Long-term clinical outcomes of coronary drug-eluting stent with bioresorbable coating: final 5-year results of the CENTURY study

Branko Beleslin
Clinical Center of Serbia, Belgrade, Serbia

On behalf of CENTURY investigators

BELESLIN B.

x I do not have any potential conflict of interest

❑ **I have the following potential conflicts of interest to report:**

- Honorarium:
- Institutional grant/research support:
- Consultant:
- Employment in industry:
- Owner of a healthcare company:
- Stockholder of a healthcare company:
- Other(s):

CENTURY study - objective

- CENTURY study is designed to evaluate the **safety and performance of Ultimaster**, a thin-strut cobalt-chromium sirolimus-eluting stent with an innovative abluminally, gradient coated bioresorbable polymer.
- The aim of current analysis is to assess **the final 5 year results** of Ultimaster DES compared with the historical data from KARE study (study of its BMS platform).

Ultimaster vs other DESs strut and coating thickness

Durable Polymer Stent		Bioresorbable Polymer Stent				Bioresorbable Scaffold
Xience/Promus CoCr / PtCr-EES	Resolute CoCr-ZES	Biomatrix 316L-BES	Ultimaster CoCr-SES	Synergy PtCr-EES	Orsiro CoCr-SES	Absorb (BVS) PLLA-EE
						
Thickness of uncoated stent (in µm)						
81	91	120	80	74	60	150
Distribution and thickness of polymer coating (in µm) & type of polymer						
Conformal 7-8 Fluoro-polymer	Conformal 6 BioLinx	Abluminal 10 PLA	Abluminal 15 PDLLA-PCL	Abluminal 4 PLGA, PCL	Conformal 4/7 PLLA	Conformal 3 PDLLA

Data from: Stefanini G. et al. Heart doi:10.1136/heartjnl-2012-303522; Garg, S. et al. Nat. Rev. Cardiol. 2013;10:248–60; Meredith I.T. Presented at TCT 2013; Lee Y. et al. Invasive Cardiol. 2014;26(2):41-5. (modified). *) Orsiro strut thickness is 80 µm for stent diameters ≥ 3.5 mm;

