

SUPPLEMENTARY DATA

This supplemental material has been provided by the authors to give readers additional information about their work.

Table S1. Distribution of patients by age group

| Age Group | N | Mean \pm SD | Min | Q1 | Median | Q3 | Max |
|------------------|----------|---------------------------------|------------|-----------|---------------|-----------|------------|
| < 75 years | 118 | 66.8 \pm 6.4 | 44 | 64 | 68 | 71 | 74 |
| \geq 75 years | 53 | 79.7 \pm 3.7 | 75 | 77 | 79 | 82 | 89 |

Max: maximum value, Min: minimum value, Q1: first quartile, Q3: third quartile.

Table S2. Angiographic and procedural characteristics of calcified lesions

| Angiographic and procedural characteristics of calcified lesions. | | | |
|--|------------------------------|----------------------------|----------------|
| Variable | < 75 years (n=118) | ≥ 75 years (n = 53) | p-value |
| Target vessel | | | 0.76 |
| LM | 8 (6.8) | 2 (3.8) | |
| LAD | 81 (68.6) | 40 (75.5) | |
| LCx | 4 (3.4) | 1 (1.9) | |
| RCA | 25 (21.2) | 10 (18.9) | |
| Diameter of initial stenosis (%) | 71.8 ± 13.4 | 70.30 ± 15.0 | 0.52 |
| Lesion length (mm) | 17.9 ± 12.8 | 19.54 ± 13.6 | 0.47 |
| Severe calcification (angiographic) | 74 (81.3) | 36 (90.0) | 0.32 |
| Access | | | |
| Radial / ulnar access | 103 (87.2) | 40 (75.5) | 0.16 |
| Sheath size | 6.4 ± 0.5 | 6.4 ± 0.5 | 0.50 |
| Procedure duration | 80.8 ± 32.5 | 89.5 ± 33.5 | 0.16 |
| Randomization group | | | 0.826 |
| RA | 38 (32.2) | 19 (35.8) | |
| IVL | 41 (34.7) | 16 (30.2) | |
| ELCA | 39 (33.1) | 18 (34.0) | |
| OCT | | | |
| Pre | 39 (33.1) | 20 (37.7) | 0.673 |
| Post | 95 (80.5) | 40 (75.5) | 0.589 |

Data are presented as n (%) or mean ± standard deviation. All angiographic parameters were measured at a central core laboratory blinded to the treatment arm.

ELCA: Excimer Laser Coronary Angioplasty; IVL: Intravascular Lithotripsy; LAD: Left Anterior Descending Artery; LCx: Left Circumflex Artery; LM: Left Main Coronary Artery; OCT: Optical Coherence Tomography; RA: Rotational Atherectomy; RCA: Right Coronary Artery.

Table S3. Optical Coherence Tomography Findings

| Variable | < 75 years (n=118) | ≥ 75 years (n = 53) | p-value |
|--|--------------------|---------------------|---------|
| OCT available pre-PMT | 39 (33.1) | 20 (37.7) | 0.67 |
| OCT available between PMT and stent | 37 (31.4) | 14 (26.4) | 0.64 |
| OCT available after stent optimization | 98 (83.1) | 41 (77.4) | 0.50 |
| Pre-PMT OCT | | | |
| Calcium arc (°) | 292 ± 83 | 319 ± 66 | 0.11 |
| Calcium length (mm) | 31.2 ± 13.0 | 30.1 ± 12.0 | 0.69 |
| Calcium thickness (mm) | 1.2 ± 0.2 | 1.2 ± 0.3 | 0.82 |
| Calcium nodule | 12 (32) | 6 (27) | 0.90 |
| Distal reference area (mm ²) | 6.1 ± 2.8 | 6.5 ± 2.9 | 0.44 |
| Proximal reference area (mm ²) | 9.1 ± 3.3 | 9.5 ± 3.2 | 0.54 |
| Min luminal diameter (mm) | 1.5 ± 0.4 | 1.4 ± 0.4 | 0.73 |
| Min luminal area (mm ²) | 2.0 ± 0.9 | 2.2 ± 1.1 | 0.44 |
| Post-PMT OCT | | | |
| Medial dissection | 26 (70) | 11 (79) | 0.81 |
| Calcium fracture | 25 (68) | 11 (79) | 0.67 |
| >1 calcium fracture | 9 (24) | 7 (50) | 0.15 |
| Final OCT | | | |
| Min stent diameter (mm) | 2.4 ± 0.7 | 2.4 ± 0.5 | 0.77 |
| Min stent area (mm ²) | 5.2 ± 1.8 | 5.7 ± 2.1 | 0.21 |
| Stent expansion (%) | 85.0 ± 17.1 | 84.0 ± 18.9 | 0.76 |

