



# Safety and efficacy of drug-eluting balloon angioplasty of dialysis fistula: 12 months outcomes from a randomized clinical trial with Passeo-18 Lux

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# Disclosure

Speaker name: Eric Therasse

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I have the following potential conflicts of interest to report:

- Consulting
- Employment in industry
- Stockholder of a healthcare company
- Owner of a healthcare company
- Other(s): Biotronik provided an unrestricted research grant to support this investigator-initiated trial.
- I do not have any potential conflict of interest

# Introduction



## **Background:**

- Safety / efficacy of DCB is influenced by paclitaxel dosages and excipients

## **Hypothesis:**

- Angioplasty with a paclitaxel / Butyryl tri-hexyl citrate (BTHC) coated PTA balloon (Passeo-18 Lux) would significantly decrease the restenosis rate of dialysis fistulae in comparison with plain balloon PTA

## **Objective:**

- To test this hypothesis in a controlled trial



# Material & Methods

## Study design

- Investigator-initiated and designed
- Prospective, single blinded, randomized multi-center clinical trial
- Patient enrolled from March 2014 to April 2018
- ClinicalTrials.gov identifier: NCT01928498



# Material & Methods

## **Clinical inclusion criteria**

- AVF and AVG
- Dysfunctional according the KDOQI clinical practice guidelines

## **Clinical exclusion criteria**

- Pregnant women
- Patients enrolled in another protocol
- Patients with HA intervention within the past 30 days
- Life expectancy < 12 months



# Material & Methods

## **Angiographic inclusion criteria**

- Recurrent or de novo stenoses
- < 2 cm upstream from the arterial anastomosis to the SVC
- $\leq 5$  cm in length and  $> 50\%$  in diameter
- Reference vessel diameter 4 - 7mm (largest DCB diameter available)

## **Angiographic exclusion criteria**

- HA with total occlusion

# Material & Methods



## **Angioplasty**

- Antegrade / retrograde venous access
- Non-compliant high-pressure PTA balloons
- Diameter = or 1 mm larger than reference diameter
- Kept inflated for 60 seconds

# Material & Methods



## Randomization

### **DCB (Biotronik Passeo-18 Lux) vs plain PTA balloon (Passeo-18)**

- Inflated for 60 seconds, at the same site as the high-pressure balloon
- Nominal pressure
- Diameter was the same as the high-pressure balloon