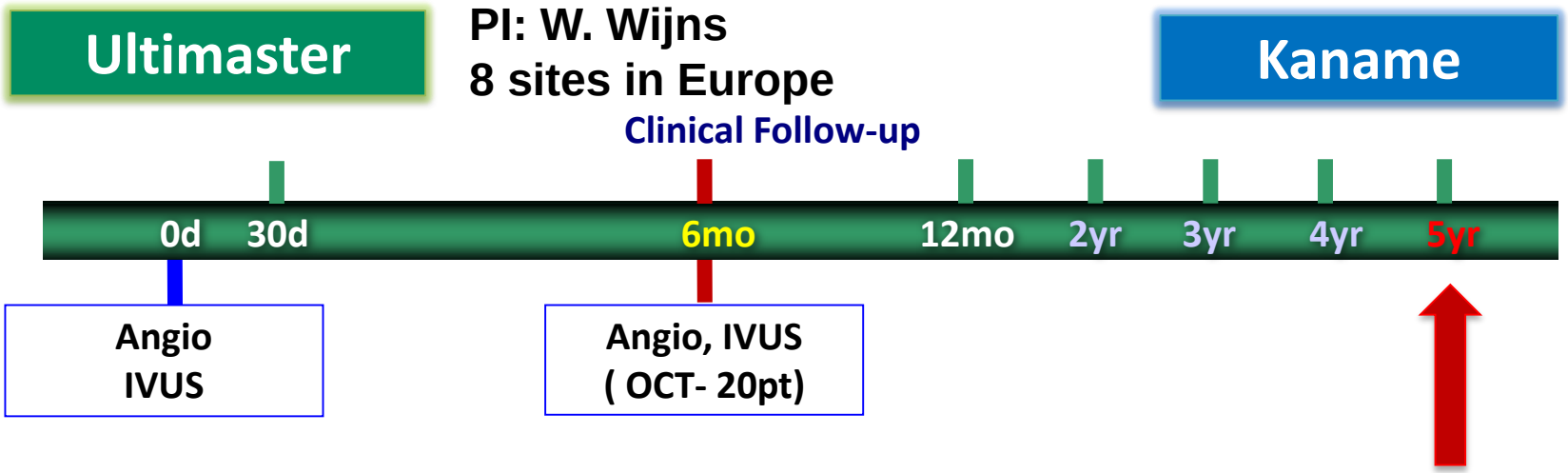
Ultimaster stent design

	Ultimaster DES
Platform	Strut thickness (**80µm**) Co-Cr Open cell design
Drug Carrier	PDLLA-PCL copolymer **resorbed within 3-4 months**
Coating	**Abluminal** gradient coating 
Drug	Sirolimus **3.9 µg/mm** stent length

CENTURY – study design

Prospective, multicentre, single arm clinical trial

Hypothesis: superiority (P<0.05) vs. historical control Kaname BMS for late loss at 6 month



Primary endpoint: in-stent LATE LUMEN LOSS at 6 months

Main secondary endpoints: TLF, Death&MI, ST, at 6 and 12m and yearly to 5 years

Angio/IVUS: late lumen loss, BAR, neointima volume and volume obstruction

CENTURY study
Patient inclusion/exclusion criteria

- Main inclusion criteria
  - **Up to two de-novo lesions** located in two epicardial vessels
  - Target lesion length <25 mm, RVD: 2.5-4.0 mm
- Main exclusion criteria
  - Intolerance to common PCI associated medications, or – limus like drugs
  - Left Main CAD
  - **CTO, ostial, bifurcation, SVG lesions**
  - Prior PCI with stenting (within 1 month before enrolment)
  - Planned major surgery within 6 m post procedure
  - **STEMI <72h before procedure**

CENTURY vs KARE Study
Baseline characteristics

	CENTURY n=104 pts	KARE n = 214 pts	P-value
Age, years (mean±SD)	62.3±8.2	62.7±11.4	0.72
Male gender, %	72.4	75.2	0.59
Smoking, current, %	29.4	30.1	0.49
Diabetes mellitus, %	23.3	24.3	0.85
Dyslipidemia, %	76.7	76.1	0.90
History of MI, %	39.3	39.7	0.94
History of PCI , %	16.8	26.2	0.06
Stable angina at admission, %	69.0	70.4	0.92

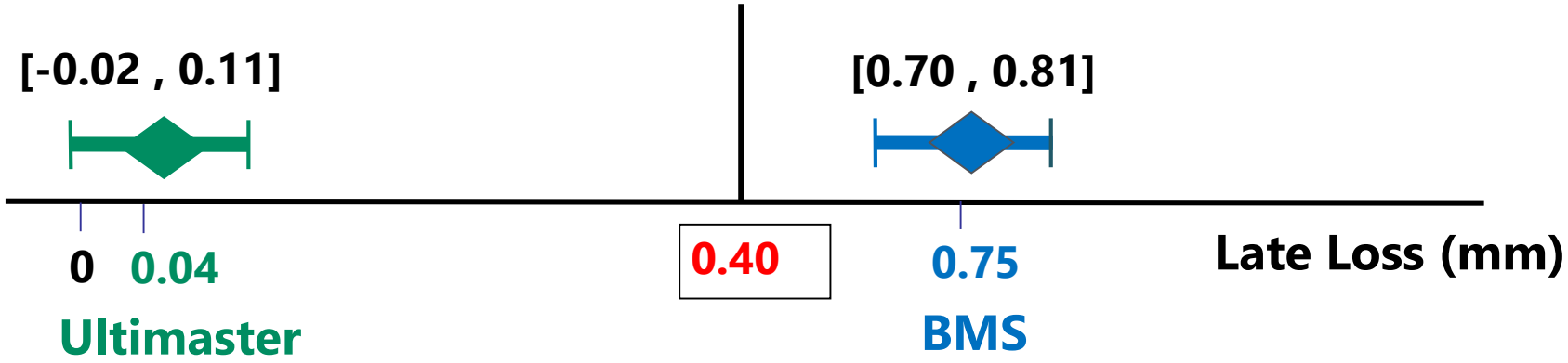
CENTURY vs KARE Study
Lesion characteristics

