

Comparison with BRS

In 30 cases (40%), multiple fracture patterns were present in the same device. The prevalence of SF was higher in OCTs performed 6 months or more after implantation (53/117 or 45.3%) versus those performed within 6 months from implantation (22/172 or 12.8%, $p < 0.001$ by Chi-Square). Patients with SF had a higher prevalence of acute coronary syndromes at index ($p = 0.013$). Devices with SF were more often implanted in the right coronary artery ($p = 0.021$), in de novo ($p = 0.027$) or in thrombotic lesions (both $p = 0.001$) and in CTOs ($p = 0.042$). Predilatation pressure was lower ($p = 0.013$), device-to-artery ratio was larger ($p = 0.049$), postdilatation was less frequent ($p = 0.025$) in devices with SF. At OCT, segments with SF showed slightly larger average stenosis areas and diameters and a larger degree of asymmetry and eccentricity ($p < 0.001$ for all parameters). The role of device asymmetry and eccentricity was particularly evident for SF patterns 1, 2 and 3 (Supplemental Table S1). The relationship between vessel/device asymmetry/eccentricity and prevalence of SF is presented graphically in Figure 4 and Supplemental Figure S2. Fractures were associated (Table 1 and Figure 5) with malapposition ($p = 0.005$), peri-strut low-intensity areas ($p = 0.001$) and subintimal calcium ($p < 0.001$).

Figure 2 describes the different patterns of SF in the two device types. While the patterns of SF were relatively evenly distributed in DES, pattern 1 was ~four times more frequent in BRS.

Parameters Associated with SF

The results of the uni- and multivariate logistic regression analysis are shown in Supplemental Tables 2B. Implantation of BRS in patients with previous by-pass surgery (OR:17.8 [4.0–79.7], $p < 0.001$), in the RCA (0.47 [0.3–0.8], $p = 0.002$), in calcific lesions (OR:3.5 [2.0–6.1], $p < 0.001$), and the degree of residual stenosis after predilation as well as the predilatation balloon diameter were associated with SF.

Supplemental Table S1. Parameters of device asymmetry and eccentricity. Both eccentricity and asymmetry tended to be consistently larger in devices with fractures, independently of the device type. BVS.

Maximal Lumen Asymmetry							Maximal Stent Asymmetry						
		Without		With		p -Value			Without		With		p -Value
		Median	IQR	Median	IQR				Median	IQR	Median	IQR	
Fracture	BVS	0.22	0.11	0.29	0.17	<0.001	Fracture	BVS	0.2	0.1	0.24	0.14	<0.001
	DES	0.23	0.1	0.26	0.21	0.02		DES	0.21	0.1	0.26	0.18	0.01
Pattern 1	BVS	0.22	0.12	0.26	0.17	0.06	Pattern 1	BVS	0.21	0.12	0.23	0.11	0.38
	DES	0.23	0.11	0.37	0.13	0.02		DES	0.21	0.1	0.37	0.16	0.01
Pattern 2	BVS	0.23	0.12	0.32	0.23	0.05	Pattern 2	BVS	0.21	0.1	0.3	0.21	0.04
	DES	0.23	0.11	0.23	0.13	0.87		DES	0.21	0.1	0.21	0.1	0.84
Pattern 3	BVS	0.22	0.11	0.33	0.12	<0.001	Pattern 3	BVS	0.21	0.11	0.31	0.21	0.01
	DES	0.23	0.11	0.26	0.1	0.7		DES	0.21	0.1	0.25	0.14	0.46
Pattern 4	BVS	0.23	0.12	0.29	0.23	0.05	Pattern 4	BVS	0.21	0.11	0.27	0.21	0.2
	DES	0.23	0.11	0.42	0.29	0.05		DES	0.21	0.1	0.34	0.23	0.15
Minimal Lumen Eccentricity							Minimal Stent Eccentricity						
		Without		With		p -value			Without		With		p -value
		median	IQR	median	IQR				median	IQR	median	IQR	
Fracture	BVS	0.7	0.12	0.63	0.12	<0.001	Fracture	BVS	0.75	0.12	0.7	0.11	<0.001
	DES							DES					

