DISRUPT PAD

((Data Summary))

Summary of the key findings from the DISRUPT PAD Study

- 99% of femoropopliteal lesions treated were moderately or severely calcified.
- Catheters showed effective deliverability with 100% procedural success in crossing challenging calcified lesions
- Demonstrated no procedural complications related to perforations, abrupt closure, slow/no reflow, thrombosis or distal embolization
  - 1% provisional stent placement due to one grade D dissection
  - 8% Embolic filter usage with no embolic debris
- Achieved consistent procedural outcomes in calcified lesions regardless of lesion complexity or location
- Showed sustained patency (77%) and target lesion revascularization rates (3%) through 6-months, when used as a stand-alone therapy
- Study was conducted with high scientific rigor, utilizing independent event adjudication committees and an independent core labs

Clinical Program Overview

DISRUPT PAD I
35 subjects, 3 sites
Jan 2014 – Sep 2014

+

DISRUPT PAD II
60 subjects, 8 sites
Jun 2015 – Dec 2015

Objective: To study the safety and effectiveness of the Shockwave Medical Lithoplasty® System in the treatment of calcified, stenotic infrainguinal peripheral arteries.

- Two-phase, prospective, non-randomized, multi-center study
- Monitoring with 100% source document verification
- Independent angiographic and duplex ultrasound core labs[1,2]
- Independent clinical events committee

1. Angiography - Alexandra Lansky, MD-Yale Cardiovascular Research Group
2. Duplex Ultrasound - Michael Jaff, MD-Vascore (MGH)

Investigational Sites

Investigator	Site
Marianne Brodmann, MD	Universitätsklinikum LKH Graz
Martin Werner, MD	Hanusch Krankenhaus
Florian Wolf, MD	Medical University of Vienna
Thomas Zeller, MD (PI)	Universitäts-Herzzentrum Freiburg & Bad Krozingen
Gunnar Tepe, MD	RoMed Klinikum Rosenheim
Giovanni Torsello, MD	St. Franziskus Hospital/ Universitätsklinikum Münster
Dierk Scheinert, MD	University Leipzig Medical Centre
Andrew Holden, MD	Auckland City Hospital

DISRUPT PAD Study Design

Key eligibility criteria

- Intermittent claudication: Rutherford Classification 2 - 4
- Ankle-brachial index ≤ 0.9
- SFA/Popliteal lesions ≥ 70% stenosis
- RVD 3.5-7.0 mm, ≤ 150 mm length
- Moderate and severe calcification by angiography

Study device

- Shockwave Medical Peripheral Lithoplasty® Catheter
- Diameters: 3.5, 4.0, 4.5, 5.0, 5.5, 6.0, 6.5, 7.0 mm
- Length: 60 mm

DISRUPT PAD Study Endpoints

Procedural

- Procedural success: <50% residual stenosis
- Exploratory endpoint: ≤30% residual stenosis

Follow up: 30 days, 6 Mo, & 12 Mo*

- Major adverse events
- Target lesion patency by DUS (stenosis <50%)
- Target lesion revascularization (TLR)
- Functional outcomes

* 60 subjects continued follow up to 12 months

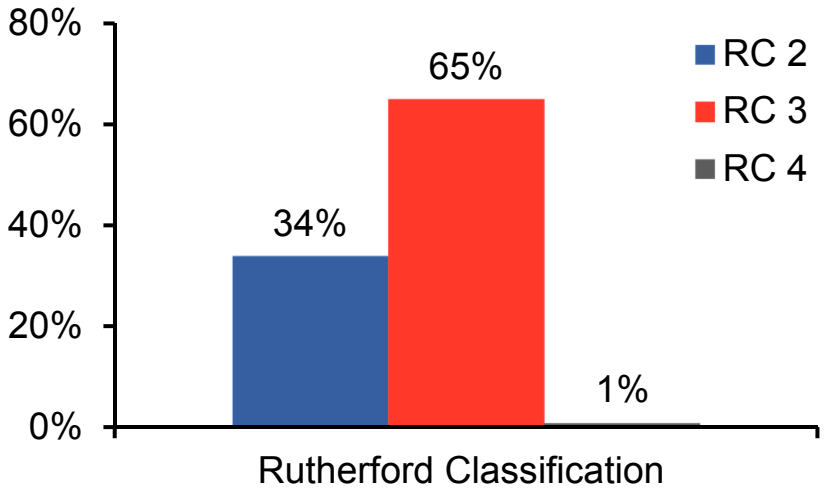
DISRUPT PAD Baseline Characteristics

Baseline characteristics between two phases of PAD study shows comparable and poolable data sets