	CENTURY n=104 pts	KARE n = 214 pts	P-value
Multivessel disease, %	24.2	25.0	0.88
Target vessel, %			0.49
CFX LAD RCA	25.2 41.7 33.1	32.0 34.4 33.6	
Predilatation, %	98.4	94.6	0.11
Postdilatation, %	27.5	25.4	0.69
QCA baseline	**n=112** lesions	**n=216** lesions	
Minimum lumen diameter, mm	1.17±0.38	1.12±0.35	0.20
Diameter stenosis, %	57.0	58.3	0.34

CENTURY Study
Primary Endpoint

Hypothesis: based upon estimated BMS Late Luminal Loss: 0.90±0.50mm
- 0.50mm improvement was considered as clinically significant

Late loss of 0.40 mm (0.90-0.50 mm) is considered upper limit for CENTURY study



Late luminal loss at 6 months
BMS: 0.75±0.43 mm
Ultimaster: 0.04±0.35mm

***P*superiority of Ultimaster <0.001**

CENTURY study
Angiography and IVUS at 6 months

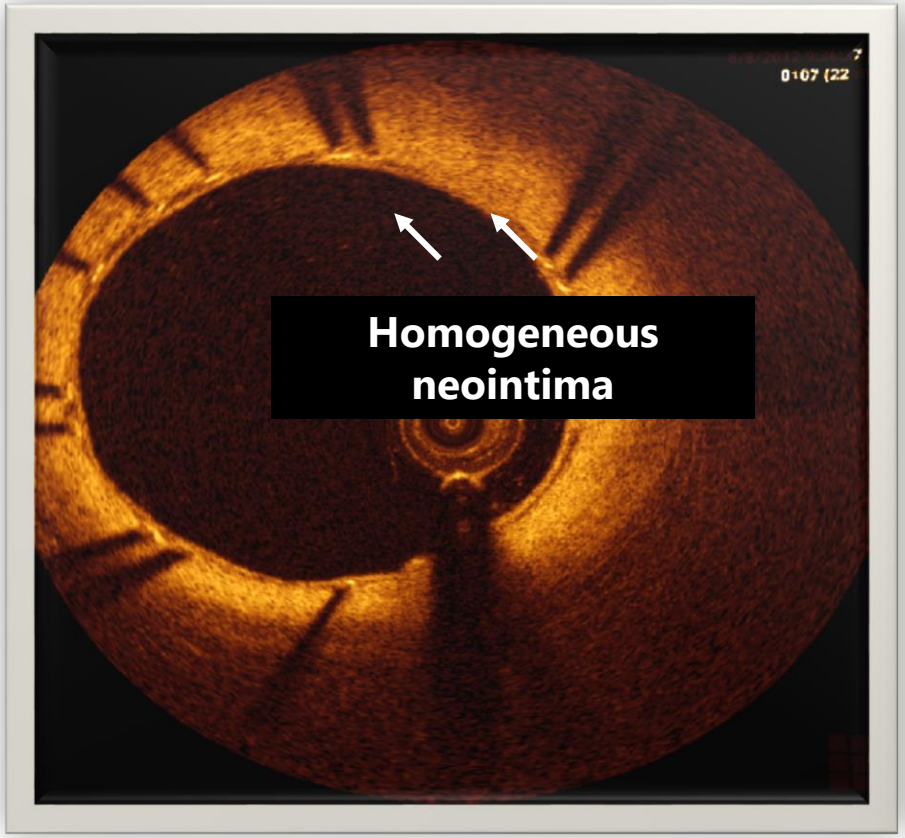
	CENTURY n=112 Lesions	KARE n=216 Lesions	**P-value**
QCA at 6 month			
Diameter stenosis, %	11.9 ± 10.4	34.3 ± 15.3	<0.001
Minimum lumen diameter, mm	2.55±0.51	1.76 ± 0.53	<0.001
Late loss in-segment, mm	-0.03 ± 0.38	0.50 ± 0.41	<0.001
Binary restenosis - segment, %	1.3	18.1	<0.001
Binary restenosis - stent, %	0.8	16.7	<0.001
IVUS at 6 month	n=41 lesions	n=31 lesions	
Neo-intima volume, mm^3	2.28 ± 2.89	41.6±23.5	<0.001
Stent mean area obstruction, %	1.54 ± 1.98	27.2±10.0	<0.001