	DES	0.71	0.11	0.67	0.14	0.09		DES	0.76	0.09	0.74	0.15	0.31
Pattern 1	BVS	0.69	0.13	0.66	0.12	0.02	Pattern 1	BVS	0.74	0.12	0.71	0.12	0.01
	DES	0.7	0.12	0.61	0.16	0.02		DES	0.77	0.09	0.65	0.14	0.01
Pattern 2	BVS	0.69	0.13	0.6	0.1	0.01	Pattern 2	BVS	0.74	0.12	0.69	0.1	0.03
	DES	0.7	0.13	0.68	0.1	0.83		DES	0.76	0.1	0.79	0.1	0.42
Pattern 3	BVS	0.69	0.13	0.62	0.12	0.01	Pattern 3	BVS	0.74	0.12	0.7	0.07	0.01
	DES	0.7	0.13	0.72	0.15	0.66		DES	0.76	0.1	0.78	0.11	0.83
Pattern 4	BVS	0.68	0.13	0.49	0.25	0.01	Pattern 4	BVS	0.73	0.12	0.76	0.12	0.92
	DES	0.7	0.12	0.56	0.39	0.15		DES	0.76	0.1	0.73	0.25	0.56

BVS: bioresorbable scaffolds.

Supplemental Table S2A. Univariate associations of SF with metallic stents.

	Coefficient	SE	<i>p</i>		
Patient Characteristics					
Age	0.0049	0.0186	0.7929		
Male	−0.0164	0.4735	0.9723		
Family History	−0.3958	0.4478	0.3768		
Diabetes	−0.2086	0.4491	0.6422		
Hypertension	−0.1809	0.4772	0.7046		
Hyperlipidemia	−0.2927	0.4057	0.4707		
Smoking	0.0674	0.1711	0.6936		
Prior MI	−0.2716	0.4507	0.5468		
Atrial fibrillation	−0.0055	0.5857	0.9925		
Valve disease	0.7633	0.4533	0.0922		
Prior PCI	0.0499	0.4113	0.9034		
CABG	−0.4722	1.0750	0.6605		
Reason PCI	0.0267	0.1516	0.8602		
Lesion/procedural Characteristics					
Vessel	−0.0831	0.2638	0.7527		
ACC/AHA Type	−0.2824	0.2391	0.2375		
De novo	−0.1690	0.4783	0.7239		
Thrombus	0.0519	0.6041	0.9316		
CTO	0.4559	1.1387	0.6889		
Overlap	0.4578	0.4342	0.2917		
Bifurcation	1.3274	0.4959	0.0074		
Predilatation	1.2677	0.6551	0.0530		
Predil. balloondiameter	−0.0643	0.1154	0.5775		
Predil. balloon length	0.0209	0.0580	0.7183		
Predil. balloon pressure	−0.0113	0.0629	0.8576		
Implantation pressure	−0.1070	0.0998	0.2839		
Device to artery ratio	3.0130	1.6816	0.0732		
Postdilatation	−0.6273	0.4230	0.1381		
Postdil. balloon diam	−0.9006	0.5613	0.1086		
Postdil. balloon length	0.0727	0.0800	0.3629		
Postdil. balloon pressure	−0.1224	0.0838	0.1439		
Final residual stenosis	−0.0741	0.0563	0.1876		
Calcium > 180°	1.3585	0.2927	0.0000		
Multivariate analysis					
	Coefficient	SE	<i>p</i>	OR	95%CI

Bifurcation	1.2507	0.5831	0.0320	3.4928	1.1139 to 10.9523
Predilatation	1.3753	0.7074	0.0519		
Calcium > 180°	1.3753	0.3031	0.0000	3.9562	2.1841 to 7.1663
Time from index to OCT	0.0005	0.0005	0.3291		

PCI: percutaneous coronary intervention; CABG: coronary artery by-pass graft; CTO: chronic total occlusion.

Supplemental Table S2B. Univariate associations of SF – bioresorbable scaffolds.

