Orsiro Mission®

BIOSTEMI and BIOSTEMI ES - Long-term Outcomes with Biodegradable Polymer Sirolimus-eluting Stents versus Durable Polymer Everolimus-eluting Stents in ST-segment Elevation Myocardial Infarction: 5-year follow-up of the BIOSTEMI randomized trial

Prof. Juan F. Iglesias, Geneva University Hospitals, Geneva, Switzerland

1. With Orsiro DES in comparison to Xience in STEMI patients, Based on Iglesias J.F., BIOSTEMI 5 year follow up, Presented at TCT 2023, San Francisco USA.

BIOSTEMI

BIOSTEMI

Comparison of an Ultrathin Strut Biodegradable Polymer Sirolimus-Eluting Stent With a Durable Polymer Everolimus-Eluting Stent for Patients With Acute STEMI Undergoing Primary PCI at 24 mo

Design

Investigator-initiated, prospective, multicenter, assessor-blinded, randomized (1:1), controlled **superiority** trial.
*BIOSTEMI-Extended Survival was led to achieve 5 follow-up.

Objective

To compare Orsiro® to Xience DES in patients with acute STEMI undergoing primary PCI within 24 hours of symptoms onset.

Principal Investigators

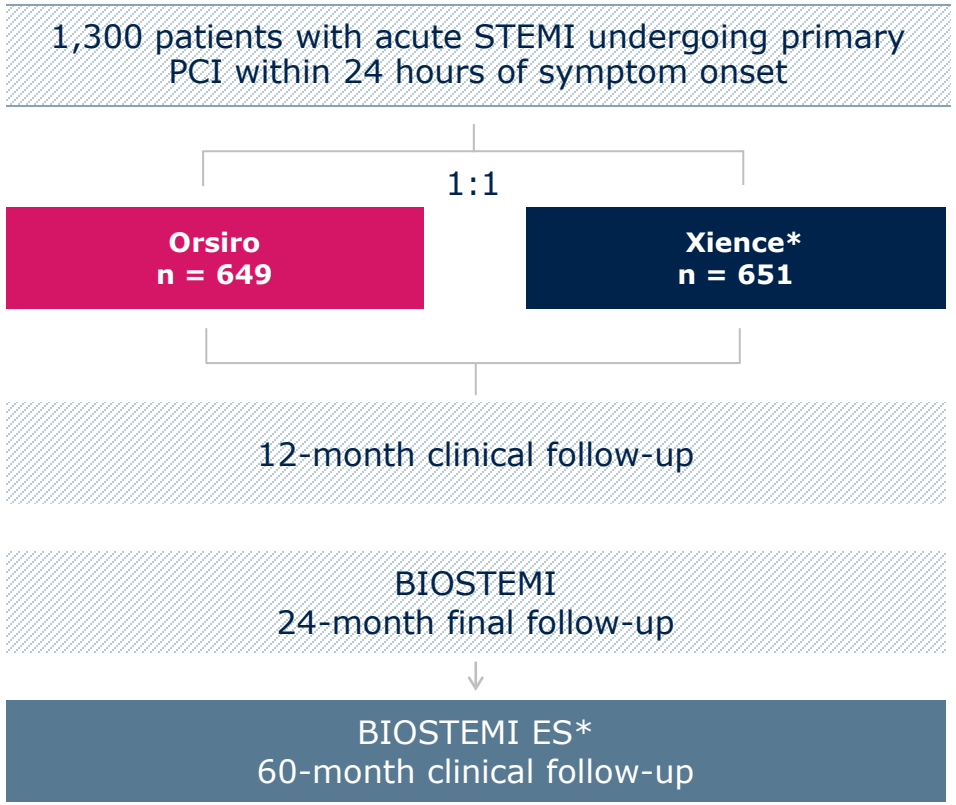
Dr. J.F. Iglesias, HUG, Geneva, CH

Dr. O. Muller, CHUV, Lausanne, CH

Pr. T. Pilgrim, Inselspital, Universitätsspital, Bern, CH

Primary Endpoint

A composite of death from cardiac causes, myocardial infarction, or stent thrombosis at 1 year, and was powered for noninferiority, with an absolute margin of 4.1% at 1-sided 5% alpha.



*Xience is a trademark of Abbott Cardiovascular Systems Inc.

Source: Pilgrim et al. Biodegradable – versus durable-polymer drug-eluting stents for STEMI. Final 2-year outcomes of the BIOSTEMI trial. J Am Coll Cardiol. Cardiovasc Interven. 2021, doi: 10.1016/j.jcin.2020.12.011

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Endpoints

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Primary Endpoint

Target Lesion Failure (TLF) - Composite of Cardiac Death, Target Vessel Myocardial Reinfarction, and clinically-indicated Target Lesion Revascularization at 12 months

Secondary Endpoints

- All-cause Death
- Cardiac Death
- Q-wave and non-Q-wave Myocardial Infarction (MI)
- Clinically-indicated and not clinically-indicated Target Lesion Revascularization (TLR)
- Clinically-indicated and not clinically-indicated Target Vessel Revascularization (TVR)
- Target Vessel Failure (TVF)
- Definite Stent Thrombosis (ST)
- Definite/Probable Stent Thrombosis (ST)

Source: Pilgrim et al. Biodegradable – versus durable-polymer drug-eluting stents for STEMI. Final 2-year outcomes of the BIOSTEMI trial. J Am Coll Cardiol. Cardiovasc Interven. 2021, doi: 10.1016/j.jcin.2020.12.011