### **Single-blinded study**

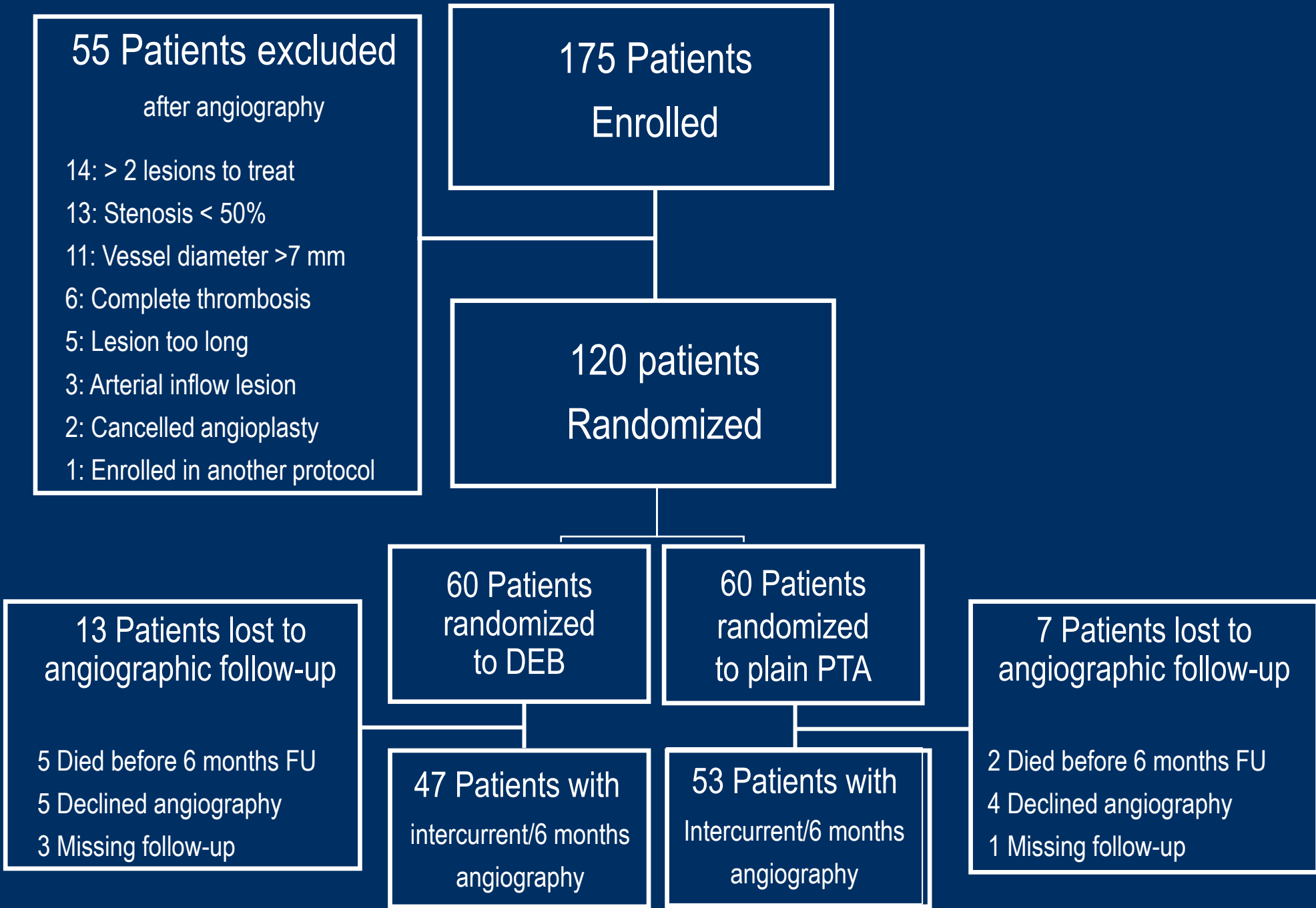
- Operators knew the patients' assigned group
- Patients, nephrologists, angiographic corelab & biostatistician were blinded



# Endpoints



- Primary efficacy endpoint: **Late lumen loss (LLL) at 6 m**
- Secondary endpoints:
  - MLD, % diameter and binary ( $\geq 50\%$ ) restenosis rates at 6 m
  - Number of adverse events within 12 months
  - Mortality at 12 months and as of July 16th 2019
  - HA failure rates at 12 months, composite endpoint of
    - (i) HA thrombosis
    - (ii) HA re-intervention or
    - (iii) dialysis catheter insertion



# Baseline demographic / clinical characteristics

<b>Characteristic</b>	<b>DCB N=60</b>	<b>Plain PTA N=60</b>	<b>P value</b>
Age, yrs	63.5±12.6	66.6±12.6	0.173
Male	83.3 (50)	83.3 (50)	1.000
Risk factors			
Dyslipidemia	65.0 (39)	65.0 (39)	1.000
Coronary artery disease	51.7 (31)	41.7 (25)	0.272
Diabetes mellitus	61.7 (37)	71.7 (43)	0.245
Hypertension	86.7 (52)	81.7 (49)	0.454
Current smoker	10.0 (6)	15.0 (9)	0.408
Peripheral arterial disease	18.3 (11)	18.3 (11)	1.000
Hepatic disease	5.0 (3)	11.7 (7)	0.186
COPD	18.3 (11)	8.3 (5)	0.107
Medication at baseline			
Antiplatelet	58.3 (35)	55.0 (33)	0.713
Anticoagulant	13.3 (8)	16.7 (10)	0.619

