#FullPhysiology

In Daily Practice

RIALTO PRO

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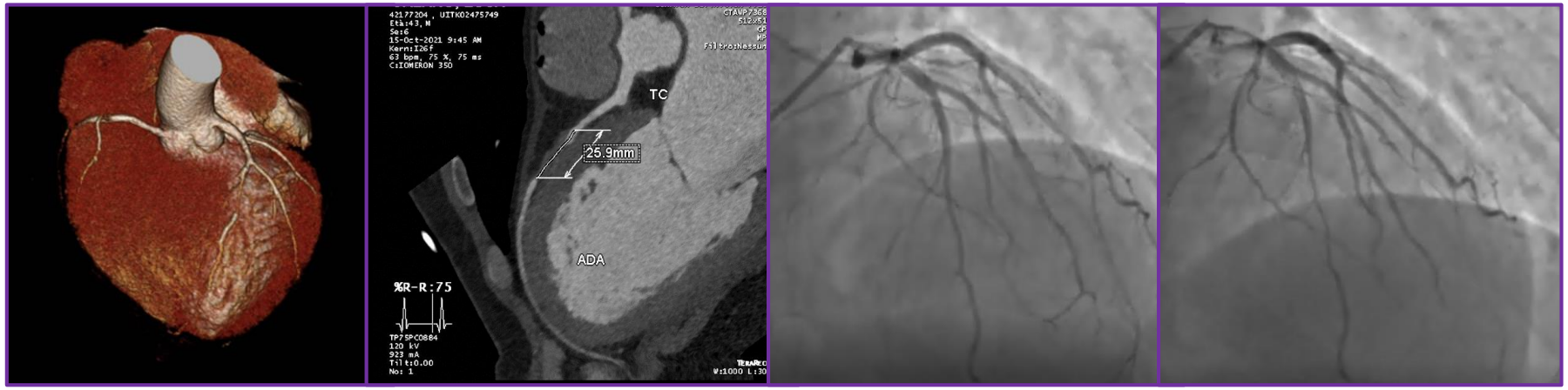
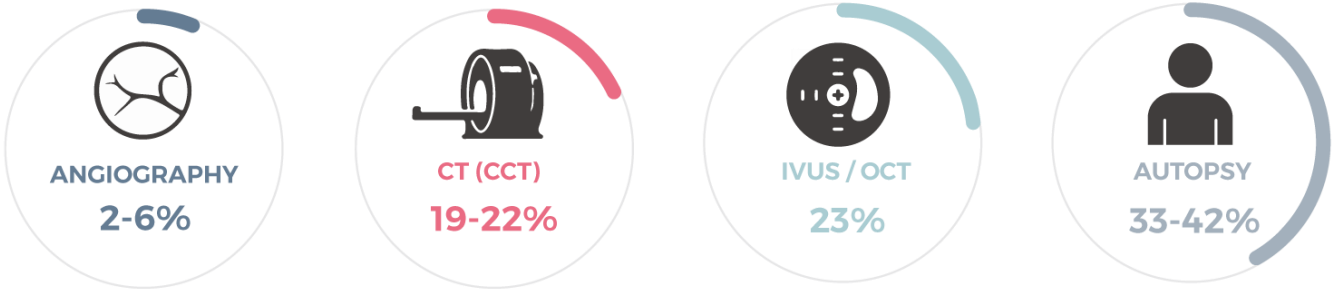
Background

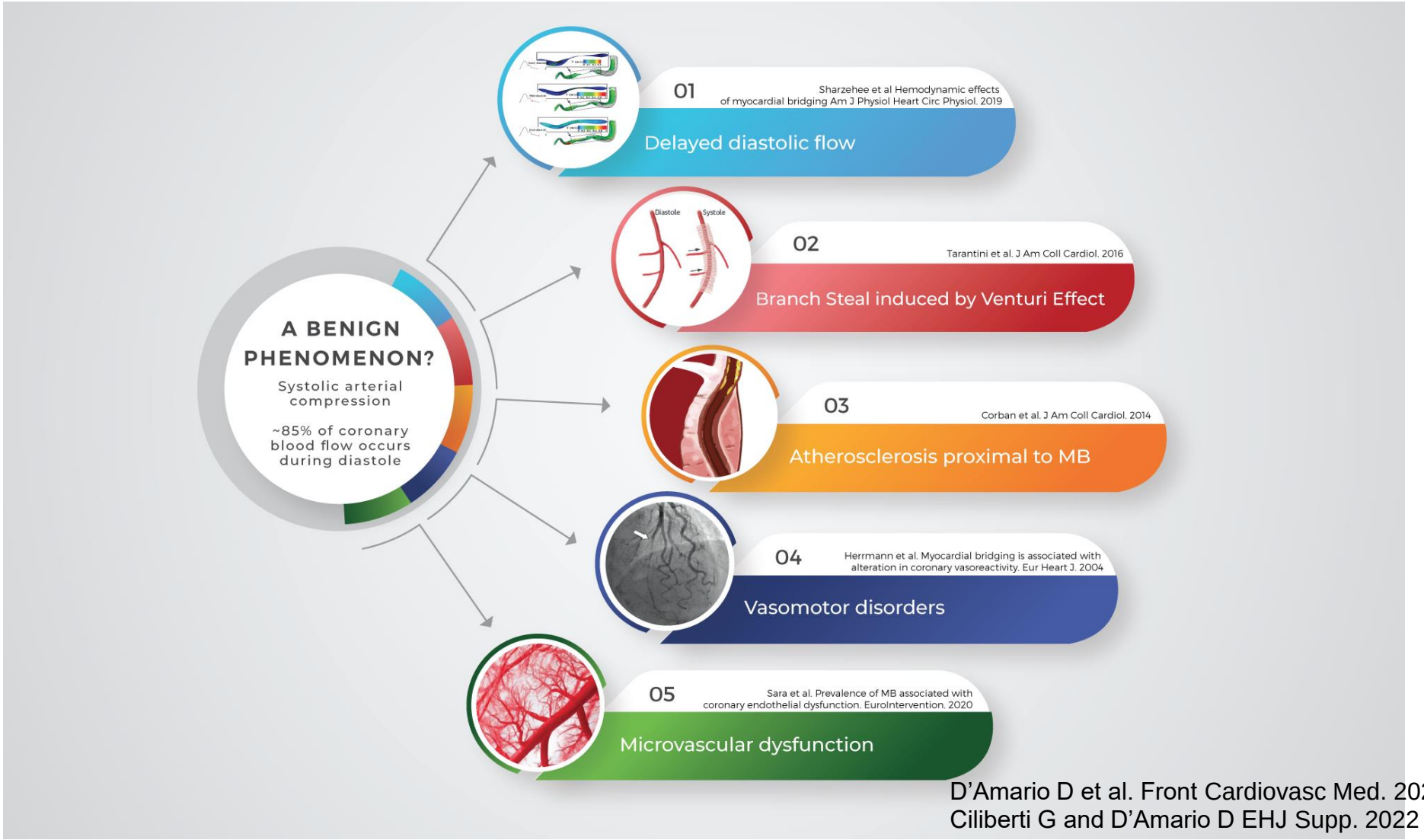
Myocardial bridge is the most common congenital coronary anomaly
in which a segment of the epicardial coronary artery takes a tunneled course
under a bridge of myocardium and is squeezed during ventricular systole