Study Design and Patient Flow

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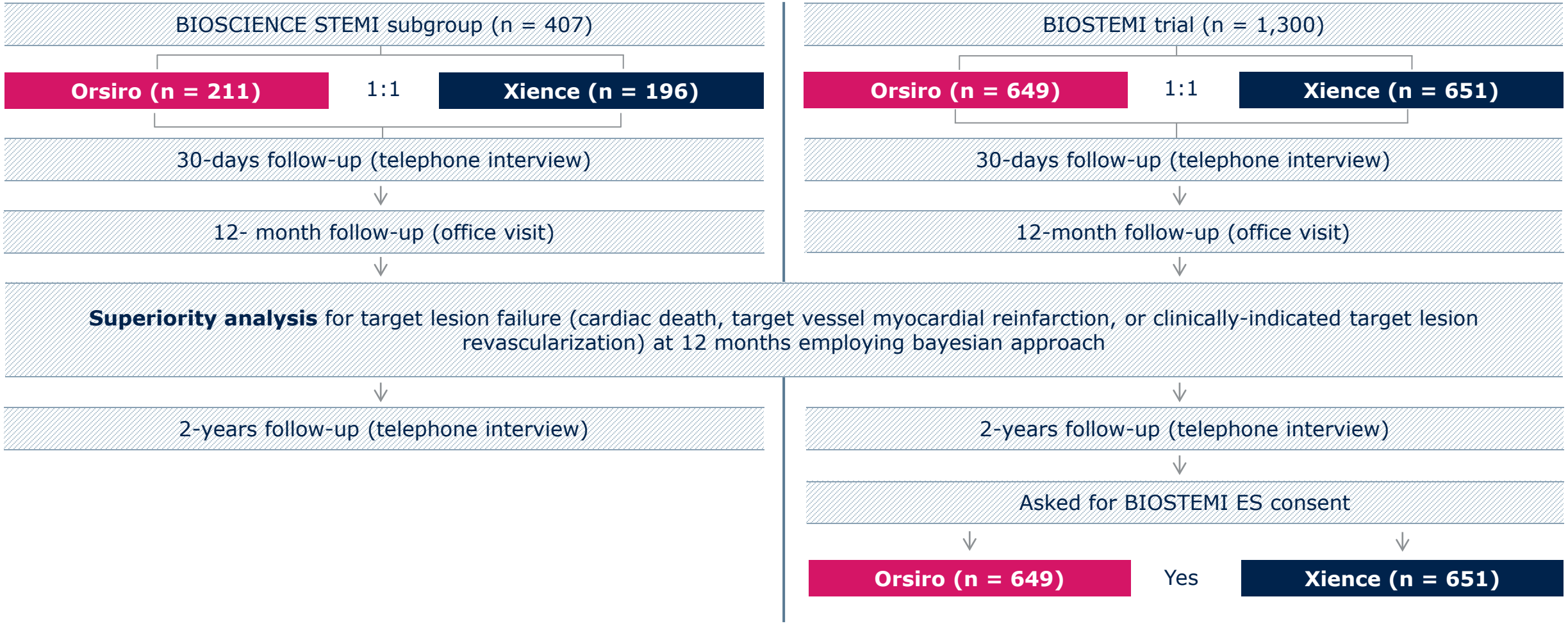

Source: Pilgrim et al. Biodegradable – versus durable-polymer drug-eluting stents for STEMI. Final 2-year outcomes of the BIOSTEMI trial. J Am Coll Cardiol. Cardiovasc Interven. 2021, doi: 10.1016/j.jcin.2020.12.011

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Baseline Clinical Characteristics

BIOSTEMI

	Orsiro (n = 649)	Xience (n = 651)
Age (years)	62.2 ± 11.8	63.2 ± 11.8
Male gender	513 (79%)	477 (73%)
BMI (kg/m^2)	26.9 ± 4.3	26.8 ± 4.3
Diabetes mellitus	73 (11%)	82 (13%)
Oral treatment	43 (7%)	60 (9%)
Insulin dependent	22 (3%)	15 (2%)
Hypertension	281 (44%)	297 (46%)
Hypercholesterolemia	304 (47%)	302 (47%)††
Active smoker	294 (46%)	250 (39%)‡‡
Prior myocardial infarction	27 (4%)	24 (4%)
Prior percutaneous coronary intervention	29 (5%)	34 (5%)
Prior coronary artery bypass surgery	2 (0.3%)	8 (1%)
Prior stroke	16 (3%)	19 (3%)
Peripheral arterial disease	16 (3%)	17 (3%)
Chronic renal failure (eGFR <60 ml/min)	76 (12%)*	78 (12%)||||
Left ventricular ejection fraction (%)	49.0 ± 11.0†	48.4 ± 11.2##

Data expressed as n (%) or mean ± standard deviation. eGFR, estimated glomerular filtration rate. *n = 633; †n = 394; ††n = 644; ‡‡n = 635; ||||n = 632;
Source: Pilgrim et al. Biodegradable – versus durable-polymer drug-eluting stents for STEMI. Final 2-year outcomes of the BIOSTEMI trial. J Am Coll Cardiol. Cardiovasc Interven. 2021, doi: 10.1016/j.jcin.2020.12.011

Baseline Clinical Characteristics

BIOSTEMI

	Orsiro (n = 649)	Xience (n = 651)	P-value
Number of lesions	n = 816	n = 806	
Target vessel location - Per lesion no. (%)			0.133
Left main coronary artery	10 (1%)	9 (1%)	
Left anterior descending artery	316 (39%)	357 (44%)	
Left circumflex artery	143 (18%)	137 (17%)	
Right coronary artery	346 (42%)	302 (38%)	
Saphenous vein graft	1 (0.1%)	1 (0.1%)	0.993
Number of lesions per patient	1.26 ± 0.57	1.24 ± 0.52	0.756
Number of lesions per patient‡ - no. (%)			0.756
0	1 (0.2%)	0 (0%)	
1	516 (80%)	523 (80%)	
2	103 (16%)	103 (16%)	
3	23 (4%)	23 (4%)	
≥4	6 (1%)	2 (0.3%)	

Data expressed as n (%) or mean ± standard deviation. ‡n = 614;
Source: Iglesias JF et al. Long-term outcomes with biodegradable polymer sirolimus-eluting stents versus durable polymer everolimus-eluting stents in ST-segment elevation myocardial infarction: 5-year follow-up of the BIOSTEMI randomised superiority trial, Lancet, 2023

Baseline Clinical Characteristics

BIOSTEMI

	Orsiro (n = 649)	Xience (n = 651)	P-value
Type of intervention			0.302
Percutaneous coronary intervention	797 (98%)	793 (98%)	
Plain old balloon angioplasty	17 (2%)	13 (2%)	
Coronary artery bypass graft	1 (0.1%)	0 (0%)	
Failed percutaneous coronary intervention	1 (0.1%)	0 (0%)	
Baseline TIMI flow			0.206
0 or 1	448 (55%)	473 (59%)	
2	108 (13%)	115 (14%)	
3	257 (32%)	215 (27%)	
Post TIMI flow			0.355
0 or 1	5 (1%)	3 (0.4%)	
2	17 (2%)	25 (3%)	
3	791 (97%)	778 (97%)	
Intra-aortic balloon pump	3 (1%)[‡]	5 (1%)[#]	0.486
Vasopressors	14 (2%)[‡]	12 (2%)[#]	0.686
Cardiogenic shock	20 (3%)[‡]	21 (3%)[#]	0.876

Data expressed as n (%) or mean ± standard deviation. [‡]n = 614;
Source: Pilgrim et al. Biodegradable – versus durable-polymer drug-eluting stents for STEMI. Final 2-year outcomes of the BIOSTEMI trial. J Am Coll Cardiol. Cardiovasc Interven. 2021, doi: 10.1016/j.jcin.2020.12.011

Baseline Clinical Characteristics

BIOSTEMI

	Orsiro (n = 649)	Xience (n = 651)	P-value
Restenotic lesion	11 (1%)	13 (2%)	0.740
Total occlusion	400 (49%)	443 (55%)	0.024
Chronic total occlusion	1 (0.1%)	3 (0.4%)	0.335
Thrombus aspiration	243 (30%)	250 (31%)	0.675
Total number of stents implanted	1.37 ± 0.64*	1.39 ± 0.66||	0.789
Total stent length (mm)	31.91 ± 18.21*	33.92 ± 19.76||	0.051
Maximum stent diameter (mm)	3.17 ± 0.52*	3.16 ± 0.50||	0.705
Maximum pressure (atm)	13.49 ± 3.24†	13.82 ± 3.23†	0.027
Overlapping stents	219 (28%)*	236 (30%)||	0.407
Pre-dilatation	215 (27%)*	202 (26%)||	0.549
Post-dilatation	525 (66%)*	528 (67%)||	0.738
Long lesion (total stent length ≥20mm)	567 (71%)*	563 (71%)||	0.814
Small vessel (minimum stent diameter ≤3.0mm)	292 (36%)	321 (40%)	0.125
Bifurcation treatment (including left main coronary artery)	101 (12%)	115 (14%)	0.400
Type of stent per lesion‡ - no.(%)			0.549
BP-SES	791 (99%)*	2 (0.3%)||	
DP-EES	1 (0.1%)*	789 (100%)||	
Other drug-eluting stent	5 (1%)*	3 (0.4%)||	
Bare-metal stent	1 (0.1%)*	0 (0%)||	

