Five-year angiographic, OCT and clinical outcomes of a randomized comparison of everolimus and biolimus-eluting coronary stents with everolimus-eluting bioresorbable vascular scaffolds

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Abstract
Aims: To compare 5-year angiographic, optical coherence tomography (OCT), and clinical outcomes between patients treated with bioresorbable vascular scaffolds (BVS) and drug-eluting stents (DES).

Methods: The EverBio-2 trial (Comparison of Everolimus- and Biolimus-Eluting Coronary Stents with Everolimus-Eluting Bioresorbable Vascular Scaffold) was a single-center, assessor-blinded, randomized controlled trial in which 240 patients were randomly allocated (1:1:1) to BVS, everolimus-eluting (EES) or biolimus-eluting (BES) DES. Clinical follow-up was scheduled up to 5 years. All patients, alive and who did not have repeat revascularization of the target lesion during follow-up were asked to return for angiographic follow-up at 5 years.

Results: Five-year angiographic follow-up was completed in 122 patients (51%) and OCT analysis was performed in 86 (36%) patients. In-stent late lumen loss was similar in both groups with 0.50 ± 0.38 mm in BVS versus 0.58 ± 0.36 mm in EES/BES, p = 0.20. Clinical follow-up was complete in 232 patients (97%) at 5 years. The rate of the device-oriented endpoint was 22% in the BVS and 18% in the EES/BES group (p = 0.49). The patient-oriented composite endpoint occurred in 40% of BVS- and 43% of EES/BES-treated patients (p = 0.72) at 5 years. No acute coronary syndrome due to stent thrombosis was detected after 2 years. Complete BVS strut resorption was observed at 5 years in the OCT subgroup.

Conclusion: Five-year clinical outcomes were similar between BVS and DES patients as well as angiographic outcomes in a selected subgroup. However, a definitive con-
CLUSION cannot be drawn because the EverBio-2 trial was not powered for clinical and angiographic endpoints at 5 years of follow-up.

KEYWORDS
BVS, drug eluting stent, percutaneous coronary intervention, stent thrombosis

1 | INTRODUCTION

Metallic coronary stents are associated with persistent physical and biochemical stresses that impact long-term outcomes. Bioresorbable vascular scaffolds (BVS) were developed to overcome these limitations in the long run. While preliminary studies in low-risk patients with simple lesions reported excellent results, later trials were more nuanced.\(^1\)

In the EverBio-2 randomized controlled trial, clinical and angiographic outcomes with BVS were satisfactory, with comparable in-stent late-lumen loss (LLL) at 9 months between BVS, everolimus-eluting (EES), and biolimus-eluting (BES) metallic stents.\(^2\) Soon thereafter, safety concerns emerged with data from several registries reporting increased rates of stent thrombosis (ST) up to 2% at 1 year.\(^3\)–\(^6\) The interim results of the ABSORB III study showed an increased risk for target-vessel myocardial infarction (MI) and ST in BVS compared to EES at 2 years.\(^7\) Based on these safety concerns and low commercial sales, the BVS was removed from the market mid-2017. The 3-year ABSORB III and the 4-year ABSORB II data confirmed the BVS’s inferiority to 2nd generation DES.\(^8\)

The reasons for BVS failure are thought to be diverse, and may include both biochemical, inflammatory, as well as pure mechanical causes.\(^9\) Some of these may be overcome by strict implantation protocols,\(^10\) and most causes are thought to disappear over time. Given that more than a million patients have been treated with BVS, the assessment of long-term outcomes is paramount.

We sought to investigate the 5-year angiographic, optical coherence tomography (OCT) and clinical outcomes of patients enrolled in the EverBio-2 trial. The population included in the angiographic follow-up consists of low-risk patients, in whom the target lesion had not been revascularized.

