

EffPac-Trial: Effectiveness of LUMINOR[®] DCB versus POBA in the SFA: 12 months results

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on behalf of the investigators

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Disclosure

Speaker name:

Ulf Teichgräber, MD, MBA

I have the following potential conflicts of interest to report:

Receipt of grants/research support

Receipt of honoraria and travel support

Participation in a company sponsored speakers' bureau

Employment in industry

Shareholder in a healthcare company

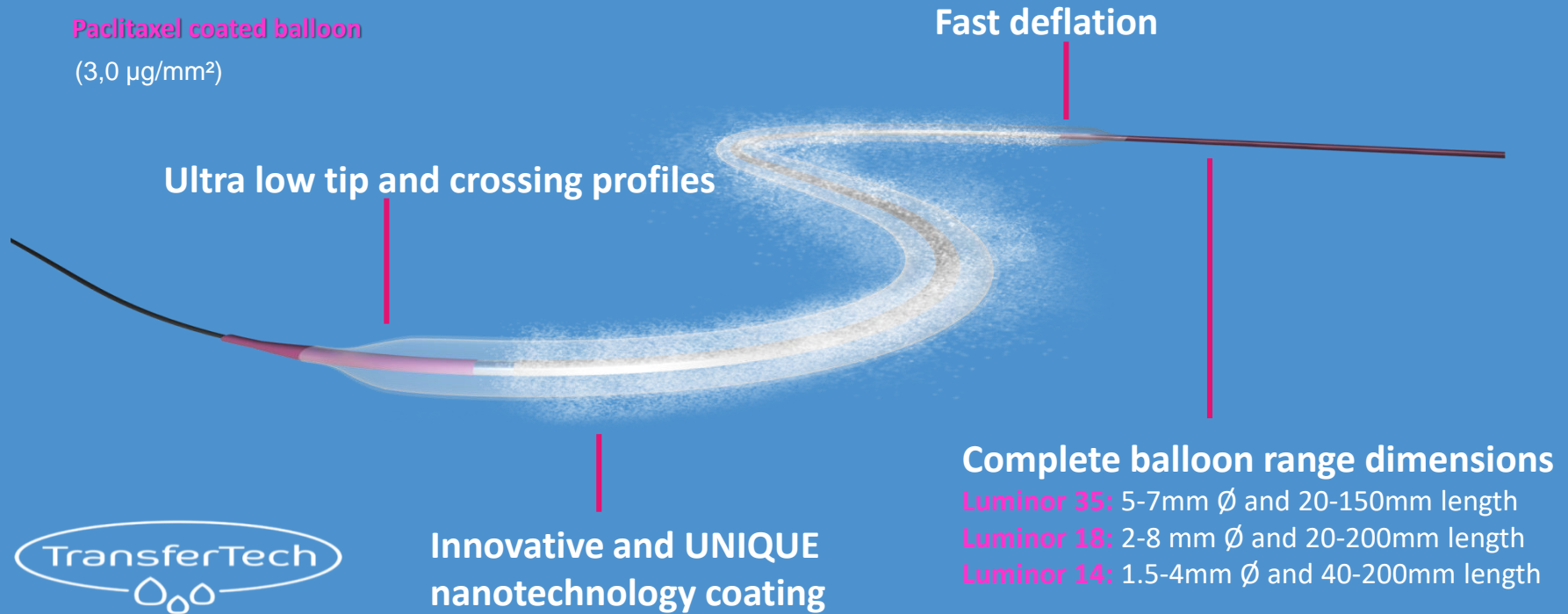
Owner of a healthcare company

I do not have any potential conflict of interest

luminor

Paclitaxel coated balloon

(3,0 µg/mm²)



