ABRE

Clinical Trial Results

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Disclosures

Consultant: BD Bard, Boston Scientific, Cook, Cordis, Gore, Medtronic, Philips, Synervention, Veryn

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Abre™ Venous Self-expanding Stent System

Stent
- Nickel-titanium alloy **(Nitinol)**
- Self-expanding
- ***Open cell*** design with three off set connection points
- ***10-20 mm*** diameters
- 40, 60, 80, ***100, 120, and 150*** mm lengths

Delivery System
- Over-the-wire
- ***9 Fr,*** 0.035" guide wire compatible
- ***Triaxial catheter*** (inner shaft, retractable sheath, and an isolation sheath)
- Thumbwheel actuated deployment

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ABRE IDE Trial – Study Design

Purpose

Evaluate the safety and effectiveness of the Abre venous self-expanding stent system for treatment of symptomatic iliofemoral venous outflow obstruction

- Prospective
- Nonrandomized, single-arm
- Multicenter, 24 global sites (16 U.S., 8 EU)
- **200 subjects**
  - *Post-thrombotic syndrome (PTS)†*
  - *Non-thrombotic iliac vein lesion (NIVL)†*
  - *Acute DVT (aDVT)†*

- 1-, 6-, 12-, 24-, and 36-month follow-up
- Independent safety analysis‡
- Imaging analysis with independent core labs§

†Initial clinical presentation assigned by clinician based on their evaluation.
‡Clinical Events Committee (CEC) adjudicated select AEs for clinical endpoint analysis; Data Safety Monitoring Board (DSMB) evaluated safety data and scientific merit of the study.
§Duplex ultrasound (DUS) VasCore Core Lab and Venography, x-ray, and Intravascular Ultrasound (IVUS) Syntactx Core Laboratory.

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ABRE IDE Trial – Primary Endpoints

Primary Endpoints

- **Primary Patency at 12 months** meeting all of the following criteria:
  - *Freedom from occlusion* of the stented segment of the target lesion
  - *Freedom from restenosis ≥50%* of the stented segment of the target lesion
  - *Freedom from clinically-driven target lesion revascularization*
- **Major Adverse Events at 30 days post stenting:**
  - *All-cause death* occurring post-procedure
  - *Clinically significant* (i.e., symptomatic, confirmed by CT pulmonary angiography) pulmonary embolism
  - *Major bleeding* complication (procedural)
  - *Stent thrombosis* confirmed by imaging as assessed by core laboratory
  - *Stent migration* confirmed by imaging as assessed by core laboratory

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ABRE IDE Trial – Key Secondary Endpoints

Key Secondary Endpoints

- **Acute success** (device success, lesion success, procedure success)
- **Primary patency** at 24- and 36 months
- **Primary assisted** and **Secondary patency** at 12-, 24-, and 36 months
- **Freedom from target lesion revascularization** through 30 days, 6-, 12-, 24-, and 36 months
- **Major adverse events** through 6-, 12-, 24-, and 36 months and **Major bleeding complication** at 30 days, 6-, 12-, 24-, and 36 months
- **Stent fracture** at 30 days, 12-, 24-, and 36 months and **delayed stent migration** at 12-, 24-, and 36 months confirmed by imaging assessed by core lab
- **Quality of Life** and **Functional Assessments:** VEINES-QOL/Sym, EQ-5D, Villalta, and VCSS assessments

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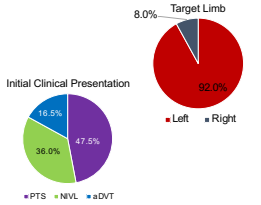
ABRE IDE Trial – Demographics

Demographics	
Age (years) (Mean ± SD)	*51.5 ± 15.9*
Female	*66.5% (133/200)*
BMI (kg/m²) (Mean ± SD)	*29.5 ± 7.1*

Medical History	
Previous history of VTE	52.0% (104/200)
Known family history of DVT	22.0% (44/200)
Pulmonary embolism	17.0% (34/200)
Smoking (active)	12.0% (24/200)
Thrombophilia	11.5% (23/200)
Cancer (ongoing or remission)	11.0% (22/200)
IVC filter present	5.0% (10/200)

