

Case 3: Cutting vs. Scoring Balloon in partially calcified In-stent stenosis

Nikos Werner, MD, PhD

Heart Center Trier

Krankenhaus der Barmherzigen Brüder Trier, Germany

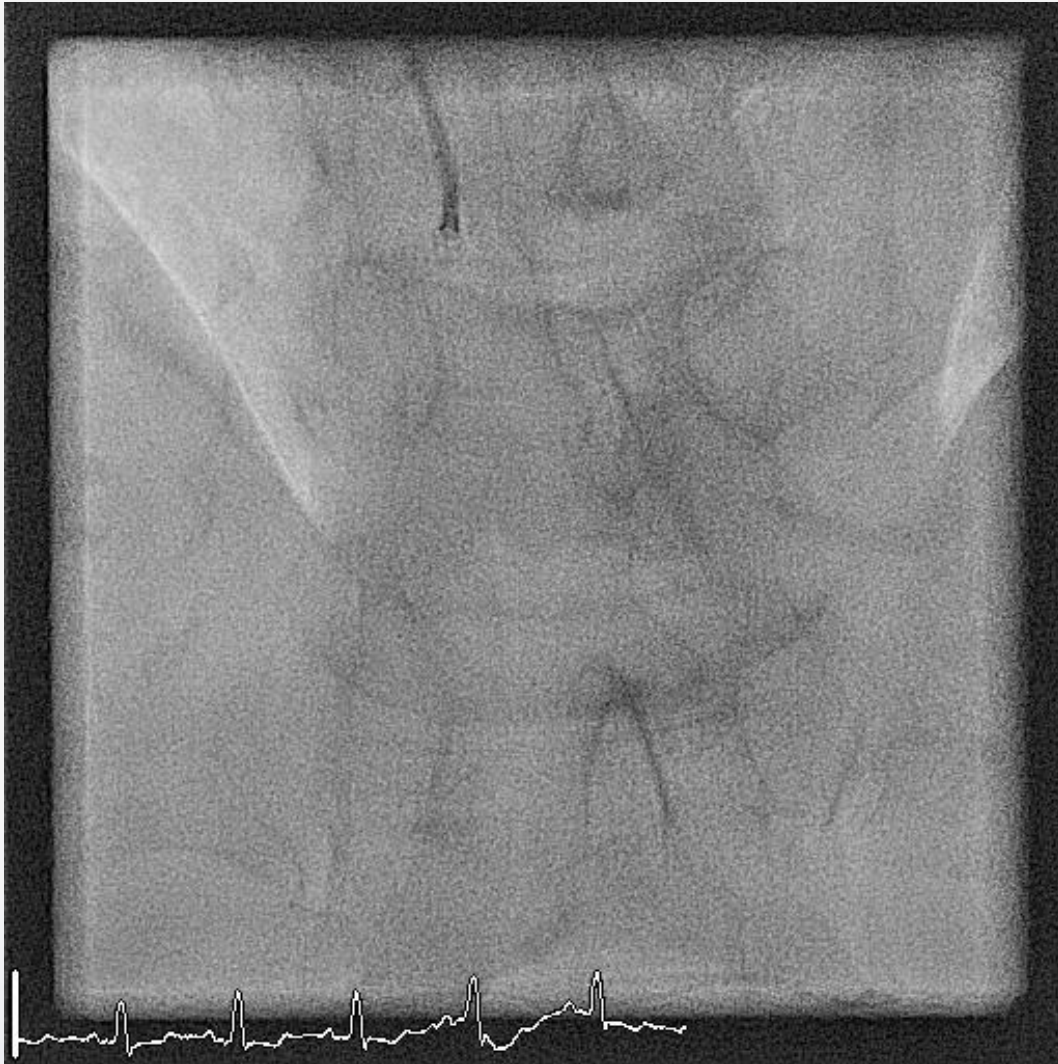
Disclosure

- Boston Scientific: Honorarium, travel grants, consulting
- Shockwave: Scientific grants, honorarium, travel grants, consulting