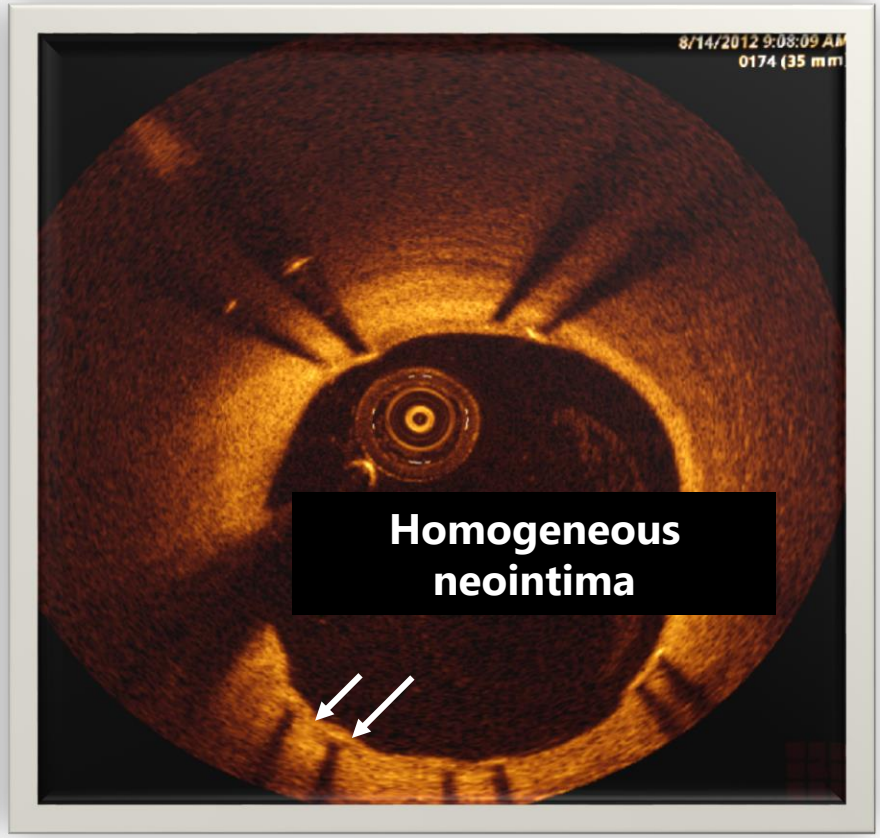
Data are mean±SD or %

CENTURY study
OCT at 6 months