Ultra low tip and crossing profiles

Fast deflation

Innovative and **UNIQUE**
nanotechnology coating

Complete balloon range dimensions

Luminor 35: 5-7mm Ø and 20-150mm length

Luminor 18: 2-8 mm Ø and 20-200mm length

Luminor 14: 1.5-4mm Ø and 40-200mm length



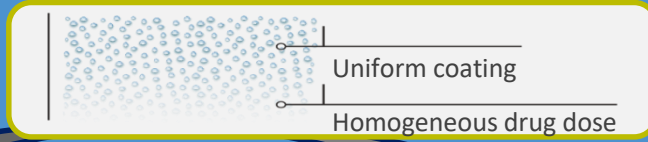
luminor UNIQUE nanotechnology coating



Ultrasound

Spray Technology

Dosage of uniform diameter nanodrops by ultrasonic deposition

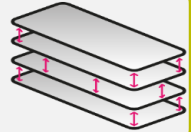


Uniform coating

Homogeneous drug dose

Multi-layer technology

- Coating durability during the procedure
- No cracking



Dry-off

- Microcrystalline structure
- Optimal drug transfer to the vessel wall within 30-60s seconds

TransferTech



Proprietary nanotechnology dosage system for an **uniform, flexible and ultrathin coating**

Excipient **20%**

Paclitaxel **80%**

Excipient

- Organic ester
- Biocompatible
- Lipophilic

Paclitaxel

- Lipophilic
- Inhibition of stenosis
- Specific cellular receptors

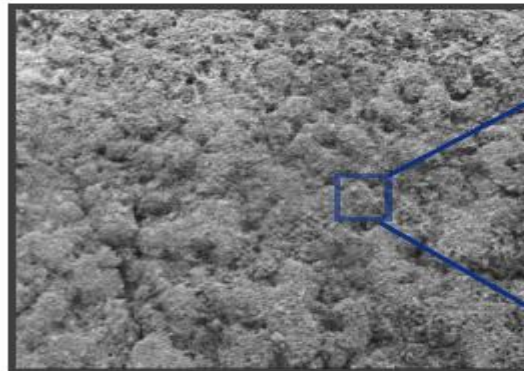
Coating Technology

- **Ultrathin multilayer coating:**

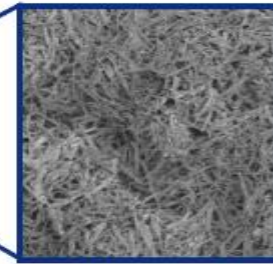
- Increases **adhesion** to balloon
 - **Lower loss** related to manipulation
- Improves **durability:**
 - **Lower loss** during navigation
- Improves mechanical properties
- **Fast absorption:** 30-60s



Dosage of uniform diameter nanodrops by direct ultrasonic deposition



SEM: magnify: x250



SEM: magnify: x 1000

Study Title

Multicenter Randomized Controlled Trial to Assess the
Effectiveness of **P**aclitaxel-coated Luminor[®] Balloon Catheter

VS.

Uncoated Balloon Catheter

in the Superficial Femoral and Popliteal Arteries to Prevent Vessel
Restenosis or Reocclusion

EffPac Trial

Design:

Investigator-initiated, prospective, multi-centre, intention-to-treat trial and 2 arms-randomized study

Objective:

Safety and efficacy of the Luminor® Paclitaxel drug-eluting balloon in inhibiting restenosis and in ensuring long-term patency

Sponsor: University of Jena, Germany

Representative of the sponsor: Prof. Dr. Ulf Teichgräber, Jena University Hospital

EffPac Trial

CoreLab: Dr. Ulrich Beschorner, coreLab Bad Krozingen GmbH, Germany

Data Safety and Monitoring Board (DSMB):

Dr. Michael Werk, Martin Luther Krankenhaus, Berlin, Germany

Dr. Vicenc Riambau, Hospital Clinic de Barcelona, Spain

Prof. Dr. Wienke, University Halle-Wittenberg, Germany

Monitoring (VascuScience GmbH): Dr. Christin Ott, Svenja Peters, Leipzig, Germany

Project Management: Nicole Brillinger, Tabitha Heller, University Hospital Jena, Germany

