Association between Radial or Femoral Access and Acute Kidney Injury in Patients with Acute Coronary Syndromes Undergoing Invasive Management

Bernardo Cortese, MD, FESC, FSICI-GISE

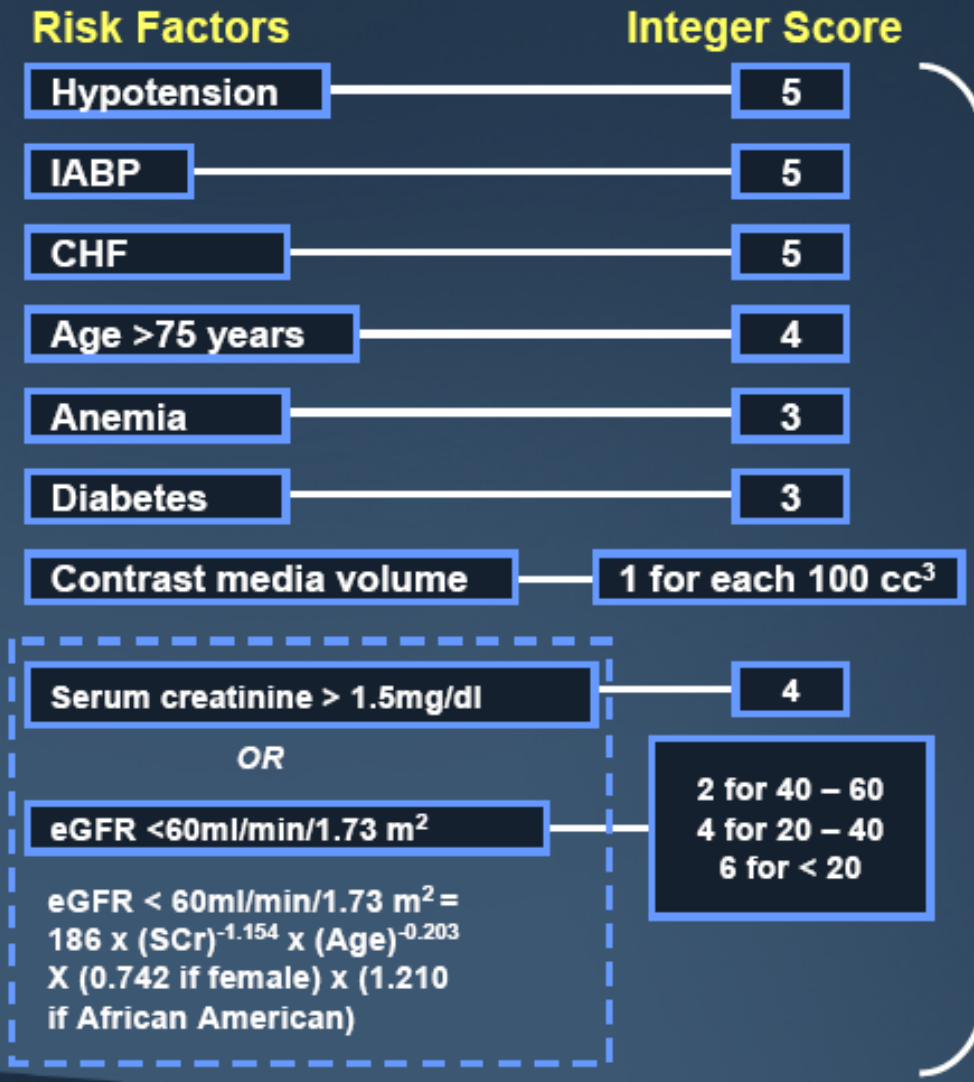
Intv' Cardiology, A.O. Fatebenefratelli MI

CNR-Fondazione Monasterio-Regione Toscana

bcortese@gmail.com

bernardocortese.com

Scheme to Define CIN Risk Score



Risk Score	Risk of CIN	Risk of Dialysis
≤ 5	7.5%	0.04%
6 to 10	14.0%	0.12%
11 to 16	26.1%	1.09%
≥ 16	57.3%	12.6%

Mehran et al. *JACC* 2004;44:1393-1399.

5 golden rules to reduce CI-AKI

- Discontinue nephrotoxic drugs
- Identify high-risk patients
- Hydrate them
- Choose “ideal” contrast medium
- Adapt dose of contrast medium

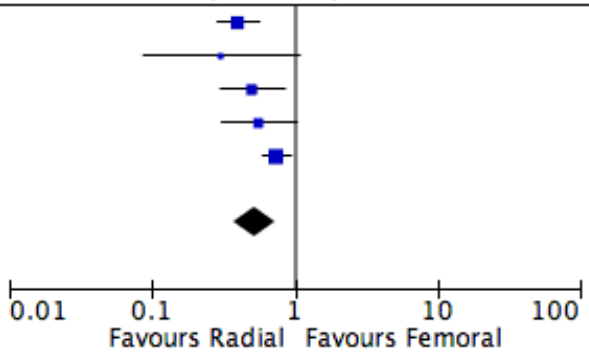
Benefit of radial approach in reducing the incidence of AKI after PCI

A meta-analysis of 22.108 patients

Study or Subgroup	Radial Events	Radial Total	Femoral Events	Femoral Total	Weight	Risk Ratio M-H, Random, 95% CI	Year
Ohno	36	648	268	1916	26.7%	0.40 [0.28, 0.56]	2013
Ando	3	66	9	60	5.9%	0.30 [0.09, 1.07]	2014
Cortese	19	225	38	225	19.4%	0.50 [0.30, 0.84]	2014
Damluij	18	733	23	521	16.6%	0.56 [0.30, 1.02]	2014
Kooiman	127	8857	172	8857	31.3%	0.74 [0.59, 0.93]	2014
Total (95% CI)		**10529**		**11579**	**100.0%**	**0.52 [0.38, 0.73]**	
Total events	203		510				