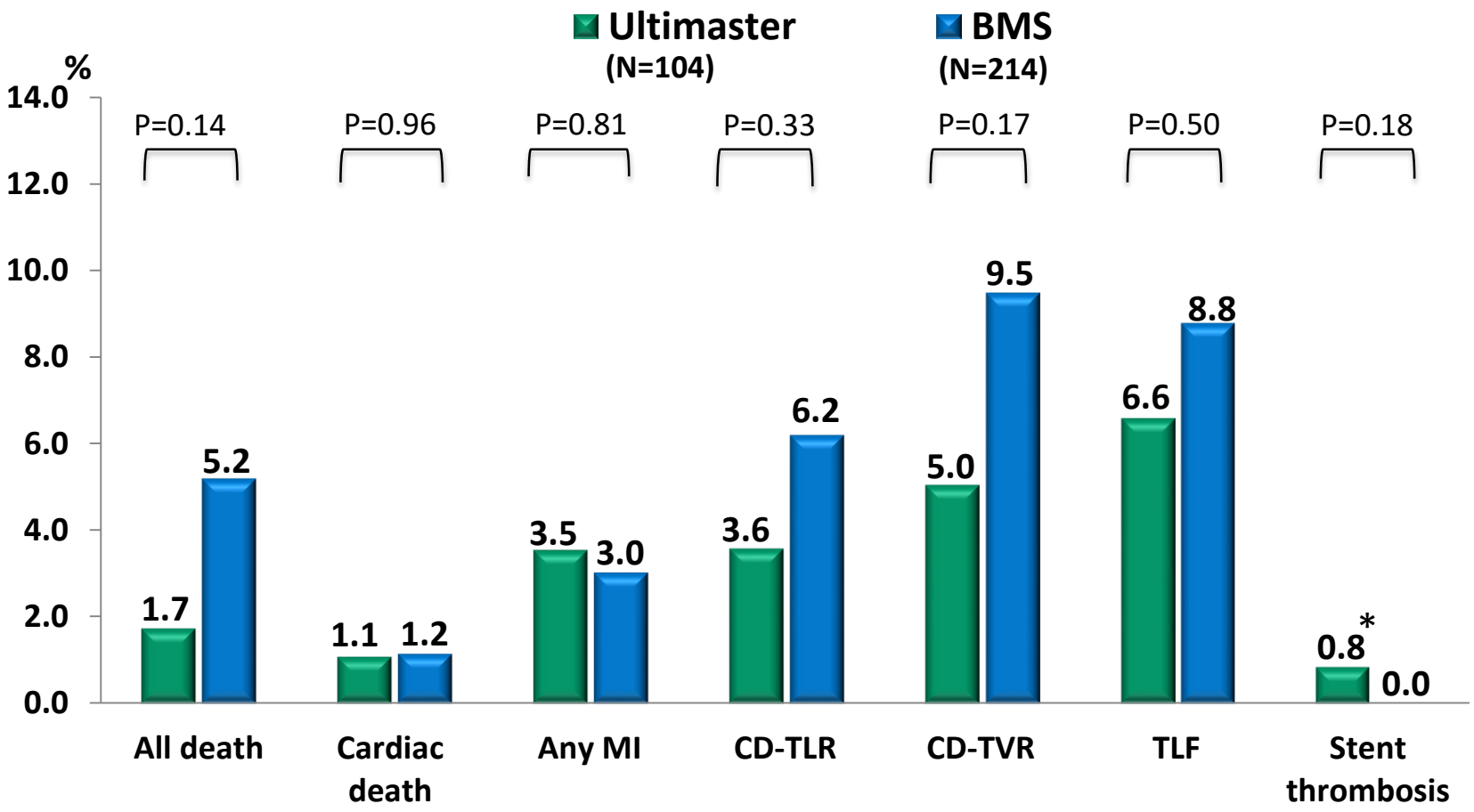
Mean strut coverage (mm)	0.08±0.04
% Covered Struts at 6 month	96.2±5.4