2 | METHODS

2.1 | Study population and data collection

The EverBio-2 trial is a single-center, assessor-blinded, randomized study. Between November 2012 and November 2013, 240 patients were allocated to either BVS (n = 80), BES (n = 80), or EES (n = 80). Trial protocol details have been published previously.\(^11\) Clinical follow-up was performed at 9 months, 1, 2, and 5 years. For the present study, all patients who were alive and who did not have repeat revascularization of the target lesion were considered for angiographic follow-up at 5 years. Patients with moderate to severe renal failure, repeat coronary angiography during the previous year, as well as those unable or unwilling to participate in angiographic follow-up were excluded from angiographic follow-up. The EverBio-2 study complied with the Helsinki Declaration and was approved by the local ethics committees of Fribourg and Vaud (043/12-CER-FR/PB_2017-00237). All patients provided written, informed consent for participation.

2.2 | Quantitative coronary angiography

Coronary angiograms were repeated and performed via the femoral or radial artery with a 5-6F guiding catheter as per clinical practice. Coronary angiograms were recorded in the same projections as during the index procedure and 9-month angiographic follow-up. All patients received 200 μg of i.c. nitroglycerin before acquisition. Coronary angiograms were analyzed with the use of an automated edge detection system (CAAS II, Pie Medical, Netherlands) at the angiographic core laboratory of the University of Fribourg.

2.3 | Primary endpoint

The primary endpoint was in-stent LLL defined as the difference between the minimal lumen diameter after the procedure and the minimal lumen diameter at 5-year follow-up. Secondary angiographic endpoints were in-segment LLL, binary restenosis, minimal lumen diameter, and percent diameter stenosis.

2.4 | Clinical endpoints

Clinical outcomes were compared using the Academic Research Consortium (ARC)-defined device-oriented composite endpoint (composite of cardiac death, MI of the target vessel, and target lesion revascularization [TLR]) and patient-oriented composite endpoint (composite of death, MI, and any revascularization), as well as acute coronary syndrome due ST at 5 years.\(^12\)

2.5 | OCT imaging and analysis

OCT was performed with the Optis Illumen system (Abbott Vascular) using the Dragonfly Duo OCT Imaging Catheter with “75 mmHR mode” pullback, the non-occlusive flushing technique at 36 mm/s.
OCT pullbacks were assessed offline using a proprietary software (Lightlab, Abbott Vascular). Quantitative analysis was performed at 1-mm intervals within the stent and 5-mm proximal and distal to the stent edges. Advanced OCT image analysis included luminal morphometry and symmetry at 5 years. Lumen area was delineated in stent and in segment. Strut analysis was performed according to Nakatani and al.13 The so-called “Golden Tube” appearance was defined as: (1) vessel without visible scaffold, (2) the presence of progressive lumen enlargement, and (3) the development of a signal-rich, low-attenuating tissue layer in absence of thin-cap fibroatheroma. Peristrut low-intensity area was defined as a region around scaffolds with a homogenous lower intensity appearance than the surrounding tissue without significant signal attenuation behind the area.

### 2.6 | Statistical analysis

Categorical variables are reported as counts and percentages; continuous variables are reported as mean and SD. Normality was assessed by visual inspection of histograms and the computation of Q–Q plots. Continuous variables are analyzed using the Student t-test or the Wilcoxon rank-sum test per distribution. Categorical variables were compared using chi-square or Fisher exact test as appropriate.

The primary endpoint was compared using a Wilcoxon rank-sum test. A multivariate linear regression was computed to rid the analysis of the primary endpoint of the potential bias arising from imbalance in pretreatment variables. Survival free from the occurrence of clinical end points was assessed by computation of the Kaplan–Meier curves.

Survival was compared using the log-rank test. Landmark analysis was performed in setting the landmark at 2 years. To fully disclose the results, post-hoc inferential statistics were performed comparing BVS to the individual DES. All statistical analyses were performed using dedicated software (Stata 14, Texas) at a 2-tailed significance level of alpha = 0.05.