PATIENT CHARACTERISTICS

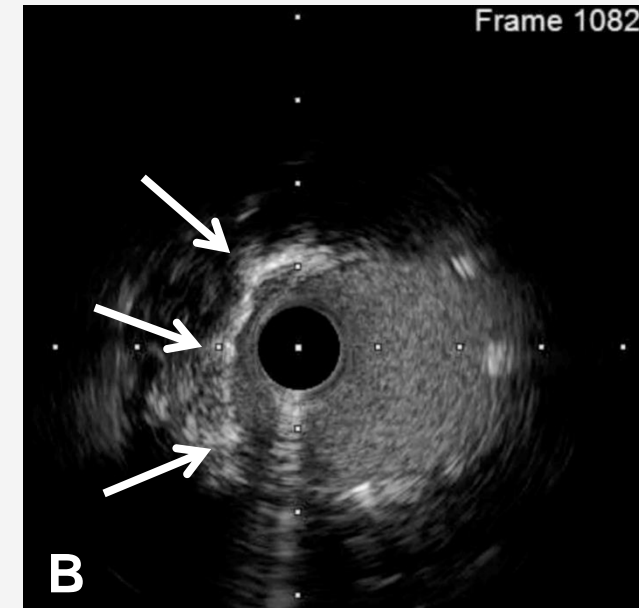
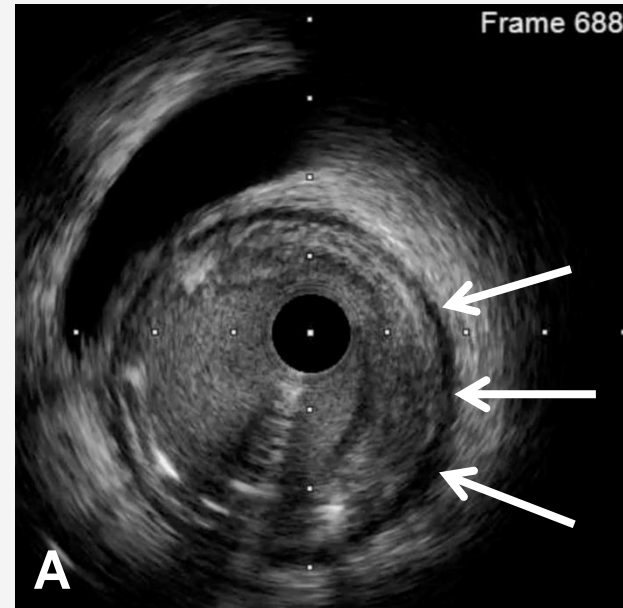
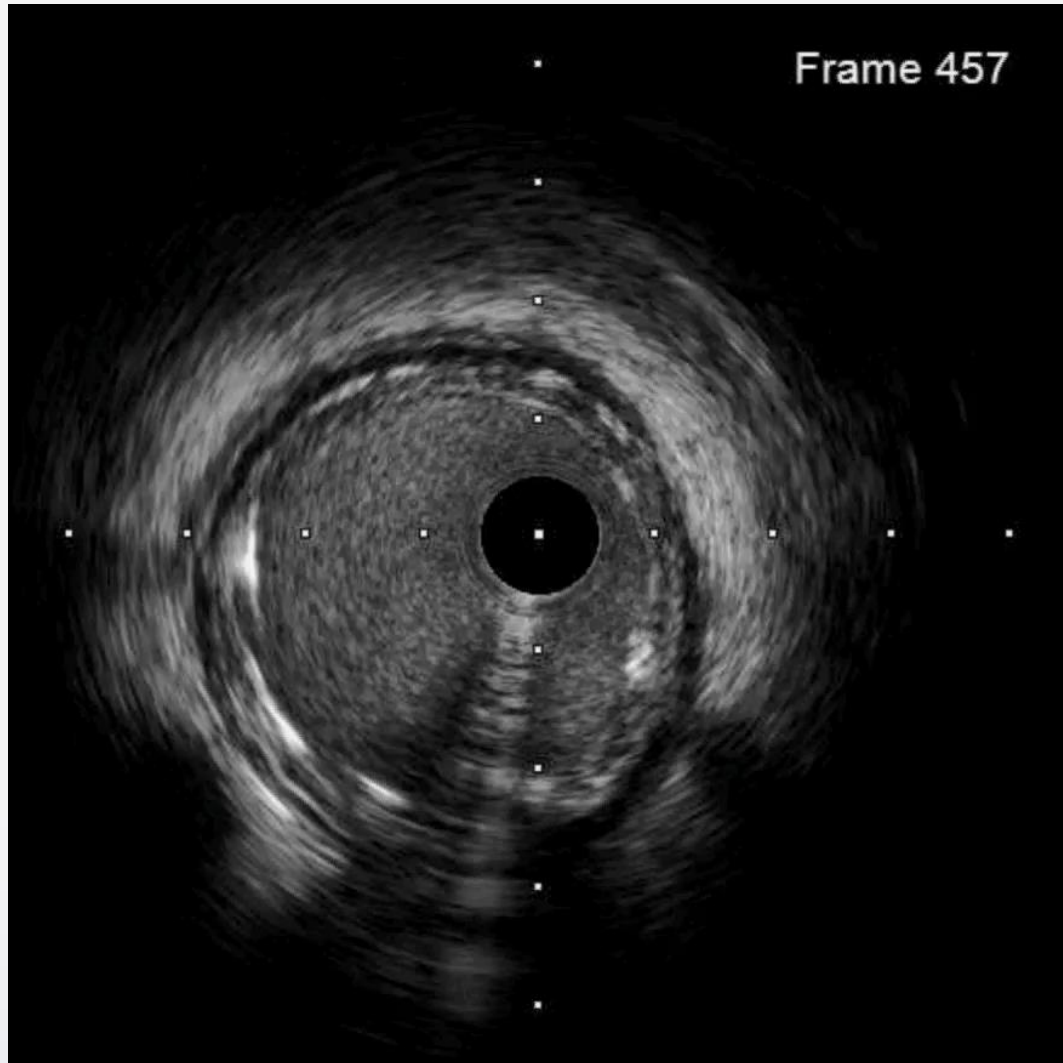
- We report on a 73-year-old female patient.
- Admission to the Chest Pain Unit due to unstable angina.
- Cardiovascular risk factors include:
 - Arterial hypertension
 - Hyperlipoproteinemia
 - Diabetes
- PCI of the ostial RCA with a Promus Premier Select 3.0 x 16mm stent in 2018