Malapposed struts, %	1.66
Malapposition volume, mm^3	1.86 ± 6.58





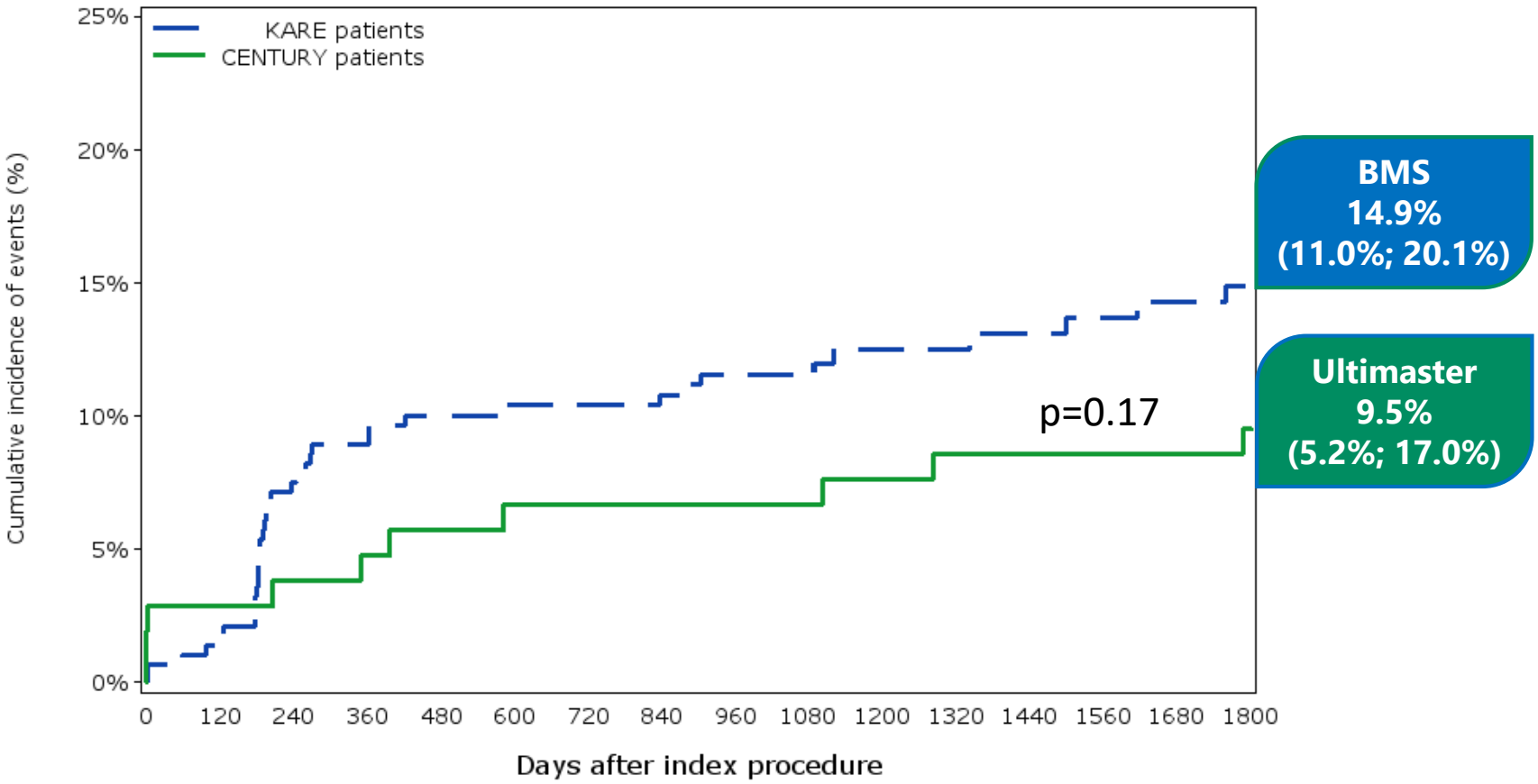
CENTURY vs KARE – Clinical outcomes up to 5 years



CD: clinically driven, TLR: target lesion revasculairzation, TVR: target vessel revascularization, TLF: composite of cardiac death, TV related MI and CD-TLR.