Data expressed as n (%) or mean ± standard deviation. ‡n = 614;
Source: Pilgrim et al. Biodegradable – versus durable-polymer drug-eluting stents for STEMI. Final 2-year outcomes of the BIOSTEMI trial. J Am Coll Cardiol. Cardiovasc Interven. 2021, doi: 10.1016/j.jcin.2020.12.011

Primary Endpoint – TLF at 24 Months

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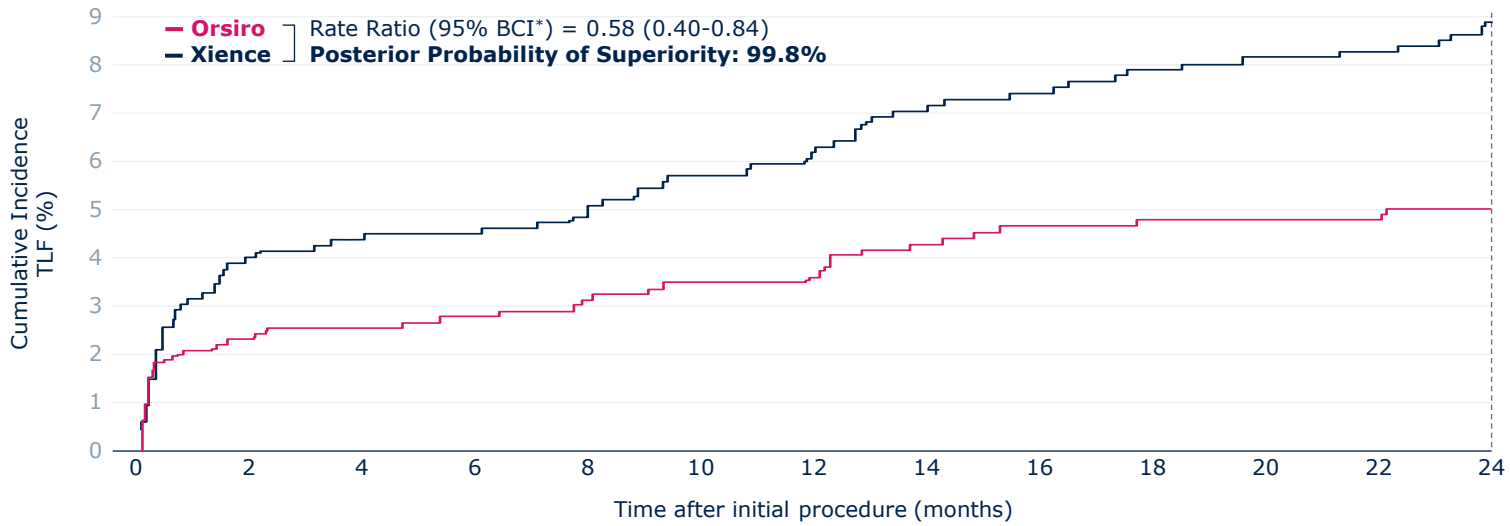
Target Lesion Failure (TLF)



Number at risk

Orsiro	860	809	803	800	797	792	788	769	765	764	762	759	754
Xience	847	791	785	783	779	772	767	748	743	737	734	732	721

At 24 months, **Orsiro** is superior to Xience in STEMI patients with respect to the primary endpoint of Target Lesion Failure (TLF) (**5.1% Orsiro** vs. **8.1% Xience**, Rate Ratio (95% BCI*): 0.58 (0.40-0.84), **Posterior Probability of Superiority: 99.8%**)

SUPERIORITY
In STEMI at 2 years[1]

42%
Lower risk of TLF[2] at 24 months

*BCI: Bayesian Credible Interval
1. vs. Xience, based on TLF rates; 2. vs. Xience in STEMI, based on a Rate Ratio of 0.58.
Pilgrim et al. Biodegradable – versus durable-polymer drug-eluting stents for STEMI. Final 2-year outcomes of the BIOSTEMI trial. J Am Coll Cardiol. Cardiovasc Interven. 2021, doi: 10.1016/j.jcin.2020.12.011

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Individual Components of Primary Endpoint at 24 Months

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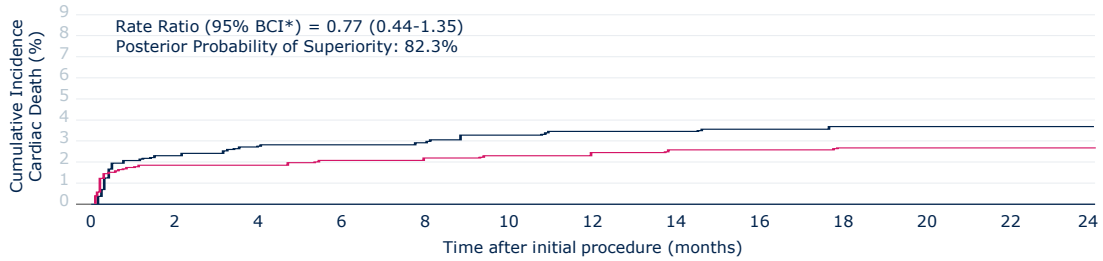
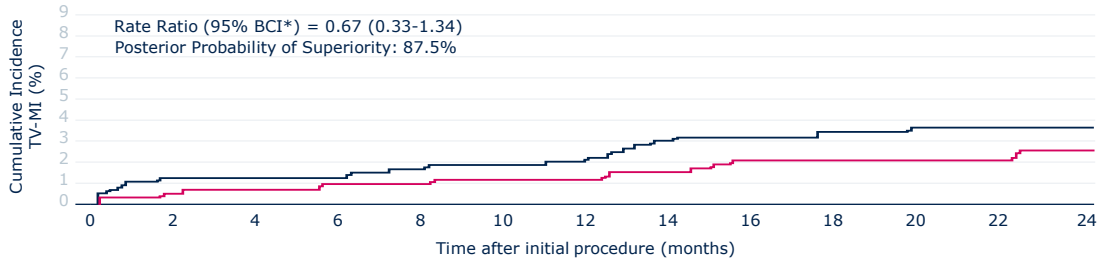
Cardiac Death



Number at risk													
Orsiro	860	814	810	807	806	803	799	784	783	782	780	777	774
Xience	847	806	800	798	796	793	790	778	775	772	771	770	762