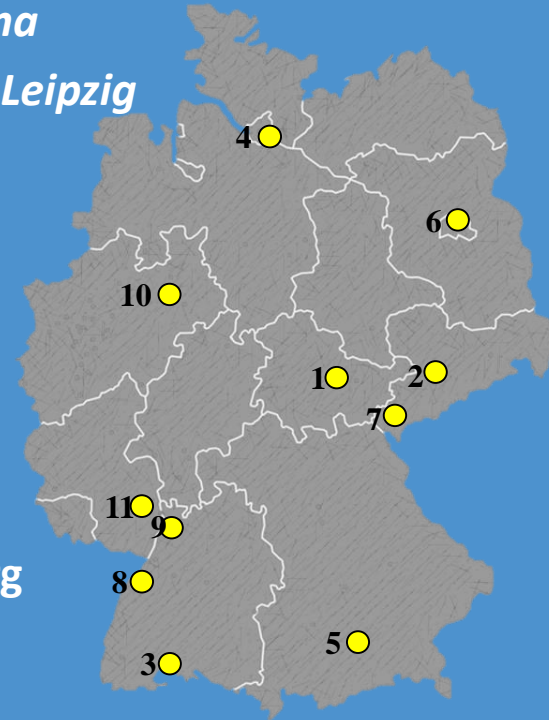
SAE Management: Monique Philipp, University Hospital Jena, Germany

Data Management: Cornelia Eichhorn, University Hospital Jena, Germany

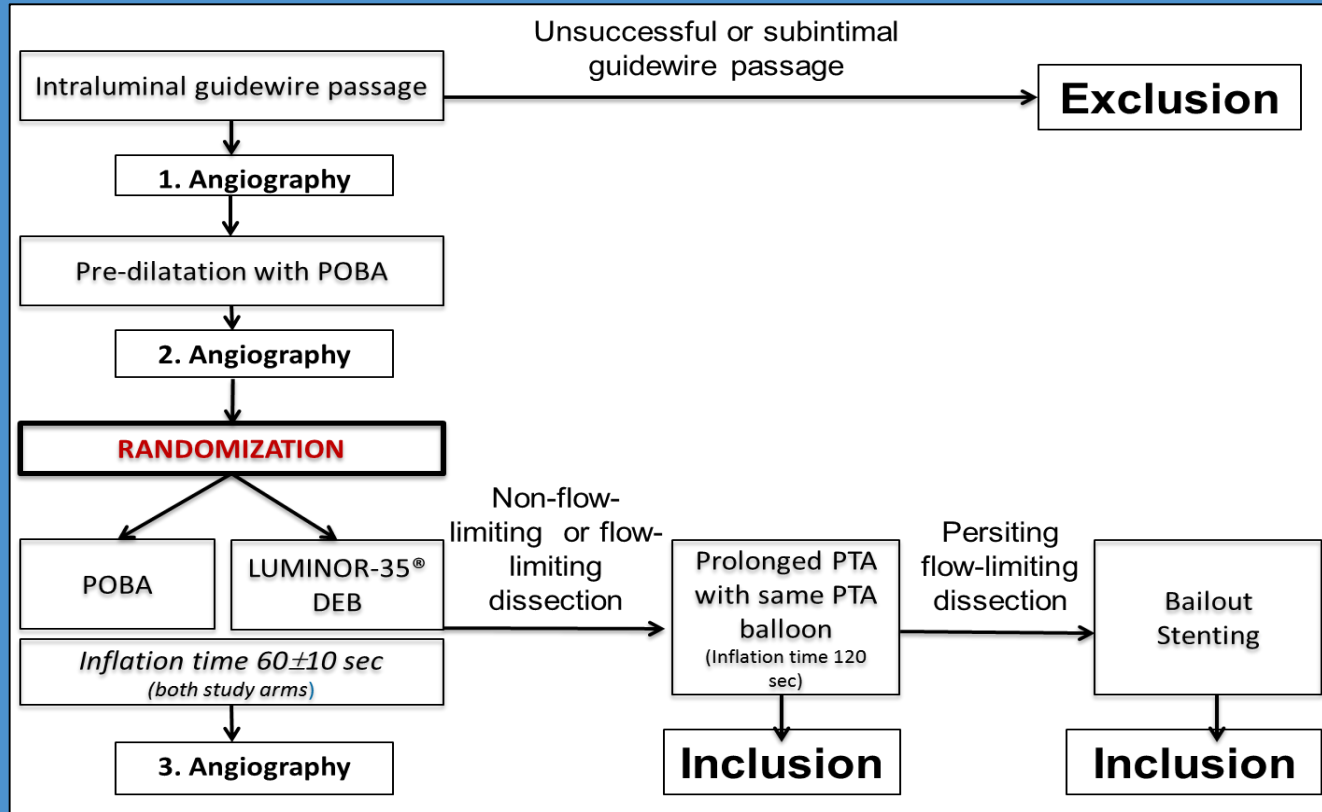
Producer of the Investigational Product: Life Vascular Devices Biotech, S.L., Barcelona, Spain