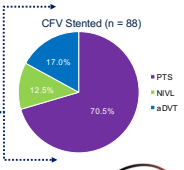


ABRE IDE Trial – Procedural Data

Assessment	
Reference vessel diameter (mm) (Mean ± SD)*	15.0 ± 2.7
% Area stenosis (Mean ± SD)†	*74.9 ± 16.8*
% Diameter stenosis (Mean ± SD)†	*63 ± 28.6*
Lesion length (mm) (Mean ± SD)†	*112.4 ± 66.1*
Total stented length (mm) (Mean ± SD)*	134.3 ± 58.0
Number of Abre stents implanted per subject	*1.5 ± 0.6*
Stented vein‡	
Common iliac vein	***96.0% (192/200)***
External iliac vein	***80.5% (161/200)***
Common femoral vein (CFV)	***44.0% (88/200)***

Of those subjects presenting with PTS, 35.8% (34/95) had a complete venous occlusion confirmed by the core lab.

Challenging population treated in the ABRE Study: stents in 88 subjects (44%) extended *below* the inguinal ligament.



*Data from Venogram
†Data from IVUS
‡Site and core laboratory data were used

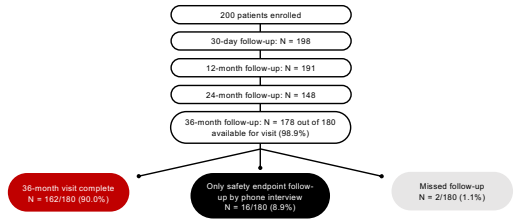
ABRE IDE Trial – Primary Endpoint Outcomes

Primary safety endpoint	Results	Performance goal	*P* value
Rate of MAEs within 30 days†	***2.0% (4/200)***	12.5%	< 0.0001
Primary effectiveness endpoint	**Results**	**Performance goal**	***P* value**
Primary patency at 12 months‡	***88.0% (162/184)***	75.0%	< 0.0001

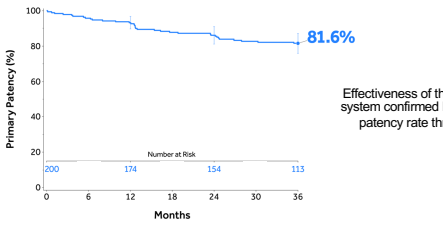
Primary safety and effectiveness endpoints were met.

†Major adverse events (MAEs) include all-cause death occurring post-procedure, clinically significant pulmonary embolism, procedural major bleeding, stent thrombosis confirmed by imaging as assessed by core lab, and stent migration confirmed by imaging as assessed by core lab.
‡Primary patency defined as freedom from occlusion of the stented segment of the target lesion, restenosis ≥ 50% of the stented segment of the target lesion, and clinically-driven target lesion revascularization.

ABRE IDE Trial – Subject Compliance through 36 Months



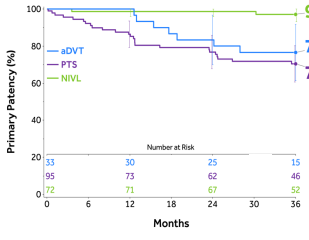
ABRE IDE Trial – Primary Patency[1] through 36 Months



Effectiveness of the Abre venous stent system confirmed by sustained primary patency rate through 36 months.

[1]Freedom from occlusion of the stented segment of the target lesion, restenosis ≥50% of the stented segment of the target lesion, and clinically-driven target lesion revascularization
Error bars are 95% Confidence Intervals (±1.96*Standard Error) at each time point

ABRE IDE Trial – Primary Patency[1] through 36 Months



Primary patency rates through 36 months as expected for challenging and complex PTS and aDVT presentations.

NIVL primary patency has been maintained through 36 months.

