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

Ulf Teichgräber, MD, MBA
on behalf of the investigators

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International Symposium CHARING CROSS

NCT02540018 | Teichgräber et al. Trials (2016) DOI 10.1186/s13063-016-1657-x

40 Years of Looking Forward

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)

Fast deflation

Ultra low tip and crossing profiles

Innovative and UNIQUE nanotechnology coating

Complete balloon range dimensions

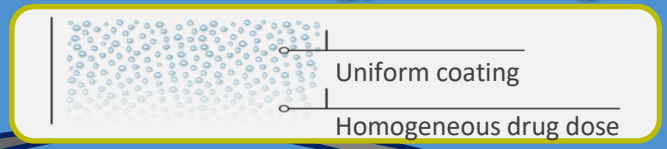
Luminor 35: 5-7mm Ø and 20-150mm length

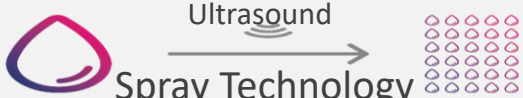
Luminor 18: 2-8 mm Ø and 20-200mm length

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

TransferTech

luminor UNIQUE nanotechnology coating

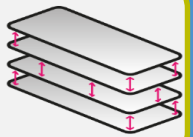




Spray Technology

Dosage of uniform diameter nanodrops by ultrasonic deposition

Multi-layer technology



- Coating durability during the procedure
- No cracking

TransferTech

Excipient
- Organic ester
- Biocompatible
- Lipophilic

Paclitaxel
- Lipophilic
- Inhibition of stenosis
- Specific cellular receptors

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

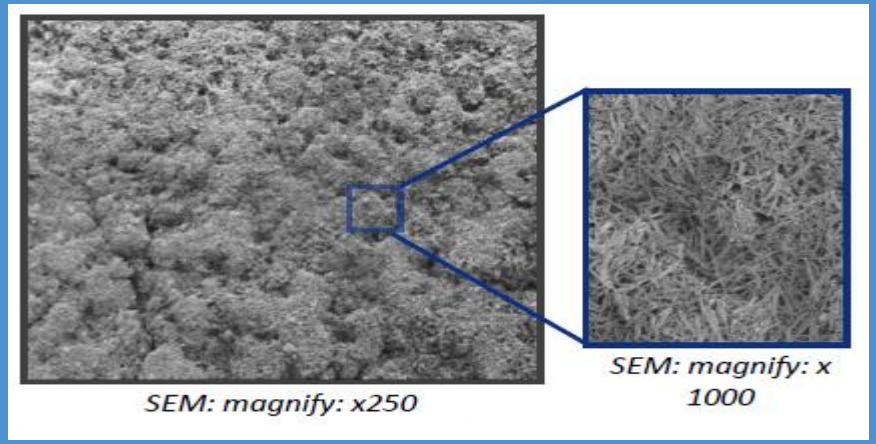
Dry-off

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

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



Study Title

Multicenter Randomized Controlled Trial to Assess the Effectiveness of Paclitaxel-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

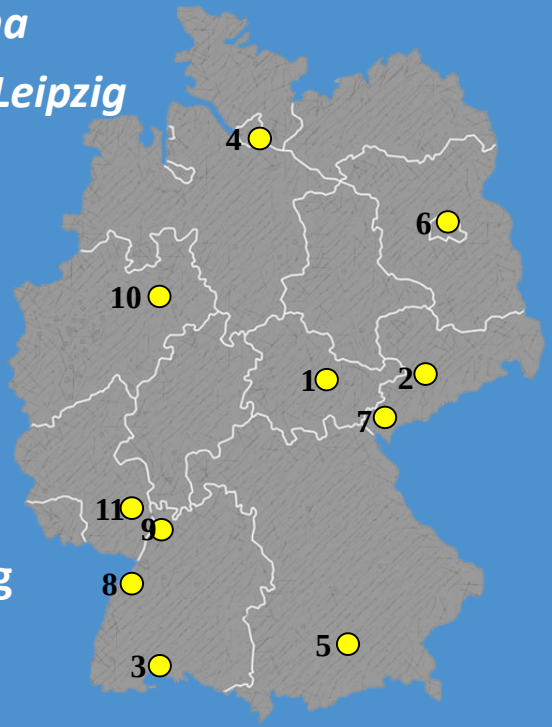
SAE Management: Monique Philipp, University Hospital Jena, Germany