SET UP SHOTS



- Intermediate in-stent restenosis of the ostial RCA with pressure dumping.
- For further analysis, we decided to perform an IVUS (Avigo+).

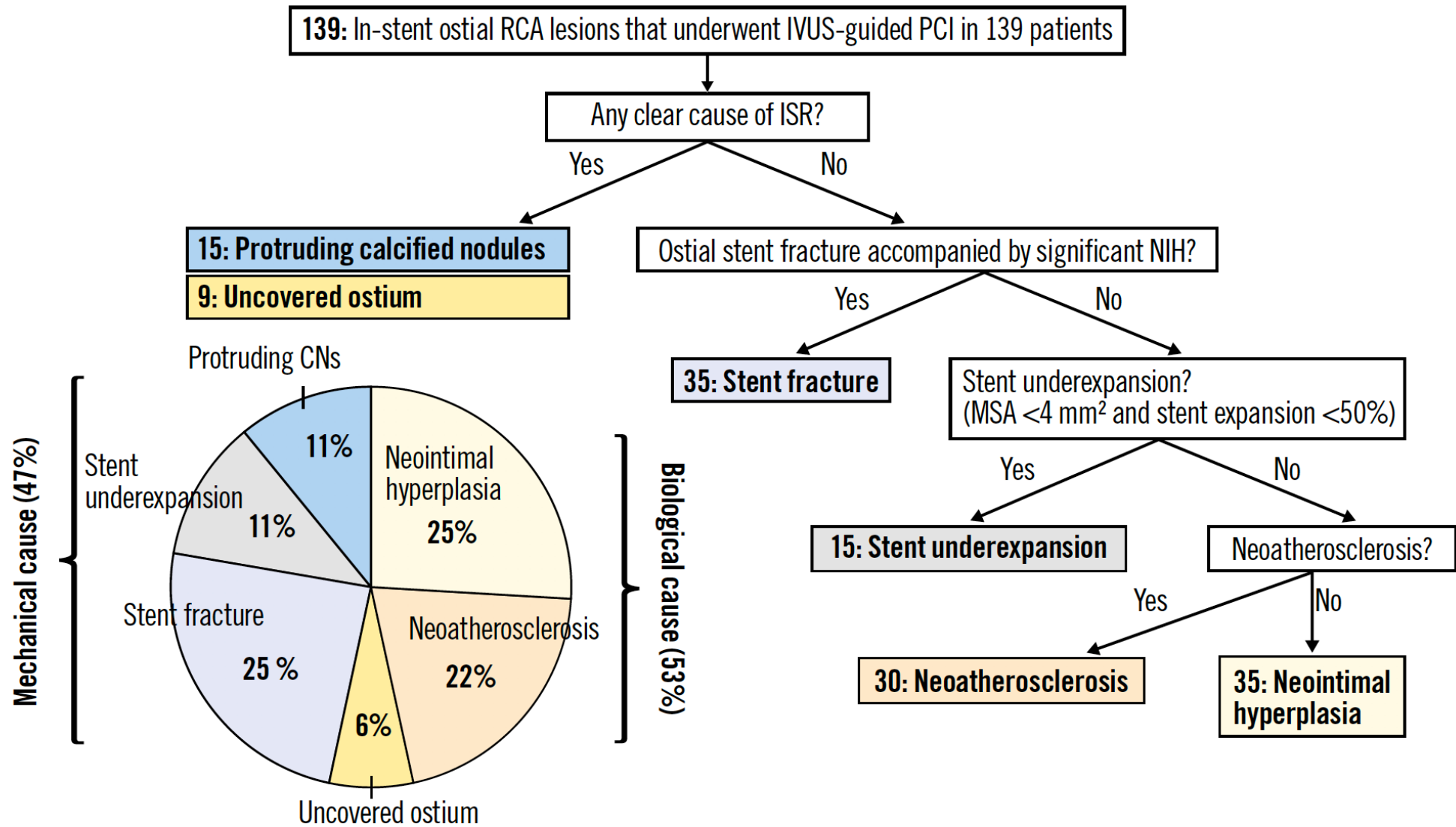
SET UP SHOTS - IVUS



In-stent restenosis of the RCA (A) with ostial calcification (B).

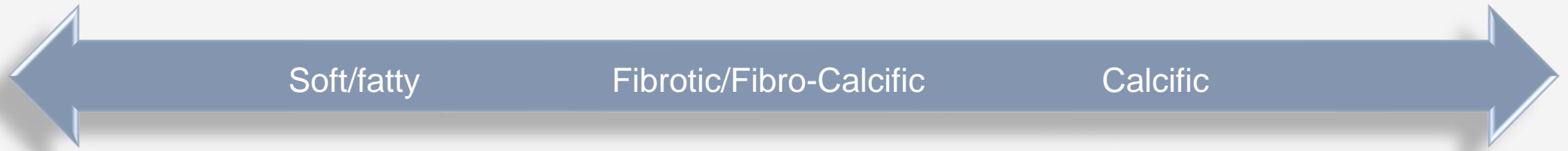
Mechanism: stent underexpansion with neointima and neoatherosclerosis