	PAD I (35)	PAD II (60)
Age	72.8 ± 7.7	71.5 ± 8.3
Male gender	82.9% (29)	78.3% (47)
BMI >30 kg/m2	25.7% (9)	30.0% (18)
Hypertension	97.1% (34)	96.7% (58)
Hyperlipidemia	85.7% (30)	80.0% (48)
Current smoker	25.7% (9)	20.0% (12)
Diabetes	40.0% (14)	56.7% (34)
Coronary disease	57.6% (19)	51.7% (31)
Renal insufficiency	20.0% (7)	28.3% (17)
Stroke/TIA	17.1% (6)	3.3% (2)
ABI	0.8 ± 0.2	0.7 ± 0.2
Rutherford Category		
2	40.0% (14)	30.0% (18)
3	57.1% (20)	70.0% (42)
4	2.9% (1)	0.0%

DISRUPT PAD Baseline and Procedural Characteristics

	Medical History N=95
Age	72.8 ± 8.2
Male gender	80.0% (76)
BMI (kg/m$^{2)}$	28.2 ± 4.2
Hypertension	96.8% (92)
Hyperlipidemia	82.1% (78)
Current smoker	22.1% (21)
Diabetes	50.5% (48)
Coronary disease	52.6% (50)
Renal insufficiency	25.3% (24)
Stroke/TIA	8.4% (8)
ABI	0.8 ± 0.2



DISRUPT PAD Pre-Procedure Angiographic Findings

99% of lesions treated in the DISRUPT PAD Study were moderate to severely calcified

	Pre-Procedure N=95
RVD (mm)	5.3 ± 0.7
MLD (mm)	1.2 ± 0.7
% diameter stenosis	77.8 ± 13.5
CTO	18.9% (18)
Lesion length (mm)	71.9 ± 36.4
Calcified length (mm)*	92.5 ± 41.4
Calcification	
Moderate	44.2% (42)
Severe	54.7% (52)

*Calcified length is measured within the entire artery as seen by angiography without contrast

Putting Calcium in Perspective

Calcium definitions across studies differ. Regardless of the definition used the DISRUPT PAD study treated 99% Moderate/Severe calcified stenotic lesions.

	DISRUPT PAD Patient Population Analyzed Using Different Calcium Definitions			
Severe Definition	Radiopacities noted prior to contrast injection involving both sides of the arterial wall[1]	≥180^0 (both sides of the vessel at the same location) and > half total lesion length[2]	>75% calcium length to lesion length[3]	≥ 1 cm on both sides[4]
None/mild	1.1%	1.1%	1.1%	1.1%
Moderate	44.2%	1.0%	4.2%	0.0%
Severe	54.7%	97.9%	94.7%	98.9%
Total	100.0%	100.0%	100.0%	100.0%

99%

Where Definition is used

[1]DISRUPT PAD Study, Resilient Study

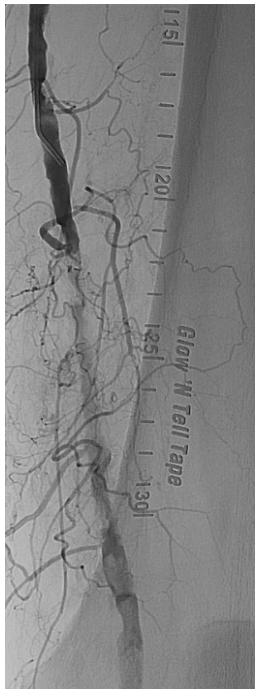
[2]PARC Paper - Patel et. al. JACC 65, no. 9: 931-941 (2015)

