

The logo for LING, featuring the word "LING" in white capital letters. The letters are partially overlaid by a stylized graphic of three curved, brush-stroke-like shapes in dark blue, red, and yellow.

**Safety and Efficacy of the Paclitaxel Releasing Peripheral
Balloon Dilatation Catheter (APERTO OTW[®]) for
Arteriovenous Fistulae Stenosis:
a Prospective, Multicenter, Randomized Controlled Trial
APERTO AVF China**

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PTA and Surgery

Table II. Endovascular treatment of thrombosed fistulae

<i>First author, year</i>	<i>No.</i>	<i>Location AVF</i>	<i>Modality</i>	<i>Technical success</i>	<i>Patency (1 yr)</i>	
					<i>Primary</i>	<i>Secondary</i>
Overbosch, 1996	24	24 forearm	Mechanical thrombectomy	89%	32%	...
Turmel-Rodrigues, 2000	73	56 forearm 17 upper arm	Thromboaspiration ± urokinase	93%	49%	81%
Haage, 2000	54	50 forearm 4 upper arm	Mechanical thrombectomy	89%	27%	51%
Schon, 2000	20	...	Mechanical thrombectomy + tPA	92%
Liang, 2002	42	37 forearm 5 upper arm	Angioplasty ± urokinase	93%	70%	80%
Rajan, 2002	25	19 forearm 6 upper arm	Mechanical thrombectomy + urokinase, tPA	73%	24%	44%
Birtl, 2005	39	...	Mechanical thrombectomy	87%	23%	...
Shatsky, 2005	62	24 forearm 36 upper arm 2 leg	Thromboaspiration ± tPA	87%	18%	69%
Moossavi, 2007	49	23 forearm 26 upper arm	Mechanical thrombectomy	96%	51%	84%
Jain, 2008	41	21 forearm 20 upper arm	Mechanical thrombectomy	76%	20%	54%
Wu, 2009	48	48 forearm	Mechanical thrombectomy	96%	44%	89%

tPA, Tissue plasminogen activator.

Table III. Surgical treatment of thrombosed fistulae

<i>First author, year</i>	<i>No.</i>	<i>Location AVF</i>	<i>Modality</i>	<i>Technical success</i>	<i>Patency (1 yr)</i>	
					<i>Primary</i>	<i>Secondary</i>
Oakes, 1998	29	29 forearm	Proximal reanastomosis	80%	69%	89%
Morosetti, 2002	26	17 forearm 9 upper arm	Thrombectomy ± proximal reanastomosis	82%	93% (6 mon)	...
Mickley, 2003	30	30 forearm	Proximal reanastomosis	100%	84%	95%
Ponikvar, 2005	268	...	Thrombectomy ± proximal reanastomosis	93%	75%	77%
Georgiadis, 2005	59	59 forearm	Thrombectomy ± Graft interposition	95%	...	85%
Palmar, 2006	10	3 forearm 7 upper arm	Thrombectomy	70%	51%	69
Lipari, 2007	32	32 forearm	Proximal reanastomosis or graft interposition	84%	73%	88%

Restenosis after PTA

- Clinically significant restenosis is generally defined as target lesion 50% or greater restenosis after technically successful PTA
- The prevalence of restenosis after PTA is unclear as there wasn't large-scale epidemiological investigations. Different studies showed the 6-month primary patency rate of dialysis grafts tended to be 36%-76%, and only 17%-48% and 26%–58% of AVGs and native AVFs remain functional without subsequent interventions at 12 months respectively

The Combat against Restenosis

- Drug Coated Balloons (DCB)
 - DCBs are coated with paclitaxel. In experimental studies, even very low single doses of paclitaxel have exhibited a sustained anti-proliferative effect on VSMCs
 - DCBs are routine therapy in the treatment of restenosis after percutaneous coronary interventions (PCIs)
 - More and more researchers focused on the DCBs usage in the treatment of hemodialysis access stenosis since 2012, and clinical results to date are encouraging

Published studies reporting the results of DCB for AV stenosis

Year	Design	No. of patients (no. of lesions)	Stenosis localization	Primary end point	Main results, DCB vs uncoated balloon
2012 ¹	Randomized, unicenter	40 (40)	Venous (NS)	PP at 6 m	70% v 25% (P< .001)
2014 ²	Randomized, unicenter	10 (20)	JAS: 10/20 Venous: 10/20	TLR at 6 m	70% v 0% (P< .01)
2015 ³	Randomized, unicenter	40 (40)	JAS: 25/40 Venous: 15/40	TLR-free survival at 12 m	308 v 161 days (P< .039)
2014 ⁴	Retrospective unicenter	26 (26)	Venous (NS)	PP and SP at 1 y and 2 y	1-year PP: 20/22 (90.2%) 2-year PP: 11/29 (57.8%) 1-year SP: 20/20 (100%) 2-year SP: 18/19 (94.7%)