11 Participating Sites

- | | |
|------------------|---|
| 01 Jena | PD Dr. R. Aschenbach, <i>University Hospital Jena</i> |
| 02 Leipzig | Prof. Dr. Dierk Scheinert, <i>University Hospital Leipzig</i> |
| 03 Bad Krozingen | Prof. Dr. Thomas Zeller, <i>Heart Center</i> |
| 04 Hamburg | Dr. S. Sixt, Dr. S. Brucks, <i>Angiologikum</i> |
| 05 München | PD Dr. M. Treitl, <i>University Hospital</i> |
| 06 Berlin | Prof. Dr. K. Brechtel, <i>„Ihre Radiologen“</i> |
| 07 Sonneberg | Dr. M. Thieme, <i>Medinos Clinic</i> |
| 08 Karlsbad | Prof. Dr. E. Blessing, <i>SRH-Clinic</i> |
| 09 Heidelberg | Dr. B. Vogel, Dr. C. Erbel, <i>University Heidelberg</i> |
| 10 Arnsberg | Dr. M. Lichtenberg, <i>Clinic Arnsberg</i> |
| 11 Kusel | Dr. P. von Flotow, <i>Westpfalz Clinic</i> |



Flowchart



Trial Design and Endpoints

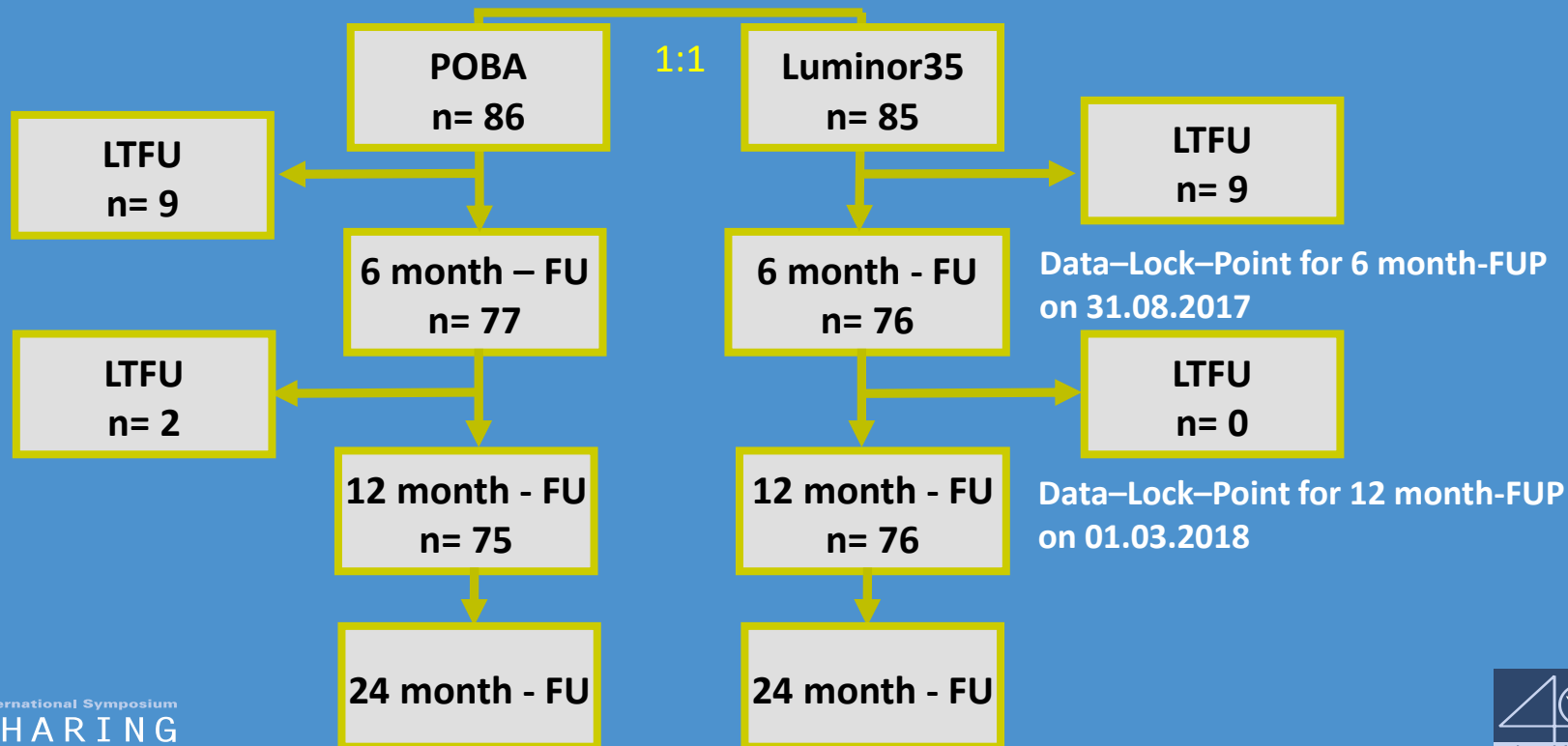
Endpoints		Baseline	6 month	12 month	24 month
Efficacy	Primary	Vessel diameter (mm)	<ul style="list-style-type: none"> Late Lumen Loss (LLL) 	-	-