### 3 | RESULTS

#### 3.1 Baseline patient and procedural characteristics

A total of 240 patients were randomly assigned to BVS, EES, or BES implantation. Angiographic follow-up was completed in 122 (51%) patients and OCT analysis was performed in 86 (36%) patients at 5 years (Figure 1). There were significant differences regarding baseline characteristics between patients who participated in 5-year angiographic follow-up and those who did not (Supplementary Tables 1 and 2). Patients undergoing paired angiographies were younger (63 ± 10 vs. 67 ± 11 year, \( p = 0.02 \)) and less frequently diabetics (16% vs. 32%, \( p < 0.01 \)) than patients not undergoing paired angiographies.

Baseline characteristics of all patients vs. patient included in the late angiographic follow-up were similar (Supplementary Tables 3 and 4). Baseline and procedural characteristics of patients participating in 5-year angiographic follow-up are summarized in Tables 1 and 2. No patient in the BVS group, but 9 EES/BES-treated patients (11%) had previously undergone coronary artery bypass grafting (CABG) (\( p = 0.03 \)).
3.2 | Angiographic outcomes

Angiographic findings are presented in Table 3. In-stent LLL at 5 years was $0.50 \pm 0.38$ mm in BVS-treated and $0.58 \pm 0.36$ mm in EES/BES-treated patients ($p = 0.20$). Patients treated with BES had a lower percentage of in-stent diameter stenosis than those allocated to EES ($p = 0.03$). Figure 2 depicts the cumulative frequency distribution of in-stent LLL at 9-months and 5-years. In-segment LLL was $0.43 \pm 0.58$ mm in BVS and $0.45 \pm 0.38$ mm in EES/BES ($p = 0.66$). After multivariate adjustment, the difference between in-stent ($p = 0.11$) and in-segment ($p = 0.76$) LLL was not statistically significant (Supplementary Table 5). 9-months angiographic outcomes of patients included in the present analysis are provided in Supplementary Table 6.

3.3 | OCT results

OCT analysis is summarized in Table 4. Baseline patient characteristics of the 5 years OCT follow-up are summarized in Supplementary Table 7. There was complete strut resorption in all BVS patients (Figure 3). Mean lumen area was significantly higher in BVS ($7.05 \pm 2.45$ mm$^2$) than in EES/BES ($5.87 \pm 2.21$ mm$^2$, $p = 0.04$). The BVS showed a trend toward a wider external elastic membrane area ($12.86 \pm 3.25$ mm$^2$) when compared with EES/BES ($11.58 \pm 3.69$ mm$^2$; $p = 0.11$). In-stent eccentricity and asymmetry index were similar between the groups. Paired OCT measurements between 9 months and 5 years were available in 24 (30%) patients. Data demonstrated a trend toward an increase in mean lumen area ($1.49 \pm 3.52$ mm$^2$) in BVS compared with EES/BES ($0.53 \pm 1.33$ mm$^2$) between 9 months and 5 years (Supplementary Table 8).

3.4 | Clinical outcomes

Clinical follow-up at 5 years as available in 99% (n = 77) of patients in the BVS group, 95% (n = 76) in the EES group, and 99% (n = 79) in the BES group, and is presented in Table 5. The device-oriented composite end point occurred in 17 BVS- (22%) and 29 (18%) EES/BES-treated patients ($p = 0.49$). Cardiac death occurred in 2 (3%) patients with BVS and 7 (4%) patients with EES/BES ($p = 0.48$). Clinical outcome at 5 years of all patients versus patient included in the late angiographic follow-up are presented in Supplementary Table 9.
TABLE 2  Late angiographic follow-up—procedural characteristics