1. J Endovasc Ther. 2012;19:263–272
2. J Vasc Interv Radiol 2014; 25:535–541

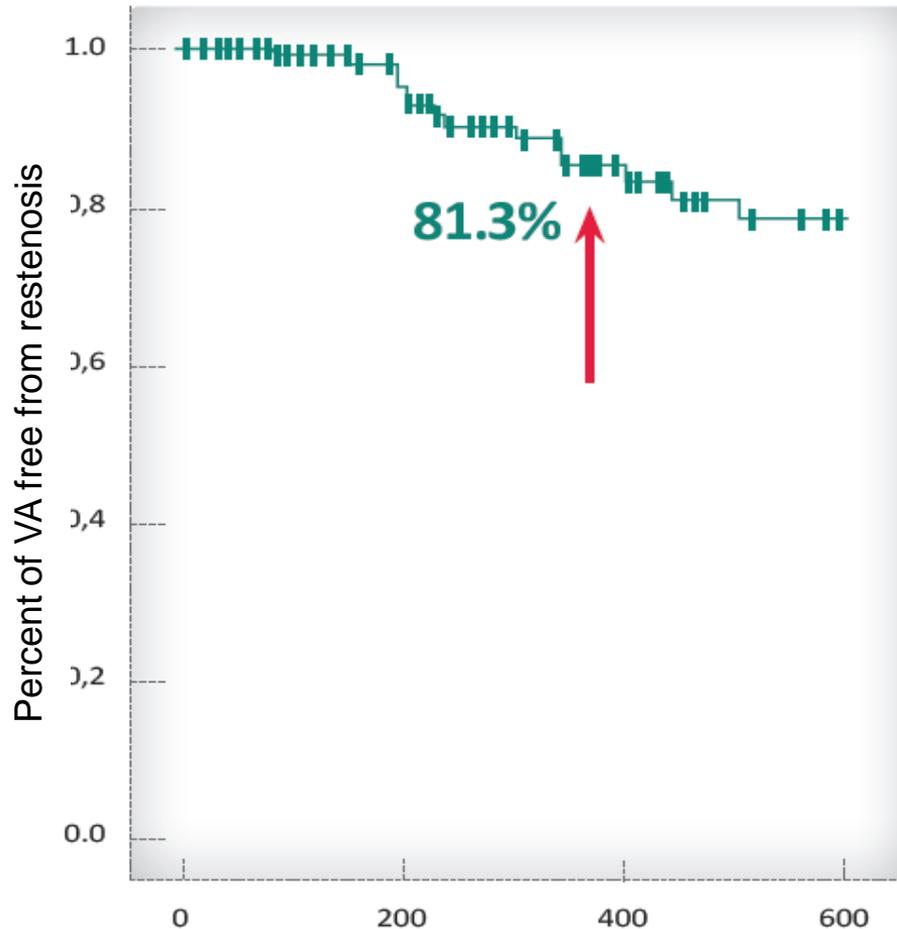
3. Eur J Radiol 2015, 84: 418–423
4. J Vasc Access 2014;15: 338-343

APERTO OTW[®] is specifically designed for AV stenosis

	Aperto	Lutonix	In.Pact Admiral	In.Pact Pacific
Drug	Paclitaxel	Paclitaxel	Paclitaxel	Paclitaxel
Dose Density	3.0 µg/mm ²	2.0 µg/mm ²	3.5 µg/mm ²	3.5 µg/mm ²
Excipient	Ammonium Salt	Polysorbate and sorbitol	Urea	Urea
	Low hydrophilic Elastic film	Highly Hydrophilic	Highly Hydrophilic	Highly Hydrophilic
Particle size	0.1 µm	2 µm	3 µm	3 µm
Shaft Length	40 cm Except 9&10mm (80 cm)	80 cm	40 cm	80 cm
High pressure	Yes Except 9&10mm (do not need high pressure)	No	No	No
Balloon diameter	Up to 10 mm	Up to 10 mm	Up to 7	Up to 12 mm

Data kindly provided by Dr Matteo Tozzi

APERTO OTW[®] registry data show high rates of freedom from restenosis with APERTO OTW[®] in a real-world scenario