Data are presented as n (%) or mean ± standard deviation.

OCT: Optical Coherence Tomography; PMT: Plaque Modification Technique.

Table S4. As-treated and per-protocol analyses of stent expansion in patients 75 years-old or older

| Comparison | SE (Mean Difference) | Low CI | High CI | p-value |
|-------------------|-----------------------------|---------------|----------------|----------------|
| As-treated | | | | |
| ELCA vs RA | -6.1 | -14.7 | 2.6 | 0.08 |
| IVL vs RA | 2.5 | -8.1 | 13.1 | 0.31 |
| Per-protocol | | | | |
| ELCA vs RA | -6.8 | -16.1 | 2.4 | 0.07 |
| IVL vs RA | 1.7 | -9.3 | 12.7 | 0.37 |

Data are presented as %.

CI: confidence interval; ELCA: Excimer Laser Coronary Angioplasty; IVL: Intravascular Lithotripsy; RA: Rotational Atherectomy; SE: Stent Expansion.

Table S5. Crossover according to initial plaque modification technique

| Initial PMT | Crossover | | p-value |
|-------------|--------------------|---------------------|---------|
| | < 75 years (n=118) | ≥ 75 years (n = 53) | |
| RA | 3 (7.9) | 3 (15.8) | 0.65 |
| IVL | 4 (9.8) | 2 (12.5) | 1 |
| ELCA | 6 (15.4) | 2 (11.1) | 0.98 |

Data are presented as n (%).

ELCA: Excimer Laser Coronary Angioplasty; IVL: Intravascular Lithotripsy; Optical Coherence

Tomography; PMT: Plaque Modification Technique; RA: Rotational Atherectomy.

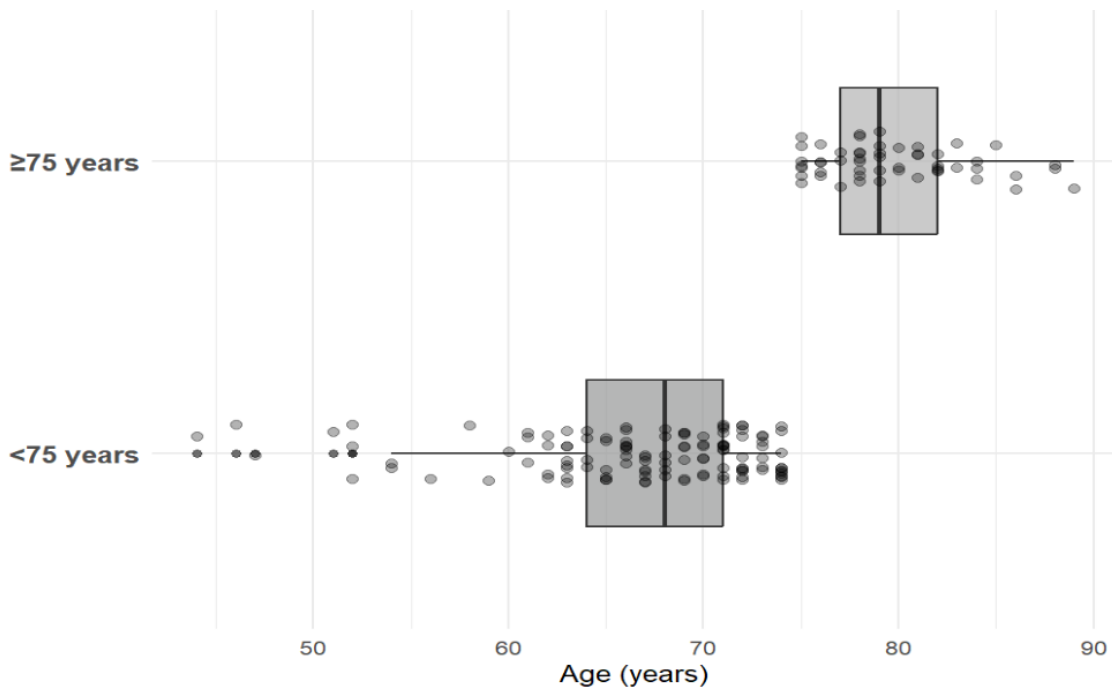
Table S6. Adjusted odds ratios for one year major adverse cardiovascular events (MACE) and all cause mortality according to age group and baseline clinical variables