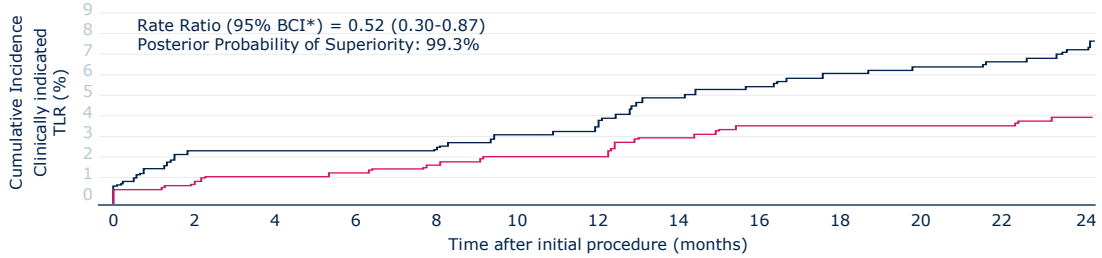
The difference in TLF was driven by significantly lower rates of clinically-indicated target lesion revascularization (TLR) (**2.5% Orsiro** vs. **5.1% Xience**, Rate Ratio (95% BCI*): 0.52 (0.30-0.87), **Posterior Probability of Superiority: 99.3%**)

Target Vessel Myocardial Infarction



Number at risk													
Orsiro	860	812	807	804	803	799	795	778	774	773	771	768	763
Xience	847	799	793	791	787	783	778	763	759	755	753	752	744

Clinically-indicated Target Lesion Revascularization



Number at risk													
Orsiro	860	810	804	801	798	793	789	770	766	765	763	760	755
Xience	847	793	787	785	783	776	771	753	748	742	739	737	726

*Bayesian Credible Interval, Pilgrim et al. Biodegradable – versus durable-polymer drug-eluting stents for STEMI. Final 2-year outcomes of the BIOSTEMI trial. J Am Coll Cardiol. Cardiovasc Interven. 2021, doi: 10.1016/j.jcin.2020.12.011

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Clinical Outcomes at 24 Months

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	Orsiro (n = 649)	Xience (n = 651)	BIOSTEMI with historical data from BIOSCIENCE		BIOSTEMI Only	
			Rate Ratio (95% BCI*)	Bayesian Posterior Probability	Rate Ratio (95% BCI*)	Bayesian Posterior Probability
Target lesion failure	**33 (5.1%)**	**53 (8.1%)**	**0.58 (0.40-0.84)**	**0.998**	**0.62 (0.40 0.96)**	**0.985**
Cardiac death	19 (2.9%)	21 (3.2%)	0.77 (0.44-1.35)	0.823	0.91 (0.49-1.69)	0.614
Target vessel MI	10 (1.5%)	13 (2%)	0.67 (0.33-1.34)	0.875	0.77 (0.33-1.75)	0.731
Clinically-indicated TLR	16 (2.5%)	33 (5.1%)	0.52 (0.30-0.87)	0.993	0.48 (0.26-0.86)	0.993
All-cause death	27 (4.2%)	25 (3.8%)	1.02 (0.64-1.63)	0.471	1.09 (0.63-1.89)	0.376
MI	24 (3.7%)	20 (3.1%)	1.01 (0.59-1.71)	0.491	1.20 (0.67-2.20)	0.267
Q-wave	5 (0.8%)	5 (0.8%)	0.73 (0.25-2.02)	0.727	1.01 (0.30-3.39)	0.495
Non-Q-wave	19 (2.9%)	16 (2.5%)	1.06 (0.58-1.93)	0.423	1.20 (0.62-2.38)	0.295
Repeat revascularization	35 (5.4%)	52 (8%)	0.67 (0.46-0.96)	0.985	0.67 (0.43-1.02)	0.969
Any TLR	18 (2.8%)	34 (5.2%)	0.54 (0.32-0.89)	0.992	0.53 (0.29-0.92)	0.989
Any TVR	22 (3.4%)	41 (6.3%)	0.58 (0.37-0.89)	0.994	0.53 (0.31-0.88)	0.993
Clinically-indicated TVR	20 (3.1%)	40 (6.1%)	0.56 (0.35-0.87)	0.995	0.50 (0.29-0.84)	0.996
Target vessel failure	39 (6%)	61 (9.4%)	0.61 (0.43-0.86)	0.998	0.63 (0.42-0.94)	0.988
Death, MI, or any repeat revascularization	65 (10%)	77 (11.8%)	0.81 (0.61-1.08)	0.929	0.84 (0.60-1.17)	0.849
Definite stent thrombosis	9 (1.4%)	12 (1.8%)	0.73 (0.30-1.69)	0.771	0.76 (0.31-1.77)	0.739
Definite or probable stent thrombosis	13 (2%)	15 (2.3%)	0.72 (0.38-1.44)	0.837	0.87 (0.41-1.84)	0.642
BARC bleeding events types 3-5	26 (4%)	24 (3.7%)	0.92 (0.58-1.59)	0.625	1.10 (0.63-1.92)	0.372

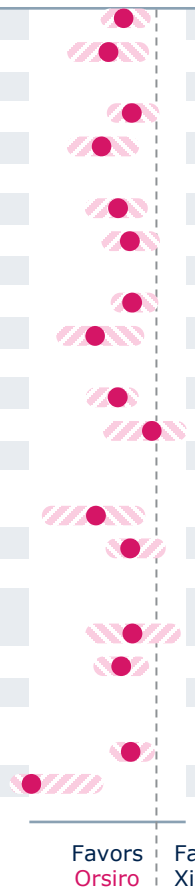
*BCI: Bayesian Credible Interval

Source: Pilgrim et al. Biodegradable – versus durable-polymer drug-eluting stents for STEMI. Final 2-year outcomes of the BIOSTEMI trial. J Am Coll Cardiol. Cardiovasc Interven. 2021, doi: 10.1016/j.jcin.2020.12.011

TLF at 24 Months by Subgroups

BIOSTEMI

		Orsiro	Xience	Rate Ratio (95% BCI**)	Bayesian Posterior Probability	Bayesian Posterior Probability (interaction)
Diabetes	no	27/575	43/569	0.59 (0.38-0.89)	0.994	0.774
	yes	5/73	10/82	0.43 (0.21-0.90)	0.986	
Gender	male	24/513	33/477	0.68 (0.43-1.06)	0.955	0.915
	female	9/136	20/174	0.39 (0.21-0.76)	0.997	
Age	<65 years	12/381	24/376	0.51 (0.28-0.89)	0.992	0.734
	≥65 years	21/268	29/275	0.65 (0.39-1.07)	0.955	
BMI (kg/m2)	<30	28/513	40/518	0.68 (0.44-1.03)	0.964	0.922
	≥30	5/134	11/131	0.35 (0.17-0.83)	0.991	
Renal failure*	no	17/557	37/555	0.50 (0.30-0.78)	0.999	0.914
	yes	15/76	16/78	0.93 (0.41-1.76)	0.578	
Small vessel (≤3.0mm)	no	3/214	12/220	0.36 (0.11-0.85)	0.990	0.891
	yes	29/429	41/431	0.67 (0.42-1.06)	0.957	
Long lesion (≥20mm)	no	6/139	10/152	0.69 (0.29-1.63)	0.799	0.658
	Yes	26/504	43/499	0.56 (0.35-0.90)	0.992	
Multi-Vessel Disease (MVD)	no	31/598	45/601	0.67 (0.45-0.99)	0.977	0.994
	yes	2/50	8/50	0.08 (0.03-0.40)	0.999	