# Baseline hemodialysis access characteristics

Characteristic	DCB N=60	Plain PTA N=60	P value
Nature of hemodialysis access			
Arteriovenous fistulae	90.0 (54)	91.7 (55)	0.752
Arterio-venous grafts	10.0 (6)	8.3 (5)	-
De novo lesion	64.4 (38)	65.0 (39)	0.946
Hemodialysis access anastomosis			
Radiocephalic	61.7 (37)	60.0 (36)	0.956
Brachiocephalic	30.0 (18)	33.3 (20)	-
Brachio-basilic	5.0 (3)	3.3 (2)	-
Other vessels	3.3 (2)	3.3 (2)	-
Hemodialysis access age, years	2.58±3.62	2.58±2.42	1.000
Side of stenoses - Left	70 (42)	76.7 (46)	0.409
Site of stenoses			
Forearm, cephalic vein	50.0 (30)	53.3 (32)	0.498
Forearm, cubital vein	1.7 (1)	0.0 (0)	-
Arm, axillary vein	0.0 (0)	1.7 (1)	-
Arm, basilic vein	8.3 (5)	3.3 (2)	-
Arm, cephalic vein	40.0 (24)	41.7 (25)	-



# Interventional characteristics



Characteristic	DCB N=60	Plain PTA N=60	P value
Number of stenoses treated			
1 stenosis	80.0(48)	93.3(56)	0.032
2 stenoses	20.0(12)	6.7(4)	-
Baseline lesion measurements			
% stenosis	66.5±9.37	67.0±9.67	0.768
MLD, mm	2.27±0.82	2.20±0.79	0.617
Reference vessel diameter, mm	6.72±1.35	6.66±1.41	0.808
Lesion length, mm	30.2±17.9	31.8±20.0	0.644
High pressure angioplasty			
Balloon length, mm	44.9±2.87	44.3±13.2	0.807
Balloon diameter, mm	5.80±0.95	5.73±0.99	0.674
Balloon inflation pressure, atm	19.18±4.31	19.28±5.00	0.914
Low pressure angioplasty			
Balloon length, mm	51.7±17.8	49.3±16.7	0.460
Balloon diameter, mm	5.80±0.90	5.74±1.02	0.741
Balloon inflation pressure, atm	9.40±3.24	10.4±3.42	0.106
Stenosis after angioplasty, %	39.3±11.9	39.8±12.7	0.819
MLD after dilatation, mm	4.00±0.92	3.96±0.99	0.794
Stent insertion	5.0(3)	3.3(2)	0.648

# Quantitative angiographic outcomes



<b>Outcome</b>	<b>DCB</b>	<b>Plain PTA</b>	<b>P value</b>
Patients with follow-up angiography	N=47	N=53	
Intercurrent	21.3 (10)	49.1 (26)	0.004
6-month follow-up	78.7 (37)	50.9 (27)	-
MLD, mm	N=46	N=51	
At intercurrent angiography	1.39±1.20	1.84±1.85	0.293
At 6 months angiography	3.81±1.16	3.70±1.51	0.751
At intercurrent or 6 months	3.34±1.51	2.83±1.60	0.113
LLL, mm			
At intercurrent angiography	1.74 ±1.20	2.02 ± 1.23	0.554
At 6 months angiography	0.37 ± 1.06	0.37 ± 1.31	0.995
At intercurrent or 6 months	0.64±1.20	1.13±1.51	0.082
Stenosis, % of lumen diameter	N=46	N=53	
At intercurrent angiography	75.8±20.4	70.4±14.7	0.399
At 6 months angiography	48.9±15.1	53.4±17.4	0.278
At intercurrent or 6 months	54.2±19.3	61.7±18.2	0.047
Binary restenosis rate	N=46	N=53	
At intercurrent angiography	88.9% (8)	92.3% (24)	0.752
At 6 months angiography	48.6% (18)	70.4% (19)	0.082
At intercurrent or 6 months	56.5% (26)	81.1% (43)	0.008

