

Impella vs. IABP in Non-Emergent High-Risk PCI: Outcomes and LVEF Recovery from a Large U.S. EHR Study

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Supplementary Data

Table S1. Clinical Conditions, Procedures, and Their Associated Codes

Table S2. Pre-Match Patient Demographics and Baseline Characteristics

Table S3. Pre-Match PCI Procedural Characteristics

Table S4. Pre-Match Patient Outcomes and LVEF

Table S5. Sensitivity Analysis for Patients Missing Follow-up LVEF Data

Table S6. Sensitivity Analysis for Dual-Device Cases (both IABP and Impella)

Table S7. Characteristics of Excluded Impella- and IABP-Supported Patients

Table S8. Outcomes and LVEF of Excluded Impella- and IABP-Supported Patients

Figure S1. Pre-Match 30-Day Patient Outcomes

Figure S2. Pre-Match LVEF Recovery in Subgroup Analysis

Tables

Table S1. Clinical Conditions, Procedures, and Their Associated Codes

Description	Code(s)
Cardiogenic shock	ICD-10 codes: R57.0 SNOMED codes: 89138009
CABG	ICD-10 codes: 02104A8, 02114KW, 02114J3, 02110J8, 0210493, 02100JF, 021049W, 02114ZF, 021109W, 02104JF, 02100ZC, 02104KW, 0210499, 02100A9, 021048C, 0211099, 0211489, 02100JW, 0211498, 02104AW, 02110AF, 0210488, 02104KC, 02100J3, 02100K8, 02110A9, 02114A8, 02114Z3, 02114AC, 02110Z9, 02104A3, 02104J8, 021108C, 02114Z9, 021108W, 02100A8, 02110A8, 02104J9, 02110JW, 02104ZF, 021009W, 02110K3, 02100KF, 02114JW, 02100Z3, 021049F, 0210489, 02100Z8, 02104K9, 0211098, 0211493, 02110AC, 02110K8, 021148F, 02104AF, 02100JC, 0210098, 02114AW, 021009F, 02104Z8, 0210089, 02100KW, 02110JF, 02100AC, 021208C, 02100J9, 02104AC, 0211088, 02110ZC, 02100A3, 02114KC, 02114Z8, 02114K9, 0212089, 0211488, 021109C, 0211483, 02110Z8, 02110K9, 02110J3, 02104A9, 021048F, 021049C, 02104KF, 02100AW, 02110AW, 02104J3, 0210099, 02110KC, 02114JF, 021009C, 02100ZF, 0211093, 02114AF, 021109F, 0212083, 02100J8, 02114A9, 02100KC, 02100Z9, 0211083, 021008W, 02104Z3, 02114K3, 02100K3, 02104JW, 0210083, 02114J9, 02104ZC, 0210498, 02110ZF, 021148W, 02114K8, 0212088, 021149W, 0211089, 02110KF, 0211499, 02104K3, 02100K9, 02104K8, 02110JC, 021048W, 02104JC, 0210093, 021008C, 0210483, 02114A3, 02114KF, 02114ZC, 02104Z9, 021148C, 02110A3, 02114JC, 02114J8, 021008F, 02110KW, 02110Z3, 02110J9, 0210088, 021149C, 021108F, 021149F, 02100AF, 021248F, 021309F, 02124K9, 021249C, 02120JW, 02124K8, 02130KC, 02120Z9, 021248W, 02130J9, 0213499, 02130KF, 021348C, 02120K3, 02130JF, 021249W, 02134Z3, 02134K3, 021208W, 02120KC, 0212488, 02130J8, 021308F, 0213498, 02120A9, 02130K3, 02120AW, 0213089, 02124AC, 02134A9, 02124J9, 021248C, 021209F, 02134A8, 02134K9, 02134K8, 0213483, 02134ZC, 02130K8, 021209W, 0213488, 02130A8, 021249F, 0212483, 02120JC, 021349C, 02130A9, 0213493, 02120ZF, 02120Z3, 02130ZC, 02134J9, 02134ZF, 02124A9, 021308C, 021349W, 021208F, 02134JW, 02124JC, 02134JC, 02130Z3, 02130JW, 02134KW, 02130A3, 02124ZC, 02130KW, 02124JW, 02130J3, 02124J8, 02120A3, 02120JF, 0212093, 02124AF, 02124Z9, 02124J3, 02124Z8, 02130JC, 02120ZC, 02134AC, 0213083, 021348W, 02120KW, 0213099, 0213489, 02134JF, 02120J8, 0212489, 02120AF, 02120KF, 0212498, 02134A3, 021309C, 021209C, 02124KW, 021309W, 0212499, 02124Z3, 02120K9, 021349F, 02120J3, 021308W, 02130K9, 02130Z8, 02134J8, 02124A8, 02134Z9, 0212099, 02134Z8, 02130Z9, 02124JF, 02120J9, 0213093, 02120AC, 02124KF, 02134AW, 02134KC, 0213098, 02130AF, 02124AW, 02124K3, 02134KF, 02120K8, 021348F,

