

Pitfalls with Comparative Assessment of BRS and DES with Angio, IVUS and OCT

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	Metallic (Xience)	PLLA Bioresorbable (ABSORB)	
Platform	Cobalt chromium	Poly-L-lactide (PLLA)	
Polymer coating	Nonerodable fluoro-polymer	Poly-D,L-lactide (PDLLA)	
Anti-proliferative drug	Everolimus 100 µgr/cm ²	Everolimus 100 µgr/cm ²	
Drug release	80% in 1 month 100% in 4 months	80% in 1 month 100% in 4 months	
Strut thickness	87 µm	156 µm	
Radio-opacity	Radio opaque	Radio-lucent	
Optical property	Opaque	Translucent	

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- Angiography
- MSCT
- IVUS
- IVUS-VH
- **OCT**

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Angiography

MSCT

IVUS

OCT

IVUS-VH

ullet

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igodot

ightarrow

Stents vs. Scaffolds





- Angiography ullet
- **MSCT** ightarrow
- **IVUS** •

 \bullet

IVUS-VH ightarrowOCT



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- **MSCT** ightarrow
- IVUS

ightarrow

IVUS-VH $\overline{}$ OCT





PLLA

24-month



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With shadowing

Without shadowing

- Angiography
- MSCT
- IVUS
- IVUS-VH
- OCT

Discrepancy between IVUS and OCT

Serruys et al . EuroIntervention 2014

N = 19	Difference				
	IVUS	OCT	IVUS-OCT	р	
Mean LA at BL	6.32±0.84	7.72±1.17	-1.40±0.60	<0.001	
Mean LA at 1Y	6.22±0.96	6.01±1.29	0.21±0.72	<0.001	
Mean LA at 3Y	6.67±1.66	6.09±1.67	0.51±0.52	<0.001	



Post-procedure









Comparative analysis method of permanent metallic stents (XIENCE) and bioresorbable poly-L-lactic (PLLA) scaffolds (Absorb) on optical coherence tomography at baseline and follow-up

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S. Nakatani and Y. Sotomi contributed equally to this work.

GUEST EDITOR: Giulio Guagliumi, MD; Cardiovascular Department, Ospedali Riuniti di Bergamo, Bergamo, Italy

- Stent (endoluminal) / Scaffold (abluminal) area
- Lumen area
- Total strut area
- Flow area
- Malapposed strut assessment
- Incomplete stent apposition (ISA) area
- Neointimal area





- Stent (endoluminal) / Scaffold (abluminal) area
- Lumen area
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- Neointimal area





Xience < **ABSORB**

Stent area excluded (embedded) or partly included in lumen area Strut area included in lumen area

- Stent (endoluminal) / Scaffold (abluminal) area
- Lumen area
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 assessment
- Incomplete stent apposition (ISA) area
- Neointimal area



Xience





Strut area not measured

Strut area measured

Absorb





Xience

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Including malapposed struts (~0.2-0.3mm²) Excluding malapposed struts (~0.41mm²)

Xience > ABSORB











Xience

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Absorb

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NI inside and between struts

Absorb

Neointima: Xience < ABSORB

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- Stent/scaffold area (Abluminal/Endolumin al stent/scaffold area)
- Lumen area \bullet
- **ISA** area \bullet
- **Embedment** \bullet
- **Interpolated Lumen** \bullet contour
- **Neointimal Bridge** \bullet
- Strut area \bullet
- Flow area ullet
- **Neointimal area** \bullet



Xience





в



Abluminal

Stent / Scaffold area

Endoluminal stent/scaffold area

Abluminal Stent / Scaffold area



Endoluminal Stent / Scaffold area

- Stent/scaffold area
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Xience

G

Absorb



Xience

- Stent/scaffold area (Abluminal/Endolumin al stent/scaffold area)
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- **ISA** area •
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- **Interpolated Lumen** \bullet contour
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- Flow area ullet
- **Neointimal area** \bullet





Xience

91µm

C. Completely Apposed

- Stent/scaffold area
 (Abluminal/Endolumin al stent/scaffold area)
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Lumen vessel contour

Absorb

D. Completely Apposed



- Stent/scaffold area
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Xience

Absorb





without connecting bridge

with a potentially "thin" abluminal connecting bridge

with abluminal connecting bridge

with lateral connecting bridge

with bilateral connecting bridges

- Stent/scaffold area
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Virtual measurement vs. Real measurement

- Stent/scaffold area
 (Abluminal/Endolumin al stent/scaffold area)
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- Strut area
- Flow area
- Neointimal area





Flow area is comparable using the endoluminal and abluminal contours.

- Stent/scaffold area

 (Abluminal/Endolumin al stent/scaffold area)
- Lumen area
- ISA area
- Embedment
- Interpolated Lumen contour
- Neointimal Bridge
- Strut area
- Flow area
- Neointimal area





Necitimal seafold area (Abluminal/Endolumin Necitimal area includinga) necitimal between and on-top of the struts = Abluminal stent contour (virtual or real) - Iumen (now) contour - scottotta

- Neointimal Bridge
- Strut area
- Flow area
- Neointimal area





2.0 mm



Discrepancy between OCT and Angiography measurements

Comparison of BRS and DES

Collaboration with ...

Takeshi Kimura: Kyoto university Gregg W. Stone : Cardiovascular Research Foundation Jeffrey J. Popma: Beth Israel Deaconess Medical Center Yoshinobu Onuma: Erasmus medical center Patrick W Serruys: Imperial College London and Academic researh team of Cardialysis QCA potentially underestimates MLD with BVS compared to Xience as demonstrated by OCT ...

Agreement between Mean LD (QCA) and Mean LD (OCT)



QCA: A single monoplane view was analyzed per lesion treated.



Relative difference of QCA versus OCT (%)



Conclusions

- We presented a standardised OCT measurement methodology. This should be implemented in ongoing and future trials comparing the Absorb scaffolds and metallic stents.
- Using OCT and untreated segment as a method and vessel of reference, it is demonstrated that QCA is differently affected by the presence of a metallic stent or a polymeric scaffold; a fact that has a significant impact on the QCA assessment of acute gain and post-procedural MLD.

Thank You!

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