# K-M analysis

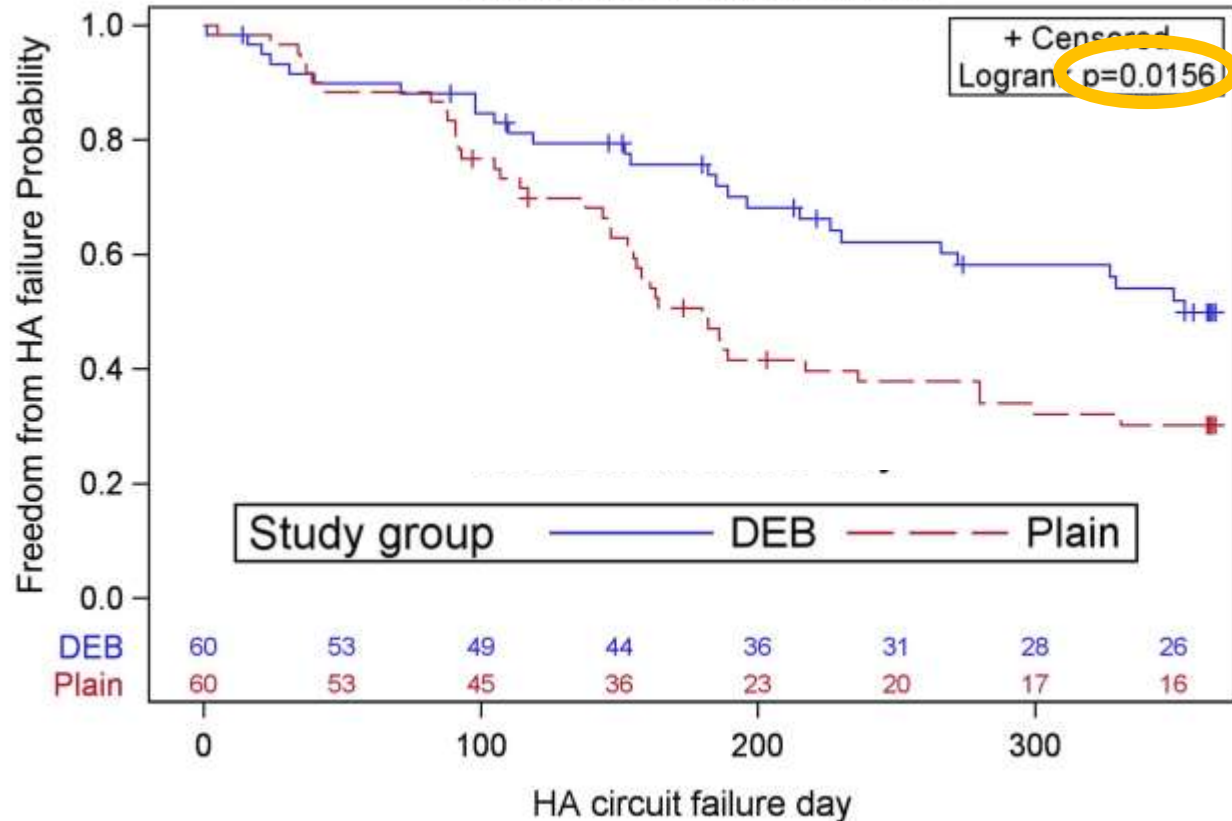


## HA circuit failure

## HA target lesion failure

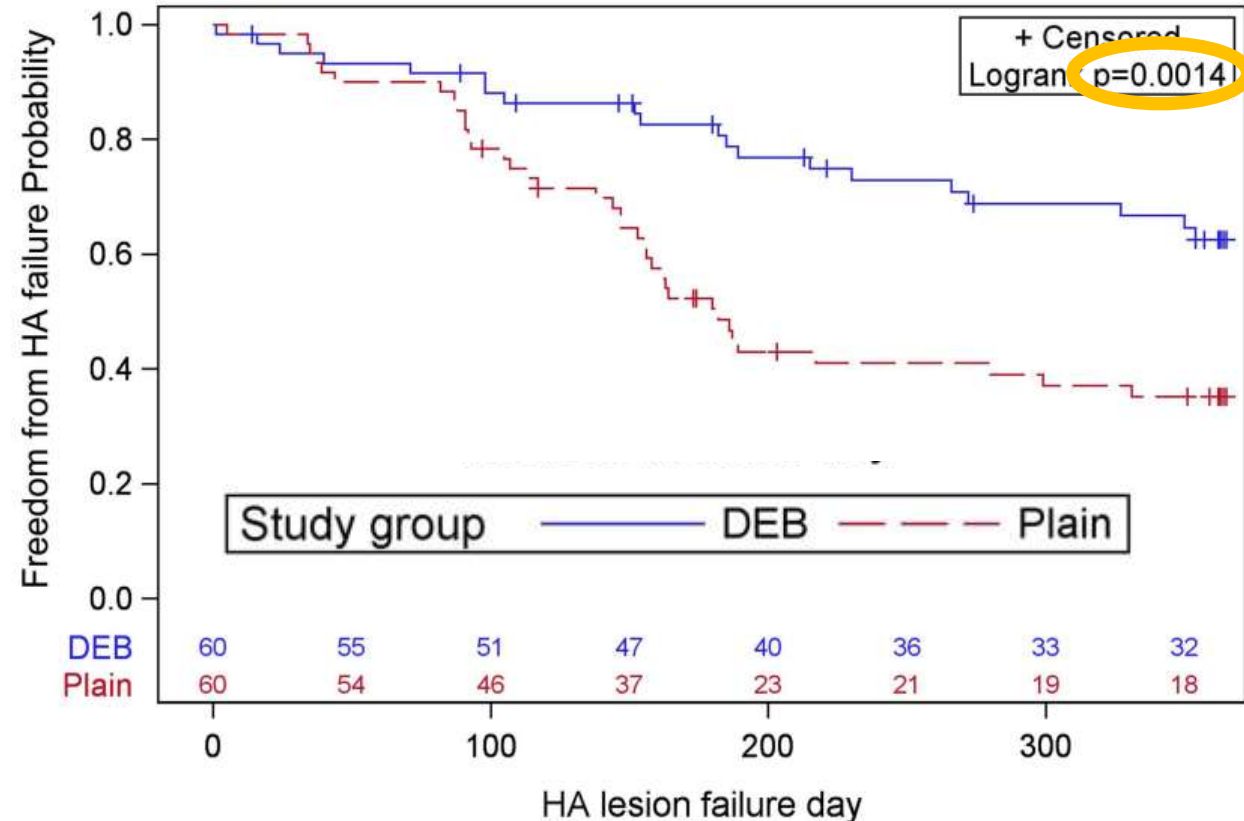
Product-Limit Survival Estimates

With Number of Subjects at Risk



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With Number of Subjects at Risk