|                               | BVS (n = 40) | EES/BES (n = 82) | EES (n = 45) | BES (n = 37) | p-value |
|-------------------------------|--------------|------------------|--------------|--------------|---------|
|                               |              |                  |              |              | BVS versus EES/BES | BVS versus EES | BVS versus BES |
| Vessels diseased per patient  | 1.8 ± 0.7    | 1.8 ± 0.8        | 1.9 ± 0.8    | 1.7 ± 0.7    | 0.74 | 1.00 | 0.64 |
| Vessels treated per patient   | 1.1 ± 0.3    | 1.1 ± 0.4        | 1.1 ± 0.3    | 1.1 ± 0.4    | 0.98 | 1.00 | 1.00 |
| Lesions per patient           | 2.2 ± 1.0    | 2.0 ± 1.2        | 2.1 ± 1.2    | 2.0 ± 1.2    | 0.32 | 1.00 | 0.54 |
| Lesions treated per patient   | 1.4 ± 0.6    | 1.4 ± 0.7        | 1.5 ± 0.7    | 1.2 ± 0.4    | 0.40 | 1.00 | 0.08 |
| Target coronary artery        |              |                  |              |              |       |      |      |
| LM                            | 0 (0)        | 1 (1)            | 1 (2)        | 0 (0)        |       | 1.00 |      |
| LAD                           | 19 (42)      | 34 (32)          | 19 (31)      | 15 (34)      | 0.27 | 0.46 | 1.00 |
| LCX                           | 13 (29)      | 21 (20)          | 13 (21)      | 8 (18)       | 0.29 | 0.74 | 0.64 |
| RCA                           | 13 (29)      | 47 (44)          | 28 (45)      | 19 (43)      | 0.10 | 0.22 | 0.38 |
| Arterial graft                | 0 (0)        | 0 (0)            | 0 (0)        | 0 (0)        |       |      |      |
| Vein graft                    | 0 (0)        | 3 (3)            | 1 (2)        | 2 (5)        | 0.55 | 1.00 | 0.48 |
| Type of intervention per lesion|            |                  |              |              |       |      |      |
| Pure stent implantation       | 43 (96)      | 105 (99)         | 61 (98)      | 44 (100)     | 0.21 | 0.76 | 0.32 |
| Hybrid with other DES implantation | 2 (4) | 1 (1) | 1 (2) | 0 (0) | 0.21 | 0.76 | 0.32 |
| Hybrid with BMS implantation  | 0 (0)        | 0 (0)            | 0 (0)        | 0 (0)        |       |      |      |
| Lesion complexity             |              |                  |              |              |       |      |      |
| A                              | 9 (20)       | 27 (25)          | 17 (27)      | 10 (23)      | 0.54 | 0.76 | 1.00 |
| B1                             | 22 (49)      | 45 (42)          | 20 (32)      | 25 (57)      | 0.48 | 0.16 | 0.90 |
| B2                             | 7 (16)       | 16 (15)          | 12 (19)      | 4 (9)        | 1.00 | 1.00 | 0.70 |
| C                              | 7 (15)       | 18 (17)          | 13 (21)      | 5 (11)       | 1.00 | 1.00 | 1.00 |
| Baseline TIMI flow per lesion  |              |                  |              |              |       |      |      |
| TIMI 0                         | 0 (0)        | 3 (3)            | 2 (3)        | 1 (2)        | 0.56 | 0.44 | 0.62 |
| TIMI 1                         | 0 (0)        | 0 (0)            | 0 (0)        | 0 (0)        |       |      |      |
| TIMI 2                         | 1 (2)        | 0 (0)            | 0 (0)        | 0 (0)        | 0.30 | 0.48 | 0.64 |
| TIMI 3                         | 44 (98)      | 103 (97)         | 60 (97)      | 43 (97)      | 1.00 | 1.00 | 1.00 |
| TIMI flow post-intervention per lesion |        |                  |              |              |       |      |      |
| TIMI 0                         | 0 (0)        | 0 (0)            | 0 (0)        | 0 (0)        |       |      |      |
| TIMI 1                         | 0 (0)        | 0 (0)            | 0 (0)        | 0 (0)        |       |      |      |
| TIMI 2                         | 0 (0)        | 1 (1)            | 1 (2)        | 0 (0)        | 1.00 | 1.00 |      |
| TIMI 3                         | 45 (100)     | 105 (99)         | 61 (98)      | 44 (100)     | 1.00 | 0.78 |      |
| Restenotic lesion             | 1 (2)        | 2 (2)            | 1 (2)        | 1 (2)        | 1.00 | 1.00 | 1.00 |
| Chronic total occlusion       | 1 (2)        | 5 (5)            | 4 (7)        | 1 (2)        | 0.67 | 0.78 | 1.00 |
| Thrombus aspiration           | 5 (11)       | 8 (8)            | 4 (6)        | 4 (9)        | 0.53 | 0.98 | 1.00 |
| Number of stent per lesion    | 1.3 ± 0.6    | 1.2 ± 0.6        | 1.3 ± 0.7    | 1.1 ± 0.4    | 0.50 | 1.00 | 0.42 |
| Lesion length, mm             | 12.1 ± 7.8   | 8.9 ± 4.9        | 8.3 ± 4.4    | 9.7 ± 5.4    | <0.01 | <0.01 | 0.24 |
| Maximum pressure per lesion, atm | 13.6 ± 3.1 | 14.0 ± 3.2       | 14.8 ± 2.7   | 13 ± 3.5     | 0.52 | 0.02 | 0.80 |
| Overlapping stents per lesion | 10 (22)      | 19 (18)          | 11 (12)      | 8 (18)       | 0.65 | 1.00 | 1.00 |
| Direct stenting per lesion    | 3 (7)        | 17 (16)          | 9 (15)       | 8 (18)       | 0.19 | 0.46 | 0.24 |
| Post-dilatation per lesion    | 17 (38)      | 30 (28)          | 15 (24)      | 15 (34)      | 0.28 | 0.28 | 1.00 |
| Time to angiographic follow-up, years | 5.1 ± 0.4 | 5.2 ± 0.4        | 5.0 ± 0.4    | 5.3 ± 0.4    | 0.67 | 0.26 | 0.80 |