Mechanisms of In-stent ostial RCA stenoses



STRATEGY

- Moderate calcification of the ostial RCA with fibrotic In-stent restenosis; 4.0mm vessel; length of lesion 12mm



POBA



- Scoring Balloon
- Cutting Balloon

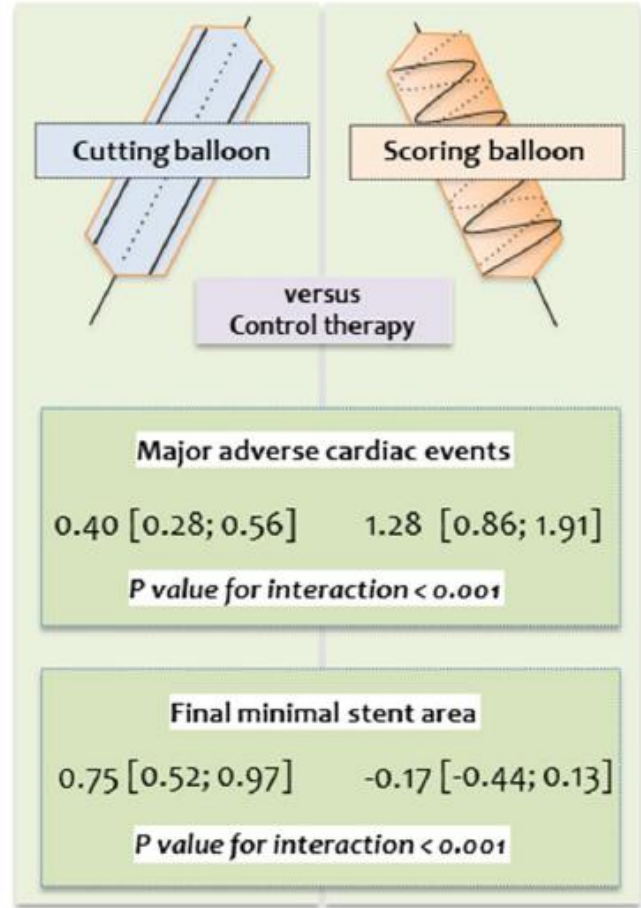
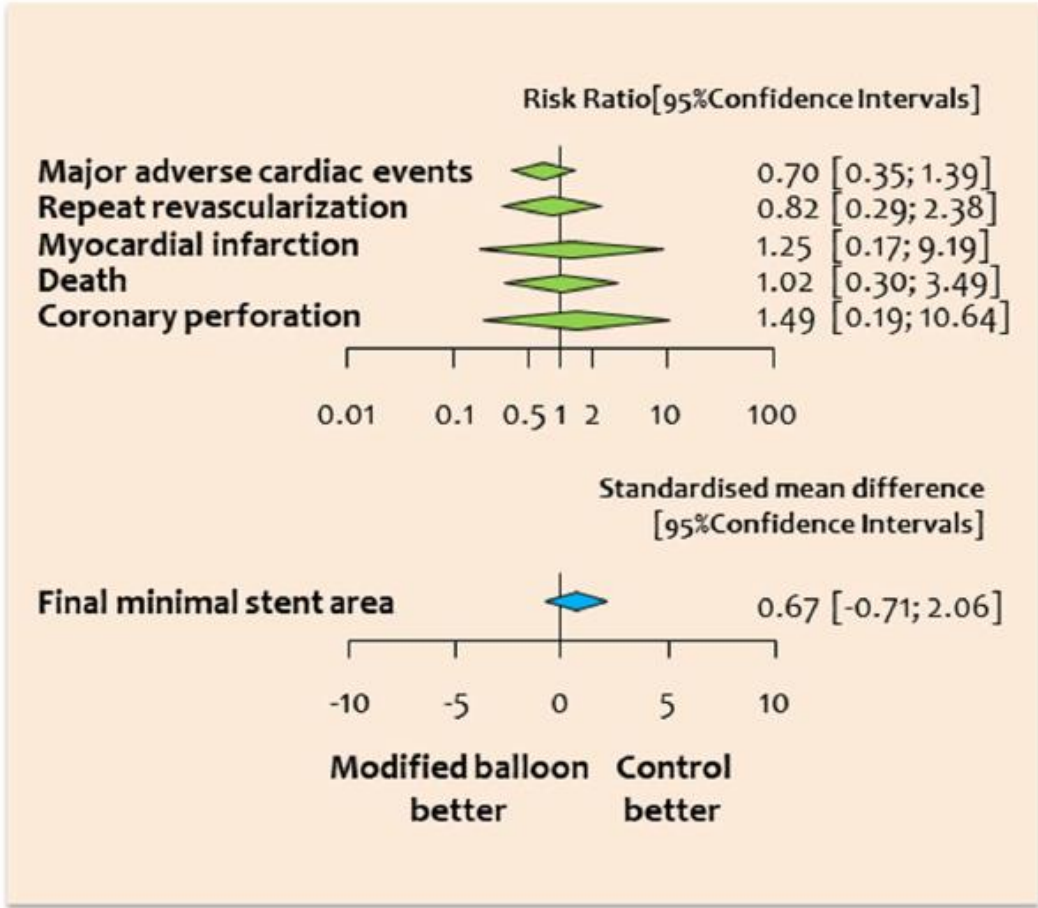