The incidence of MB depends on the modality used to identify the tunneled segment:



Myocardial bridge-related ischemia



D'Amario D et al. Front Cardiovasc Med. 2022
Ciliberti G and D'Amario D EHJ Supp. 2022

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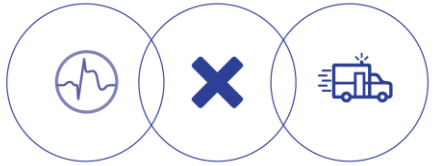
PRIMARY ENDPOINT

Incidence of MACE
(Myocardial infarction, cardiac death and cardiac hospitalization)
in patients with Myocardial bridge referred to coronary angiography



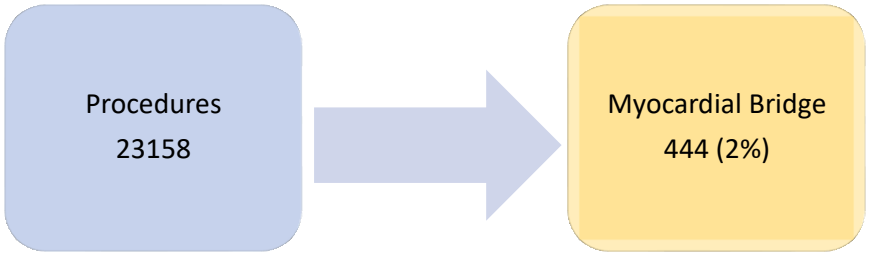
SECONDARY ENDPOINTS

Rate of patients with significant angina
(SAQ < 70)

Impact of invasive intracoronary assessment on outcomes
(MACE and SAQ)

- Functional test (FFR/cFFR)
- Imaging (OCT-IVUS)
- Provocative test (acetylcholine)

Study population



Left anterior descending 96,8 %

Circumflex artery 1,5 %

Right coronary artery 0,5 %

Posterior interventricular artery 0,5 %

First diagonal branch 0,5 %

First septal branch 0,2 %

Number of patients	444
Male sex (%)	71,8 %
Age (Mean ± SD)	59 ± 11,2
Body mass index (Mean ± SD)	24,6 ± 2,7
Risk factors	
Hypertension (%)	62,8 %
Diabetes, (%)	13,5 %
Dyslipidemia (%)	52,7 %
Former smoker (%)	26,4 %
Active smoker (%)	16,9 %
Stroke histoty (%)	2,3 %
Previous myocardial infarction (%)	8,3 %
Previous CABG (%)	0,5 %
Previous PCI (%)	14,2 %