Note: Values are mean ± SD or n (%).
Abbreviations: BES, biolimus-eluting stent; BVS, bioresorbable vascular scaffold; EES, everolimus-eluting stent; LAD, left anterior descending; LCX, left circumflex artery; LM, left main coronary artery; RCA, right coronary artery.
Landmark analysis between 2 and 5 years did not show significant differences in clinical outcomes between years 2 and 5 of follow-up (Figure 4). No acute coronary syndrome due to ST was detected beyond 9 months.

4 | DISCUSSION

The key findings of the 5-year late angiographic and clinical follow-up of the EverBio-2 trial are: (a) similar patient and device-oriented clinical outcomes in the overall population, (b) no significant difference in in-stent LLL between BVS and EES/BES treated patients in a selected angiographic subgroup, (c) complete BVS strut resorption in the OCT subgroup.

4.1 | Angiographic findings

Repeat angiography was completed in 122 of 240 patients (51%) at 5 years, which is comparable to previous trials studying long-term angiographic follow-up.\textsuperscript{14,15} The angiographic in-stent LLL at 5 years was similar between patients treated with BVS and those treated with EES/BES. In-stent (0.50 ± 0.38 mm) LLL at 5 years was considerably higher than in patients enrolled in the ABSORB Cohort B (0.16 ± 0.32 mm)\textsuperscript{16} or ABSORB EXTEND (0.26 ± 0.54 mm).\textsuperscript{17} The higher patient and lesion complexity in the present trial may explain this difference. To our knowledge, no systematic 5-year angiographic follow-up assessing LLL has been performed for either EES or BES.

The current analysis likely underestimates the true in-stent LLL of the patient population enrolled in the EverBio-2 trial, given that patients who died or had undergone TLR at 5 years were excluded from angiographic follow-up. However, the presented data is the only available long-term head-to-head comparison of BVS and metallic DES for angiographic endpoints. While angiographic LLL at 9 months and 1-year is believed to be a robust marker of the ultimate need for TLR,\textsuperscript{18} the significance of 5-year LLL in regard to very long-term outcomes remains uncertain.