	Coefficient	SE	p		
Patient characteristics					
Age	-0.0108	0.0117	0.3566		
Male	0.6641	0.3770	0.0782		
Family History	-0.3115	0.3008	0.3004		
Diabetes	-0.5830	0.3653	0.1105		
Hypertension	0.2319	0.3215	0.4708		
Hyperlipidemia	-0.2128	0.2778	0.4437		
Smoking	-0.0768	0.1107	0.4880		
Prior MI	0.4152	0.3121	0.1834		
Atrial fibrillation	-0.2695	0.8523	0.7519		
Valve disease	0.0656	0.3732	0.8605		
Prior PCI	0.1469	0.2806	0.6006		
CABG	2.1072	0.6582	0.0014		
Reason PCI	0.1056	0.1103	0.3382		
Lesion/procedural Characteristics					
Vessel	-0.4648	0.1812	0.0103		
ACC/AHA Type	0.2636	0.1273	0.0383		
De novo	0.2907	0.5664	0.6079		
Thrombus	0.4974	0.3070	0.1052		
CTO	-1.2799	1.0516	0.2236		
Overlap	-0.0936	0.3344	0.7797		
Bifurcation	-0.0534	0.6644	0.9359		
Predilatation	-0.0232	0.7704	0.9760		
Predil. balloon diameter	0.1052	0.0494	0.0332		
Predil. balloon length	0.0413	0.0345	0.2315		
Predil. balloon pressure	-0.0007	0.0459	0.9880		
Implantation pressure	0.0874	0.0620	0.1583		
Device to artery ratio	1.7403	0.8936	0.0515		
Postdilatation	0.1742	0.2945	0.5542		
Postdil. balloon diam	-0.1163	0.5352	0.8280		
Postdil. balloon length	-0.0260	0.0570	0.6480		
Postdil. balloon pressure	0.0081	0.0574	0.8878		
Final residual stenosis	-0.0414	0.0409	0.3106		
Calcium > 180°	0.7898	0.2146	0.0002		
Multivariate Analysis					
	Coefficient	SE	p	OR	95%CI
CABG	2.8782	0.7656	0.0002	17.7831	3.9660 to 79.7378
Vessel	-0.7570	0.2448	0.0020	0.4691	0.2903 to 0.7578

ACC/AHA Type	-0.0142	0.1679	0.9325	0.9859	0.7094 to 1.3701
Predil. Balloon diameter	0.1090	0.0497	0.0281	1.1152	1.0118 to 1.2292
Residual stenosis after predilatation	0.0134	0.0067	0.0454	1.0135	1.0003 to 1.0269
Calcium >180°	1.2420	0.2885	0.0000	3.4627	1.9672 to 6.0951
Time from index to OCT	1.0053	1.0037 to 1.0070	0.0053	0.0008	0.0000

Supplemental Table S3. Device failures.

Time From Index to OCT	Sex	Reason for PCI	Vessel	Device	Lesion Type	Predilatation	Postdilatation	Antiplatelet Therapy	Sizing	Fractures	Fracture Type (Most Severe)
Thrombosis											
4	Male	NSTEMI	LCX	DES	C	yes	No	Clopidogrel, ongoing	1.10	0	0
262	Male	UnstAng	LCX	BRS	B2	yes	No	Prasugrel, ongoing	1.12	1	3
455	Male	CCS	LCX	BRS	B2	yes	Yes	Clopidogrel, interrupted	1.04	1	3
0	Male	CCS	LCX	DES	B2	yes	Yes	Prasugrel	1.17	1	3
367	Male	UnstAng	RCA	BRS	B2	yes	No	Clopidogrel, interrupted	1.17	1	3
690	Female	NSTEMI	LAD	BRS	A	yes	Yes	Prasugrel, interrupted	1.34	1	4
690	Female	NSTEMI	LAD	BRS	A	yes	Yes	Prasugrel, interrupted	1.18	1	4
635	Male	STEMI	LAD	BRS	C	No	No	Prasugrel, interrupted	1.42	1	2
549	Male	CCS	LCX	BRS	B2	yes	No	Clopidogrel, interrupted	1.54	1	4
0	Male	STEMI	LCX	DES	B1	yes	No	Ticagrelor	0.86	1	1
0	Female	NSTEMI	RCA	BRS	B1	yes	Yes	Prasugrel	1.30	0	0
0	0	STEMI	RCA	BRS	C	yes	Yes	Prasugrel	1.02	1	3
578	Male	STEMI	RCA	DES	A	yes	Yes	Ticagrelor, interrupted	1.20	1	4
0	Male	CCS	RCA	BRS	B2	yes	Yes	Prasugrel	1.08	0	0
762	Male	CCS	LCX	BRS	B2	yes	Yes	Ticagrelor, interrupted	2.00	1	3
762	Male	CCS	LCX	BRS	B2	yes	Yes	Ticagrelor, interrupted	1.59	1	3
0	Male	STEMI	LAD	DES	B1	yes	No	Prasugrel	1.18	0	0
0	Male	STEMI	LAD	DES	B1	yes	No	Prasugrel	1.11	0	0
0	Male	STEMI	RIVA	DES	B2	yes	No	Ticagrelor	1.42	0	0
145	Male	NSTEMI	RCX	DES	B2	yes	no	Clopidogrel	1.38	1	3
Restenosis											
600	Male	CCS	LCX	DES	B2	yes	No	Prasugrel	0.84	1	1
630	Male	CCS	LAD	DES	B2	yes	No	Prasugrel	0.83	1	2
294	Male	UnstAng	LCX	BRS	C	yes	Yes	Prasugrel	0.87	1	1
374	Male	CCS	RCA	BRS	B2	yes	No	Prasugrel	1.20	0	0
529	Male	CCS	LCX	BRS	C	yes	Yes	Prasugrel	1.31	1	1