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AMI NSTEMI	ICD-10 codes: I21.4 SNOMED CT codes: 401314000,1208872002,1204151009,1204154001,1204155000,1204152002,1204222000
HFrEF	ICD-10 codes: I50.20, I50.22, I50.1, I50.21, I50.41, I50.42, I50.43, I50.40, I50.23

Insulin-Dependent Diabetes	ICD-10 codes: E10.*, Z79.4
Diabetes	ICD-9 codes: 250.31, 362.01, 362.07, 250.30, 250.32, 366.41, 362.02, 250.61, 250.52, 250.53, 362.05, 250.62, 250.12, 362.04, 250.01, 250.72, 250.13, 250.50, 250.40, 250.23, 250.41, 362.06, 250.00, 250.10, 250.03, 250.11, 250.33, 250.81, 250.70, 357.2, 250.60, 250.80, 250.91, 250.43, 250.90, 250.20, 250.02, 250.73, 250.63, 250.21, 362.03, 250.92, 250.42, 250.93, 250.71, 250.22, 250.82, 250.51, 250.83 SNOMED codes: 1255271005, 721121000124104, 1285519007, 721111000124107, 420279001, 719216001, 713702000, 422034002, 421437000, 197605007, 723074006, 722454003, 445170001, 426875007, 420789003, 311366001, 420514000, 609567009, 706894000, 310387003, 421075007, 420918009, 313436004, 712883005, 199229001, 237599002, 713706002, 313435000, 421305000, 609566000, 703137001, 420436000, 703138006, 421986006, 425455002, 190389009, 190368000, 190331003, 28032008, 9859006, 81531005, 190330002, 44054006, 23045005, 11530004, 190372001, 127013003, 111552007, 420715001, 236499007, 421779007, 427571000, 420486006, 713705003, 314902007, 236500003, 199230006, 359642000, 309426007, 713703005, 237627000, 789542009, 712882000, 792926007, 421893009, 427027005, 290002008, 707221002, 609564002, 421847006, 445353002, 38046004, 63510008, 1196923000, 1196922005, 771000119108, 128001000119105, 140121000119100, 104961000119108, 751000119104, 140101000119109, 82551000119103, 71421000119105, 104951000119106, 138881000119106, 1501000119109, 71791000119104, 71721000119101, 18521000119106, 90791000119104, 87921000119104, 71701000119105, 90781000119102, 109171000119104, 28331000119107, 769219006, 90751000119109, 731000119105, 31321000119102, 90741000119107, 126551000119103, 90761000119106, 1491000119102, 71441000119104, 420756003, 138941000119105, 97331000119101, 82541000119100, 70694009, 138921000119104, 96441000119101, 711000119100, 770098001, 368521000119107, 90721000119101, 741000119101, 82571000119107, 138911000119106, 60971000119101, 41911000119107, 157141000119108, 71771000119100, 140131000119102, 1511000119107, 104941000119109, 60961000119107, 31211000119101, 421920002, 769220000, 243421000119104, 110181000119105, 90731000119103, 127991000119101, 368101000119109, 368591000119109, 138901000119108, 97341000119105, 82581000119105, 368581000119106, 721000119107, 781000119106, 60981000119103, 1551000119108, 1481000119100, 138891000119109, 102781000119107, 140111000119107, 90771000119100, 16746741000119102, 16746661000119106, 368201000119100, 16745131000119100, 16747101000119101, 16697471000119102, 16745531000119108, 16745931000119102, 16697521000119104, 16747141000119104, 368421000119108, 368451000119100, 16747901000119104, 16749661000119102, 16747021000119109, 16749781000119101, 16747341000119101, 16746941000119104, 16748141000119100, 16745211000119100, 16746341000119103, 368471000119109, 16747741000119100, 368541000119101, 16745891000119105, 16745611000119102, 16746901000119101, 16748741000119101, 368441000119102, 16746261000119108, 428007007, 422166005, 46635009, 691000119103, 422099009, 421365002, 609562003,

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CKD	ICD-10 codes:
	N18.9, N18.5, N18.32, N18.31, N18.2, N18.3, N18.6, N18.4, N18.30, N18.1
Anemia	ICD-10 codes:

	D50.0, D64.9, D62
Dementia	ICD-10 codes: F03.918, F01.51, F01.518, F03.911, F01.511, F03.91, F01.50, F03.90
CAD	ICD-10 codes: I25.111, I25.10, I25.119, I25.110, I25.118
CHF	ICD-10 codes: I50.20, I50.32, I50.22, I50.33, I50.1, I50.21, I50.30, I50.31, I50.40, I50.23, I50.41, I50.42, I50.43
Liver Disease	ICD-10 codes: K76, K76.5, K76.7, K76.9, K76.8, K76.0, K76.81, K76.82, K76.3, K76.6, K76.4, K76.89, K76.1, K76.2, K74.01, K74.00, K74.02, K74.4, K70.9, O98.419, K71.51, B17.10, K71.10, K71.4, K70.40, K70.41, B19.21, B17.2, K73.8, O98.411, K74.1, B18.2, K71.50, K70.11, K72.00, K70.10, K74.3, B17.11, K70.31, K73.2, B19.0, K74.69, K70.0, B17.8, K71.7, K71.2, O98.413, K74.60, K72.90, K71.9, K71.6, K75.4, B17.0, B18.8, K71.3, K71.11, K70.30, K71.8, B19.9, K72.11, K73.0, B18.9, K72.91, K71.0, K70.2, K72.10, O98.412, K74.2, K74.5, K73.9, K73.1, K72.01, B19.20, B17.9 SNOMED codes: 307757001, 435101000124104, 435091000124105, 702969000, 831000119103, 50711007, 370889009, 347891000119103, 10759111000119102, 10759151000119101, 328383001, 62216007, 66870002, 41889008, 59927004, 58282009, 72445008, 50325005, 37871000, 51292008, 79720007, 76783007, 41309000, 60037002, 57412004, 4846001, 31005002, 4896000, 19943007, 10295004, 9953008, 16069000, 3738000, 1186854003, 1197150002, 551621000124109, 551611000124101, 1187643003, 1197704005, 1230291009, 1230342001, 1186865008, 7111000119109, 146371000119104, 768289009, 774204006, 235895002, 1092801000119102, 773113008, 371139006, 76795007, 103611000119102, 302919001, 768288001, 838305005, 774207004, 838380002, 447961000124105, 767809001, 838377003, 38662009, 768125005, 767810006, 314963000, 768126006, 768127002, 61977001, 44047000, 768006009, 871619002, 1087101000119109, 125921000119106, 16098491000119109, 863957008, 442374005, 699189004, 735451005, 450880008, 725938001, 442134007, 725940006, 446698005, 721710005, 713181003, 715864007, 397575003, 723829000, 703866000, 721713007, 419728003, 721588008, 720461006, 420054005, 708248004, 707341005, 432908002, 713370005, 716203000, 721711009, 426364002, 722865001, 708198006, 721712002, 715401008, 765482002, 413438002, 425413006, 424758008, 725939009, 722864002, 713966008, 725416005, 735733008, 89789003, 83864008, 1260140008, 128302006, 123606000, 111879004, 109819003, 111891008, 123716002, 89580002, 111896003, 123604002, 123603008, 123605001, 89231008, 123717006, 1234778004, 86454000, 266468003, 235866006, 235876009, 235889003, 235869004, 235865005, 206372007, 235875008, 235867002, 278929008, 197271008, 197352008, 199203001, 197268000, 197361008, 186628001, 197270009, 197360009, 197284004, 197359004, 197286002, 408335007, 95556007, 235881000, 235901004, 235885009, 235902006, 235884008, 235897005, 235864009, 266471006, 213231008, 213230009, 235896001, 235899008,

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Cancer

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SAVR	ICD-10 codes: 027F0DZ, 027F0ZZ, 02QF0ZJ, 02QF0ZZ, 02RF07Z, 02RF08Z, 02RF0JZ, 02RF0KZ, X2RF032, X2RX0N7
Angina	ICD-10 codes: I20.0, I20.1, I20.8, I20.9, I23.7, I25.110, I25.111, I25.118, I25.119, I25.700, I25.701, I25.708, I25.709, I25.710, I25.711, I25.718, I25.719, I25.720, I25.721, I25.728, I25.729, I25.730, I25.750, I25.758, I25.759, I25.760, I25.769, I25.790, I25.798, I25.799
Cardiomyopathy	ICD-10 codes: E05.9, E05.90, E05.91, I25.5, I42.0, I42.1, I42.2, I42.3, I42.4, I42.5, I42.6, I42.7, I42.8, I42.9, I51.7, O90.3, O99.4, O99.41, O99.411, O99.412, O99.413, O99.419, O99.42, O99.43
PE	ICD-10 codes: I26.0, I26.01, I26.02, I26.09, I26.9, I26.90, I26.92, I26.93, I26.94, I26.99
PAD	ICD-10 codes: I73.9
GDMT: HF-specific beta-blocker	RXNorm codes: 19484, 20352, 31555, 6918, 200031, 200032, 200033, 686924, 854901, 854905, 854908, 854916, 854919, 860510, 860516, 860522, 860532, 866412, 866419, 866427, 866436, 866452, 866461, 866472, 387013, 751612, 751618, 827073