4.2 | OCT findings

During the first few months, the poly-L-lactic acid backbone is hydrolyzed and progressively substituted by a provisional acellular

| TABLE 3 Late angiographic follow-up—quantitative coronary angiography measurements |
| BVS (n = 45) | EES/BES (n = 106) | EES (n = 62) | BES (n = 44) |
|---|---|---|---|
| p-value | BVS versus EES/BES | BVS versus EES | BVS versus BES |
| MLD, in-stent, mm | 2.05 ± 0.55 | 2.15 ± 0.47 | 2.10 ± 0.43 | 2.22 ± 0.52 | 0.27 | 1.00 | 0.28 |
| MLD, in-segment, mm | 1.90 ± 0.53 | 1.81 ± 0.43 | 1.75 ± 0.37 | 1.88 ± 0.49 | 0.40 | 0.40 | 1.00 |
| Diameter stenosis, in-stent | 15.26 ± 13.49 | 12.24 ± 11.86 | 14.05 ± 11.64 | 9.56 ± 11.79 | 0.18 | 1.00 | 0.03 |
| Diameter stenosis, in-segment | 20.15 ± 14.04 | 17.49 ± 14.53 | 19.92 ± 15.30 | 14.06 ± 12.77 | 0.20 | 1.00 | 0.05 |
| Binary restenosis in-stent | 1 (2) | 0 (0) | 0 (0) | 0 (0) | 0.29 | 0.82 | 1.00 |
| Binary restenosis in-segment | 1 (2) | 3 (3) | 3 (5) | 0 (0) | 1.00 | 1.00 | 1.00 |
| RVD, mm | 2.78 ± 0.68 | 2.52 ± 0.76 | 2.44 ± 0.70 | 2.64 ± 0.82 | 0.04 | 0.03 | 0.64 |
| Late loss, in-stent, mm | 0.50 ± 0.38 | 0.58 ± 0.36 | 0.59 ± 0.38 | 0.57 ± 0.34 | 0.20 | 0.54 | 0.48 |
| Late loss, in-segment, mm | 0.43 ± 0.58 | 0.45 ± 0.38 | 0.41 ± 0.32 | 0.50 ± 0.44 | 0.66 | 1.00 | 0.92 |

Note: Values are mean ± SD or n (%).
Abbreviations: BES, biolimus-eluting stent; BVS, bioresorbable vascular scaffold stent; EES, everolimus-eluting stent; MLD, minimum lumen diameter; RVD, reference vessel diameter.
matrix that is secondarily cellularized into intima. Between the 1st and 3rd year, programmed disintegration of the polymeric scaffold struts occurs, and OCT images may show scaffold discontinuities, endoluminal dislocation, and peristrut low-intensity area, which are signs of a fragilized backbone. No intraluminal material was found in the current analysis at 5 years. In all studied segments, the struts were no longer visible with normalized light intensity. While OCT is not capable of measuring polymer resorption, these results support that resorption and tissue replacement of struts is complete by 5 years post implantation in this selected patient population.

Furthermore, once the BVS is resorbed, the artery can behave more freely, unlike metallic DES, whose backbone constrains the vascular remodeling capacities. OCT follow-up showed a significantly higher mean lumen area in BVS than in metallic stent at 5 years. Moreover, we observed a trend toward late luminal enlargement in BVS and shrinking in DES in 24 paired OCT measurement between 9 months and 5 years. Our results are in line with a previous report comparing the remodeling
of BVS with DES. Indeed, Nakatani et al. demonstrated a relationship between the strut integration process and late luminal enlargement. In 5 out of 10 paired OCT of the BVS group, we observed a perfect “Golden Tube” as described by Serruys et al. (Figure 3). Although our OCT findings are difficult to generalize due to the limited number of patients, serial angiographic and OCT data are nonetheless useful and support the hypothesis of positive vascular remodeling.

### 4.3 Clinical outcomes

The 5-year clinical outcomes between BVS and EES/BES were similar. Device-oriented composite end point occurred in 22% of patients in the BVS arm and in 18% of patients in the EES/BES arm ($p = 0.49$).