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BIOSTEMI Trial

Publication

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Title

Biodegradable - Versus durable-polymer drug-eluting stents for STEMI. Final 2-year outcomes of the BIOSTEMI trial

Authors

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Conclusion

In patients with STEMI undergoing primary PCI, BP-SES were superior to DP-EES with respect to TLF at 2 years. The difference was driven by lower rates of ischemia-driven TLR

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JACC: CARDIOVASCULAR INTERVENTIONS VOL. ■, NO. ■, 2021

Biodegradable- Versus Durable-Polymer Drug-Eluting Stents for STEMI

Final 2-Year Outcomes of the BIOSTEMI Trial

Thomas Pilgrim, MD, MSc,[a,*] Olivier Muller, MD, PhD,[b,*] Dik Heg, PhD,[c] Marco Roffi, MD,[d] David J. Kurz, MD,[e] Igal Moarof, MD,[f] Daniel Weilenmann, MD,[g] Christoph Kaiser, MD,[h] Maxime Tapponnier, MD,[i] Sylvain Losdat, PhD,[c] Eric Eeckhout, MD, PhD,[b] Marco Valgimigli, MD, PhD,[a] Peter Jüni, MD,[j] Stephan Windecker, MD,[a] Juan F. Iglesias, MD[d]

ABSTRACT

OBJECTIVES The aim of this study was to investigate the safety and efficacy of biodegradable-polymer sirolimus-eluting stents (BP-SES) compared with durable-polymer everolimus-eluting stents (DP-EES) in patients with ST-segment elevation myocardial infarction (STEMI).

BACKGROUND Primary percutaneous coronary intervention (PCI) is an effective treatment for patients with STEMI, and long-term outcomes are determined by the safety and efficacy profile of the newest generation drug-eluting stents.

METHODS BIOSTEMI (A Comparison of an Ultrathin Strut Biodegradable Polymer Sirolimus-Eluting Stent With a Durable Polymer Everolimus-Eluting Stent for Patients With Acute ST-Segment Elevation Myocardial Infarction Undergoing Primary Percutaneous Coronary Intervention) was an investigator-initiated, multicenter, assessor-blind, randomized superiority trial using Bayesian methods. Patients with STEMI undergoing primary PCI within 24 h of symptom onset were randomized in a 1:1 ratio to receive BP-SES (n = 649) or DP-EES (n = 651). The primary endpoint was target lesion failure (TLF), a composite of cardiac death, target vessel myocardial reinfarction, and clinically indicated target lesion revascularization (TLR) at 2 years.

RESULTS Between April 2016 and March 2018, 1,300 patients were included. Baseline characteristics were comparable between the 2 treatment groups. Follow-up through 2 years was complete in 1,221 patients (94%). At 2 years, TLF occurred in 33 patients (5.1%) treated with BP-SES and in 53 patients (8.1%) treated with DP-EES (rate ratio: 0.58; 95% Bayesian credible interval: 0.40 to 0.84; posterior probability of superiority = 0.998). The difference was driven by a lower incidence of clinically indicated TLR in patients treated with BP-SES compared with DP-EES (2.5% vs. 5.1%; rate ratio: 0.52; 95% Bayesian credible interval: 0.30 to 0.87; posterior probability of superiority = 0.993). There were no significant differences in rates of cardiac death, target vessel myocardial reinfarction, and definite stent thrombosis between the 2 treatment arms.

CONCLUSIONS In patients with STEMI undergoing primary PCI, BP-SES were superior to DP-EES with respect to TLF at 2 years. The difference was driven by lower rates of ischemia-driven TLR. (A Comparison of an Ultrathin Strut Biodegradable Polymer Sirolimus-Eluting Stent With a Durable Polymer Everolimus-Eluting Stent for Patients With Acute ST-Segment Elevation Myocardial Infarction Undergoing Primary Percutaneous Coronary Intervention [BIOSTEMI]; NCT02579031) (J Am Coll Cardiol Intv 2021;■:639–48) © 2021 The Authors. Published by Elsevier on behalf of the American College of Cardiology Foundation. This is an open access article under the CC BY-NC-ND license (http://creativecommons.org/licenses/by-nc-nd/4.0/).

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Source: Pilgrim et al. Biodegradable – versus durable-polymer drug-eluting stents for STEMI. Final 2-year outcomes of the BIOSTEMI trial. J Am Coll Cardiol. Cardiovasc Interven. 2021, doi: 10.1016/j.jcin.2020.12.011

Conclusion

BIOSTEMI

1. At 24 months, Orsiro is superior to Xience in STEMI patients with respect to the primary endpoint of Target Lesion Failure (TLF) (5.1% vs. 8.1%, Rate Ratio (95% BCI*): 0.58 (0.40-0.84), **Posterior Probability of Superiority: 99.8%)**

2. The difference in TLF rates remained statistically significant after the exclusion of historical information from the STEMI subgroup of the BIOSCIENCE trial (Rate Ratio (95% BCI*): 0.62 (0.40-0.96), **Posterior Probability of Superiority: 98.5%)**

3. Clinically-indicated Target Lesion Revascularization (TLR) rate was significantly lower in Orsiro compared to Xience (2.5% vs. 5.1%, Rate Ratio (95% BCI*): 0.52 (0.30-0.87), **Posterior Probability of Superiority: 99.3%)**

4. The significant difference at 24-m favoring the Orsiro vs. Xience DES might have clinically relevant implications for routine clinical practice.

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BIOSTEMI ES

Long-term Outcomes with Biodegradable Polymer Sirolimus-eluting Stents versus Durable Polymer Everolimus-eluting Stents in ST-segment Elevation Myocardial Infarction

Design

Investigator-initiated, prospective, multicenter, assessor-blinded, randomized (1:1), controlled **superiority** trial.
*BIOSTEMI Extended Survival was led to achieve 5 follow-up.