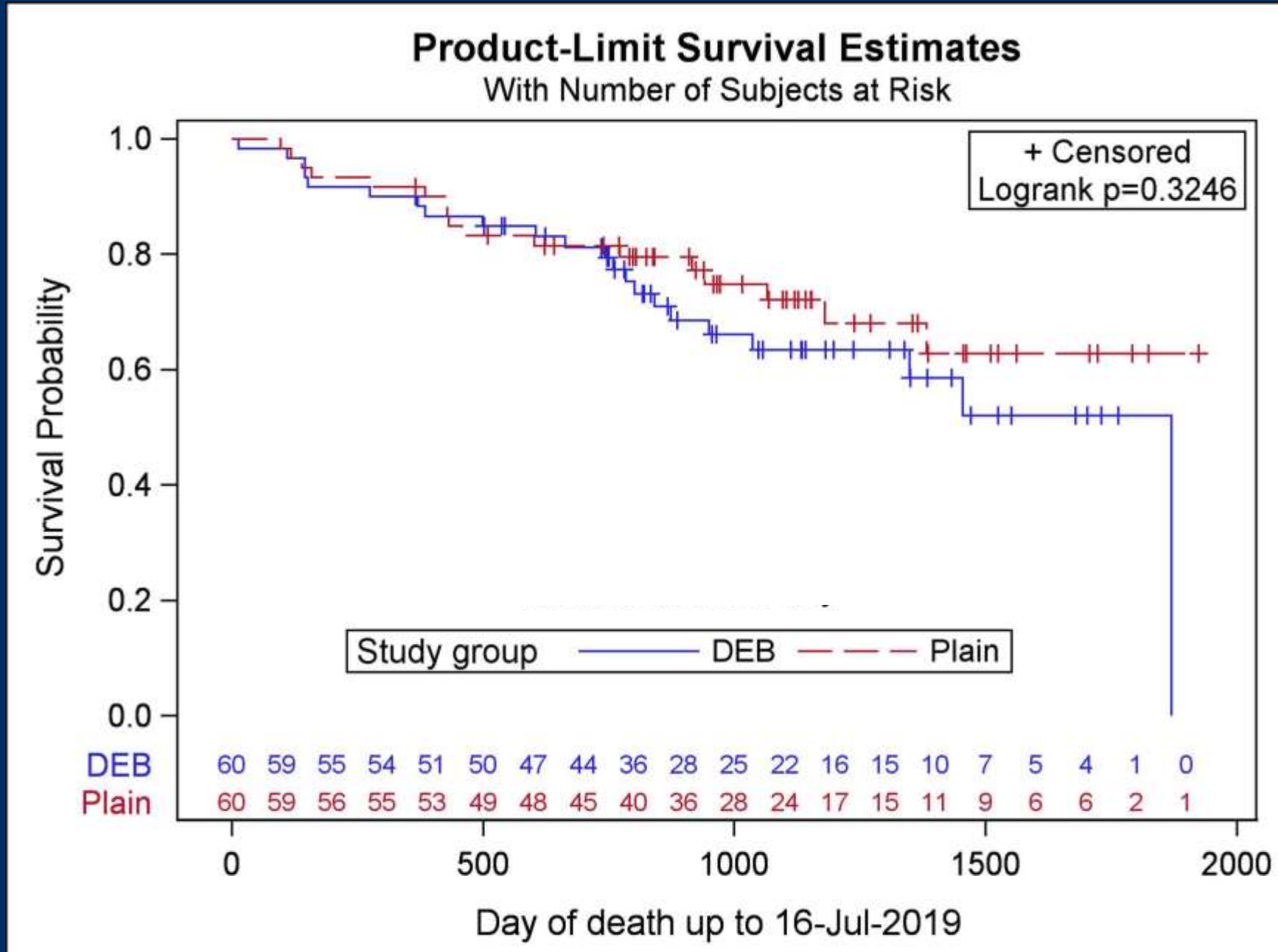
# Clinical events at 12 months after angioplasty



Outcome	DCB N = 60	Plain PTA N = 60	P value ITT	P value As treated
Adverse events related to the hemodialysis access				
Number of device-related AE or SAE	0.0	0.0	1.000	1.000
Number of AE per patient (excluding SAE)	0.87 ±1.14	1.28 ±1.39	0.076	0.070
Number of SAE per patient	0.77 ±1.05	1.18 ±1.21	0.046	0.069
Number of AE per patient (including SAE)	1.63 ±2.07	2.47 ±2.35	0.042	0.049
At least 1 AE (excluding SAE)	48.3 (29)	66.7 (40)	0.042	0.021
At least 1 SAE	45.0 (27)	66.7 (40)	0.017	0.008
At least 1 AE (including SAE)	53.3 (32)	75.0 (45)	0.013	0.005
Mortality				
Deaths at 1-year follow-up	10.0 (6)	8.3 (5)	0.751	0.437
Deaths up to July 16 <sup>th</sup> 2019	36.7 (22)	28.3 (17)	0.327	0.310



# K-M analysis of survival





# Conclusions

## DEB using Paclitaxel / BTHC in dialysis fistulae

- Failed to demonstrate a LLL improvement at 6 months
  - Significantly lower needs for re-interventions
  - Significantly lower access failure rate
  - No significant increase in mortality
- at 12 months