	Secondary		<ul style="list-style-type: none"> Freedom from Target Lesion Revascularization (TLR/TVR) Patency* Change of ABI, Rutherford stage, QoL (WIQ), EQ-5D 		
Safety	Primary		<ul style="list-style-type: none"> Major and minor amputation rate at index limb Mortality, independently of cause 		

Distribution

171/172 subjects
enrolled

Recruitment completed on 31. Dec. 2016

Randomization



Baseline Patient Characteristics

	LUMINOR®	POBA
Age - yr	68.0 ± 7.5 (85)	68.1 ± 8.8 (86)
Male - % (no.)	60.0% (51/85)	69.8% (60/86)
Diabetes mellitus - % (no.)	36.5% (31/85)	40.7% (35/86)
Hypertension - % (no.)	87.1% (74/85)	84.9% (73/86)
Hyperlipidemia - % (no.)	70.6% (60/85)	68.6% (59/86)

Rutherford at Baseline

		LUMINOR™	POBA
Rutherford Clinical Category			
Mild claudication	1	0% (0/85)	0% (0/85)
Moderate claudication	2	15.3% (13/85)	21.2% (18/85)
Severe claudication	3	81.2% (69/85)	77.6% (66/85)
Ischemic rest pain	4	2.4% (2/85)	1.2% (1/85)
Minor tissue loss	5	1.2% (1/85)	0% (0/85)
Major tissue loss	6	0% (0/85)	0% (0/85)
ABI (treated leg)		0.73 ± 0.23 (69)	0.74 ± 0.23 (69)