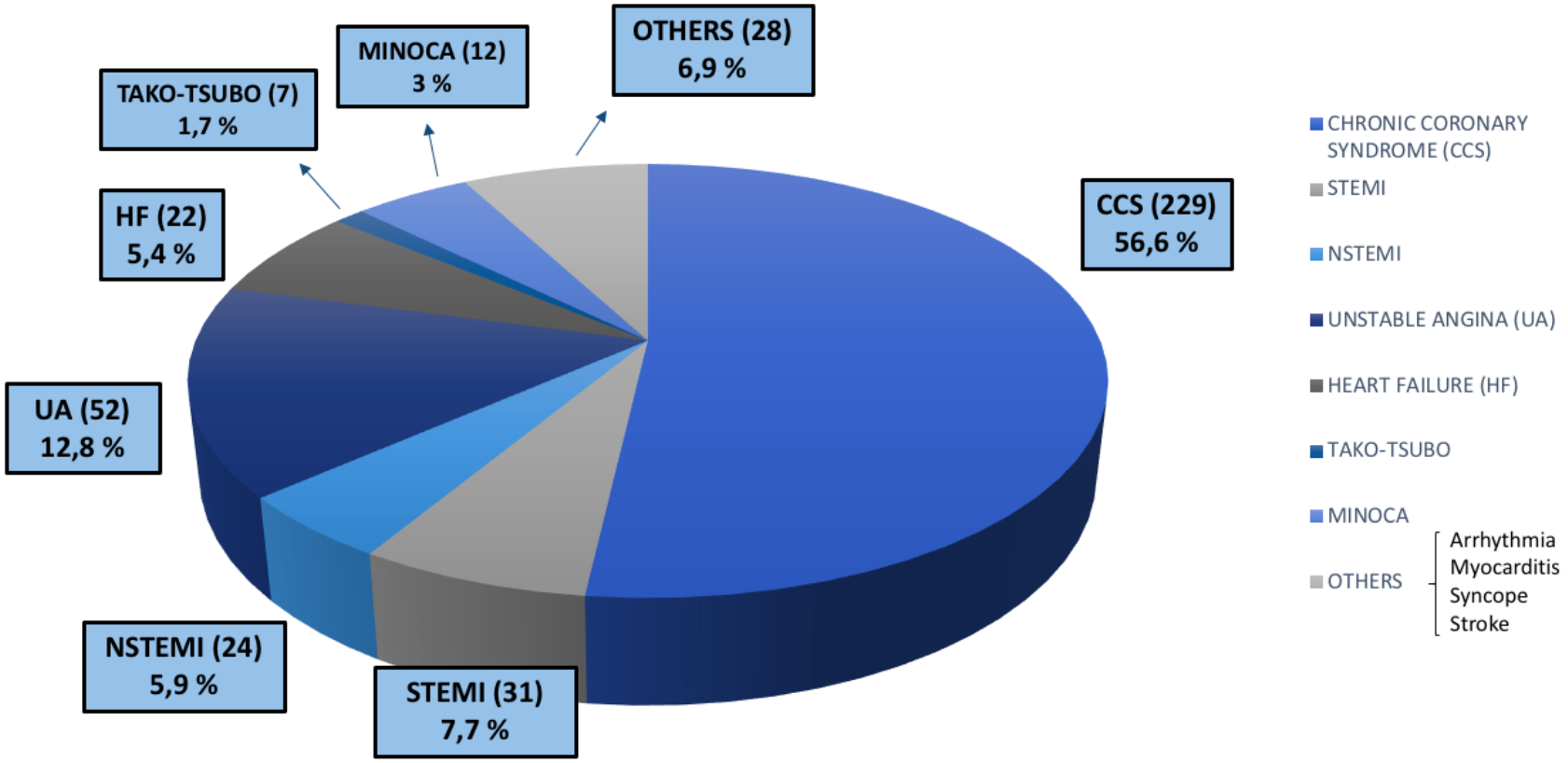
MACE	n°of patients at follow-up	n°	(%)
6 month	266	31	11,6%
12 months	247	16	6,5%
24 months	193	26	13,5%

SAQ<70	n°of patients at follow-up	n°	(%)
6 month	266	50	18,8%
12 months	247	51	20,6%
24 months	193	42	21,8%

Personalised Medicine in:

Clinical Presentation: not all bridges are born equal!

Acute (38%) vs Chronic (62%) Coronary Syndromes



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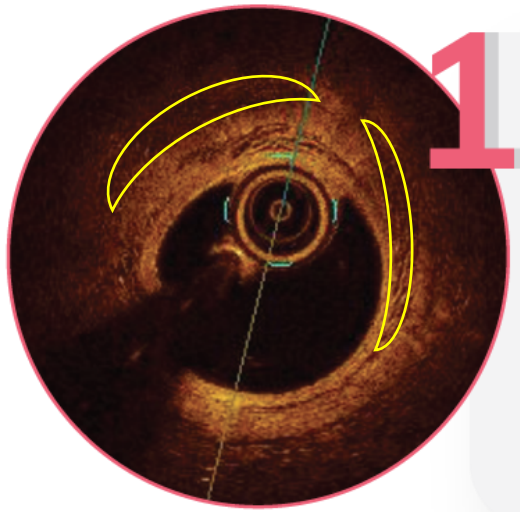
Intracoronary imaging

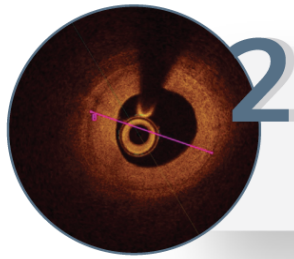


1

To limit underdiagnosis of MB

- Systolic compression of the vessell
- Heterogeneous fusiform band with intermediate-intensity signal, similar to tunica media
- Perivascular "half-moon" surrounding the vessel adventitia
- Sharp borders
- No discontinuity between the fusiform area and the adventitia

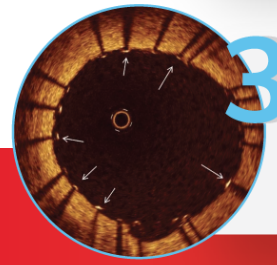
Vergallo R, D'Amario D et al under submission



2

To assess MB-associated CAD

Evaluation of atherosclerosis proximal to Myocardial Bridge



3

To guide stenting

PCI with DES in patients with Myocardial Bridge is related to risks:

very late stent thrombosis, stent malapposition, perforation

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n°64 (15,8%)