[3]Confirm Registries

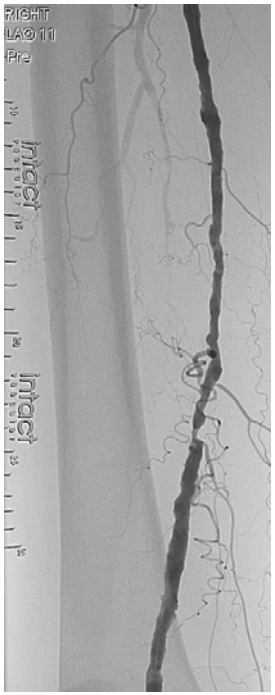
[4]Definitive Ca++, Definitive AR, SUPERB

Putting Calcium in Perspective

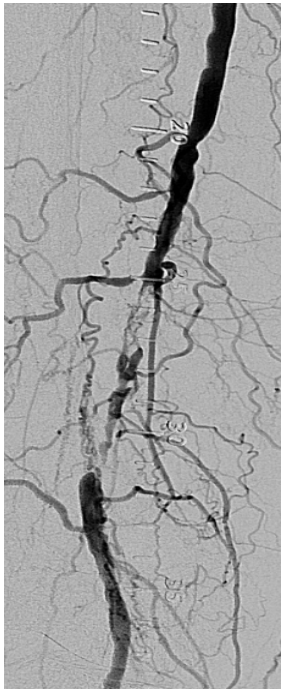
The following diagnostic angiograms highlight the range of moderate to severely calcified lesions treated in the DISRUPT PAD Study



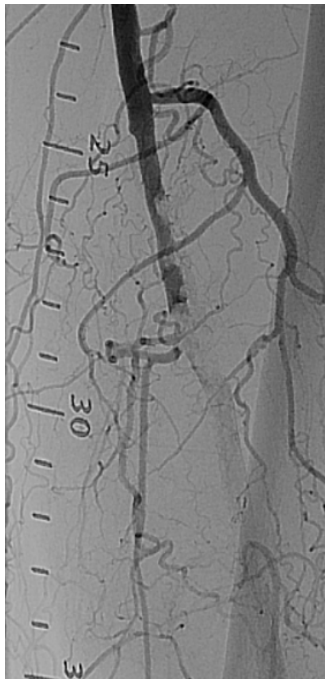
Total Occlusion
10.2 cm lesion



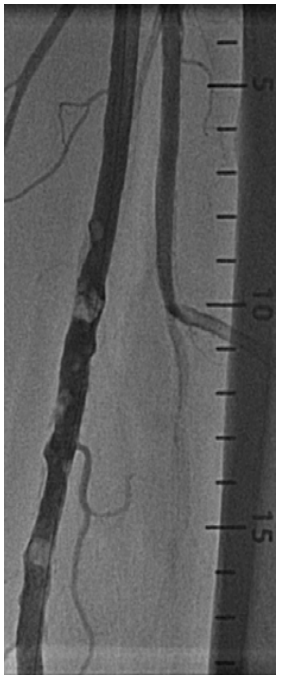
69% Occluded
9.0 cm lesion



Total Occlusion,
7.7 cm Lesion



95% Occluded,
5.7 cm Lesion



83% Stenosis,
7.3 cm Lesion

DISRUPT PAD Catheter Performance

Lithoplasty® Catheters have shown effective deliverability with 100% successful crossing of moderate and severely calcified lesions* with limited need for adjunctive therapy.

	Catheter Performance
Lesion Crossing	100% (95)

	Adjunctive Therapy N=95
Pre-dilatation	11.6% (11)
Post-dilatation	7.4 % (7)
Provisional stenting	1.1% (1)
Embolic Filter**	8.4% (8)

* Including 19% CTO
** At the discretion of the operator

DISRUPT PAD Angiographic Findings

Treatment of moderately and severely calcified lesions with Lithoplasty® Catheters showed a low residual stenosis of 24%, no failures due to acute recoil and minimal vessel injury with 1 stent placed due to a single grade D dissection.