GDMT: ACE/ARB/ARNI	RXNorm codes: 1545989, 1546022, 1546196, 1546358, 1546359, 1546377, 1546379, 1546393, 1546400, 18867, 1998, 35208, 35296, 3827, 38454, 50166, 54552, 1091643, 214354, 321064, 52175, 69749, 73494, 83515, 83818, 1000001, 1091646, 1091652, 1235144, 1235151, 1299859, 1299871, 1299890, 1299896, 1299897, 1435624, 153822, 153823, 1600716, 1600724, 1600728, 1656340, 1656349, 1656354, 197436, 197437, 197438, 197439, 197884, 197885, 197886, 197887, 198188, 198189, 199351, 199352, 199353, 200094, 200095, 200096, 200284, 200285, 205304, 205305, 205326, 261962, 282755, 283316, 283317, 308962, 308963, 308964, 310140, 310792, 310793, 310796, 310797, 310809, 311353, 311354, 312748, 312749, 312750, 314076, 314077, 314203, 317173, 349199, 349200, 349201, 349353, 349373, 349401, 349405, 349483, 351292, 351293, 403853, 403854, 403855, 477130, 485471, 577776, 578325, 578330, 636042, 636045, 639537, 722126, 722131, 722134, 722137, 730861, 730866, 730869, 730872, 802749, 845488, 848131, 848135, 848140, 848145, 848151, 854925, 854984, 854988, 857166, 857169, 857174, 857183, 857187, 858804, 858810, 858813, 858817, 858824, 858828, 876514, 876519, 876524, 876529, 897781, 897783, 897844, 897853, 898342, 898346, 898350, 898353, 898356, 898359, 898362, 898367, 898372, 898378, 898687, 898690, 898719, 898723, 979464, 979468, 979471, 979480, 979485, 979492, 999967, 999986, 999991, 999996, 1656340, 1656349, 1656354
GDMT: SGLT2i	RXNorm codes: 1488564, 1545653, 1546031, 1940495, 1486977, 1486981, 1488566, 1488567, 1488568, 1488573, 1534343, 1534344, 1534397, 1488564, 1486972, 1486975, 1486976, 1488569, 1486971, 1486979, 1488574, 1488565, 1486968, 1545658, 1545666, 1545654, 1545665, 1545653, 1545655, 1545656, 1545657, 1545659, 1545660, 1545661, 1545662, 1545663, 1545664, 1545667, 1545668, 1664310, 1664322
GDMT: MRA	RXNorm codes: 9997, 324042, 104232, 198222, 198223, 198224, 198225, 298869, 351256, 351257, 353386, 353387
Glucose	LOINC codes: 2345-7, 6777-7
LVEF	SNOMED codes: 250908004 LOINC codes: 10230-1,8806-2,8808-8,8811-2,8812-0,18043-0,8807-0,8809-6,18046-3,8810-4,18047-1,18048-9,93646-8,77890-2,77891-0,79990-8,77889-4,18049-7,93644-3,79992-4,93645-0,79993-2,18045-5,79991-6,77892-8,18044-8
Serum creatinine	LOINC codes: 38483-4, 2160-0
Impella	ICD-10 codes:

02HA3RS, 5A0221D, 02HA3RZ, 02HA0RZ, 02HA0RS, 02HA3RJ, 02HA0RJ

CPT codes:

33991, 33992, 33993, 33990

Truveta codes:

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IABP

ICD-10 codes:

5A02110, 5A02210

CPT codes:

33967, 33970, 33971, 33968, 33974, 33973

Truveta codes:

3536212, 3536225, 3536207, 3536175, 3536157, 3536227, 3536177, 3536245, 3536155,
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SNOMED codes:

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LOINC codes:

80998-8

ACE, angiotensin-converting enzyme inhibitors; AKI, acute kidney injury; AMI, acute myocardial infarction; ARB, angiotensin 2 receptor blockers; ARNI, angiotensin receptor/neprilysin inhibitor; CABG, coronary artery bypass grafting; CAD, coronary artery disease; CHF, congestive heart failure; CKD, chronic kidney disease; CPT, Current Procedural Terminology; ECMO, extracorporeal membrane oxygenation; GDMT, guideline-directed medical therapy; HCPCS, Healthcare Common Procedure Coding System; HF, heart failure; HFrEF, heart failure with reduced ejection fraction; IABP, intra-aortic balloon pump; ICD, International Classification of Diseases; LOINC, Logical Observation Identifiers Names and Codes; LVEF, left ventricular ejection fraction; MRA, mineralocorticoid receptor antagonist; NSTEMI, non-ST-segment elevation myocardial infarction; PAD, peripheral artery disease; PCI, percutaneous coronary intervention; PE, pulmonary embolism; SGLT2i, sodium-glucose cotransporter-2 inhibitor; SAVR, surgical aortic valve replacement; SNOMED, Systematized Nomenclature of Medicine; RXNorm, a normalized naming system for generic and branded drugs; UDI, unique device identifier.