| Variable | adjOR MACE 1-year (95% CI) | p value | adjOR all-cause death 1-year (95% CI) | p value |
|-------------------|-----------------------------------|----------------|--|----------------|
| Age ≥ 75 years | 7.4 (1.5–53.9) | 0.02 | 10.7 (1.5–218.7) | 0.04 |
| Anemia | 1.0 * | 0.99 | 3.8 (0.4–33.4) | 0.22 |
| ACS presentation | 2.4 (0.4–12.4) | 0.29 | 3.2 (0.4–25.7) | 0.26 |
| Renal dysfunction | 0.9 (0.1–6.2) | 0.90 | 0.4 (0.1–3.9) | 0.49 |

*adjOR estimate for MACE was numerically close to 1 but highly unstable because of sparse events.

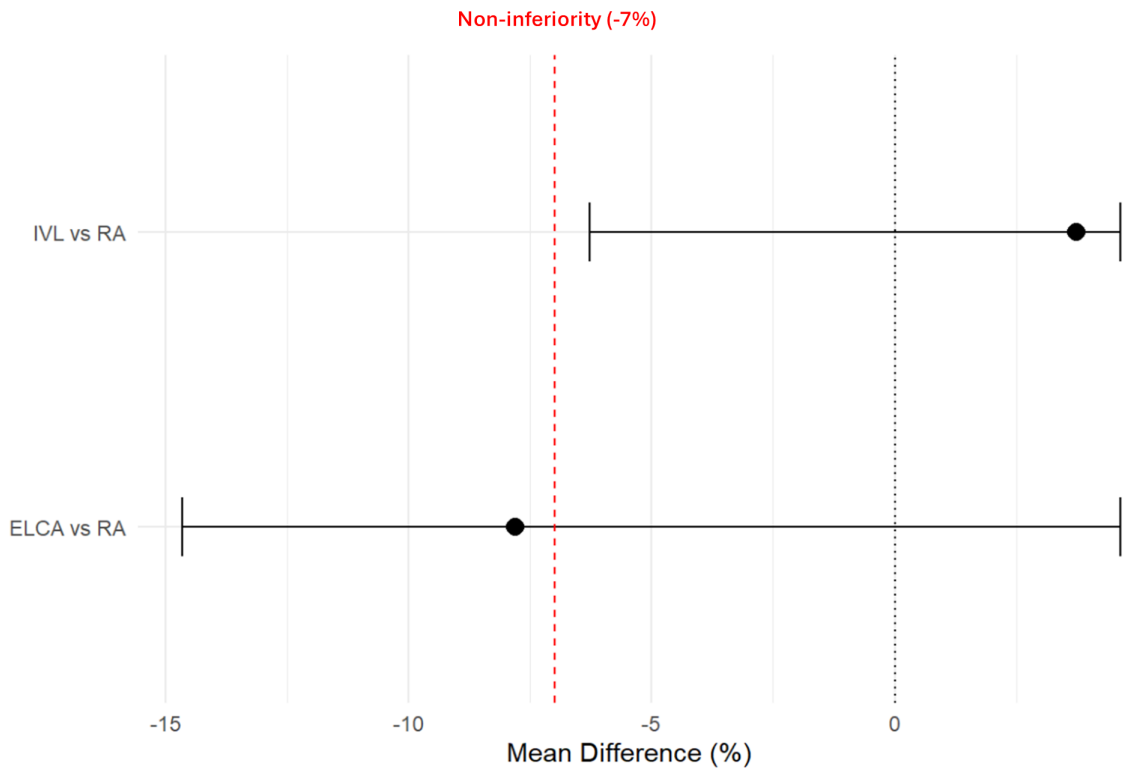
ACS: Acute Coronary Syndrome, adjOR: Adjusted Odds Ratios, MACE: Major Adverse Cardiovascular Events.