Objective

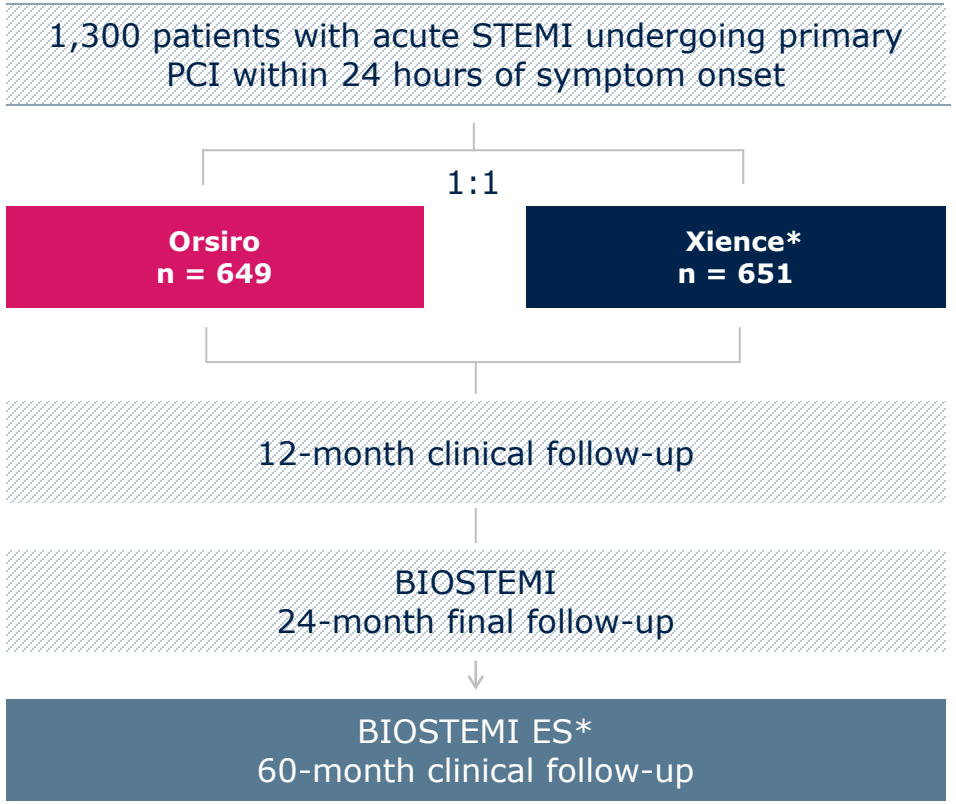
To compare Orsiro® to Xience DES in patients with acute STEMI undergoing primary PCI within 24 hours of symptoms onset.

Principal Investigators

Dr. J.F. Iglesias, HUG, Geneva, CH

Primary Endpoint

A composite of death from cardiac causes, myocardial infarction, or stent thrombosis at 5 year, and was powered for noninferiority, with an absolute margin of 4.1% at 1-sided 5% alpha.



*Xience is a trademark of Abbott Cardiovascular Systems Inc.
Iglesias, JF. et al. Long-term outcomes with biodegradable polymer sirolimus-eluting stents versus durable polymer everolimus-eluting stents in ST-segment elevation myocardial infarction: 5-year follow-up of the BIOSTEMI randomised superiority trial, Rounded outcomes from publications

Primary Endpoint – TLF at 60 Months

Orsiro - Significantly reduces target lesion failure in STEMI patients[1]

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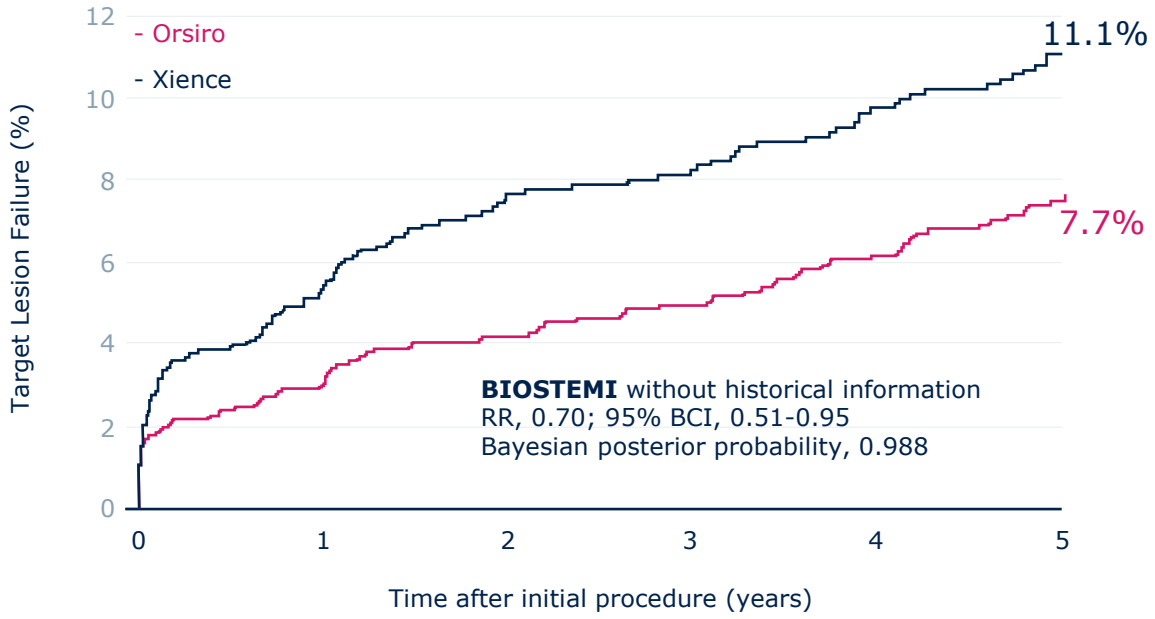
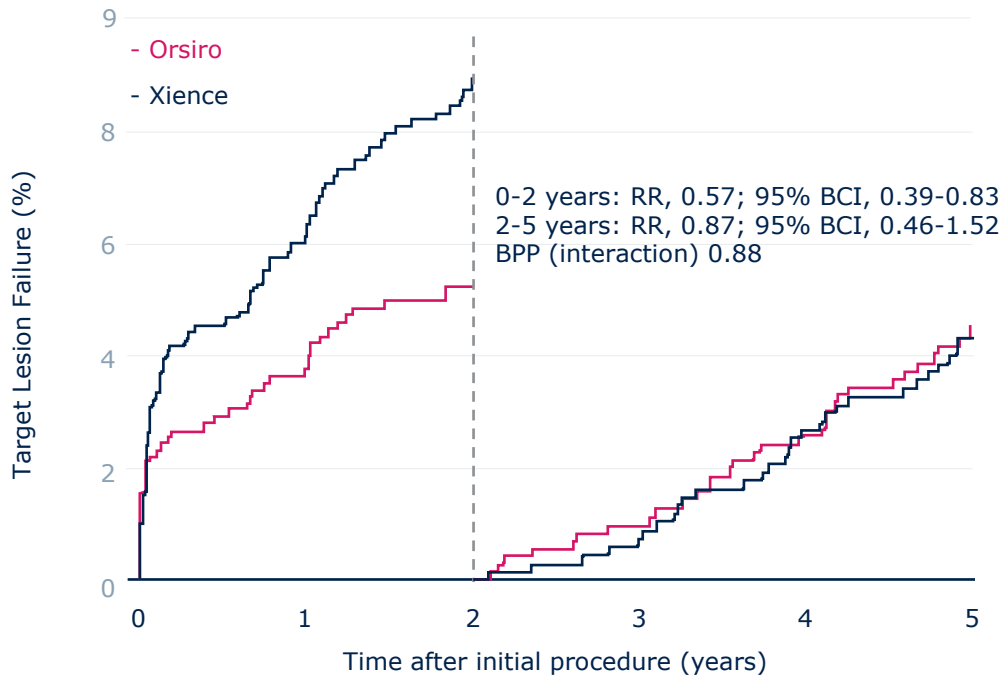
Target Lesion Failure



Continued Superiority In STEMI Upto 5 years[1]

31% significantly lower risk for 5y TLF

Target Lesion Failure Landmark Analysis at 2 years



Orsiro makes the difference from implantation up to 2 years and maintaining it up to 5-year follow-up in STEMI patients[1,2]

1. Based on TLF with Orsiro DES in comparison to Xience DES in STEMI patients Source: Iglesias, JF. et al. Long-term outcomes with biodegradable polymer sirolimus-eluting stents versus durable polymer everolimus-eluting stents in ST-segment elevation myocardial infarction: 5-year follow-up of the BIOSTEMI randomised superiority trial.