Table S2. Pre-Match Patient Demographics and Baseline Characteristics

	Impella (n=2,794)	IABP (n=1,884)	SMD
Patient Demographics			
Age (Years), mean (SD)	72.9 (10.9)	68.5 (12.0)	0.383
Sex Category, n (%)^a	-	-	0.090
Male	1,985 (71.7)	1,259 (67.6)	-
Female	783 (28.3)	604 (32.4)	-
Prior Comorbidities, n (%)			
Congestive Heart Failure	1,359 (48.6)	446 (23.7)	0.538
Anemia	670 (24.0)	285 (15.1)	0.225
Insulin-Dependent Diabetes	551 (19.7)	244 (13.0)	0.184
AMI-NSTEMI	956 (34.2)	305 (16.2)	0.424
Liver Disease	189 (6.8)	102 (5.4)	0.056
Cancer	575 (20.6)	239 (12.7)	0.213
HFrEF	1,202 (43.0)	352 (18.7)	0.546
Any Diabetes	983 (35.2)	422 (22.4)	0.285
Surgical Aortic Valve Replacement	1 (0.0)	2 (0.1)	0.026
Percutaneous Coronary Intervention	205 (7.3)	148 (7.9)	0.020
Coronary Artery Bypass Grafting	25 (0.9)	14 (0.7)	0.017
Characteristics at Admission, n (%)			
Acute Coronary Syndrome	83 (3.0)	108 (5.7)	0.136
Anemia	288 (10.3)	193 (10.2)	0.002
Angina	646 (23.1)	349 (18.5)	0.113
Coronary Artery Disease	1,637 (58.6)	958 (50.8)	0.156
Chronic Kidney Disease	517 (18.5)	259 (13.7)	0.130
Cardiomyopathy	649 (23.2)	303 (16.1)	0.181
Dementia	21 (0.8)	15 (0.8)	0.005

Pulmonary Edema	25 (0.9)	20 (1.1)	0.017
Respiratory Disease	337 (12.1)	200 (10.6)	0.046
Insulin-Dependent Diabetes	171 (6.1)	107 (5.7)	0.019
AMI-NSTEMI	570 (20.4)	382 (20.3)	0.003
Liver Disease	96 (3.4)	47 (2.5)	0.056
Peripheral Artery Disease	220 (7.9)	105 (5.6)	0.092
On GDMT	2,070 (74.1)	921 (48.9)	0.536
Baseline Labs and Hemodynamics, median (IQR)			
LVEF (%)	34.1 (23.0, 50.0)	40.0 (27.0, 53.0)	0.225
Hemoglobin (g/dL)	11.9 (10.1, 13.4)	12.9 (11.0, 14.6)	0.374
Creatinine (mg/dL)	1.1 (0.9, 1.6)	1.1 (0.9, 1.4)	0.136
Glucose (mg/dL)^b	127.0 (104.0, 171.3)	148.0 (118.0, 206.0)	0.310
eGFR (mL/min/1.73m²)	63.1 (43.0, 84.7)	68.9 (48.7, 88.7)	0.191
Baseline LVEF Collection Time (days)^c	-4 (-19, 0)	0 (-4, 0)	0.120

AMI-NSTEMI, acute myocardial infarction – non-ST-elevation myocardial infarction; dL, deciliter; eGFR, estimated glomerular filtration rate; GDMT, guideline-directed medical therapy; g, grams; HFrEF, heart failure with reduced ejection fraction; IABP, intra-aortic balloon pump; IQR, interquartile range; LVEF, left ventricular ejection fraction; m, meter; mg, milligrams; min, minute; mL, milliliter; PCI, percutaneous coronary intervention; SD, standard deviation; SMD, standardized mean difference.

^a Missing category not shown

^b Availability in < 50% of the population

^c Number of days before PCI that baseline LVEF was collected; a value of 0 indicates collection on the day of PCI, and negative values indicate collection prior to PCI

Table S3. Pre-Match PCI Procedural Characteristics

	Impella (n=2,794)	IABP (n=1,884)	SMD
Number of Vessels, n (%)			
One	1,368 (49.0)	1,154 (61.3)	0.249
Two	888 (31.8)	286 (15.2)	0.399
Three	475 (17.0)	122 (6.5)	0.331
Four	126 (4.5)	26 (1.4)	0.186
Two or More ^a	1,397 (50.0)	424 (22.5)	0.597
Additional Treatment Post-procedure within 1 year of PCI			
Receiving any category of HF GDMT, n (%)	2,549 (91.2)	1,702 (90.3)	0.031
Receiving 3-4 categories of HF GDMT, n (%)	1,043 (37.3)	572 (30.4)	0.148
Cardiac resynchronization therapy, n (%)	686 (24.5)	334 (17.7)	0.168

GDMT, guideline-directed medical therapy; HF, heart failure; IABP, intra-aortic balloon pump; PCI, percutaneous coronary intervention; SMD, standardized mean difference.