Figure S1. Distribution of patients by age.



Age distribution of the study population by age group. Horizontal box plots show median, interquartile range, and range of age for patients <75 years and ≥75 years, with individual dots representing each patient.

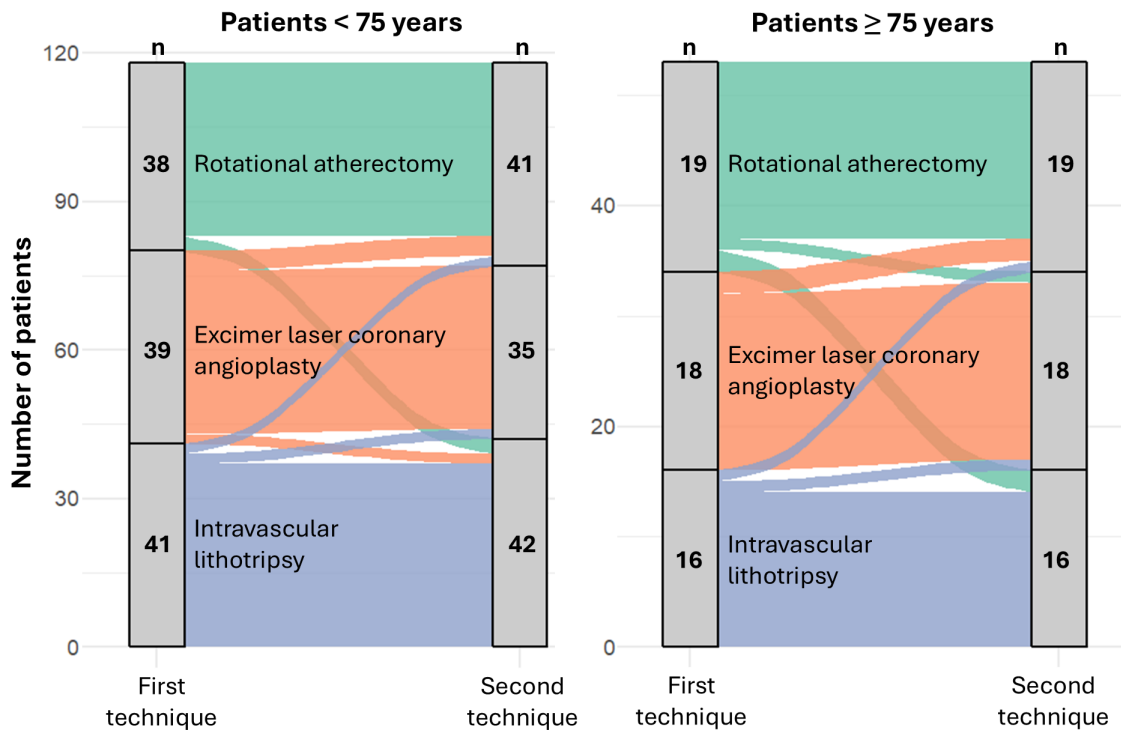
Figure S2. Exploratory comparison of stent expansion between plaque-modification techniques in patients ≥ 75 years.