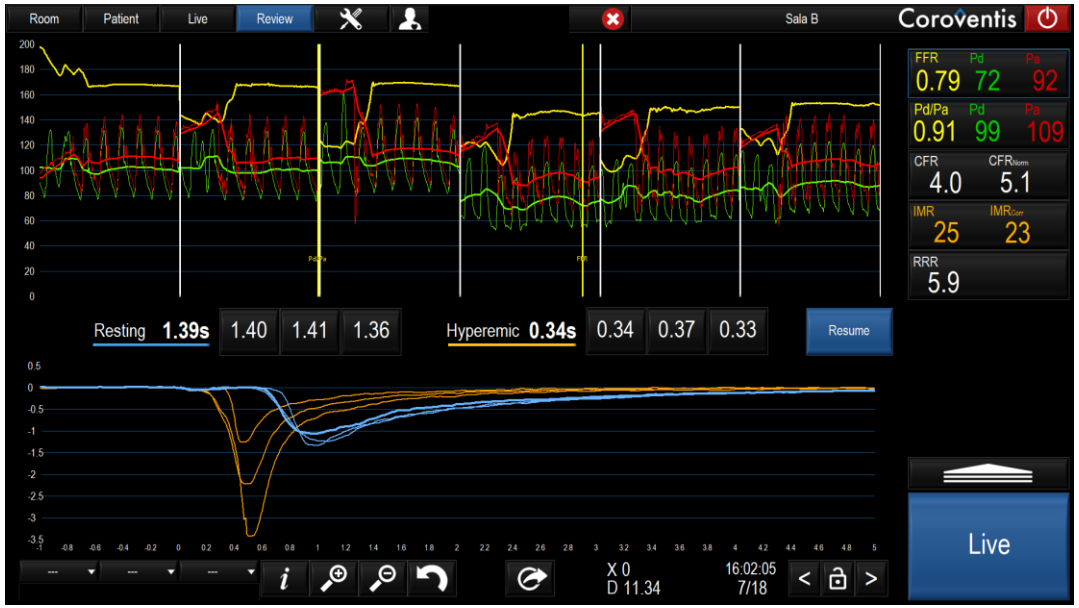
FUNCTIONAL TESTS

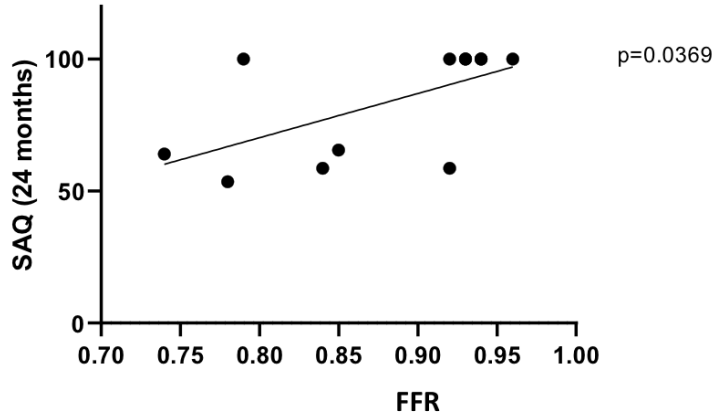
FFR-cFFR
CFR

IMR
CFR

To evaluate the hemodynamic significance both of MB and plaques proximal to MB

To evaluate microvascular Dysfunction





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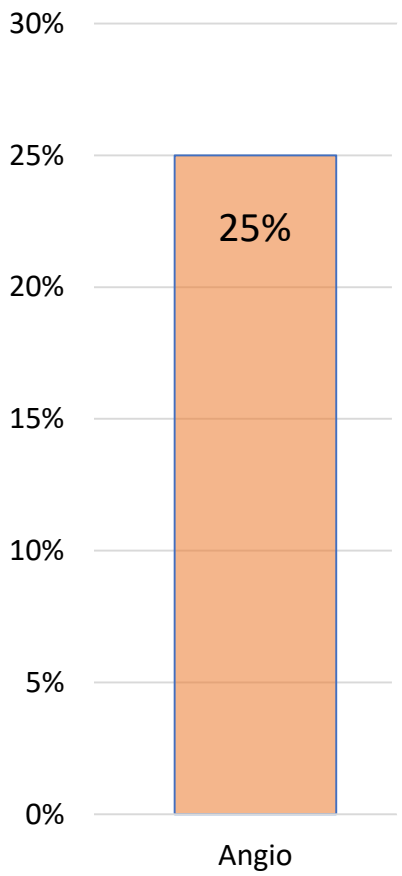
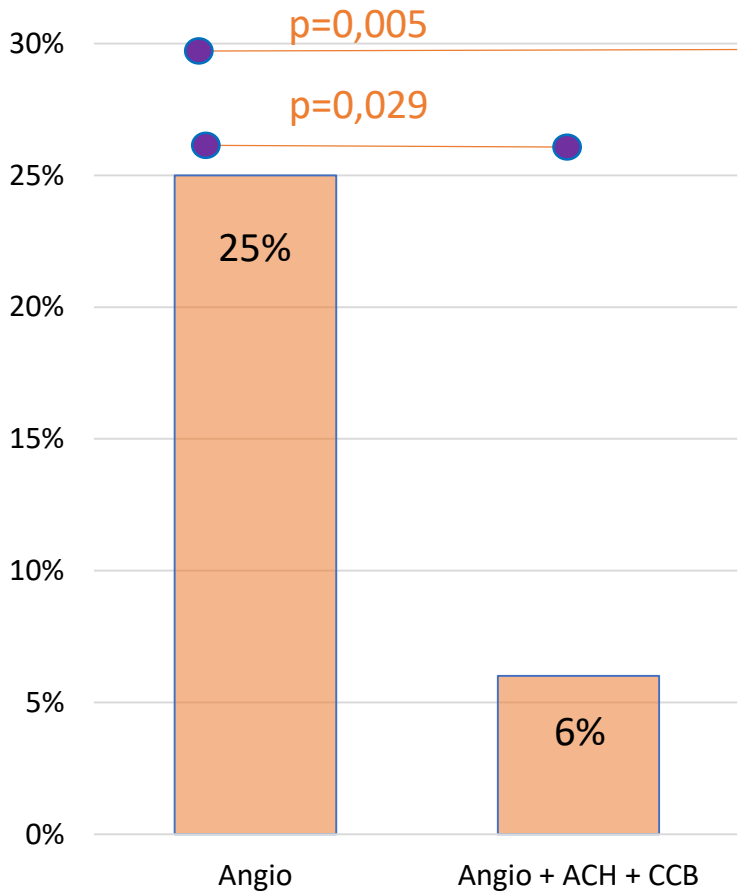
Personalised therapy