	Pre	Post
MLD (mm)	1.2 ± 0.7	4.2 ± 0.6
% diameter stenosis	77.8 ± 13.5	23.8 ± 5.7

	Pre-Procedure N=95
RVD (mm)	5.3 ± 0.7
CTO	18.9% (18)
Lesion length (mm)	71.9 ± 36.4
Calcified length (mm)*	92.5 ± 41.4
Calcification	
Moderate	44.2% (42)
Severe	54.7% (52)

	Post-Procedure N=95
Acute gain (mm)	3.0 ± 0.8
Dissection	
None	85.2% (82)
A	0.0%
B	7.4% (7)
C	6.3% (6)
D	1.1% (1)**

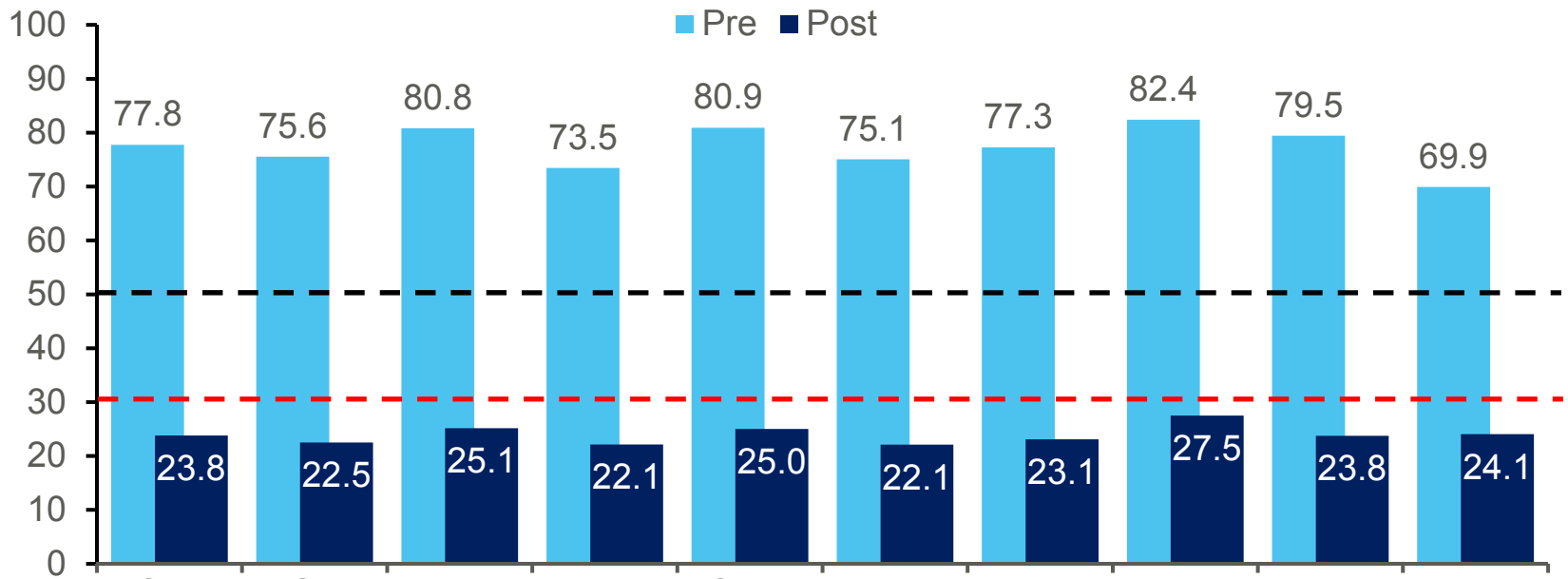
*Calcified length is measured within the entire artery as seen by angiography without contrast

**One Grade D resolved following stent implant

PAD Procedural Success by Subgroups

Achieves consistent successful procedural outcomes in calcified lesions regardless of lesion complexity or location.