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Selected Secondary Endpoints at 60 Months

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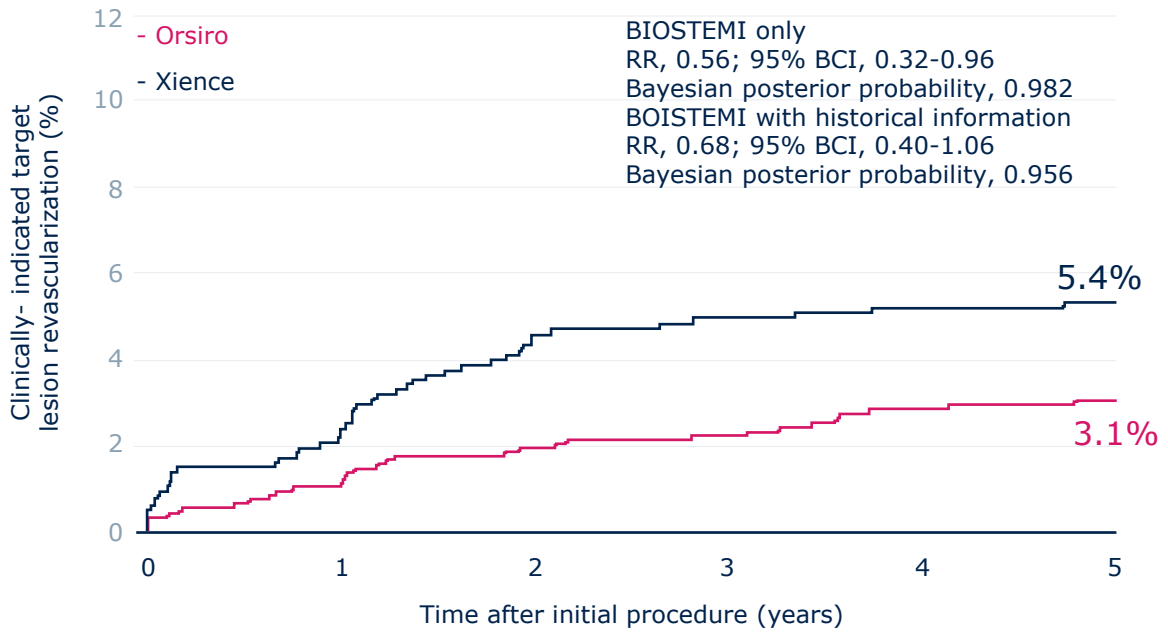
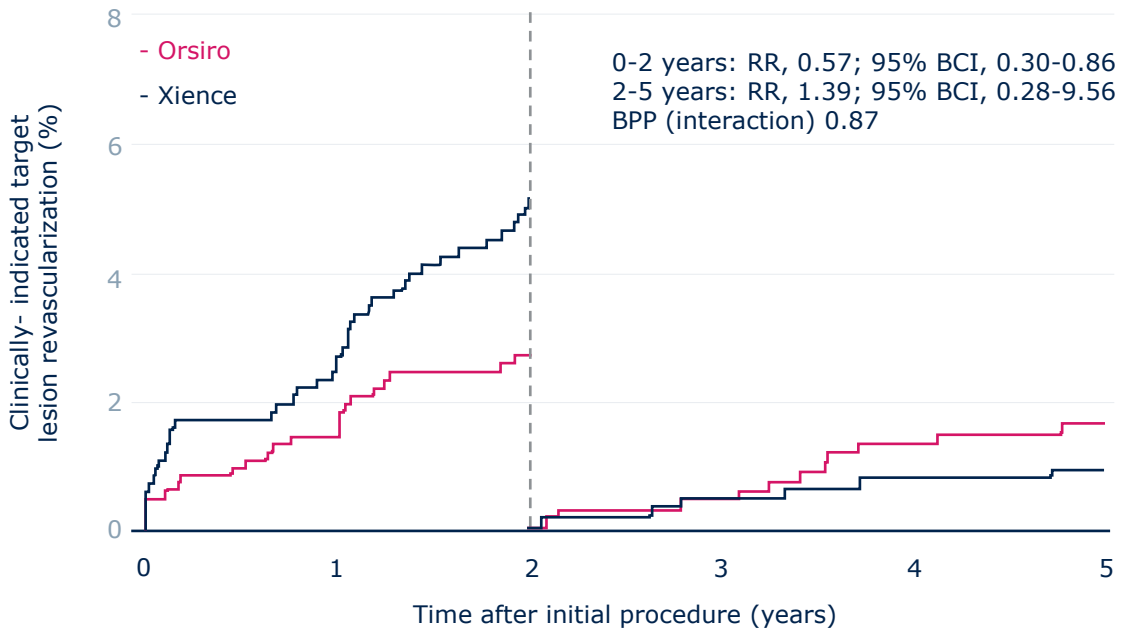
Orsiro is superior to Xience with respect to the rates of TLF at 5 years of follow-up, a difference driven by a numerically lower risk for clinically-driven TLR.

Clinically-indicated TLR[1]



Clinically-indicated TLR Landmark Analysis at 2 years[2]



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Selected Secondary Endpoints at 60 Months

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			BIOSTEMI with historical information from BIOSCIENCE		BIOSTEMI only Without historical information from BIOSCIENCE	
	Orsiro	**Xience**	**Rate Ratio (95% BCI)**	**Bayesian Posterior Probability of Superiority**	**Rate Ratio (95% BCI)**	**Bayesian Posterior Probability of Superiority**
TLF	**8%**	**11%**	**0.70 (0.51-0.95)**	**0.988**	**0.68 (0.47-0.98)**	**0.981**
Cardiac Death	5%	6%	0.81 (0.54–1.23)	0.839	0.89 (0.55–1.43)	0.677
TV-ReMI	2%	3%	0.76 (0.41-1.34)	0.833	0.67 (0.32–1.35)	0.868
CI-TLR	3%	5%	0.68 (0.40–1.06)	0.956	**0.56 (0.32-0.96)**	**0.982**
Target Vessel Failure	**10%**	**13%**	**0.74 (0.55–0.97)**	**0.984**	**0.71 (0.51–0.98)**	**0.982**
CI-TVR	**4%**	**6%**	**0.59 (0.34-0.98)**	**0.979**	**0.56 (0.34–0.92)**	**0.990**
POCE	16%	18%	0.88 (0.66–1.14)	0.836	0.87 (0.67–1.13)	0.847
Definite Stent Thrombosis	2%	3%	0.58 (0.28–1.18)	0.933	0.59 (0.28–1.20)	0.927