Therapy At Discharge	Angio	Angio + ACH	Angio + FFR	P value
Beta Blockers	65,7%	34%	63,6%	<0,001
Calcium Channel Blockers	20,6%	63,8%	20,5%	<0,001

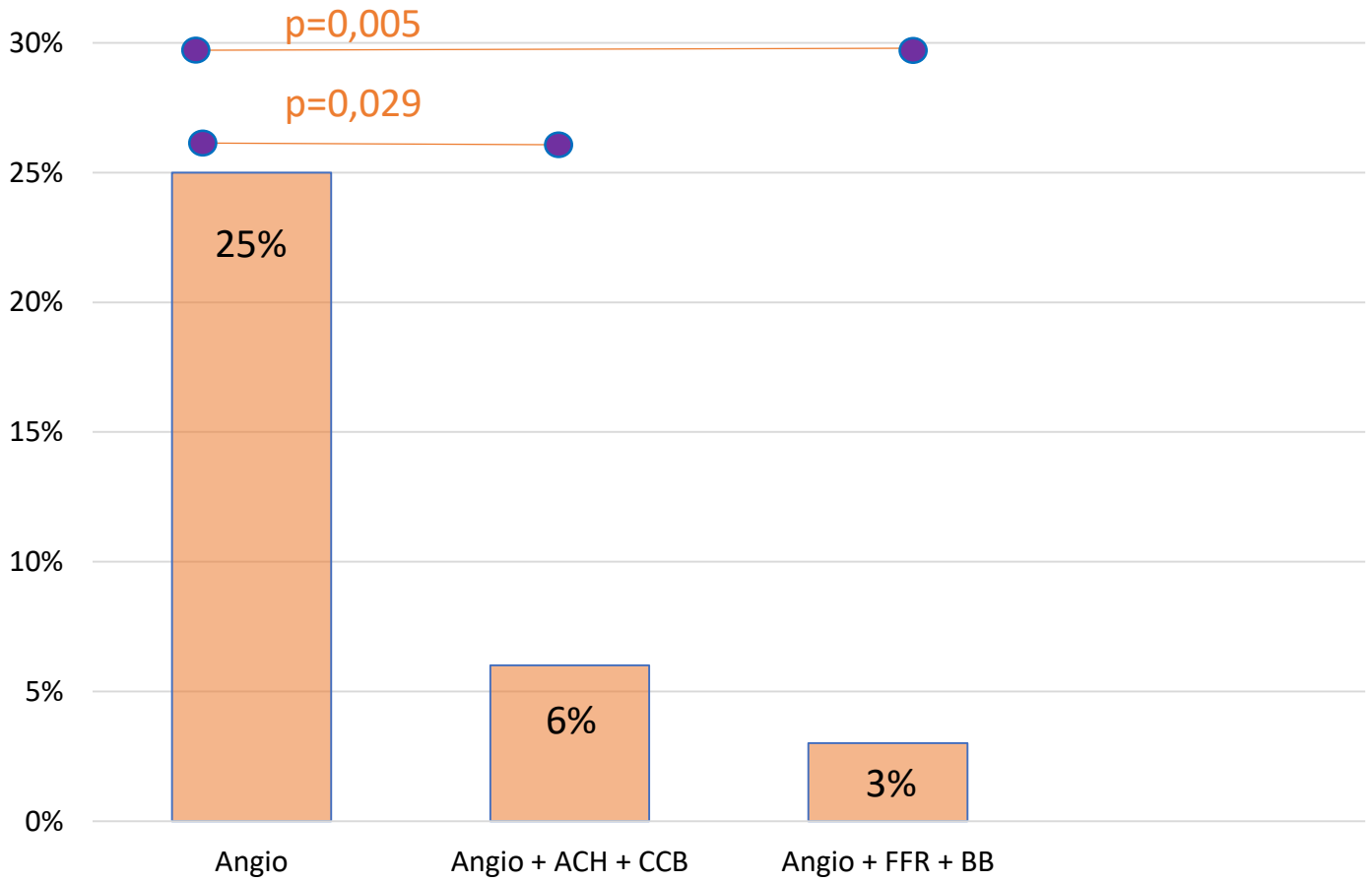
Personalised therapy: incidence of MACE at 24 months



Personalised therapy: incidence of MACE at 24 months



Personalised therapy: incidence of MACE at 24 months



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Myocardial Bridging

How We Can Help You

A myocardial bridge is a usually harmless condition in which one or more of the coronary arteries goes through the heart muscle instead of lying on its surface. Most bridges don't seem to cause symptoms. However, some people with myocardial bridges can experience angina, or chest pain.

At Stanford, we actively look for and diagnose hard-to-detect forms of non-obstructive coronary artery disease, like myocardial bridging. In fact, our doctors helped to establish the link between myocardial bridges and chest pain. We use specific tests to diagnose this condition and give people an explanation for their pain. Our cardiologists provide experienced-based treatment approaches to ease symptoms and prevent complications.

FIND A DOCTOR | MAKE AN APPOINTMENT | FIND A CLINIC

WHAT WE OFFER YOU FOR MYOCARDIAL BRIDGING

Take Home Message

- The early results of the study demonstrate that myocardial bridge is a challenging cause of ischemia in symptomatic patients referred for coronary angiography.

- A remarkable proportion of patients were found to have a myocardial bridge during the occurrence of an acute or chronic coronary syndrome, highlighting that different mechanisms of ischemia may coexist.