^a Counts may not sum to the expected total due to overlapping entries in the electronic health record (e.g., some patients recorded in both two- and three-vessel PCI categories)

Table S4. Pre-Match Patient Outcomes and LVEF

	Impella	IABP	P-value
All-Cause Mortality, n (%)	n=2,794	n=1,884	
7-Day	235 (8.4)	193 (10.2)	0.04
30-Day	340 (12.2)	293 (15.6)	<0.001
90-Day	429 (15.4)	345 (18.3)	0.008
In-Hospital Code-Derived Cardiogenic Shock	426 (15.3)	584 (31.0)	<0.001
Subgroup Analysis (LVEF Change), median (IQR)	n=1,775	n=1,254	
Change in LVEF (%)	+7	+3	<0.001
Pre-PCI LVEF (%)	32.5 (22.1, 46.4)	38.5 (26.4, 51.0)	-
Post-PCI LVEF (%)	40.0 (27.0, 52.5)	42.0 (30.0, 55.0)	-

IABP, intra-aortic balloon pump; IQR, interquartile range; LVEF, left ventricular ejection fraction; PCI, percutaneous coronary intervention.

Table S5. Sensitivity Analysis for Patients Missing Follow-up LVEF Data

	Impella (n=579)	IABP (n=507)	SMD
Patient Demographics			
Age (Years), mean (SD)	72.09 (10.45)	71.42 (11.12)	0.062
Sex, n (%)^a			
Male	184 (31.8)	159 (31.4)	0.009
Female	395 (68.2)	348 (68.6)	
Prior Comorbidities, n (%)			
Congestive Heart Failure	162 (28.0)	140 (27.6)	0.008
Anemia	107 (18.5)	78 (15.4)	0.083
Insulin-Dependent Diabetes	91 (15.7)	77 (15.2)	0.015
AMI-NSTEMI	127 (21.9)	95 (18.7)	0.079
Liver Disease	37 (6.4)	32 (6.3)	0.003
Cancer	102 (17.6)	80 (15.8)	0.049
HFrEF	129 (22.3)	111 (21.9)	0.009
SAVR	579 (100.0)	507 (100.0)	<0.001
Any Diabetes	159 (27.5)	133 (26.2)	0.028
Percutaneous Coronary Intervention	45 (7.8)	56 (11.0)	0.112
Coronary Artery Bypass Grafting	5 (0.9)	5 (1.0)	0.013
Characteristics at Admission, n (%)			
Acute Coronary Syndrome	28 (4.8)	24 (4.7)	0.005
Anemia	60 (10.4)	52 (10.3)	0.003
Angina	154 (26.6)	120 (23.7)	0.068
Coronary Artery Disease	366 (63.2)	293 (57.8)	0.111
Chronic Kidney Disease	96 (16.6)	79 (15.6)	0.027
Cardiomyopathy	114 (19.7)	86 (17.0)	0.071
Dementia	3 (0.5)	5 (1.0)	0.054
Pulmonary Edema	5 (0.9)	2 (0.4)	0.059
Respiratory Disease	67 (11.6)	56 (11.0)	0.017

Insulin-Dependent Diabetes	30 (5.2)	33 (6.5)	0.057
AMI-NSTEMI	117 (20.2)	110 (21.7)	0.037
Liver Disease	21 (3.6)	10 (2.0)	0.1
Peripheral Artery Disease	57 (9.8)	20 (3.9)	0.234
Baseline Labs and Hemodynamics, median (IQR)			
LVEF (%)	41.0 (25.3, 56.5)	41.6 (27.0, 54.2)	0.036
Hemoglobin (g/dL)	12.1 (10.10, 13.50)	12.3 (10.5, 14.2)	0.178
Creatinine (mg/dL)	1.1 (0.9, 1.5)	1.1 (0.9, 1.5)	0.017
Glucose (mg/dL)^b	127.0 (102.8, 171.5)	147.0 (113.3, 205.5)	0.267
eGFR (mL/min/1.73m²)	67.9 (45.5, 88.2)	68.5 (43.9, 87.0)	0.016
Baseline LVEF Collection Time (days)^c	-4.0 (-13.5, 0.0)	0.0 (-6.0, 0.00)	0.067

AMI-NSTEMI, acute myocardial infarction – non-ST-elevation myocardial infarction; dL, deciliter; eGFR, estimated glomerular filtration rate; g, grams; HFrEF, heart failure with reduced ejection fraction; IABP, intra-aortic balloon pump; IQR, interquartile range; LVEF, left ventricular ejection fraction; m, meter; mg, milligrams; min, minute; mL, milliliter; PCI, percutaneous coronary intervention; SD, standard deviation; SMD, standardized mean difference.

