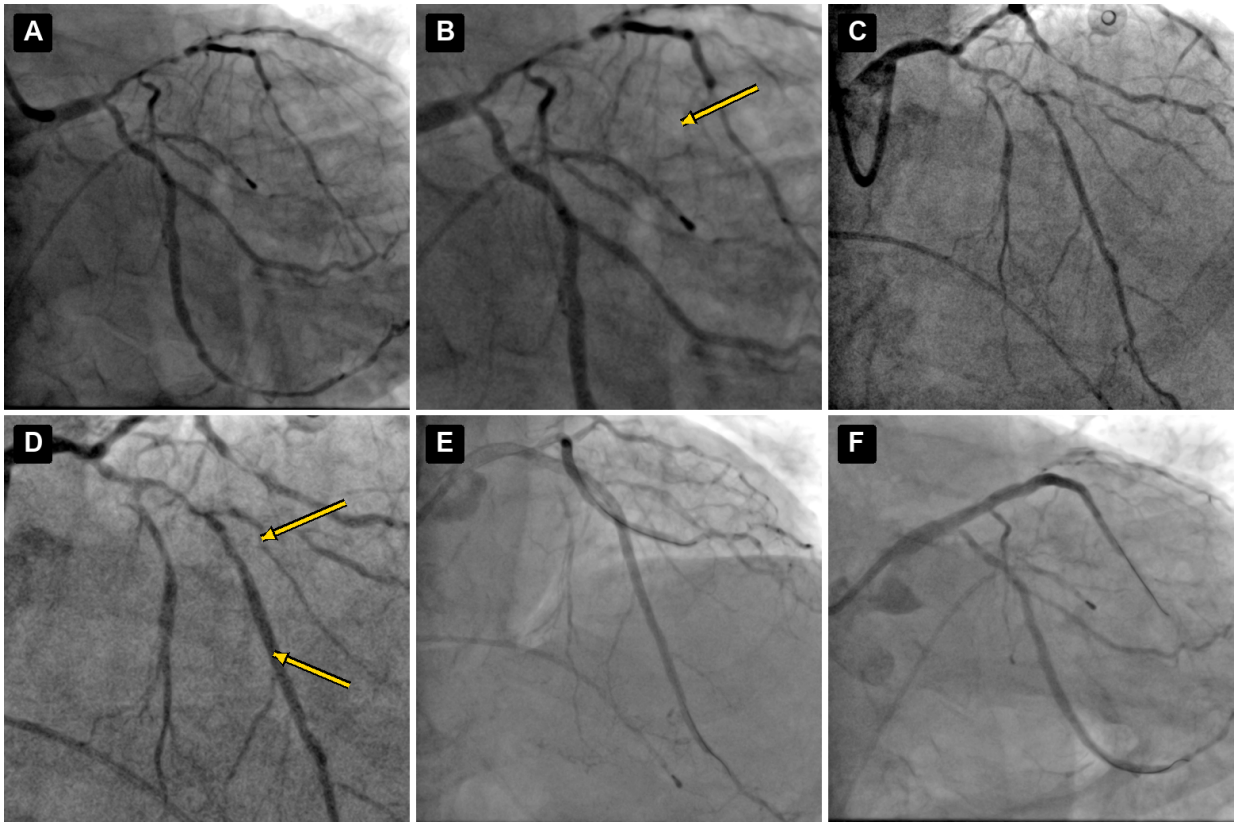


Figure 1. Stage 1 left-system angiography. (**A**–**D**) Baseline caudal and cranial views showing severe Cx and serial LAD disease (arrows). (**E**,**F**) Final views after LM–LAD/Cx reconstruction, kissing-balloon inflation, and proximal optimization, with patent LAD and preserved Cx flow.

Given stable preprocedural hemodynamics and the absence of cardiogenic shock, prophylactic mechanical circulatory support was not used for Stage 2. The patient remained stable, with an intra-aortic balloon pump, extracorporeal membrane oxygenation, and on-site cardiac surgical support immediately available for bailout use. After proximal-RCA balloon dilatation and initiation of temporary pacing, lesion modification was performed with a 1.5 mm rotational-atherectomy burr, followed by additional balloon preparation of the posterior descending artery and RCA (Figure 2B). Four overlapping DES were implanted from the crux/PL branch to the RCA ostium (Table 1). Devices were selected according to the required dimensions and local inventory; the mixing of platforms was not intended to confer a biological or clinical advantage. Final angiography showed TIMI grade 3 RCA-PL flow without significant residual stenosis, dissection, or an angiographically apparent stent-edge complication (Video S6; Figure 2). Stage 2 added 121 mm, bringing the cumulative total to nine DES and 293 mm across separate coronary territories.