790	Male	UnstAng	LAD	BRS	B1	yes	No	Clopidogrel	1.81	1	1
390	Male	STEMI	RCA	BRS	C	yes	No	Prasugrel	1.02	1	4
194	Male	CCS	LCX	BRS	B1	yes	Yes	Prasugrel	1.28	1	1
469	Female	NSTEMI	LCX	BRS	B2	yes	Yes	Prasugrel	1.63	1	4
778	Female	CCS	RCA	BRS	A	yes	Yes	Prasugrel	1.78	0	0
778	Female	CCS	RCA	BRS	A	yes	Yes	Prasugrel	1.70	0	0
226	Male	NSTEMI	LAD	BRS	C	yes	Yes	Prasugrel	1.15	1	2
863	Male	NSTEMI	LAD	BRS	A	yes	Yes	Prasugrel	1.45	1	1
180	Female	CCS	LCX	DES	B1	yes	No	Clopidogrel	1.50	1	1
180	Female	CCS	LCX	DES	B1	yes	No	Clopidogrel	1.41	1	4
300	Male	CCS	LCX	DES	A	yes	Yes	Clopidogrel	1.15	1	1
371	Male	STEMI	LCX	DES	B2	yes	Yes	Ticagrelor	1.01	0	0
360	Male	CCS	LAD	BRS	A	yes	Yes	Clopidogrel	1.24	0	0
188	Male	CCS	RCA	DES	B2	yes	no	Prasugrel	1.50	0	0
168	Male	CCS	RCA	DES	B2	yes	no	Prasugrel	1,74	1	4
18	Female	CCS	LAD	DES	B2	yes	no	Ticagrelor	1,48	0	0
144	Male	CCS	RCA	DES	B2	yes	no	Clopidogrel	1,21	1	3
188	Male	CCS	RCA	DES	B2	yes	no	Clopidogrel	1,21	1	4
257	Female	CCS	LAD	DES	B2	Yes	Yes	Clopidogrel	1.34	1	4
814	Male	CCS	LAD	DES	B2	Yes	Yes	Clopidogrel	1.05	0	0
106	Female	CCS	LAD	DES	B2	Yes	Yes	Clopidogrel	1.18	1	1
0	Male	CCS	RCA	DES	B2	Yes	no	Clopidogrel	1.37	1	3
192	Male	CCS	RCA	DES	B2	Yes	Yes	Prasugrel	1.83	1	3
805	Male	CCS	RCX	DES	B2	yes	Yes	Clopidogrel	1.25	0	0
0	Male	CCS	RCA	DES	B2	yes	No	Ticagrelor	1.49	1	3
187	Male	CCS	LM	DES	B2	yes	No	Clopidogrel	1.41	1	0
780	Male	UnstAng	RIVA	DES	B2	yes	No	Prasugrel	1.15	0	0
188	Male	CCS	RCA	DES	B2	yes	No	Clopidogrel	1.38	0	0
0	Male	CCS	RCA	DES	B2	yes	No	Clopidogrel	1.16	1	4