- Super high-pressure balloon
- Lithoplasty
- Rotational Atherectomy
- Orbital Atherectomy

Modified balloon
(cutting/scoring),
patients n= 335

6 RCTs,
patients
N= 648

Control therapy,
patients n= 313



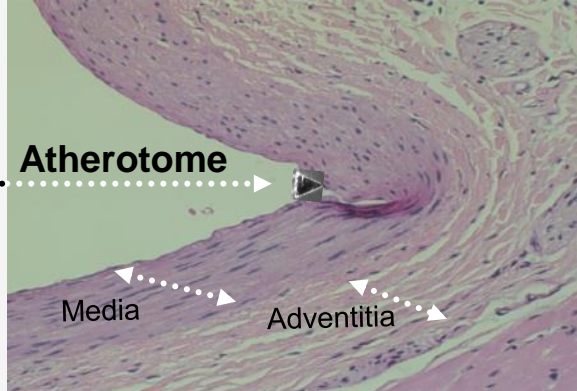
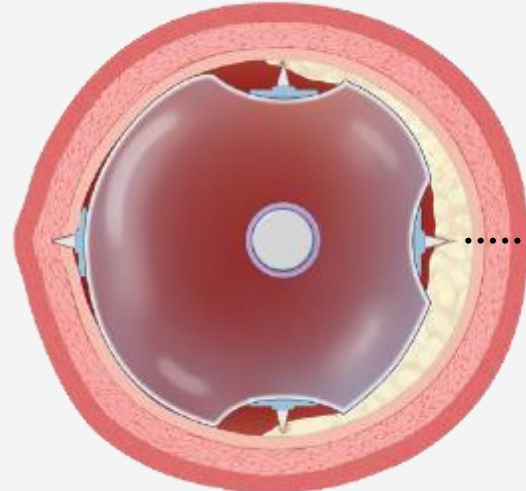
Significant treatment effect-by-modified balloon type interaction for the outcome MACE in patients assigned to cutting balloon compared with control therapy [RR = 0.40 (0.28–0.56), P for interaction (*P_{int}*) < 0.001].