^a Missing category not shown

^b Availability in < 50% of the population

^c Number of days before PCI that baseline LVEF was collected; a value of 0 indicates collection on the day of PCI, and negative values indicate collection prior to PCI

Table S6. Sensitivity analysis for dual-device cases (both IABP and Impella)

Sensitivity Analysis	
LVEF Change in pts with dual-device use, median (IQR)	
n=92	
Change in LVEF (%)	+9
Pre-PCI LVEF (%)	30.9 (24.0, 45.0)
Post-PCI LVEF (%)	40.0 (30.0, 53.0)

IABP, intra-aortic balloon pump; IQR, interquartile range; LVEF, left ventricular ejection fraction; PCI, percutaneous coronary intervention.

Table S7. Characteristics of Excluded Impella- and IABP-Supported Patients

	Impella n=1,263	IABP n=353
Patient Demographics		
Age, mean (SD)	75.3 (9.9)	58.2 (10.1)
Sex, n (%)		
Male	318 (25.7)	132 (39.8)
Female	919 (74.3)	200 (60.2)
Prior Comorbidities, n (%)		
Congestive Heart Failure	880 (69.7)	13 (3.7)
Anemia	370 (29.3)	18 (5.1)
Insulin-Dependent Diabetes	300 (23.8)	19 (5.4)
AMI-NSTEMI	619 (49.0)	9 (2.5)
Liver Disease	98 (7.8)	11 (3.1)
Cancer	325 (25.7)	4 (1.1)
HFrEF	803 (63.6)	7 (2.0)
Surgical Aortic Valve Replacement	0 (0.0)	0 (0.0)
Characteristics at Admission, n (%)		
Acute Coronary Syndrome	20 (1.6)	39 (11.0)
Anemia	135 (10.7)	15 (4.2)
Angina	300 (23.8)	26 (7.4)
Coronary Artery Disease	765 (60.6)	117 (33.1)
Chronic Kidney Disease	261 (20.7)	17 (4.8)
Cardiomyopathy	354 (28.0)	28 (7.9)
Dementia	11 (0.9)	2 (0.6)
Pulmonary Edema	14 (1.1)	5 (1.4)
Respiratory Disease	164 (13.0)	28 (7.9)

Insulin-Dependent Diabetes	79 (6.3)	15 (4.2)
AMI-NSTEMI	273 (21.6)	47 (13.3)
Liver Disease	38 (3.0)	8 (2.3)

AMI-NSTEMI, acute myocardial infarction – non-ST-elevation myocardial infarction; HFrEF, heart failure with reduced ejection fraction; PCI, percutaneous coronary intervention; SD, standard deviation.

^a Counts may not sum to the expected total due to overlapping entries in the electronic health record (e.g., some patients recorded in both two- and three-vessel PCI categories)

Table S8. Outcomes and LVEF of Excluded Impella- and IABP-Supported Patients

	Impella	IABP
	n=1,263	n=353
All-Cause Mortality, n (%)		
7-Day	96 (7.6)	27 (7.7)
30-Day	145 (11.5)	39 (11.1)
90-Day	196 (15.5)	45 (12.8)
Subgroup Analysis (LVEF Change), median (IQR)		
Change in LVEF (%)	+7	+3
Pre-PCI LVEF (%)	30.7 (22, 42)	44.8 (33, 55)
Post-PCI LVEF (%)	38.2 (26, 50)	48.1 (35, 55)

IABP, intra-aortic balloon pump; IQR, interquartile range; LVEF, left ventricular ejection fraction; PCI, percutaneous coronary intervention.