Data Mangement: Cornelia Eichhorn, University Hospital Jena, Germany

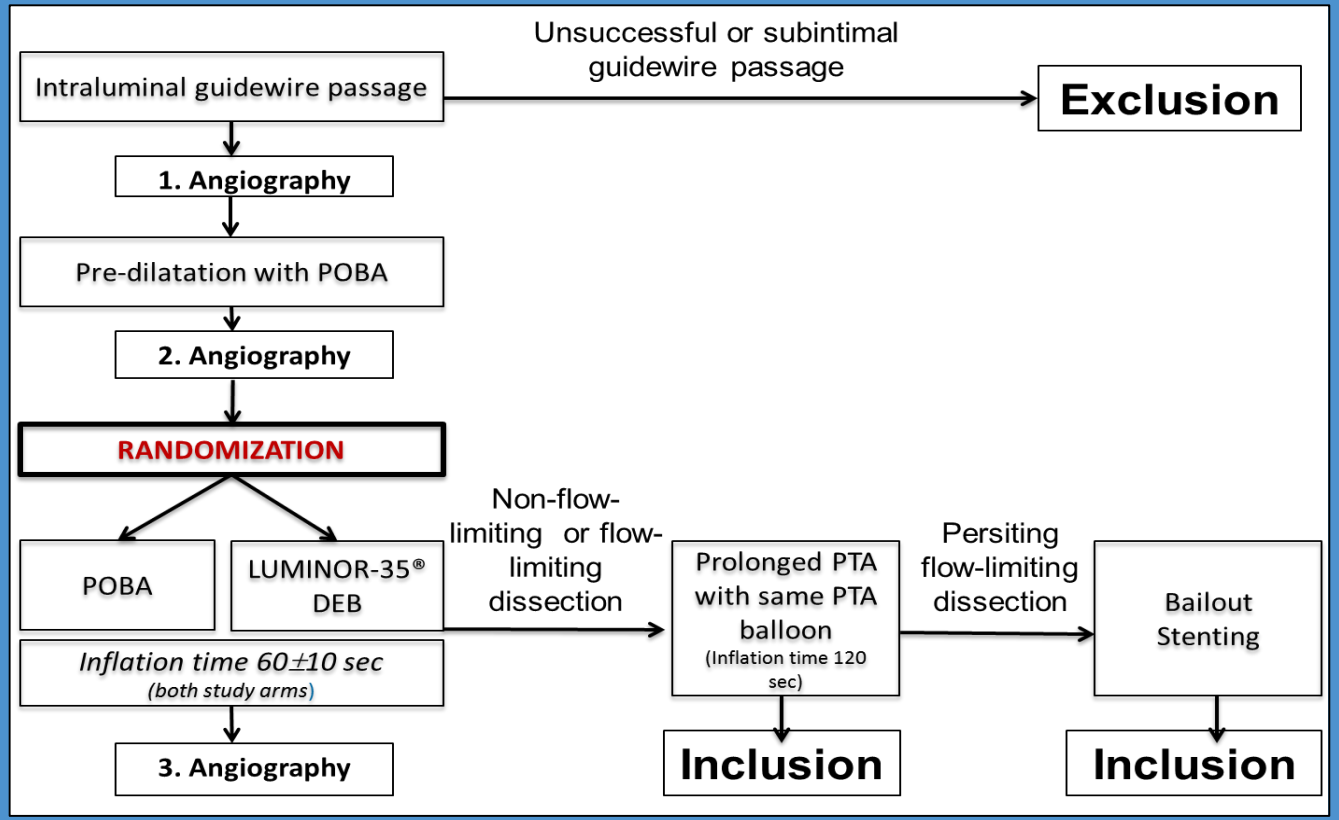
Producer of the Investigational Product: Life Vascular Devices Biotech, S.L., Barcelona, Spain