Although BVS was clearly associated with increased rates of major clinical events up to 3 years, data beyond 3 years are limited. Lower major adverse cardiac events rates have been reported after 3 years in a recent meta-analysis showing no differences for TLF (OR = 1.23, 95% CI = 0.73–2.07, $p = 0.44$), target vessel MI (OR = 1.03, 95% CI 0.42–2.53, $p = 0.95$), TLR (OR = 1.61, 95% CI 0.77–3.33, $p = 0.20$), and ST (OR = 0.71, 95% CI 0.10–5.07, $p = 0.74$).

### 5 LIMITATIONS

The EverBio-2 trial was not powered for clinical and angiographic endpoints at 5-year follow-up. The results of the 5-year angiographic analysis are restricted to relatively low-risk patient

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**TABLE 5 Clinical outcome at 5 years**

|                         | BVS (n = 78) | EES/BES (n = 160) | EES (n = 80) | BES (n = 80) | p-value BVS versus EES/BES | p-value BVS versus EES | p-value BVS versus BES |
|-------------------------|-------------|------------------|-------------|-------------|---------------------------|-----------------------|-----------------------|
| Device-oriented composite | 17 (22)     | 29 (18)          | 18 (23)     | 11 (14)     | 0.49                      | 1.00                  | 0.34                  |
| Cardiac death           | 2 (3)       | 7 (4)            | 2 (3)       | 5 (6)       | 0.48                      | 1.00                  | 0.52                  |
| MI of the target vessel | 3 (4)       | 1 (1)            | 1 (1)       | 0 (0)       | 0.07                      | 0.62                  | 0.16                  |
| TLR                     | 15 (19)     | 23 (14)          | 15 (19)     | 8 (10)      | 0.37                      | 1.00                  | 0.20                  |
| Patient-oriented composite | 31 (40)    | 69 (43)          | 37 (46)     | 32 (40)     | 0.72                      | 0.76                  | 1.00                  |
| All-cause mortality     | 4 (5)       | 16 (10)          | 7 (9)       | 9 (11)      | 0.20                      | 0.72                  | 0.32                  |
| Any MI                  | 6 (8)       | 6 (4)            | 5 (6)       | 1 (1)       | 0.19                      | 1.00                  | 0.10                  |
| Any revascularization   | 28 (36)     | 58 (36)          | 32 (40)     | 26 (33)     | 0.97                      | 1.00                  | 1.00                  |

Note: Values are n (%), p-values are derived from log-rank test.
Abbreviations: BES, biolimus-eluting stent; BVS, bioresorbable vascular scaffold stent; EES, everolimus-eluting stent; MI, myocardial infarction; TLR, target lesion revascularization.

**FIGURE 4** Landmark analysis for device-oriented (A) and patient-oriented (B) composite endpoints per implanted device. DES, drug-eluting stent; DOCE, device-oriented composite endpoint; EES, everolimus-eluting stent; POCE, patient-oriented composite endpoint [Color figure can be viewed at wileyonlinelibrary.com]
population without TLF. Implementation of protocol-mandated angiography at 9 months likely inflated the rates of repeat revascularization. There was no BVS-specific implantation protocol. Therefore, procedural heterogeneity and low rates of postdilatation may have led to different angiographic and clinical outcomes than reported in large-scale more recent trials with dedicated implantation protocols. The observational data from paired OCT was only possible in a small number of patients with inherent selection bias, as OCT could not technically be performed in all lesions, particularly in more peripheral lesions.

6 | CONCLUSION

Clinical outcomes were similar between BVS and DES patients at 5 years of follow-up. In a low-risk population, angiographic and OCT outcomes were similar between BVS and EES/BES drug-eluting stents. Complete BVS strut resorption was observed in the OCT subgroup. However, a definitive conclusion cannot be drawn because the EverBio-2 trial was not powered for the clinical and angiographic end-points at 5 years of follow-up.

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CONFLICT OF INTEREST

The author declares that there is no conflict of interest that could be perceived as prejudicing the impartiality of the research reported.

DATA AVAILABILITY STATEMENT

The datasets used and/or analysed for the current study are available from the corresponding author on reasonable request.

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SUPPORTING INFORMATION
Additional supporting information may be found online in the Supporting Information section at the end of this article.

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