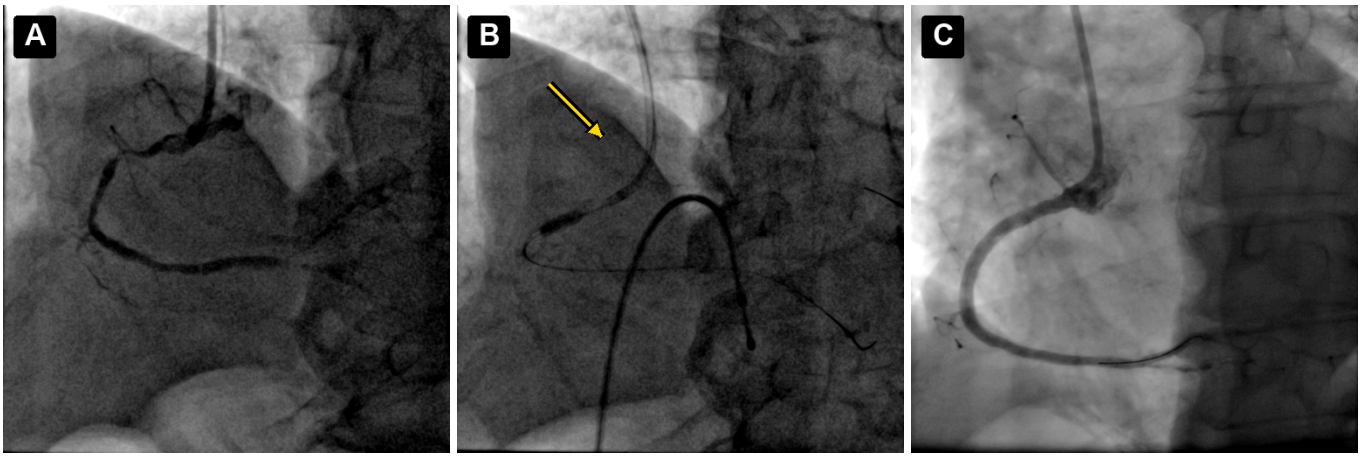


Figure 2. Stage 2 RCA lesion preparation and final result. (**A**) Baseline RCA angiography showing diffuse severe calcific disease with critical proximal and crux lesions and limited distal filling. (**B**) Fluoroscopy during rotational atherectomy with a 1.5 mm burr (arrowhead). (**C**) Final angiography after implantation of four overlapping DES from the crux/PL branch to the RCA ostium, with selective guide-catheter engagement and complete distal opacification. DES, drug-eluting stent; PL, posterolateral branch; RCA, right coronary artery.

Table 1. Staged PCI strategy and implanted drug-eluting stents.

Stage/Date	Segment	DES Platform	Size (mm)	Procedural Role
Stage 1 16 January 2024	Distal LAD	Sirolimus-eluting Ultimaster (Terumo)	2.25 × 28	Anchor-assisted delivery after atherectomy and cutting-balloon preparation
Stage 1	Mid-LAD	Everolimus-eluting Xience (Abbott)	2.75 × 38	Delivered with diagonal balloon-anchor support
Stage 1	Proximal LAD	Zotarolimus-eluting Resolute Integrity (Medtronic)	3.0 × 34	Proximal extension completing LAD coverage
Stage 1	Distal Cx	Sirolimus-eluting Ultimaster (Terumo)	2.5 × 38	Implanted after suboptimal balloon dilatation
Stage 1	LM-to-LAD	Zotarolimus-eluting Resolute Integrity (Medtronic)	4.0 × 34	Ostial LAD and contiguous distal-LM plaque coverage; Cx rewiring, kissing inflation, and proximal optimization
Stage 1 total	LM–LAD/Cx	5 DES	172 mm	Left-system bifurcation reconstruction
Stage 2 29 August 2024	Crux-to-PL	Sirolimus-eluting Ultimaster Tansei (Terumo)	2.25 × 33	Distal RCA–PL construct