Wolverine Cutting Balloon - Mechanism of Action

Innovative design for safe and efficient calcium cracking³

1 Atherotome Amplified Force.¹
 The atherotomes anchor into the plaque and amplify pressures generated by the balloon. This creates controlled, longitudinal cracks in the calcium.¹

2 Safely Cracks Calcium.
 Due to its design, Wolverine can modify calcium at lower pressures than POBA.³ Atherotomes penetrate a small distance into the vessel wall, even in healthy tissue.⁴



Pre-clinical Swine Coronary artery post Cutting Balloon¹

Atherotome Cutting Height	127 μm
Human LAD Media Thickness ²	320 μm
Human LAD Wall Thickness ²	900 μm

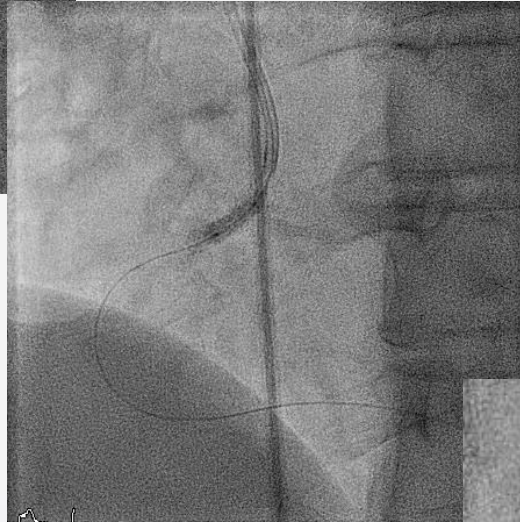
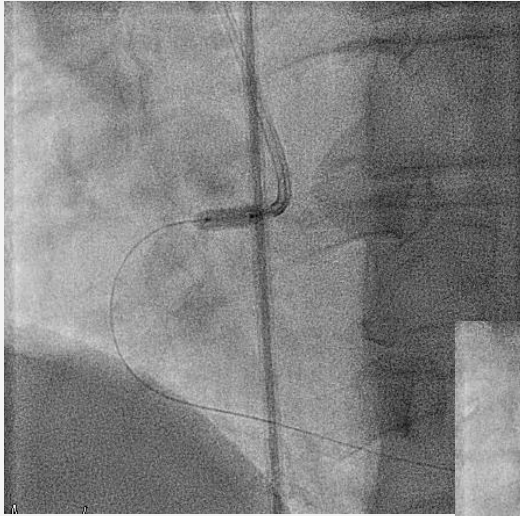
¹ Xiaodong Zhu et al.;Circ Rep 2021; 3: 1 – 8 doi: 10.1253/circrep.CR-20-0070. Results of computer models are not predictive of clinical performance. Clinical results may vary.
² Bonan, J InvasivCardiol, 1999; 11: 230
³ Mangieri, A. Cutting Balloon to Optimize Predilatation for Stent Implantation: The COPS Randomized Trial, TCT 2022
⁴ BSC Data on file. Photos taken by Boston Scientific. Results of internal bench studies are not representative of clinical performance. Clinical results may vary.