Mean differences in stent expansion (Δ SE) between IVL versus RA and ELCA versus RA, with 95 % confidence intervals.

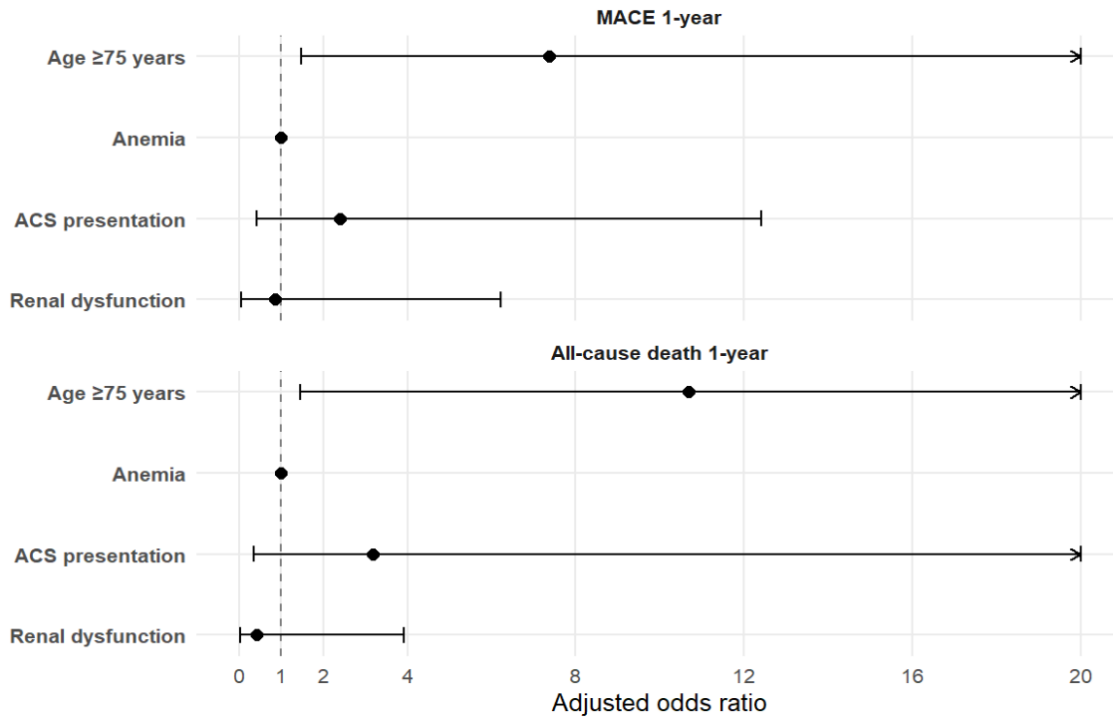
ELCA: Excimer Laser Coronary Angioplasty; IVL: Intravascular Lithotripsy; RA: Rotational Atherectomy.

Figure S3. Crossover between plaque-modification techniques stratified by age.



This alluvial plot illustrates the distribution of patients initially treated with rotational atherectomy, intravascular lithotripsy, or excimer laser coronary angioplasty, and the proportion of patients who required crossover to a second plaque-modification technique due to failure of the initial strategy (uncrossable or undilatable lesion). The left panel shows patients aged <75 years, and the right panel those ≥75 years. The width of each stream represents the number of patients transitioning from one technique to another. Crossover was allowed when the first technique failed to adequately modify the lesion and a second device was needed to complete plaque preparation.

Figure S4. Adjusted odds ratios (points) and 95% confidence intervals (horizontal lines) for the association of age ≥ 75 years, anemia, ACS presentation and renal dysfunction with one-year MACE (top panel) and all-cause mortality (bottom panel).



The dashed vertical line indicates the null value (OR = 1).

ACS: Acute Coronary Syndrome, MACE: Major Adverse Cardiovascular Events