Pre and Post % Diameter Stenosis



	All Subjects	SFA	Popliteal	Moderate Ca	Severe Ca	Lesion <5 cm	Lesion 5–10 cm	Lesion >10 cm	Concentric	Eccentric
N	95	70	24	42	52	33	39	23	78	17

50% Primary Performance

30% Exploratory Performance

DISRUPT PAD Safety*

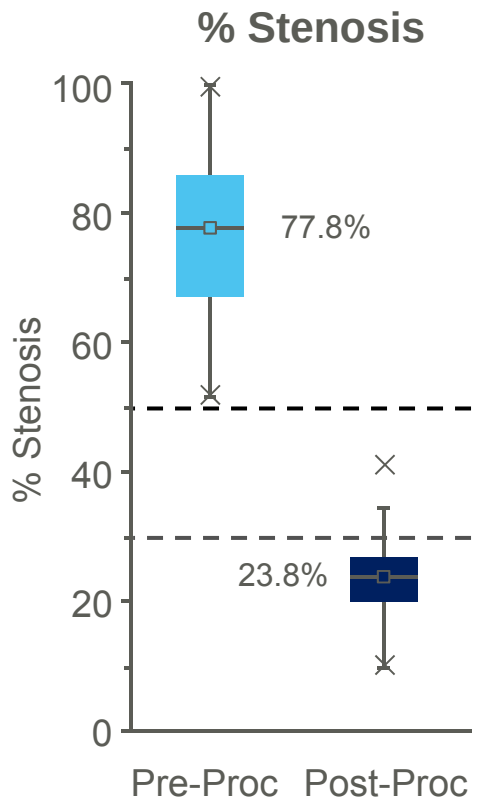
All events adjudicated by independent clinical events committee

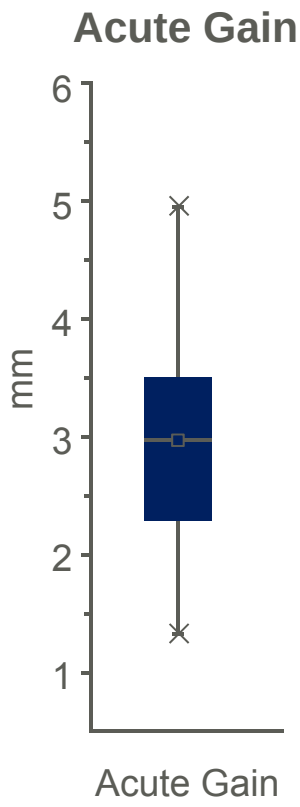
- **Demonstrated no procedural complications related to perforations, abrupt closure, slow/no reflow, thrombosis or distal embolization**
- **One subject experienced a Grade D dissection requiring a stent**

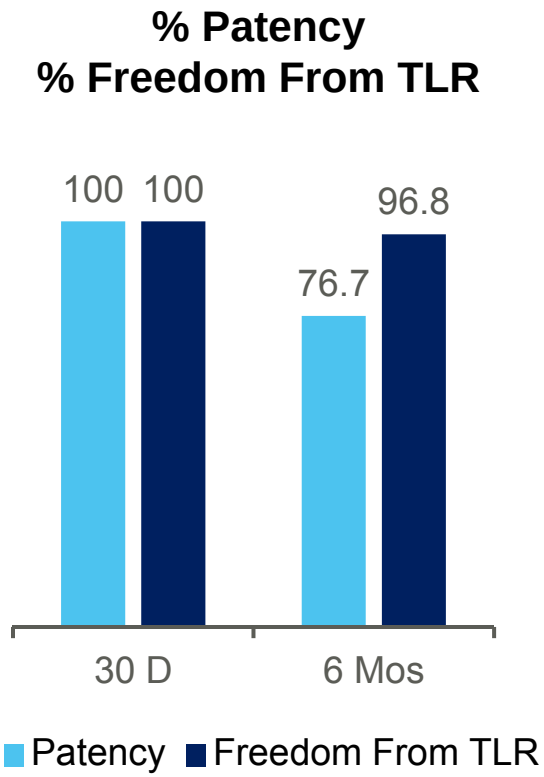
	30 days N=95	6 mo N=93
Major adverse events		
Target limb emergency surgical revascularization	0%	0%
Target limb major amputation	0%	0%
Thrombus or distal emboli with treatment	0%	0%
Perforations and dissections (≥D) with treatment	1.1% (1)	1.1% (1)