STRATEGY

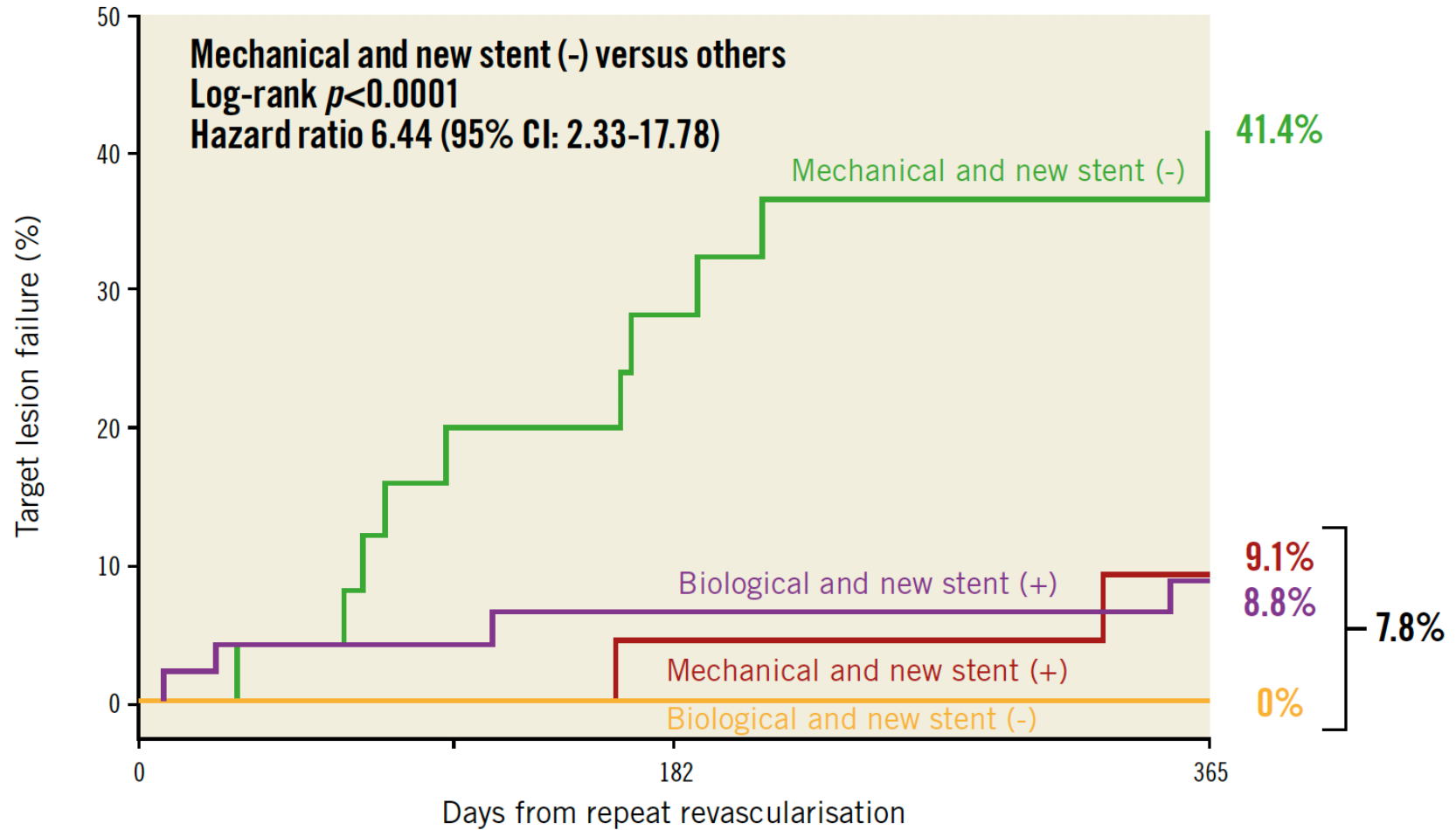
- Moderate calcification of the ostial RCA as well as fibrotic In-stent restenosis; 4.0mm vessel; length of lesion 10mm
 - » Cutting balloon Wolverine 3.5/10mm @ 12 atm.
 - » Dilatation with a NC Quantum Apex 4.0/15mm @ 14atm.
 - » Promus Element DES 4.0/16mm

LESION PREP – WOLVERINE 3.5/10mm



Stent or DCB ?

B



Number at risk
 Mechanical cause
 and new stent (-)
 Others

33	19	12
106	73	67

KEY LEARNINGS

- Intravascular imaging is one of the basic pillars for planning the appropriate strategy in the treatment of in-stent restenosis.
- Cutting balloons are ideal for fibrotic/calcified stenoses
- Adequate preparation of the stenosis is crucial for the final result.
- The use of a cutting balloon vs. a scoring balloon may have beneficial effects in lesion preparation with limited data available.



TCTAP 2024

Thank you for your kind attention!

Nikos Werner

n.werner@bbtgruppe.de