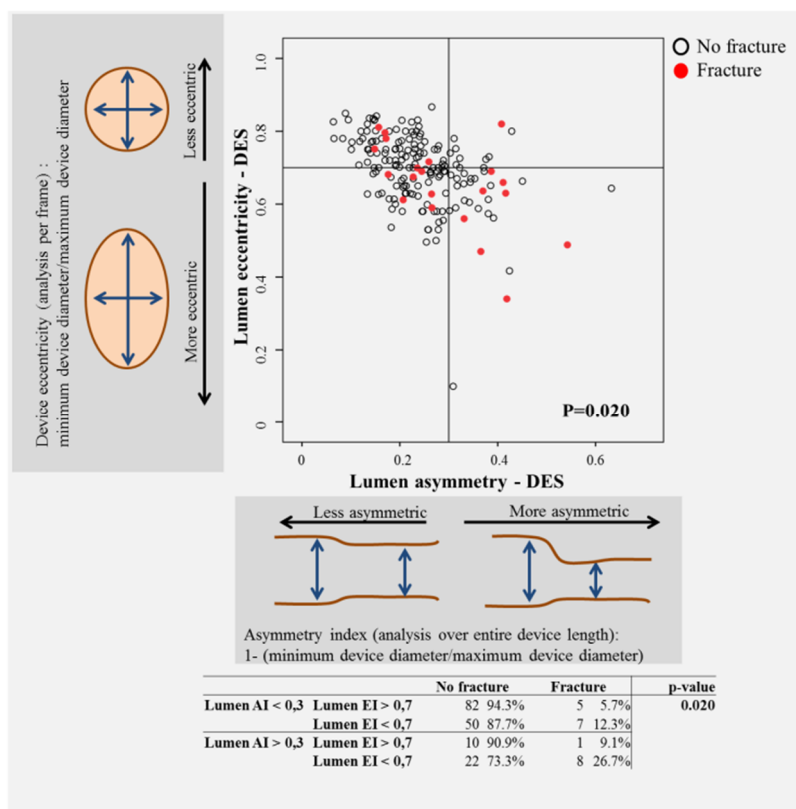
LCX: left circumflex; LAD: left anterior descending; CCS: chronic coronary syndrome. Sizing: ratio of device to artery.

Supplemental S4A. A Multivariate analysis of the predictors of device failure–metallic stents.

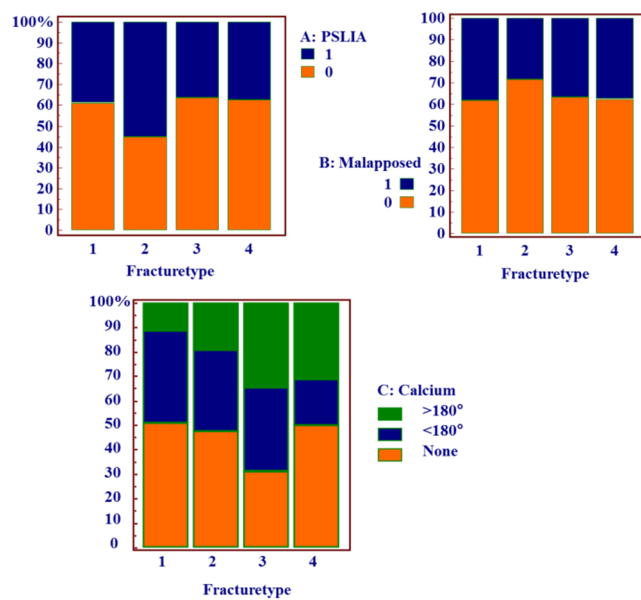
	Odd's Ratio	CI	p
Thrombus Fracture	1.4	0.4 to 5.1	0.61
	12.5	5.3 to 29.4	0.0000

Supplemental Table S4B. Multivariate analysis of the predictors of device failure–bioresorbable scaffolds.