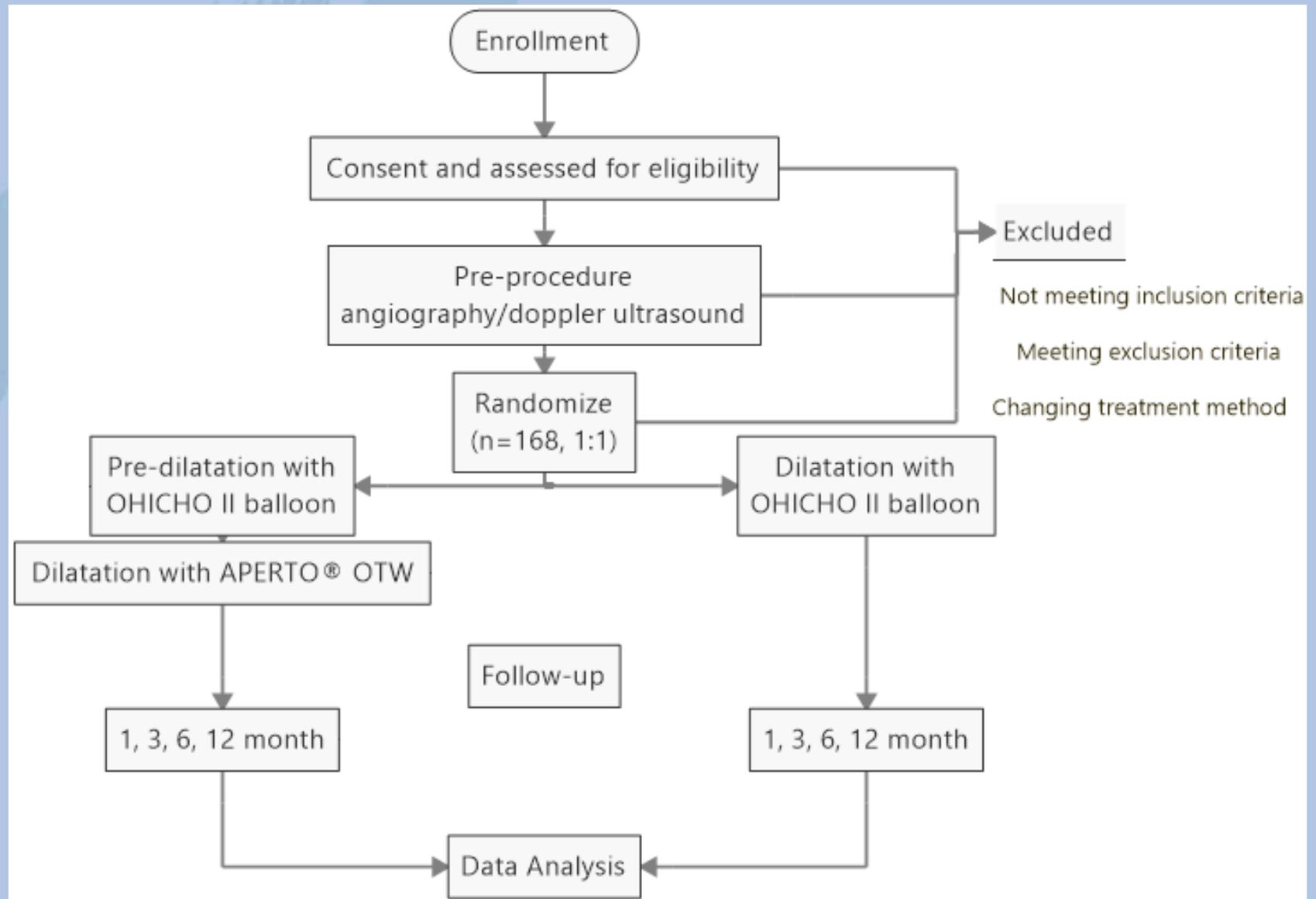


Kaplan-Meier plot of freedom from restenosis after Aperto angioplasty

150 patients and 176 stenosis treated under conditions of actual clinical practice

Data kindly provided by Dr Matteo Tozzi, Varese, Italy

How in China? A RCT Study



Aperto AVF China Trial

- Study Design:
Prospective, multicenter, randomized, controlled trial
- Device:
 - Treatment group:
APERTO OTW[®] balloon (Paclitaxel Releasing Hemodialysis Shunt Balloon Dilatation Catheter)
 - Control group:
OHICHO II balloon (Balloon Dilatation Catheter)
- Statistic design:
Superiority
- Primary Endpoints (6 month):
Primary patency rate of the target lesion at 6 month post procedure
- Secondary Endpoints:
 - Device Success (intraoperative)
 - Technical Success (intraoperative)
 - Clinical Success (at 1 month post procedure)
 - Clinical-driven Target Lesion Revascularization (CD-TLR, 12 month)
 - Clinical-driven Target Shunt Revascularization (CD-TSR, 12 month)
 - Major Adverse Event rate (MAE, including stroke, all-cause death and thrombosis at the target lesion site, 12 month)

CASE

Before angioplasty

After angioplasty

Follow-up 12 m



Conclusions

- The China Aperto trial is the first multicenter randomized controlled trial to evaluate the safety and efficacy of APERTO OTW[®] compared with POBA for the treatment of AVF stenosis
- The final results will be available at CIRSE 2018

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LING

Thank you
for your attention

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