Figures

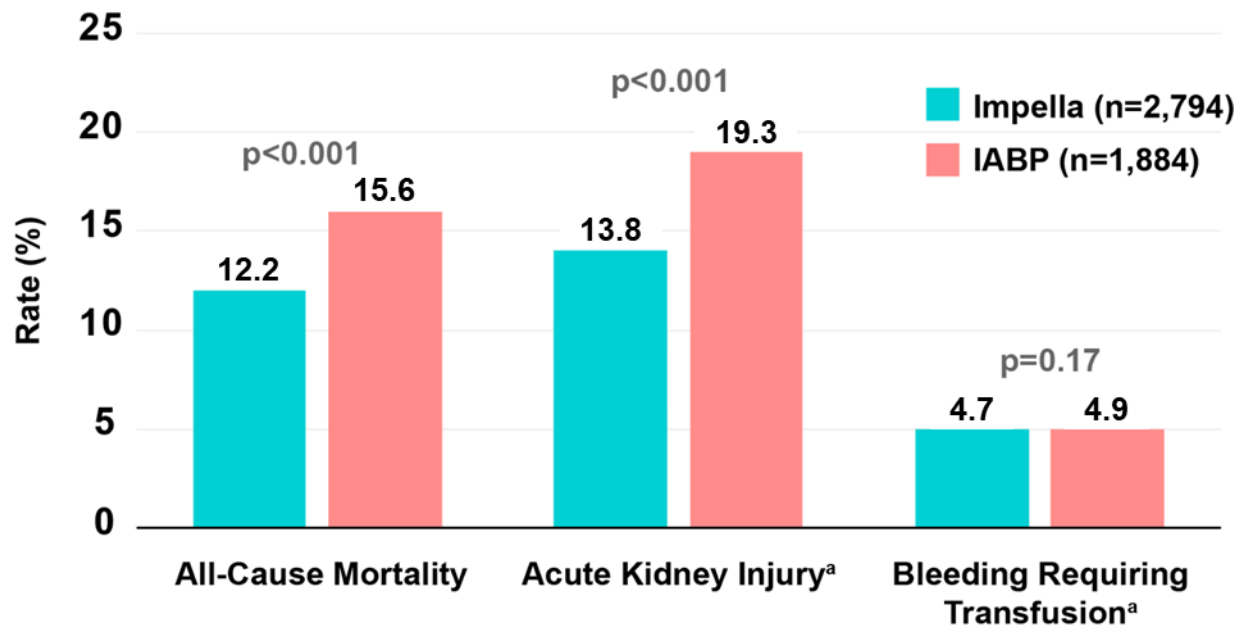


Figure S1. Pre-Match 30-Day Patient Outcomes

IABP, intra-aortic balloon pump.

^a medical codes-derived

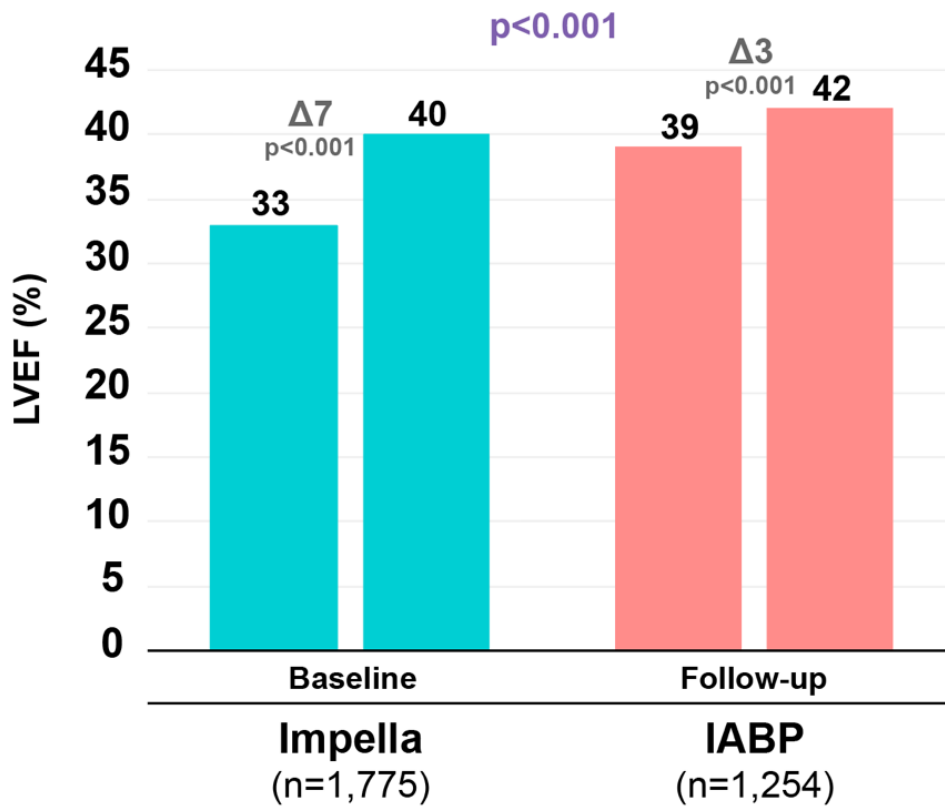


Figure S2. Pre-Match LVEF Recovery in Subgroup Analysis

IABP, intra-aortic balloon pump; LVEF, left ventricular ejection fraction.