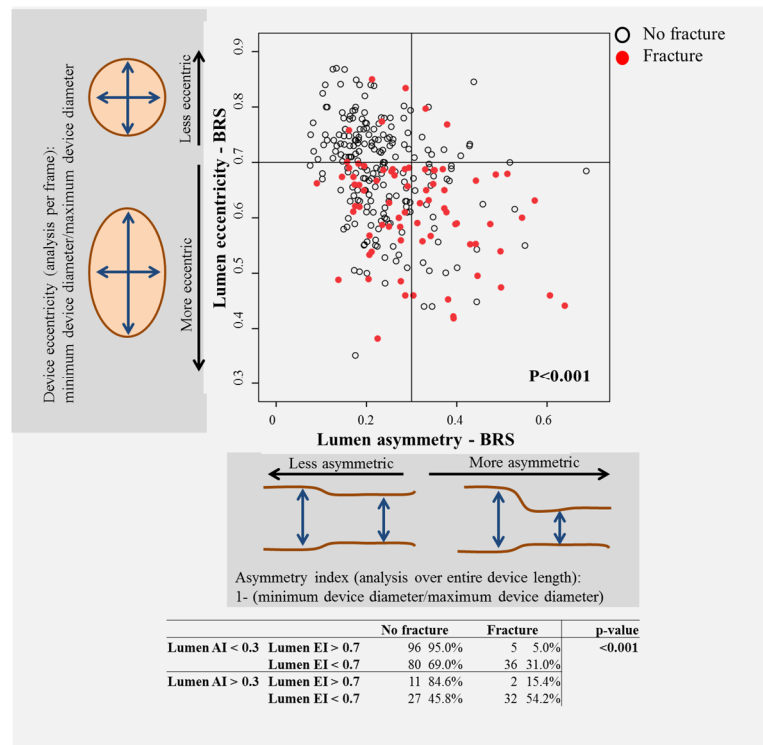
	Odd's ratio	CI	p
Fractures	7.2	2.2 to 23.2	0.0010
Smoking	1.3	0.9 to 1.8	0.1559
Prior PCI	2.0	0.7 to 5.8	0.2212
Malappositions	0.2	0.02 to 1.6	0.1303
Calcium >180°	1.3	0.7 to 2.8	0.4178
Device-to-artery ratio	202.8	17.0 to 2413.8	0.0000



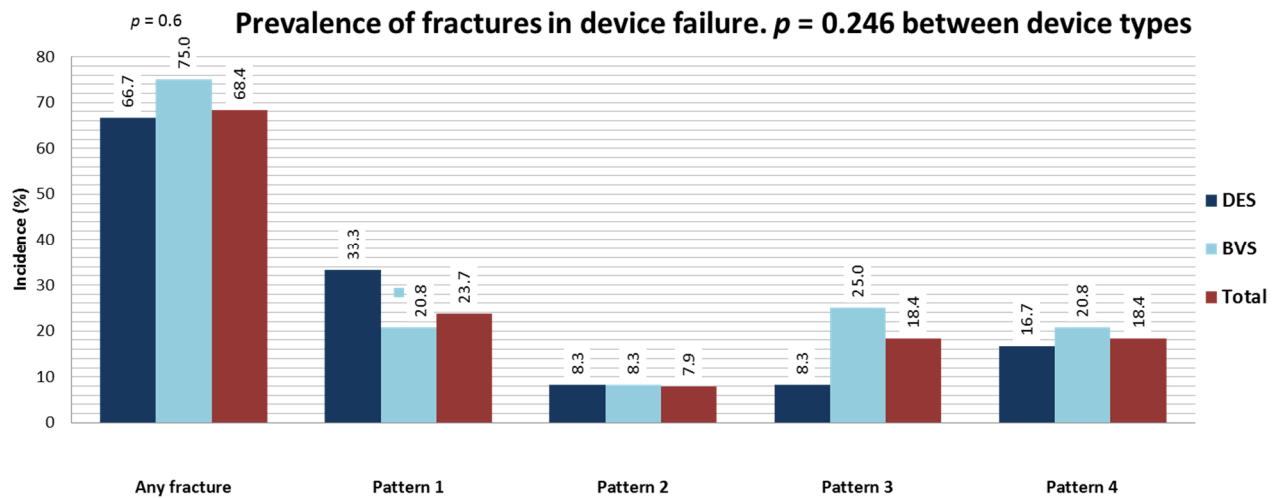
Supplemental Figure S1. Asymmetry and eccentricity for drug eluting stents.



Supplemental Figure S2. Incidence of peri-strut low intensity areas (PSLIA, A), malapposition (B) and calcium (C) by fracture type.



Supplemental Figure S3. Asymmetry and eccentricity in scaffolds



Supplemental Figure S4. Prevalence of fractures in device failure