[1]Freedom from occlusion of the stented segment of the target lesion, restenosis ≥50% of the stented segment of the target lesion, and clinically-driven target lesion revascularization
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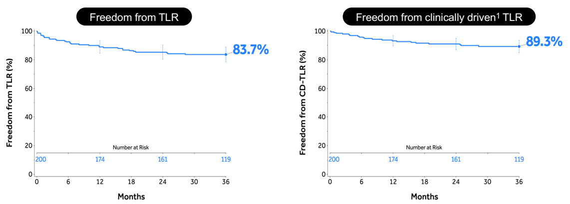
ABRE IDE Trial – TLR through 36 Months



83.7% and 89.3% of subjects did not experience a TLR or CD-TLR, respectively, through 36 months.

[1]Clinically driven is defined as the recurrence of symptoms present at baseline or the onset of new symptoms including, but not limited to venous pain, swelling, dermatitis, or ulceration related to the target limb. Adjudicated by the CEC based on core laboratory adjudicated imaging data and relevant clinical information provided by the site.
Error bars are 95% Confidence Intervals (±1.96*Standard Error) at each time point

TLR = Target Lesion Revascularization

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ABRE IDE Trial – Secondary Endpoints: Stent Fracture and Delayed Stent Migration

An average of 1.5 stents were implanted per subject.

Secondary endpoint through 36 months	
Number of stents with fracture†	0.0% (0/215)
Secondary endpoint through 36 months	
Delayed stent migration‡	0.0% (0/214)

No stent fractures or delayed stent migration reported through 36 months.

†Fracture or breakage of any portion of the stent. Determined by X-ray for the first 30 subjects at 30 days and for all subjects (including the first 30 subjects) at 12, 24, and 36 months.
‡Position change of a venous stent observed with an imaging modality >1 cm from its original location at the conclusion of the index procedure, as determined with regard to a reference anatomic structure.

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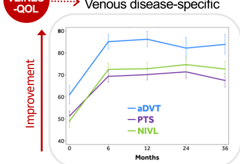
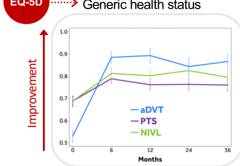
ABRE IDE Trial – Secondary Endpoints: Quality of Life Assessments

VEINES-QOL → Venous disease-specific



EQ-5D → Generic health status



All initial clinical presentation patient groups demonstrated sustained and clinically meaningful improvements in both the VEINES-QOL and EQ-5D index scores through 36 months compared to baseline.

Error bars are ±1 Standard Error at each time point

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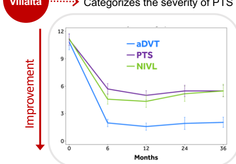
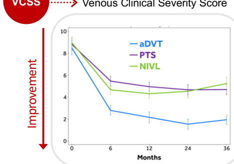
ABRE IDE Trial – Secondary Endpoints: Venous Functional Assessments

Villalta → Categorizes the severity of PTS



VCSS → Venous Clinical Severity Score



All initial clinical presentation patient groups demonstrated sustained and clinically meaningful improvement in Villalta and VCSS scores through 36 months compared to baseline indicating less severity of PTS disease and venous disease overall.

Error bars are ±1 Standard Error at each time point

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Clinical Application

Post-thrombotic patient with 5-year follow-up

Patient History

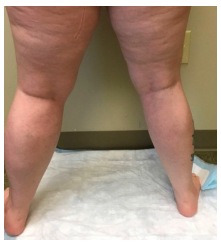
Patient Profile
- Female in mid 30s
- Complains of LLE aching and heaviness, worse with standing, and swelling from knee down
- Compliant with compression, however, has difficulty working secondary to discomfort

Relevant Medical History
- Knee surgery resulted in left lower extremity DVT and PE in 2015
  - Managed by Xarelto for 6 months
  - DVT recurred 2 weeks after stopping anticoagulation

Risk Factors
- Previous DVT (x2) and PE
- Negative Thrombophilia

Baseline Physical Exam

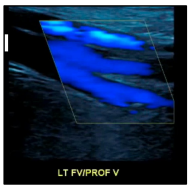
- Left lower extremity fullness & edema without skin changes
- CEAP 3
- VCSS 8
  - Edema 3, pain 3, inflammation 2