Baseline Angiographic Data

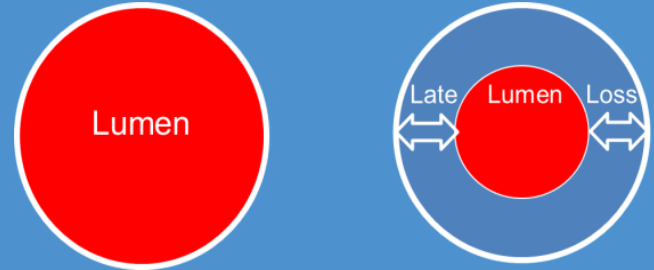
	LUMINOR®	POBA	p value
Lesion Length (cm)	5.9 ± 4.3 (84)	5.6 ± 3.9 (86)	0.731
Total Occlusion	20.2% (17/84)	25.6% (22/86)	0.468
Calcification			0.094
none/mild	54.2% (45/83)	44.2% (38/86)	
moderate	42.2% (35/83)	44.2% (38/86)	
severe	3.6% (3/83)	11.6% (10/86)	
Diameter Stenosis (%)	88.0 ± 9.8 (85)	90.1 ± 8.8 (86)	0.191
Reference Vessel Diameter (mm)	5.4 ± 0.6 (85)	5.4 ± 0.7 (86)	0.732
# of Patent Run-off Vessel			0.311
0	0% (0/85)	1.2% (1/86)	
1	22.4% (19/85)	22.1% (19/86)	
2	41.2% (35/85)	31.4% (27/86)	
3	36.5% (31/85)	45.3% (39/86)	

Procedural Characteristics

	LUMINOR®	POBA	p value
Vessel preparation: Pre-dilatation performed	100% (84/84)	98.8% (85/86)	1.000
Dissection	37.6% (32/85)	40.7% (35/86)	0.755
Stent rate	15.3% (13/85)	18.8% (16/85)	0.684

Primary Endpoint: **Late Lumen Loss** (LLL)

* **LLL** = difference between the diameters (in mm) at 6 months follow-up minus post-procedure



	LUMINOR®	POBA	Difference, 95% CI (LUMINOR® vs. POBA)	p value
LLL 6M (mm)*	0.14 [CI: -0.38; 0.67]	1.06 [CI: 0.54; 1.59]	-0.92 [CI: -1.36; -0.49]	<0.001

* Estimated LLL (Mean, 95% CI) from linear mixed model adjusted for center

Efficacy: Late Lumen Loss (LLL)

Study	Drug-coated balloon 6 mo LLL (mm)	Control 6 mo LLL (mm)	LLL Difference (mm)
THUNDER Tepe et al. 2008 Paccocath coating	0.4±1.2	1.7±1.8	-1.3
AcoArt I Trial Jia et al. 2016 Orchid (Acotec)	0.05±0.73	1.15±0.89	-1.1
EFFPAC 2018 Luminor (iVascular)	0.14 [CI: -0.38; 0.67]	1.06 [CI:0.54; 1.59]	-0.92
RANGER Bausback et al. 2017 Ranger DCB	-0.16±0.99	0.76±1.4	-0.92
LEVANT I Scheinert et al. 2014 Lutonix (Bard)	0.46±1.13	1.09±1.07	-0.63
BIOLUX P-I Trial Scheinert et al. 2015 Passeo-18 Lux (Biotronik)	0.51±0.72	1.04±1.0	-0.53
FEMPAC Werk et al. 2008 Paccocath DCB	0.5±1.1	1.0±1.1	-0.5
CONSEQUENT 2017 SeQuent Please (B. Braun)	0.35 [CI: 0.19; 0.79]	0.72 [CI: 0.68; 1.22]	-0.37