*By CEC

DISRUPT PAD Effectiveness*





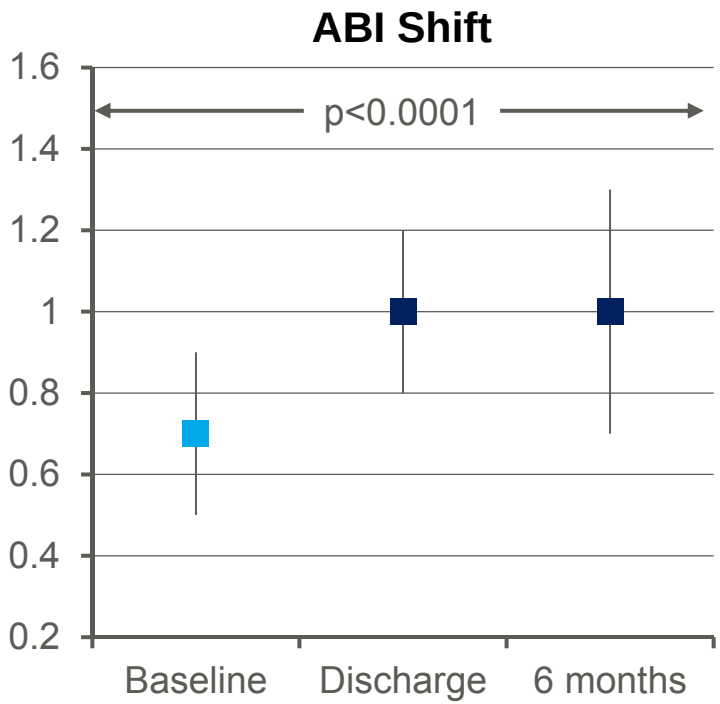


Effectiveness Summary:

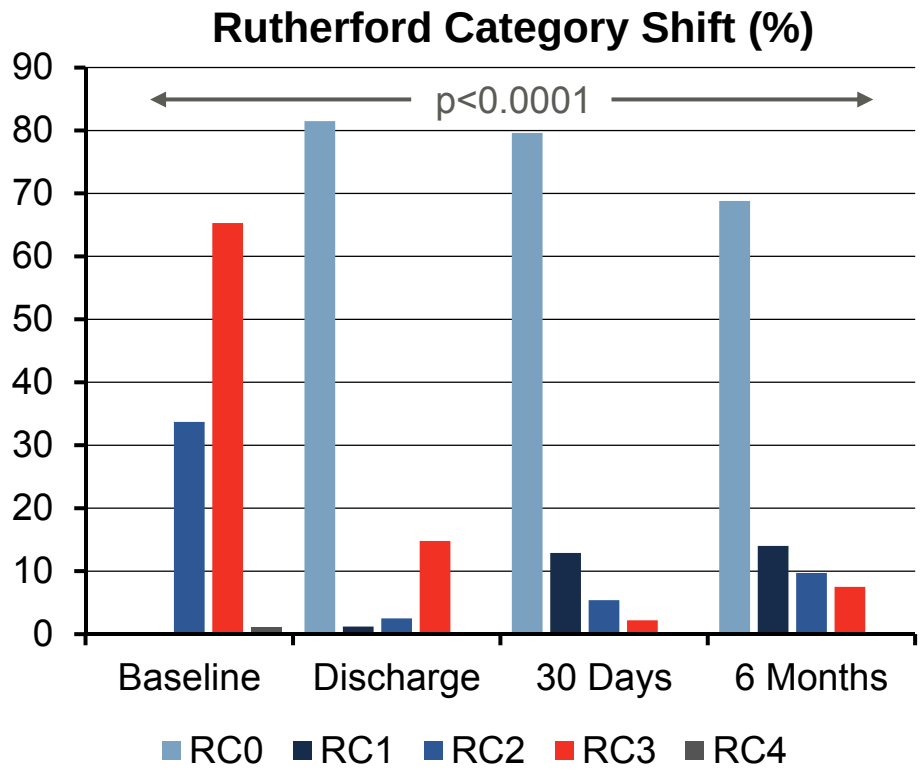
- **100% procedural success with a 24% residual stenosis**
- **Compelling 6 month results in a challenging lesion cohort**