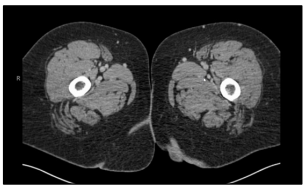


Baseline Imaging: US and CTV

Reflux → Bilateral femoral vein and GSV upper thigh only

Iliac US → Occluded left CIV and EIV, septated CFV, profunda & femoral veins patent





Diagnosis and Treatment Plan

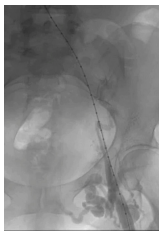
Diagnosis

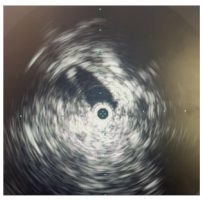
- Occluded left CIV and EIV, Post-thrombotic non-occlusive scarring in left CFV

Treatment Plan

- Venogram / IVUS
- Venoplasty
- Venous stent placement

Procedural Imaging – Venography and IVUS

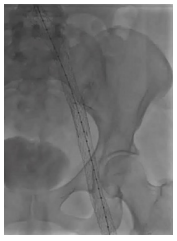


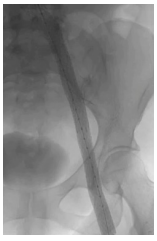


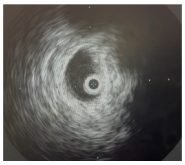
Procedural Details: Venoplasty and Stent Placement

- *Femoral vein access*
- *Occluded segments crossed*
- *Pre-Venoplasty:*
  - 14 x 60 mm and 16 x 60 mm Atlas™ balloons
- *Venous stent placement:*
  - 14 x 150 mm (distal) and 16 x 150 mm (cranial) Abre stents
  - Placed from iliac confluence to femoral profunda confluence
- *Post-Venoplasty:*
  - 16 x 60 mm Atlas balloon

Post-treatment Evaluation/Imaging







Follow-Up Patient Care & Considerations

Post-Treatment guidance

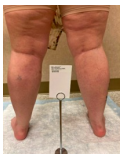
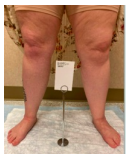
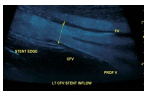
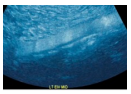
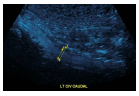
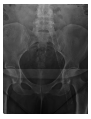
- Femoral Access closure with MYNX CONTROL™ VENOUS Vascular Closure Device followed by 5 minutes pressure and ACE wrap
- Lovenox in PACU and every 12 hours for 2 weeks followed by a transition to DOAC and Anti-platelet
- Anti-platelet 3 – 6 months
- US at 2 weeks, 3 months, 6 months, then yearly

Patient Post-Procedure 5-year Outcomes

- Minimal leg symptoms with a slightly larger calf
  - Likely attributable to deep venous reflux

R CFV	0.55 sec	L CFV	5.15 sec
R FV mid thigh	0.30 sec	L FV mid thigh	3.05 sec
R popliteal	0.77 sec	L popliteal	1.91 sec

- VCSS (without compression component): 2
  - Discomfort 1, edema 1
- Iliac Ultrasound:
  - No migration / stent fracture
  - Widely patent stent without collapse

Conclusion and Key Learning Points

- The Abre venous stent demonstrates excellent performance even in the most challenging patient populations, those with post-thrombotic conditions.
- The ABRE Study data out to 36-months demonstrates stent integrity and durability with no stent fractures despite a high proportion of stents across the groin.
- Clinical success is now seen past 5-years in many patients even those who are post-thrombotic with stents extending into the groin.
- The 50-year durability tests indicate the likelihood of continued long-term integrity of the Abre venous stent.
- Ideally, with the younger and healthier patients generally treated with venous stents compared to their counterparts with arterial stents, 50-year durability testing will become the standard for venous stents coming to the market.

Thank You

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