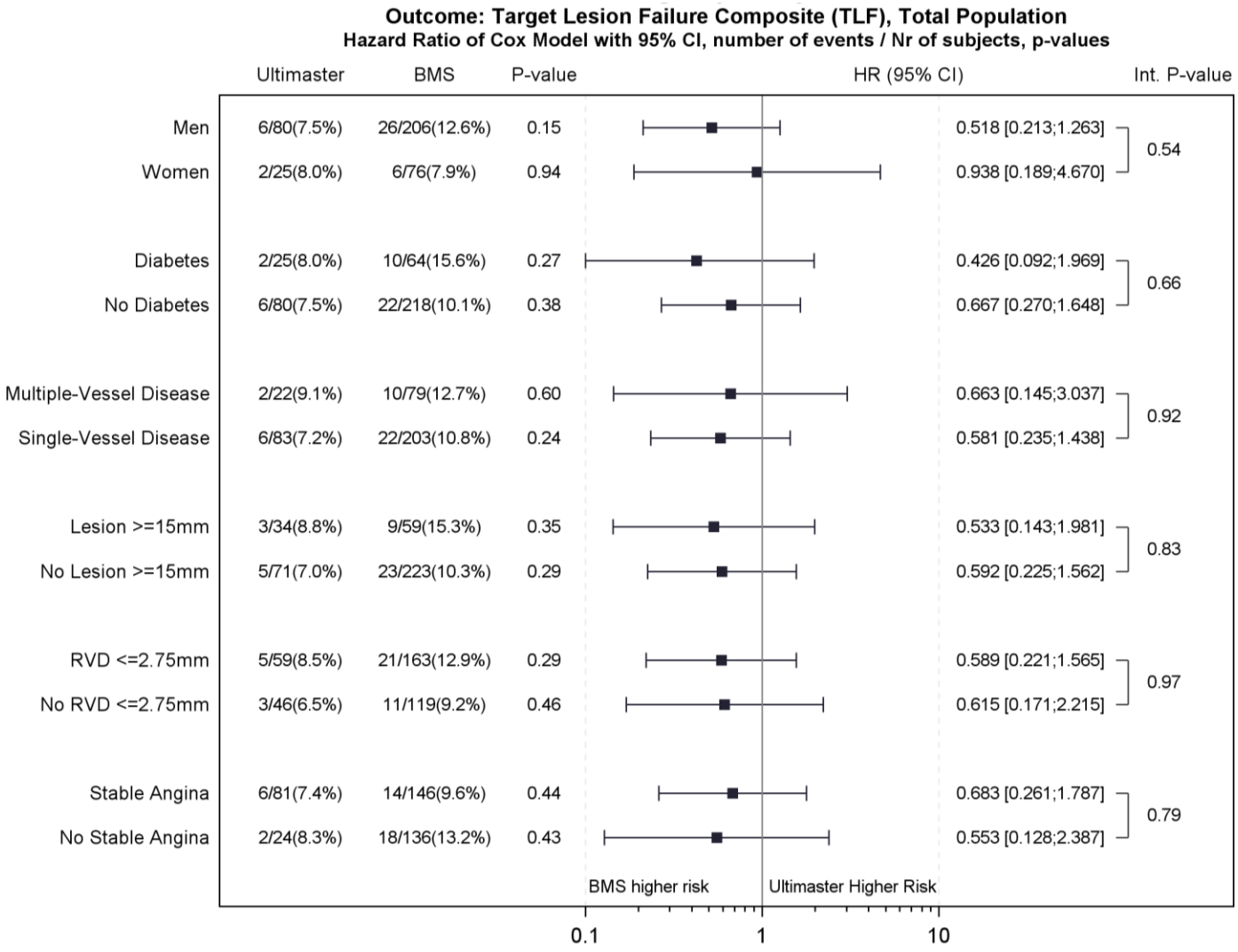
* One acute stent thrombosis due to untreated dissection

CENTURY vs KARE
Kaplan-Meier curve of TVF up to 5 years



TVF: target vessel failure, composite of cardiac death, TV related MI and CD-TVR.