11 Participating Sites

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



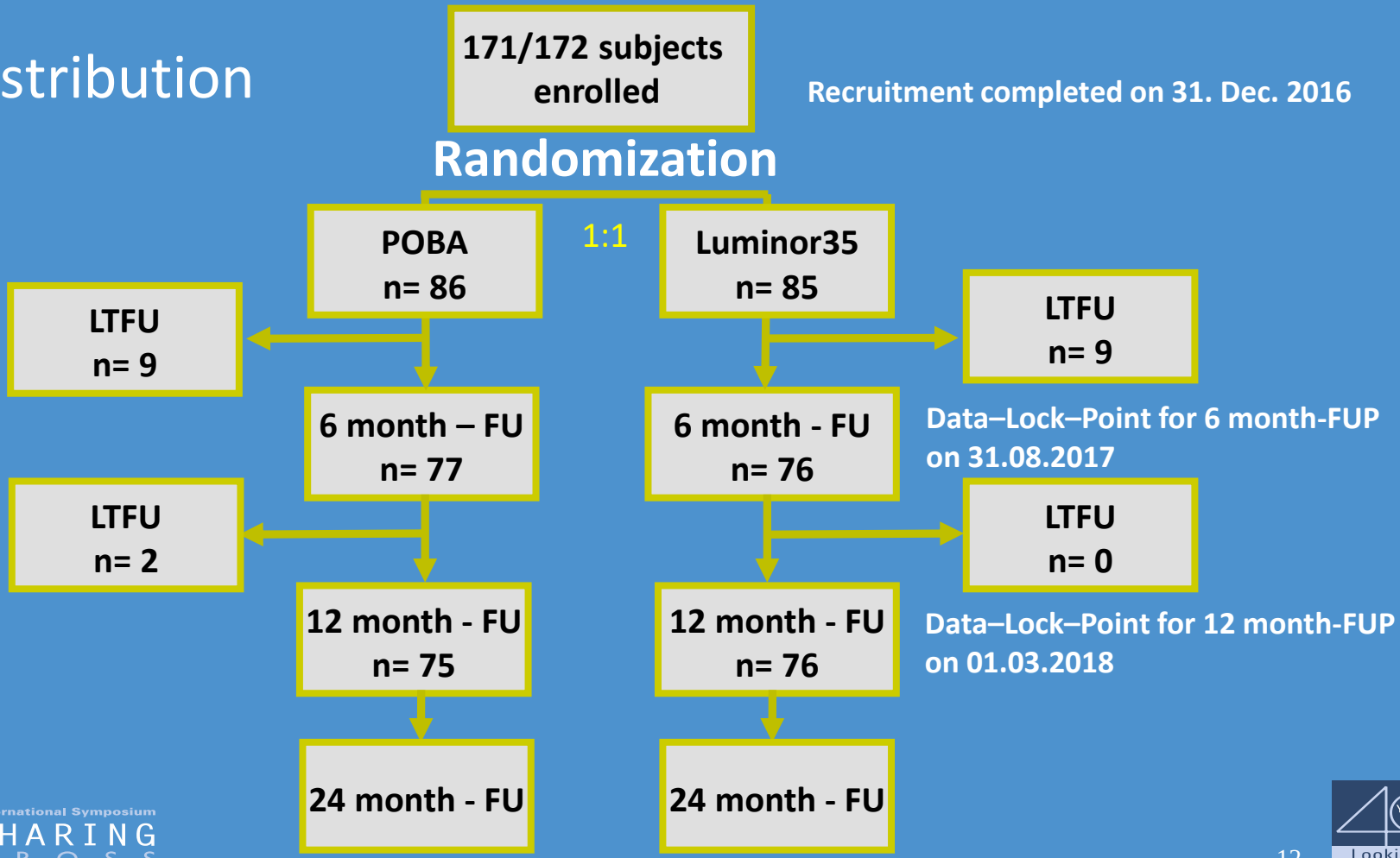
Flowchart


Intraluminal guidewire passage
Unsuccessful or subintimal guidewire passage
Exclusion
1. Angiography
Pre-dilatation with POBA
2. Angiography
RANDOMIZATION
POBA
LUMINOR-35® DEB
Inflation time 60±10 sec
(both study arms)
3. Angiography
Non-flow-limiting or flow-limiting dissection
Prolonged PTA with same PTA balloon
(Inflation time 120 sec)
Inclusion
Persiting flow-limiting dissection
Bailout Stenting
Inclusion

Trial Design and Endpoints

Endpoints		Baseline	6 month	12 month	24 month
Efficacy	Primary	Vessel diameter (mm)	• Late Lumen Loss (LLL)	-	-
	Secondary		• Freedom from Target Lesion Revascularization (TLR/TVR) • Patency* • Change of ABI, Rutherford stage, QoL (WIQ), EQ-5D		
Safety	Primary		• Major and minor amputation rate at index limb • Mortality, independently of cause		