- Stratified medical therapy, guided by invasive functional assessment, has a significant impact on cardiovascular outcomes.

See you in Paris @ EuroPCR 2024

Coronary physiology in INOCA/ANOCA *View this session*

Wednesday 15 May 2024 — Moderated e-Poster

08:30 - 10:00 — Poster Lab

Session comprising selected EuroPCR 2024 Abstract submissions

Speaker : Prognostic implications of myocardial bridging-related coronary artery spasm (08:48 - 08:53)

The invitation was confirmed on the 07-Mar-24 14:23.

Personalised Vascular Care Award - Competition *View this session*

Thursday 16 May 2024 — Abstracts

08:30 - 10:00 — Room 341

Session comprising selected EuroPCR 2024 Abstract submissions

Speaker : Myocardial bridge evaluation towards personalised medicine: final results of the RIALTO registry (08:30 - 08:35)

ClinicalTrials.gov ID: NCT06281067

Study Identification

Unique Protocol ID:	271.673
Brief Title:	Reassessment of myocardIAL Bridge TOwards PeRsOnalized Medicine (RIALTO PRO)
Official Title:	Reassessment of myocardIAL Bridge TOwards PeRsOnalized Medicine: RIALTO PRO
Secondary IDs:	

Study Status

Record Verification:	February 2024
Overall Status:	Recruiting
Study Start:	December 15, 2023 [Actual]
Primary Completion:	January 1, 2026 [Anticipated]
Study Completion:	January 1, 2026 [Anticipated]

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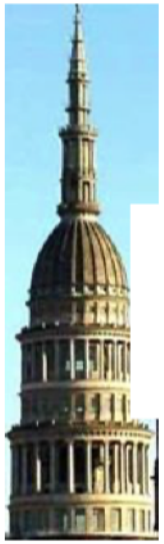

Comitato Etico Territoriale (CET)
Interaziendale AOU Maggiore della Carità di Novara

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- *Azienda Ospedaliero Universitaria Maggiore della Carità (Novara)*
- *Azienda Ospedaliero Universitaria Città Della Salute E Scienza (Torino)*
- *Presidio Ospedaliero Sant'Andrea (Vercelli)*
- *Ospedale Generale Regionale F. Miulli (Acquaviva delle Fonti, BA)*
- *Ospedale Civile Santissima Annunziata (Sassari)*
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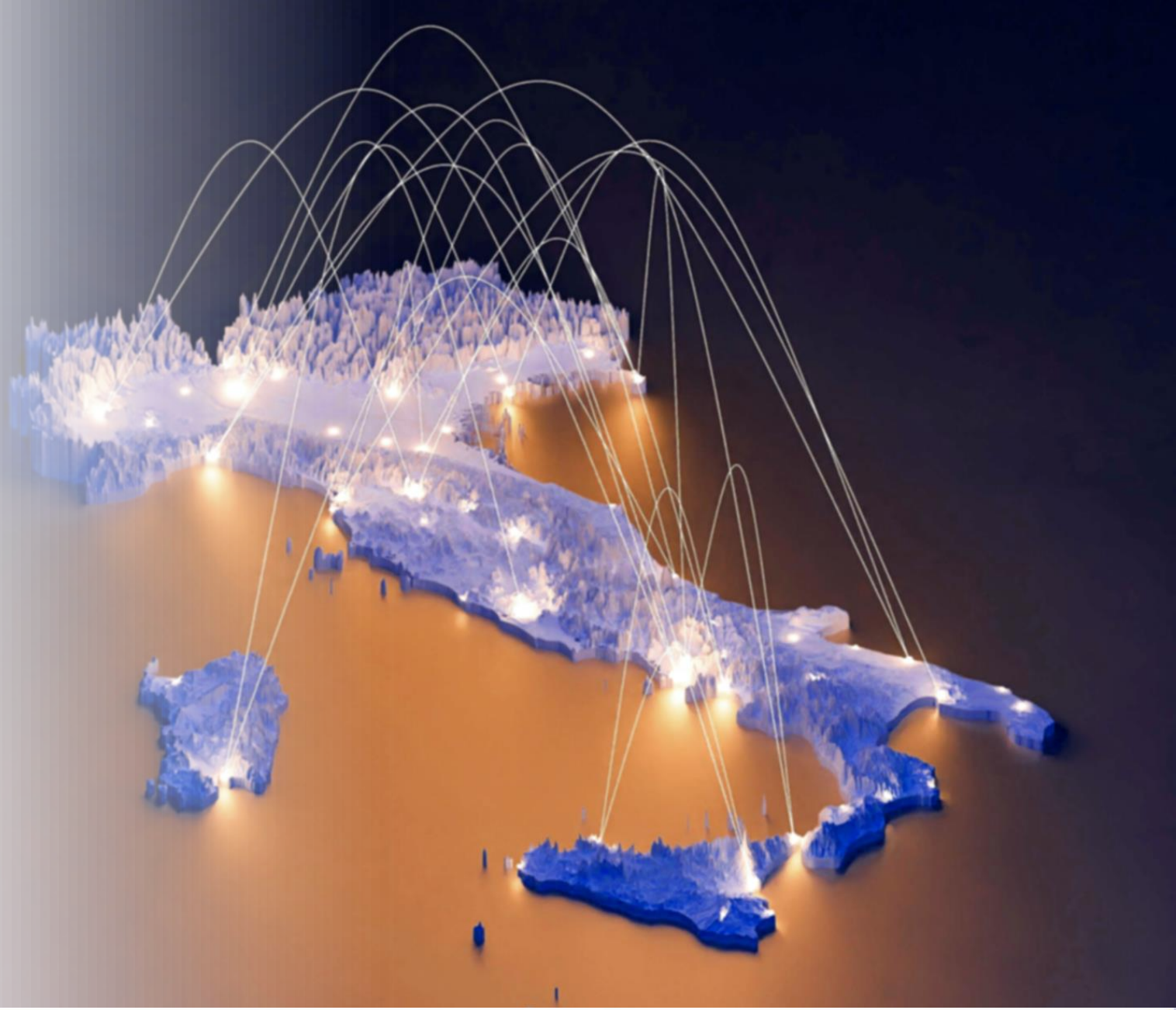
- *ASST Papa Giovanni XXIII (Bergamo)*
- *Centro Cardiologico Monzino IRCCS (Milano)*