Efficacy: Improvement of Rutherford DEB vs POBA

*

Improvement of Rutherford Stages*	6M		12M**	
	LUMINOR®	POBA	LUMINOR®	POBA
Deterioration of 1 stage	1.4% (1/74)	0% (0/72)	1.3% (1/75)	2.8% (2/72)
No improvement	13.5% (10/74)	25.0% (18/72)	8.0% (6/75)	20.8% (15/72)
Improvement of 1 stage	12.2% (9/74)	20.8% (15/72)	17.3% (13/75)	19.4% (14/72)
Improvement of 2 stages	28.4% (21/74)	26.4% (19/72)	24.0% (18/75)	27.8% (20/72)
Improvement of 3 stages	44.6% (33/74)	27.8% (20/72)	49.3% (37/75)	29.2% (21/72)

* In comparison to baseline

** In case of TLR, 6M results were used

*** Cochran-Mantel-Haenszel method,

**** Mann-Whitney U test

p=0.021***/
p=0.015****

p=0.055***
/p=0.006***
*

Efficacy: Target Lesion Revascularization (TLR)

	LUMINOR®	POBA	Relative Risk, 95% CI (LUMINOR® vs. POBA)	Number needed to treat (NNT)	p value
TLR 6M (%)	1.3 (1/76)	17.1 (13/76)	0.082 [CI: 0.012; 0.560]	7	<0.001
TLR 12M (%)	1.3 (1/76)	18.7 (14/75)	0.077 [CI: 0.011; 0.526]*	6	<0.001

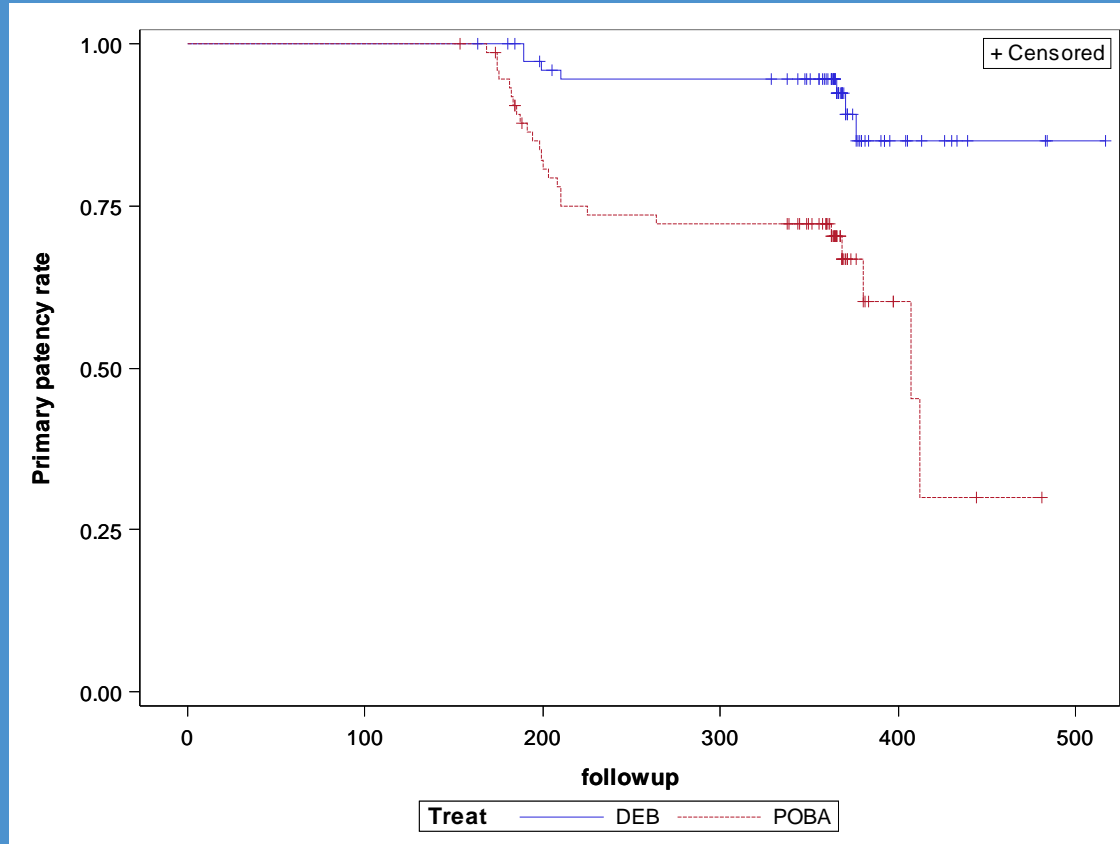
*Relative Risk Reduction (RRR) = 92.3%, Cochran-Mantel-Haenszel estimate, adjusted for center