Table 1. *Cont.*

Stage/Date	Segment	DES Platform	Size (mm)	Procedural Role
Stage 2	RCA body	Biolimus A9-eluting BioMatrix Alpha (Biosensors International, Singapore)	3.0 × 33	Overlapped with distal stent
Stage 2	Proximal RCA	Sirolimus-eluting Orsiro (Biotronik, Bülach, Switzerland)	3.5 × 40	Proximal extension with overlap
Stage 2	RCA ostium	Everolimus-eluting Xience Pro (Abbott)	3.5 × 15	Ostial coverage with overlap
Stage 2 total	RCA–PL	4 DES	121 mm	RCA reconstruction
Cumulative	Multiple territories	9 DES	293 mm	Staged multivessel reconstruction

Cx, circumflex artery; DES, drug-eluting stent; LAD, left anterior descending artery; LM, left main; PCI, percutaneous coronary intervention; PL, posterolateral branch; RCA, right coronary artery. The 293 mm value is cumulative across separate territories and does not represent one continuous 293 mm stented segment. The four LM–LAD/LAD stents and the four RCA–PL stents formed serial overlapping constructs; the distal Cx stent was anatomically separate. Exact overlap lengths were not prospectively recorded.

3.4. Guideline-Directed Medical Therapy and Secondary Prevention

After Stage 1, the documented maintenance regimen comprised aspirin, clopidogrel, pantoprazole, metoprolol 50 mg once daily, ramipril 5 mg once daily, spironolactone 25 mg once daily, dapagliflozin 10 mg once daily, atorvastatin 40 mg once daily, and ezetimibe 10 mg once daily. Follow-up medication lists continued to document this heart-failure and secondary-prevention regimen except during temporary antiplatelet modifications for procedures and active bleeding. Extended DAPT was periodically reassessed and reflected an individualized balance between the high ischemic risk associated with diffuse multivessel disease and long overlapping stent constructs and the patient's evolving bleeding risk.

3.5. Noncoronary Interventions and Antiplatelet Management

Two clinically important noncoronary interventions complicated longitudinal management. Sixteen days after Stage 1, bilateral prostatic artery embolization was performed for benign prostatic hyperplasia. Clopidogrel was temporarily withheld for the procedure, while aspirin was continued as single antiplatelet therapy. The exact clopidogrel stop and restart dates were not available in the records reviewed. No coronary ischemic complication was documented.

In March 2025, 201 days after Stage 2, the patient was admitted with overt gastrointestinal bleeding and severe iron-deficiency anemia while receiving aspirin and clopidogrel. Hemoglobin decreased to 6.9 g/dL, and one unit of packed red blood cells and intravenous iron were administered. Because the overt bleeding required transfusion, the event was retrospectively classified as BARC type 3a. No emergency endoscopic hemostasis or surgery for acute bleeding control was required, and intravenous vasoactive therapy was not administered. Both antiplatelet agents were interrupted for three days during active bleeding. After hemostasis and clinical stabilization, aspirin and clopidogrel were resumed. Diagnostic gastroscopy (upper gastrointestinal endoscopy) and colonoscopy were subsequently performed as part of the bleeding work-up rather than as emergency hemostatic procedures. Colonoscopy identified an ascending-colon mass, and the available preoperative biopsy

showed a tubulovillous adenoma; final histopathology of the hemicolectomy specimen was not available in the records reviewed. After these investigations, elective surgical treatment of the colonic lesion was planned. Aspirin and clopidogrel were therefore discontinued again seven days before surgery. Right hemicolectomy was performed approximately 15 days after gastroscopy and colonoscopy and was not undertaken for acute bleeding control.