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Inclusion criteria

- ✓Ability to give informed consent to the study.
- ✓Age ≥ 18 years and ≤ 75 years.
- ✓Diagnosis of **myocardial bridge during index coronary angiography.**
- ✓Symptoms or signs of inducible ischemia

Exclusion criteria

- Moderate to severe **coronary artery disease** (≥ 50% stenosis in any vessel, including chronic total occlusion)
- Previous **coronary artery bypass graft involving the index vessel.**
- Severe **valvular** heart disease.
- Left ventricular systolic dysfunction **< 40%**
- Clinically significant **right ventricular dysfunction**.
- **eGFR < 30** ml/min/1.73 m2).
- Known severe **hepatic** impairment
- Life expectancy **< 1 year**.
- Any previous history of **ischemic stroke, intracranial haemorrhage**
- Pregnant or breastfeeding women.
- Known hypersensitivity or contraindication to any of the drugs used

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Study Design

Randomized controlled, open-label, multicenter, superiority trial

Symptoms and/or signs of inducible ischemia

Angiographic evidence of Myocardial Bridge

1:1 Randomization

Full-physiology approach

- Basal Pd/Pa, a-FFR, RFR, d-FFR
- CFR/d-CFR, IMR/d-IMR
- ACH test.

Tailored approach

- Hemodynamic significance (Pd/Pa≤ 0.92, FFR≤ 0.80, RFR≤ 0.89 and/or dobutamine FFR< 0.75) ⋯▸ **BBs ± Ivabradine**
- Structural microvascular dysfunction (CFR< 2.0 and IMR≥ 25) **BBs + Ace-I + Statins**
- Epicardial or microvascular spasm (positive ACH test) ⋯▸ **CCBs**

Standard approach

Only angiographic evaluation

No specified GDMT

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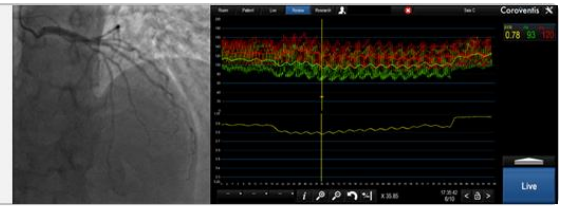
Future perspectives: the RIALTO-PRO

1 Epicardial disease assessment
- NHPR (≤0.89)
- cFFR (≤0.83)
- FFR (≤0.83)



2 Microvascular disease assessment
- IMR (>25)
- CFR (< 2.0)
- RRR (<2.0)*

Resistive resistance ratio $= \frac{Trm*Pdr}{Thm*Pdh}$

3 Vasomotor testing
- Ach

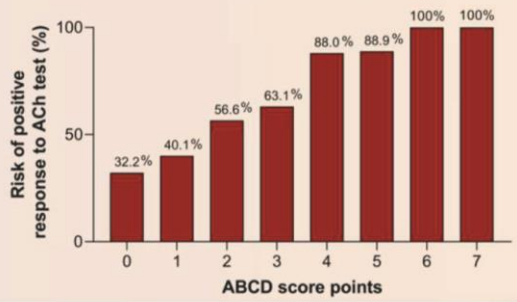
Set the new standard for the diagnosis and treatment of patients with MB optimizing the care pathway according to specific endotype

ABCD score

		Points
Acute clinical presentation	Yes (i.e. MINOCA)	2
	No (i.e. INOCA)	0
Presence of myocardial **B**ridge	Yes & lenght >20 mm	3
	Yes & lenght ≤20 mm	1
	No	0
C-reactive protein	> 5 mg/L	1
	≤ 5 mg/L	0
Dyslipidaemia	Yes	1
	No	0

- **94.3% with ABCD score ≥4 had a positive ACh test.**
- **All patients with an ABCD score ≥6 presented a positive ACh test response**