DISRUPT PAD Functional Outcomes

Sustained hemodynamic and Rutherford Category improvement



N	91	88	89



N	95	81	93	89

DISRUPT PAD

((Summary))

- Lithoplasty® System safety and performance has been demonstrated in the treatment of calcified SFA/Popliteal lesions
  - 99% moderate to severe calcified lesion treated regardless of calcium definition

- 100% Procedural Success
  - 100% successful crossing with limited adjunctive balloon required
  - 24% Residual stenosis and 3.0 mm acute gain
  - Consistent effectiveness regardless of lesion characteristics
  - No procedural complications related to perforations, abrupt closure, slow/no reflow, thrombosis or distal embolization
    - 1% provisional stent placement due to one grade D dissection
    - 8% Embolic filter usage with no embolic debris

- 6 month DISRUPT PAD Results
  - Compelling patency and TLR rate in challenging lesion population
  - Sustained hemodynamic and Rutherford Category improvement

Caution: Federal law (USA) restricts this device to sale by or on the order of a physician.

Indication for Use - The Shockwave Medical Lithoplasty System is intended for lithotripsy-enhanced balloon dilatation of lesions, including calcified lesions, in the peripheral vasculature, including the iliac, femoral, ilio-femoral, popliteal, infra-popliteal, and renal arteries. Not for use in the coronary or cerebral vasculature.

Contraindications - Do not use if unable to pass 0.014" guidewire across the lesion • Not intended for treatment of in-stent restenosis or in coronary, carotid, or cerebrovascular arteries.

Warnings – Intended for single use only • DO NOT re-sterilize and/or reuse • Inspect all product components and packaging prior to use • Do not use the device if it or the packaging has been damaged or if sterility has been compromised • Only to be used by physicians who are familiar with interventional vascular procedures •.Physicians must be trained prior to use of the device • Use the Generator in accordance with recommended settings as stated in the Operator's Manual. Do not attempt to override the lifetime pulse limits per device.

Precautions - Use only the recommended balloon inflation medium • Appropriate anticoagulant therapy should be administered by the physician • Decision regarding use of distal protection should be made based on physician assessment of treatment lesion morphology • If the catheter appears not to deliver lithotripsy pulsatile mechanical energy, remove and replace it with another catheter.

Adverse Effects - Possible adverse effects consistent with standard angioplasty include: •Access site pain • Allergic reaction to contrast medium, anticoagulant and/or antithrombotic therapy • Arterial bypass surgery • Arterial dissection, perforation, rupture, spasm • Arteriovenous fistula • Bleeding complications • Death • Emboli • Entry site complications • Fracture • Hematoma • Hemorrhage •Hypertension/Hypotension • Infection/sepsis • Ischemia • Placement of a stent • Pseudoaneurysm • Renal failure • Restenosis of the treated segment • Shock/pulmonary edema • Total occlusion •Vascular complications. Risks unique to the device and its use: • Allergic/immunologic reaction to the catheter material(s) • Device malfunction or failure • Inability for balloon to deliver adequate pulsatile mechanical energy • Generator or cable malfunction leading to failure to deliver pulsatile mechanical energy • Excess heat at target site due to malfunction of Generator.

Prior to use, please reference the Instructions for Use for more information on indications, contraindications, warnings, precautions, and adverse events. www.shockwavemedical.com

SHOCKWAVE MEDICAL INC