In BIOSTEMI ES, Orsiro showed significantly lower:

- Target Lesion Failure: **-31%**[1]
- Clinically-Indicated Target Lesion Revascularisation: **-43%**[1]
- Target Vessel Failure: **-28%**[1]
- Clinically-Indicated Target Vessel Revascularisation: **-43%**[1]

1. Based on 5Y FUP of the BIOSTEMI trial, Source: Iglesias, JF. et al. Long-term outcomes with biodegradable polymer sirolimus-eluting stents versus durable polymer everolimus-eluting stents in ST-segment elevation myocardial infarction: 5-year follow-up of the BIOSTEMI randomised superiority trial, Rounded outcomes from publications

BIOSTEMI ES

Publication

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Title

Long-term outcomes with biodegradable polymer sirolimus-eluting stents versus durable polymer everolimus-eluting stents in ST-segment elevation myocardial infarction: 5-year follow-up of the BIOSTEMI randomized superiority trial

Authors

Juan F Iglesias, Marco Roffi, Sylvain Losdat, Olivier Muller, Sophie Degrauwe, David J Kurz, Laurent Haegeli, Daniel Weilenmann, Christoph Kaiser, Maxime Tapponnier, Stéphane Cook, Florim Cuculi, Dik Heg, Stephan Windecker, Thomas Pilgrim

Conclusion

In patients undergoing primary percutaneous coronary intervention for STEMI, biodegradable polymer sirolimus-eluting stents were superior to durable polymer everolimus-eluting stents with respect to target lesion failure at 5 years of follow-up. The difference was driven by a numerically lower risk for ischemia-driven target lesion revascularisation.

Articles

Long-term outcomes with biodegradable polymer sirolimus-eluting stents versus durable polymer everolimus-eluting stents in ST-segment elevation myocardial infarction: 5-year follow-up of the BIOSTEMI randomised superiority trial

Juan F Iglesias, Marco Roffi, Sylvain Losdat, Olivier Muller, Sophie Degrauwe, David J Kurz, Laurent Haegeli, Daniel Weilenmann, Christoph Kaiser, Maxime Tapponnier, Stéphane Cook, Florim Cuculi, Dik Heg, Stephan Windecker, Thomas Pilgrim

Summary

Background Biodegradable polymer sirolimus-eluting stents improve early stent-related clinical outcomes compared to durable polymer everolimus-eluting stents in patients with ST-segment elevation myocardial infarction (STEMI) undergoing primary percutaneous coronary intervention. The long-term advantages of biodegradable polymer sirolimus-eluting stents after complete degradation of its polymer coating in patients with STEMI remains however uncertain.

Methods BIOSTEMI Extended Survival (BIOSTEMI ES) was an investigator-initiated, follow-up extension study of the BIOSTEMI prospective, multicentre, single-blind, randomised superiority trial that compared biodegradable polymer sirolimus-eluting stents with durable polymer everolimus-eluting stents in patients with STEMI undergoing primary percutaneous coronary intervention at ten hospitals in Switzerland. All individuals who had provided written informed consent for participation in the BIOSTEMI trial were eligible for this follow-up study. The primary endpoint was target lesion failure, defined as a composite of cardiac death, target vessel myocardial re-infarction, or clinically indicated target lesion revascularisation, at 5 years. Superiority of biodegradable polymer sirolimus-eluting stents over durable polymer everolimus-eluting stents was declared if the Bayesian posterior probability for a rate ratio (RR) of less than 1 was greater than 0·975. Analyses were performed according to the intention-to-treat principle. The study was registered with ClinicalTrials.gov, NCT05484310.

Findings Between April 26, 2016, and March 9, 2018, 1300 patients with STEMI (1622 lesions) were randomly allocated in a 1:1 ratio to treatment with biodegradable polymer sirolimus-eluting stents (649 patients, 816 lesions) or durable polymer everolimus-eluting stents (651 patients, 806 lesions). At 5 years, the primary composite endpoint of target lesion failure occurred in 50 (8%) patients treated with biodegradable polymer sirolimus-eluting stents and in 72 (11%) patients treated with durable polymer everolimus-eluting stents (difference of −3%; RR 0·70, 95% Bayesian credible interval 0·51–0·95; Bayesian posterior probability for superiority 0·988).

Interpretation In patients undergoing primary percutaneous coronary intervention for STEMI, biodegradable polymer sirolimus-eluting stents were superior to durable polymer everolimus-eluting stents with respect to target lesion failure at 5 years of follow-up. The difference was driven by a numerically lower risk for ischaemia-driven target lesion revascularisation.

Funding Biotronik.

Introduction

Primary percutaneous coronary intervention is the preferred reperfusion therapy for patients with ST-segment elevation myocardial infarction (STEMI).[1,2] Newer-generation drug-eluting stents with both durable and biodegradable polymer coatings have been shown to improve long-term stent-related and patient-oriented clinical outcomes compared with early-generation drug-eluting stents[3,4] among patients with STEMI, and constitute the current standard of care.[1,2] However, drug-eluting stent implantation at the level of ruptured coronary plaques in the setting of STEMI might perpetuate the prothrombotic and proinflammatory environment that delays arterial healing,[5] and increase the long-term risk for device-related adverse clinical outcomes after primary percutaneous coronary intervention.[6]

The challenge in drug-eluting stent design consists in finding a balance between reducing neointimal hyperplasia to mitigate repeat revascularisations, and facilitating early stent strut endothelialisation to minimise the risk of stent thrombosis. Drug-eluting stents that combine thinner metallic stent platforms and biodegradable polymer coatings were introduced with the aim of reducing vessel wall injury, inflammatory

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Conclusion

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1. **At 60 months, Orsiro remains superior to Xience in STEMI patients** with respect to the primary endpoint of Target Lesion Failure (TLF) (7.7% vs. 11.1%, RR, 0.68;95% BCI, 0.47-0.98, Bayesian Posterior Probability, 0.981, **Posterior Probability of Superiority: 99.8%)**

2. In BIOSTEMI ES, Orsiro showed significantly lower:
   - Target Lesion Failure: **-31%**
   - Clinically-Indicated Target Lesion Revascularization: **-43%**
   - Target Vessel Failure: **-28%**
   - Clinically-Indicated Target Vessel Revascularization: **-43%**

3. In patients with STEMI undergoing primary PCI, Orsiro DES is superior to Xience DES with respect to the rates of TLF at 5 years of follow-up, a **difference driven by a numerically lower risk for clinically-driven TLR.**

4. The significant difference at 60-m favoring the Orsiro vs. Xience DES might have clinically relevant implications for routine clinical practice.

Iglesias, JF. et al. Long-term outcomes with biodegradable polymer sirolimus-eluting stents versus durable polymer everolimus-eluting stents in ST-segment elevation myocardial infarction: 5-year follow-up of the BIOSTEMI randomised superiority trial.