Distribution



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

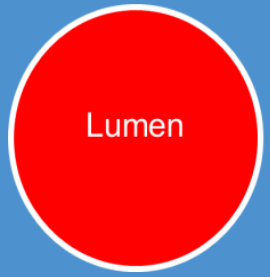
	LUMINOR®	POBA	p value
Lesion Length (cm)	5.9 ± 4.3 (84)	5.6 ± 3.9 (86)	0.731
Total Occlusion	20.2% (17/84)	25.6% (22/86)	0.468
Calcification			0.094
none/mild	54.2% (45/83)	44.2% (38/86)	
moderate	42.2% (35/83)	44.2% (38/86)	
severe	3.6% (3/83)	11.6% (10/86)	
Diameter Stenosis (%)	88.0 ± 9.8 (85)	90.1 ± 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)	

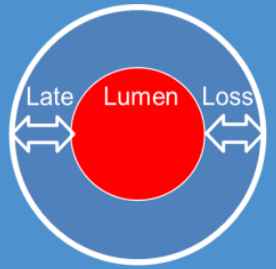
Procedural Characteristics

	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 *

	6M		12M**	
Improvement of Rutherford Stages*	**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

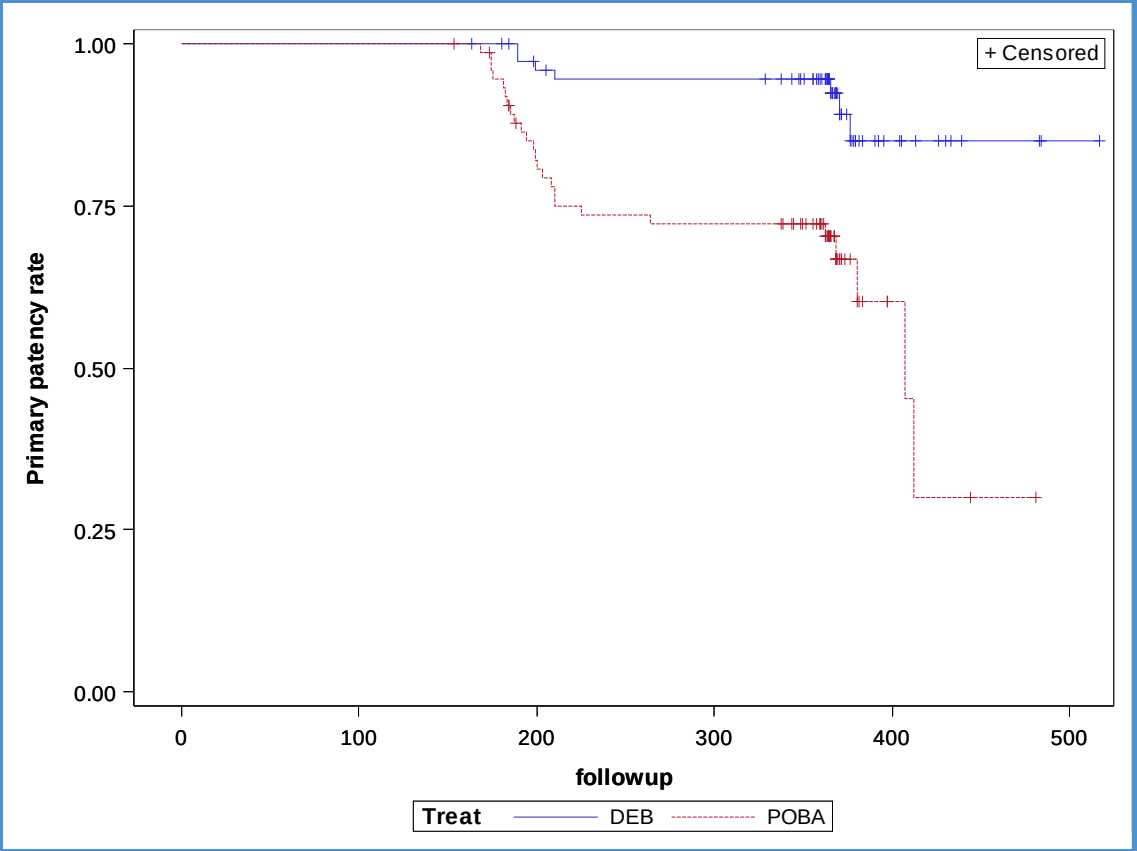
*Relative Risk Reduction (RRR) = 92.3%, Cochran-Mantel-Haenszel estimate, adjusted for center

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