Overall population

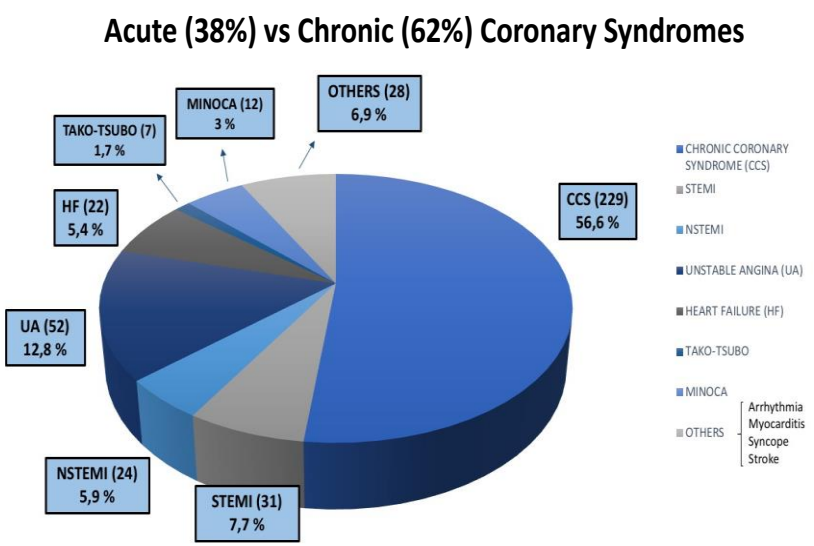


Rinaldi R et al, Atherosclerosis. 202

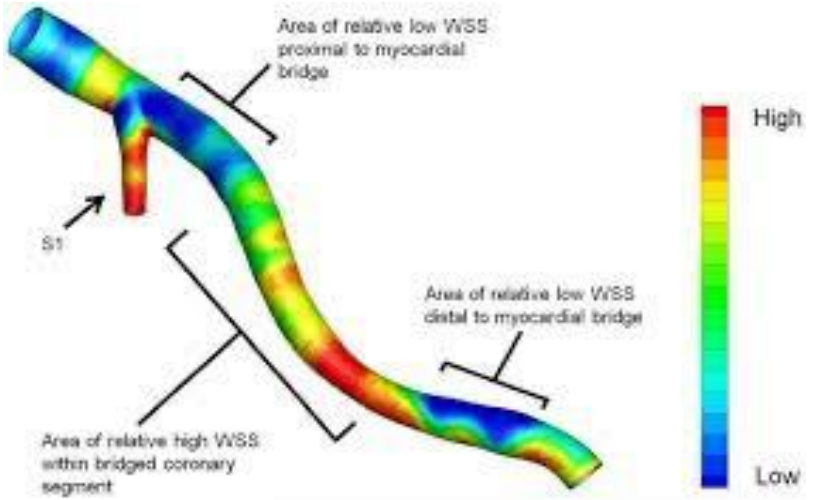
Title	First Author	Number of patients with MB included in the study (n)	Positivity in MB+ at Ach test (n, %)	Positivity in MB- at Ach test (n, %)
"Myocardial bridging is related to endothelial dysfunction but not to plaque as assessed by intracoronary ultrasound"	J. W. Kim	128	**89%**	**35%**
"Mechanisms involved in symptomatic myocardial bridging"	A Hazenberg	12	**17%**	
"Characterizing Mechanisms of Ischemia in patients With Myocardial Bridges"	Divaka Perera	30	**54%**	**29%**
"Comparison of Frequency of Coronary Spasm in Korean Patients"	Jin Kim	81	**77%**	**16%**
"The Impact of Myocardial Bridging on the Coronary Functional Test"	Hiroki Teragawa	15	**87%**	**55%**
"Characteristics of stress tests and symptoms in patients with myocardial bridge and coronary artery spasm"	Ding-Cheng Xiang	68	**85%**	**53%**
"Angiographic and Clinical Characteristics according to Intracoronary Acetylcholine Dose"	Sung Im	483	ACh 20/50/100 µg: **100%/88%/68%**	
"Prognostic Impact of Nitrate Therapy in Patients with Myocardial Bridge"	Ji Bak Kim	757 (504 nitrate, 253 no nitrate)	ACh 20/50/100 µg: **6%/33%/60%**	
"Interplay Between Myocardial Bridging and Coronary Spasm"	Rocco Montone	53	**79%**	**55%**
"Relation between severity of myocardial bridge and vasospasm"	Yuichi Saito	140	**59%**	**43%**
"The impact of myocardial bridge on coronary artery spasm."	Purumeh Nam	812	**59%**	
"Myocardial Bridging Increases the Risk of Coronary Spasm"	Teragawa et al.	41	**73%**	**40%**
"Prevalence of myocardial bridging associated with coronary endothelial dysfunction in patients with chest pain and non- obstructive coronary artery disease"	Ding-Cheng Xiang	208	**60%**	**50%**
"Clinical features of coronary artery spasm patients with or without myocardial bridge"	Ding-Cheng Xiang	26	**81%**	**57%**
			Average: 69%	**Average: 40%**

Don’t Throw the baby with the bad water!

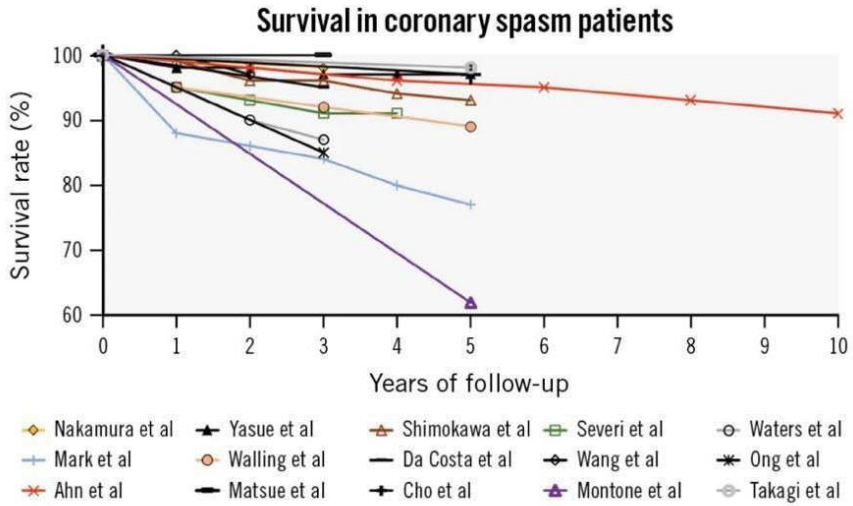
Does Clinical Presentation Matter?



Length… How in MB??



Cohort selection!



RIALTO Cohort - MB

Ach test in ACS: 67%

Ach in CCS: 64%


CHANGE
IN CARDIOLOGY
3.0
TRANCE

#Grazi

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