Efficacy: Target Lesion Revascularization (TLR)

Study	DCB 12 mo TLR (%)	Control 12 mo TLR (%)	NNT
EFFPAC 2018 Luminor (iVascular)	1.3 (1/76)	17.7 (14/75)	6
THUNDER Tepe et al. 2008 Paccocath coating	10 (5)	48 (26)	3
AcoArt I Trial Jia et al. 2016 Orchid (Acotec)	7.2 (7/97)	39.6 (38/96)	4
CONSEQUENT 2017 SeQuent Please (B. Braun)	17.8 (13)	37.7 (26)	6
RANGER Bausback et al. 2017 Ranger DCB	9.0*	30.0*	5
BIOLUX P-I Trial Scheinert et al. 2015 Passeo-18 Lux (Biotronik)	15.4 (4)	41.7 (10)	4

* Kaplan-Meier estimates

Efficacy: Patency



Efficacy: **Patency**

	LUMINOR®	POBA	Relative Risk, 95% CI (LUMINOR® vs. POBA)	Number needed to treat (NNT)	p value
Patency 6M (%)	94.7 (72/76)	75.0 (57/76)	1.26 [CI: 1.100; 1.443]	6	<0.001
Patency 12M (%)	90.3 (65/72)	65.3 (47/72)	1.38* [CI: 1.146; 1.664]	4	<0.001

Primary patency: Freedom from restenosis (determined by duplex ultrasound PSVR <2.5) and freedom from TLR at 12 months

* Interpretation: Relative chance for patency is increased by 38% in the LUMINOR® group

Efficacy: **Patency**

- * Patency based on freedom from target lesion revascularization and restenosis, restenosis by angiography (>50%DS) at 12M
- ** Kaplan-Meier estimates

Study	DCB 12 mo Patency (%)	Control 12 mo Patency (%)	NNT
EFFPAC 2018 Luminor (iVascular)	90.3(65/72)	65.3 (47/72)	4
IN.PACT Tepe et al. 2015 IN.PACT Admiral DCB	82.2 (157/191)	52.4 (54/103)	4
ILLUMINATE Schroeder et al. 2017 Stellarex DCB	83.9 (188/224)	60.6 (40/66)	5
AcoArt I Trial Jia et al. 2016 Orchid (Acotec)	76.1 (67/88)	33.7 (30/89)	3
LEVANT I Scheinert et al. 2014 Lutonix DCB	66.7 (30/45)**	54.8 (23/42)**	9
RANGER-SFA 2017 Ranger DCB	86.0**	56.0**	4

Safety: Adverse Events (AE) after 12M

	LUMINOR®	POBA	p value
Minor Amputation (%)	0 (0/85)	1.2 (1/86)	1.000
Major Amputation (%)	0 (0/85)	0 (0/86)	1.000
Death (not related, %)	1.2 (1/85)	2.3 (2/86)	1.000

Conclusions

The **LUMINOR® Paclitaxel-coated balloon catheter** demonstrates to be **clinical highly effective and safe in inhibiting restenosis** compared to **POBA**

The **innovative coating technique** matters and is **shown not only in the patency, LLL and TLR data**, but also in an **improvement of the Rutherford stage**

The results of the study allow **direct comparison to other already-completed RCTs** applying Paclitaxel-coated DEB from different manufacturers in the same target vessel

EffPac trial results after 24-months will be presented in spring 2019