The patient underwent planned right hemicolectomy with ileocolic anastomosis and concomitant cholecystectomy; the 20-day hospitalization included six days in intensive care. After drain removal, aspirin was restarted on postoperative day 2, and clopidogrel was added on postoperative day 3, thereby re-establishing DAPT. No perioperative myocardial infarction, stent thrombosis, or urgent coronary revascularization was documented. De-escalation to single antiplatelet therapy was considered after the BARC type 3a bleeding event. However, after surgical treatment of the identified colonic lesion and multidisciplinary reassessment involving cardiology, gastroenterology, and general surgery, extended DAPT was continued because of the LM-LAD and long overlapping RCA-PL constructs, diabetes, and diffuse multivessel disease. No recurrent gastrointestinal bleeding was documented during close gastroenterology and surgical follow-up, and pantoprazole was maintained for gastroprotection.

3.6. Clinical Follow-Up

Clinical follow-up extended 913 days (approximately 2.5 years) after the index PCI and 687 days after completion of both stages. No cardiovascular death, nonfatal myocardial infarction, repeat coronary revascularization, stroke, definite or probable stent thrombosis, or hospitalization for heart failure was documented. At the latest assessment on 17 July 2026, the patient reported no angina or dyspnea and had a functional capacity greater than 4 metabolic equivalents. LVEF was 55%, low-density lipoprotein cholesterol 25 mg/dL, glycated hemoglobin 7.7%, and estimated glomerular filtration rate 83 mL/min/1.73 m^2. Aspirin, clopidogrel, pantoprazole, and the remaining guideline-directed medical therapy continued to be documented, with no recurrent gastrointestinal bleeding after surgery. The clinical course and medication timeline are summarized in Table 2.

Table 2. Clinical and medication timeline with documented outcomes.

Date/Interval	Clinical Event	Key Findings or Management	Documented Coronary Outcome
16 January 2024	Presentation and Stage 1 PCI	CCS class III progressive angina; LVEF 30%; SYNTAX 34; 5 DES/172 mm in LM–LAD/Cx	TIMI 3 LM–LAD/Cx flow; no significant residual stenosis, dissection, or angiographically apparent edge complication
After Stage 1 and during follow-up	GDMT and secondary prevention	Aspirin + clopidogrel; pantoprazole; metoprolol 50 mg; ramipril 5 mg; spironolactone 25 mg; dapagliflozin 10 mg; atorvastatin 40 mg; ezetimibe 10 mg daily	Medical therapy accompanied staged revascularization
1 February 2024 (day 16)	Bilateral prostatic artery embolization	Clopidogrel temporarily withheld; aspirin continued as single antiplatelet therapy; exact stop/restart dates unavailable	No ischemic event
Feb–May 2024	Interval follow-up	LVEF 35–40%, then 40–45%; no reported or documented angina, acute coronary syndrome, or other ischemic event; no functional ischemia testing	Clinical stability

Table 2. *Cont.*

Date/Interval	Clinical Event	Key Findings or Management	Documented Coronary Outcome
29 August 2024 (month 7)	Stage 2 PCI	Originally scheduled one month after Stage 1; performed at first return in month 7 after the patient missed the planned procedure. Patent left-system stents; 40% ostial Cx narrowing; residual SYNTAX 24 before Stage 2; 4 DES/121 mm in RCA–PL; extended DAPT for high ischemic/metal burden	TIMI 3 RCA–PL flow; no significant residual stenosis, dissection, or angiographically apparent edge complication
Mar 2025 (day 201 after Stage 2)	Major GI bleeding and abdominal surgery	Overt GI bleeding classified as BARC type 3a; hemoglobin 6.9 g/dL; 1 unit packed red blood cells and IV iron; no emergency endoscopic hemostasis, surgery for acute bleeding control, or IV vasoactive therapy. Aspirin/clopidogrel were interrupted for three days during active bleeding and resumed after hemostasis and stabilization. Subsequent diagnostic gastroscopy and colonoscopy identified an ascending-colon mass; biopsy showed tubulovillous adenoma. After elective surgery was planned for treatment of the colonic lesion, both agents were discontinued again seven days preoperatively. Planned right hemicolectomy with ileocolic anastomosis and concomitant cholecystectomy was performed approximately 15 days after gastroscopy and colonoscopy and not for acute bleeding control. Aspirin was restarted on postoperative day 2 after drain removal, and clopidogrel was added on postoperative day 3. Extended DAPT was continued after multidisciplinary reassessment; no recurrent GI bleeding was documented during close gastroenterology and surgical follow-up, and pantoprazole was maintained. Final specimen histopathology was unavailable.	No perioperative MI, stent thrombosis, or urgent revascularization
17 July 2026 (day 913)	Latest documented follow-up	No angina or dyspnea; >4 METs; LVEF 55%; LDL 25 mg/dL; aspirin/clopidogrel, pantoprazole, and GDMT documented; no recurrent GI bleeding after surgery	No three-point MACE; no stroke, stent thrombosis, or HF hospitalization