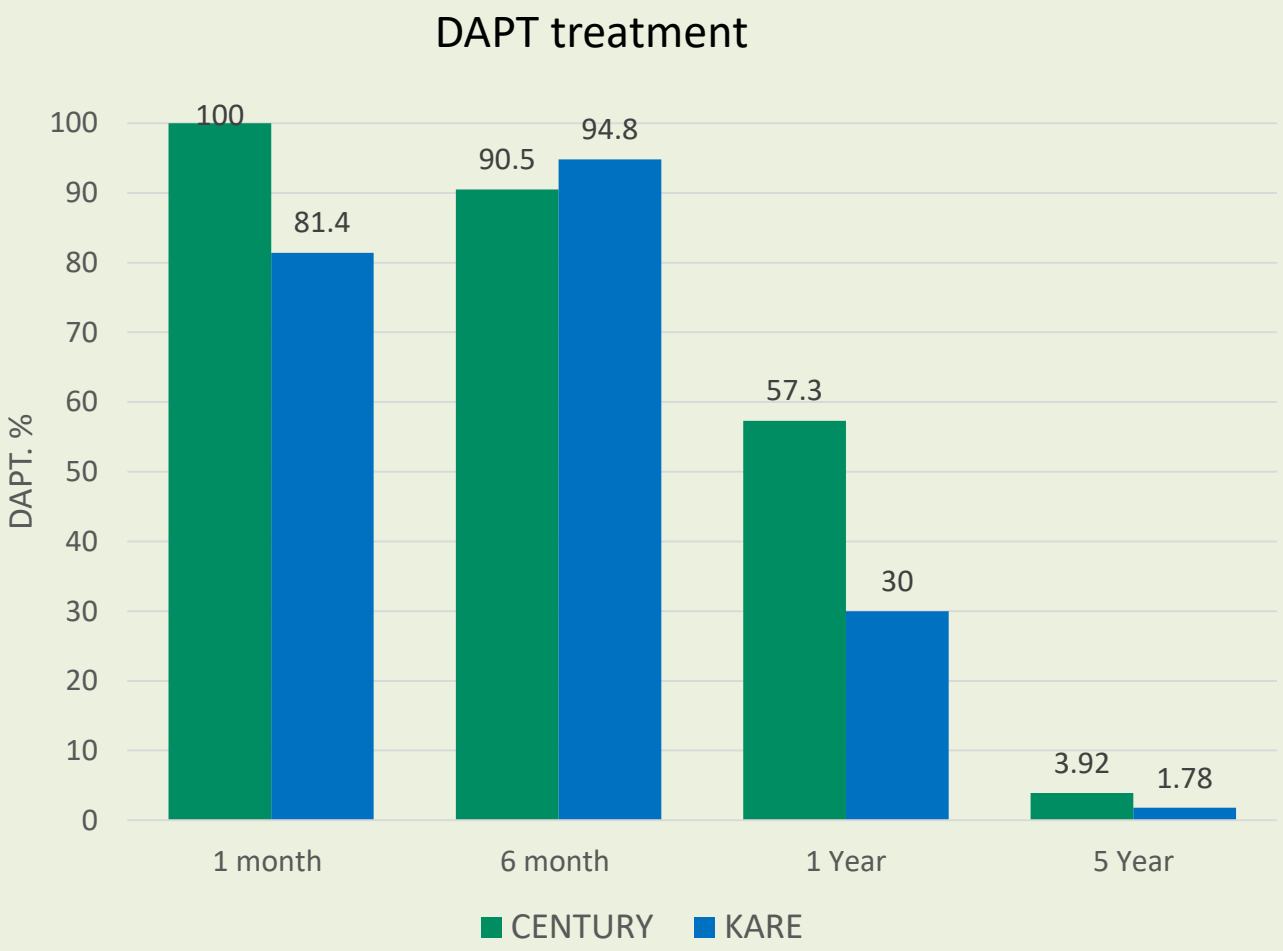
CENTURY vs KARE – Subgroup analysis of hazard ratio using Cox model



BMS higher risk

Ultimaster higher risk

CENTURY vs KARE
DAPT up to 5 years



CENTURY – Conclusions (1/2)

- Ultimaster DES has several distinct features that are designed to:
  - ✓ Further optimize treatment and clinical outcomes of patients with coronary artery disease;
  - ✓ Potentially minimize duration of DAPT.
- Ultimaster DES showed superior efficacy versus bare metal stent (historical control) by **reducing late loss at 6 months by 95%.**
- Long term follow-up until 5 years showed **low rates of clinically indicated revascularizations of target lesion** compared with its bare metal platform Kaname. The clinical safety of Ultimaster DES was also reflected **by no new stent thromboses between 1 day to 5 years.**

CENTURY – Conclusions (2/2)

- These positive results of Ultimaster DES have been **confirmed in a randomized trials (CENTURY II and MASTER) including a broader patient population,** patients with STEMI and complex lesions, as well as in a large worldwide all-comers registry (e-Ultimaster), representative of real world PCI practice. The feasibility and **safety of reduced DAPT is currently being studied** in a large, randomized, MASTER DAPT clinical trial.