CCS, Canadian Cardiovascular Society; Cx, circumflex artery; DAPT, dual antiplatelet therapy; DES, drug-eluting stent; GI, gastrointestinal; HF, heart failure; IV, intravenous; LAD, left anterior descending artery; LDL, low-density lipoprotein; LM, left main; LVEF, left ventricular ejection fraction; MACE, major adverse cardiovascular event; MET, metabolic equivalent; MI, myocardial infarction; PCI, percutaneous coronary intervention; PL, posterolateral branch; RCA, right coronary artery.

4. Discussion

This single-patient report describes the technical completion of two planned PCI stages and subsequent clinical follow-up in the setting of an extensive cumulative DES burden and competing ischemic and bleeding risks. Its educational value lies in the integrated sequence of decisions rather than stent length alone: PCI selection after repeated surgical counseling, management of failed device delivery, treatment of a distal-Cx lesion while preserving the ostial Cx during LM-to-LAD crossover, and coordinated care during major noncoronary interventions.

4.1. Revascularization Choice and the Role of Staging

Randomized evidence from FREEDOM and SYNTAX generally favors CABG for patients with diabetes and anatomically complex multivessel or left main disease when surgery is feasible [6,7]; pooled randomized data have also examined outcomes according to diabetes status in left main disease [8]. Current guidelines emphasize Heart Team review, anatomical complexity, completeness of revascularization, and patient preference [1,2], while the SYNTAX Extended Survival analysis links long-term outcomes to revascularization completeness [9]. PCI in this case was not selected as an equivalent alternative to CABG. Surgery was repeatedly recommended, but the patient declined it, and advanced distal disease compromised potential graft targets. The resulting strategy was an individualized attempt to achieve the most complete technically feasible catheter-based revascularization.

Staging was selected to limit the duration and physiological burden of a single procedure. Stage 2 was planned for one month after Stage 1, but the patient missed the scheduled admission and returned only in month 7; RCA PCI was performed at that first return. No interval angina, acute coronary syndrome, or other ischemic event was reported or documented, although no functional ischemia test was obtained. The seven-month interval therefore reflected nonattendance rather than an intentionally prolonged or ischemia-guided deferral.

4.2. Calcification, Lesion Preparation, and Procedural Problem Solving

Both stages required rotational atherectomy and adjunctive balloon preparation. The 2023 EAPCI and 2024 SCAI consensus documents support lesion-specific calcium assessment and modification, including rotational atherectomy for selected severely calcified, uncrossable, or undilatable lesions [5,10]. ROTAXUS improved acute procedural success without establishing a universal late clinical benefit [11], and subsequent data support individualized atherectomy and, for selected morphologies, combined preparation with modified balloons [12,13].

During Stage 1, balloon anchoring in the diagonal branch provided the guide support required after atherectomy and cutting-balloon preparation failed to permit stent delivery. LM-to-LAD crossover covered the ostial LAD lesion and contiguous distal-LM plaque, while the distal-Cx lesion was treated separately. Cx rewiring, final kissing-balloon inflation, and proximal optimization preserved the ostial Cx without additional ostial metal. Stage 2 addressed a distinct problem: diffuse calcific RCA disease requiring a four-stent overlapping construct from the crux/PL branch to the ostium.

Neither IVUS nor OCT was used for lesion assessment or stent optimization during either stage because these modalities were not routinely available at the treating center; cost constraints and the decision to proceed under angiographic guidance also contributed. This is a major limitation because angiography cannot reliably characterize calcium depth, stent expansion, malapposition, or edge disease. In RENOVATE-COMPLEX-PCI, intravascular imaging guidance reduced the composite of cardiac death, target-vessel myocardial infarction, and clinically driven target-vessel revascularization compared with angiographic guidance [14], with benefit sustained at five years [15]. A recent synthesis of eight large randomized trials further concluded that the clinical benefit of intracoronary imaging increases with lesion complexity, particularly in long lesions, bifurcations, and left main PCI [16]. Contemporary complex-PCI practice should therefore strongly favor intravascular imaging for calcified left main, proximal LAD, and long overlapping constructs whenever technically and clinically feasible.

4.3. Interpreting the 293 mm Cumulative DES Burden

The 293 mm value is the cumulative nominal length of nine DES across the LM-LAD/Cx and RCA-PL territories, not a continuous single-vessel metal jacket. Nevertheless, the biological and mechanical burden is substantial. In GRAND-DES, total stent length greater than 40 mm was associated with higher rates of target-lesion failure and definite or probable stent thrombosis [3]. Full-metal-jacket cohorts likewise reported nontrivial repeat revascularization and stent-thrombosis risks [17,18], and overlap has been associated with adverse outcomes that vary across DES generations [4]. Evidence comparing single- and multiple-brand strategies remains limited [19]. Here, devices were selected according to required dimensions and local inventory rather than an intended biological advantage; this pragmatic choice does not establish platform interchangeability.

During the 913 days after the index procedure and 687 days after completion of both stages, no three-point MACE or definite or probable stent thrombosis was documented. This is a descriptive observation in a single patient. It cannot define a safe threshold for cumulative stent length, justify avoidable overlap, or support routine extensive multivessel stenting.

4.4. Competing Ischemic and Bleeding Risks

The gastrointestinal bleed and subsequent abdominal surgery created a direct conflict between high ischemic and bleeding risks. The 2024 ESC guideline recommends aspirin plus clopidogrel for up to six months as the default strategy after PCI for chronic coronary syndrome and emphasizes individualized reassessment when ischemic and bleeding risks compete [2]. In this case, the bleeding event occurred 201 days after Stage 2, after completion of approximately six months of DAPT, and prompted explicit reconsideration of de-escalation to single antiplatelet therapy. Greater PCI complexity may increase the ischemic benefit of longer DAPT at the cost of bleeding [20]. The Academic Research Consortium provides a standardized framework for high bleeding risk [21], whereas MASTER DAPT supports abbreviated strategies in selected high-bleeding-risk patients after an initial event-free period [22]. These data underscore the need for repeated individualized assessment rather than a uniform strategy.

Perioperative guidance emphasizes the interval following PCI, surgical urgency, bleeding severity, coronary complexity, and multidisciplinary coordination when antiplatelet therapy is interrupted [23,24]. Clopidogrel was withheld and aspirin continued for prostatic artery embolization. During the later gastrointestinal bleed, both agents were interrupted for three days and were resumed after hemostasis and clinical stabilization. Subsequent diagnostic gastroscopy and colonoscopy identified the ascending-colon lesion. Once elective surgical treatment was planned, aspirin and clopidogrel were discontinued again seven days before surgery. Planned right hemicolectomy with ileocolic anastomosis and concomitant cholecystectomy was performed approximately 15 days after gastroscopy and colonoscopy and not for acute hemostasis. Aspirin was restarted on postoperative day 2 and clopidogrel on day 3. Although de-escalation to single antiplatelet therapy was considered, extended DAPT was continued after multidisciplinary review because the identified colonic lesion had been surgically treated and the LM-LAD and long RCA-PL constructs, diabetes, and diffuse multivessel disease indicated very high ischemic risk. No recurrent gastrointestinal bleeding was documented during close gastroenterology and surgical follow-up, and pantoprazole was maintained. This individualized decision should not be interpreted as supporting routine prolonged DAPT after major gastrointestinal bleeding, and the observed absence of ischemic or recurrent bleeding events does not establish the safety or reproducibility of this strategy.

4.5. Ventricular Recovery During Staged Revascularization Plus Guideline-Directed Medical Therapy

LVEF increased from 30% to 55%, with resolution of angina and functional capacity greater than 4 metabolic equivalents. Recovery occurred during both staged revascularization and multidrug guideline-directed medical therapy. Metoprolol, ramipril, spironolactone, and dapagliflozin represented the principal evidence-based drug classes for reduced systolic function, while atorvastatin plus ezetimibe provided intensive lipid lowering [25]. LVEF had already increased to 35–40% in February and 40–45% in May 2024, before Stage 2. Possible contributors include relief of ischemia, recovery of hibernating myocardium, pharmacological reverse remodeling, and risk-factor control. Manfrini et al. reported improved resting flow at six months in both target and nontarget arteries after PCI, providing mechanistic context without establishing causation here [26]. STICH demonstrated a long-term survival benefit of CABG plus medical therapy in surgically eligible ischemic cardiomyopathy [27], whereas REVIVED-BCIS2 did not show that PCI reduced death or heart-failure hospitalization in patients suitable for PCI [28]. The present observation should therefore be described as recovery during staged revascularization plus guideline-directed medical therapy, not as a specific PCI treatment effect.

4.6. Limitations

This report is limited by its single-patient observational design, absence of intravascular imaging, and lack of scheduled surveillance angiography or coronary computed tomography after Stage 2. Clinical events were reconstructed from available records without independent adjudication. Exact overlap lengths, the clopidogrel interruption interval for prostatic artery embolization, final histopathology of the hemicolectomy specimen, and a final post-Stage 2 residual SYNTAX score were unavailable. Medication adherence, tolerance, and dose titration were derived from routine documentation rather than a prospective protocol. LVEF recovery cannot be attributed causally to PCI. Moreover, the complete construct was observed for 687 days, which is insufficient to assess late failure of extensive overlapping DES. These limitations substantially restrict generalizability.

5. Conclusions

After the patient declined CABG following repeated Heart Team counseling, two planned stages of rotational atherectomy-assisted PCI were technically completed with a cumulative 293 mm DES burden. During 913 days after the index PCI and 687 days after completion of both stages, no three-point MACE or definite or probable stent thrombosis was documented; LVEF increased from 30% to 55%. Recovery occurred during staged revascularization plus guideline-directed medical therapy and cannot be attributed to PCI alone. The case illustrates meticulous lesion preparation, staged procedural problem solving, individualized antiplatelet management, and coordinated longitudinal care. It does not establish the safety or durability of extensive stenting or imply equivalence to CABG.

Supplementary Materials: The following supporting information can be downloaded at: https://www.mdpi.com/article/10.3390/jcdd13110555/s1, Video S1, baseline Stage 1 left coronary angiography in a caudal projection, showing diffuse severe left-system disease; Video S2, fluoroscopy during rotational atherectomy of the left system with a 1.5-mm burr; Video S3, final Stage 1 left-system angiography after LM–LAD/Cx reconstruction; Video S4, Stage 2 left-system control angiography showing patent LM-to-LAD stents and preserved Cx flow; Video S5, baseline Stage 2 RCA angiography showing severe diffuse calcified disease; Video S6, final Stage 2 RCA–PL angiography after the four-stent reconstruction.

Author Contributions: Conceptualization, K.E. and E.Ş.; clinical data curation and interpretation, K.E., E.Ş., M.E.Ö. and E.T.; writing—original draft preparation, E.Ş.; writing—review and editing, K.E., E.Ş., M.E.Ö. and E.T.; supervision, K.E. and E.T. All authors have read and agreed to the published version of the manuscript.

Funding: This research received no external funding.

Institutional Review Board Statement: Not applicable. This retrospective single-patient communication describes routine clinical care and did not involve a prospective research intervention.

Informed Consent Statement: Written informed consent was obtained from the patient for publication of the clinical details and all anonymized angiographic images and videos included in this report.

Data Availability Statement: De-identified clinical data may be made available by the corresponding author on reasonable request, subject to institutional requirements and protection of patient privacy. Source DICOM files are not publicly available because of privacy restrictions.

Acknowledgments: During preparation of this manuscript, the authors used GPT-5.6 through OpenAI Codex and ChatGPT Work (accessed September–October 2026) for English-language editing, structural organization, and document and figure formatting, and for the development and layout of the graphical abstract. The anatomical heart illustrations in the graphical abstract were generated using the integrated image-generation tool within the same GPT-5.6 workflow in ChatGPT Work (accessed 3 September 2026; a separate image-generation model version was not displayed by the interface). These tools were not used for clinical decision-making, clinical data analysis, or interpretation. The authors reviewed and verified all clinical facts, interpretations, references, figures, videos, and graphical-abstract content and take full responsibility for the manuscript.

Conflicts of Interest: The authors declare no conflicts of interest.

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