Heterogeneity: $Tau^2 = 0.08$; $Chi^2 = 10.63$, df = 4 (P = 0.03); $I^2 = 62\%$

Test for overall effect: Z = 3.78 (P = 0.0002)



Andò, Int J Cardiol '15

Study Organization and Sites

Italian society of interventional cardiology

Grant suppliers: The Medicines Company and Terumo

Principal Investigator: Marco Valgimigli, *MD, PhD*

78 Sites, 4 EU countries recruited 8404 patients

Executive Committee

Marco Valgimigli, Andrea Gagnor; Paolo Calabrò, Paolo Rubartelli, Stefano Garducci, Giuseppe Andò, Andrea Santarelli, Mario Galli; Roberto Garbo; Ezio Bramucci; Salvatore Ierna, Carlo Briguori, Bernardo Cortese; Ugo Limbruno, Roberto Violini; Patrizia Presbitero; Nicoletta de Cesare; Paolo Sganzerla; Arturo Ausiello; Paolo Tosi; Gennaro Sardella; Manel Sabate'; Salvatore Brugaletta.

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Dik Heg

Data Mng

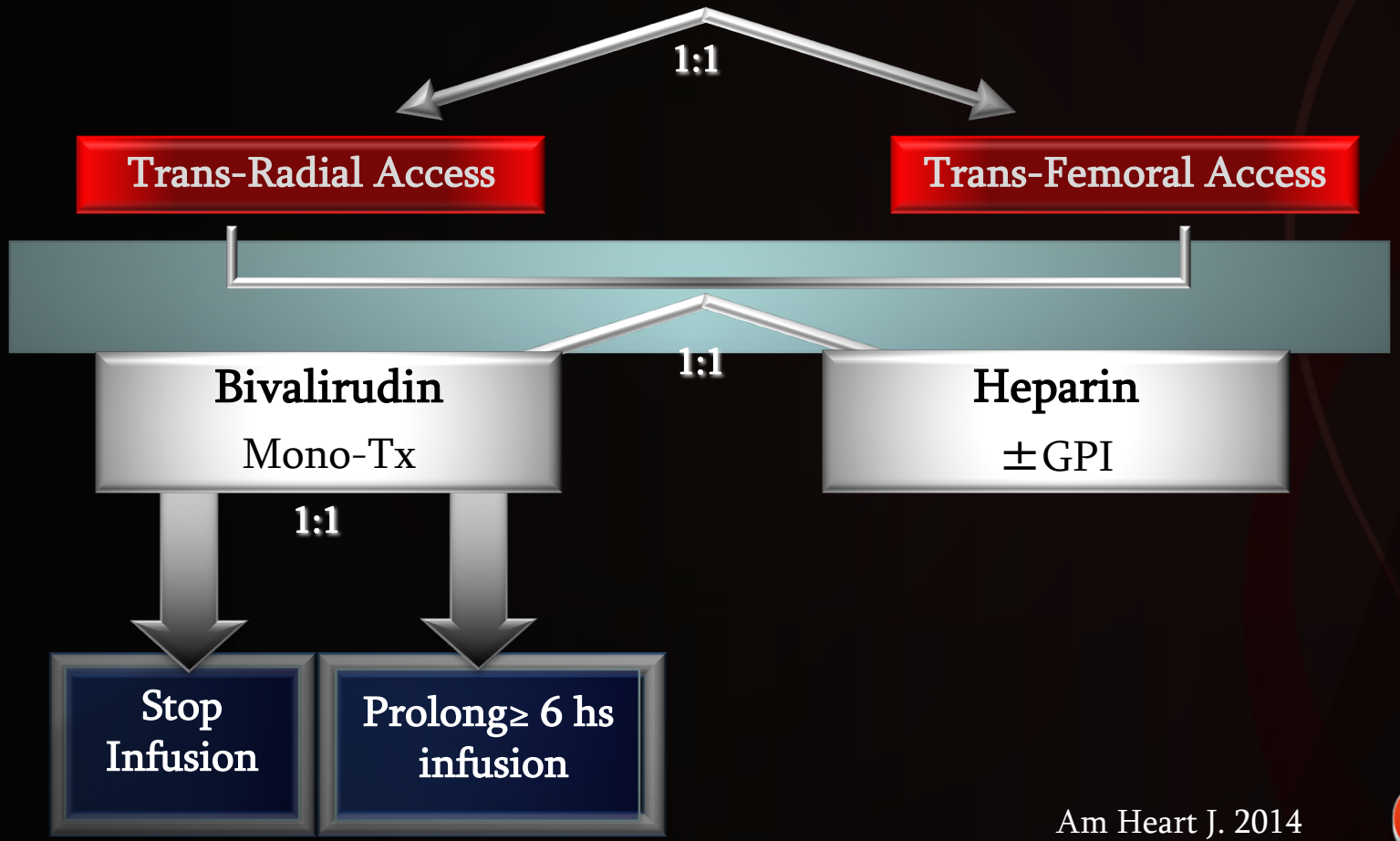
E. Frigoli, *Eustrategy*
Project Leader

MATRIX study overview

NSTEACS or STEMI with invasive management

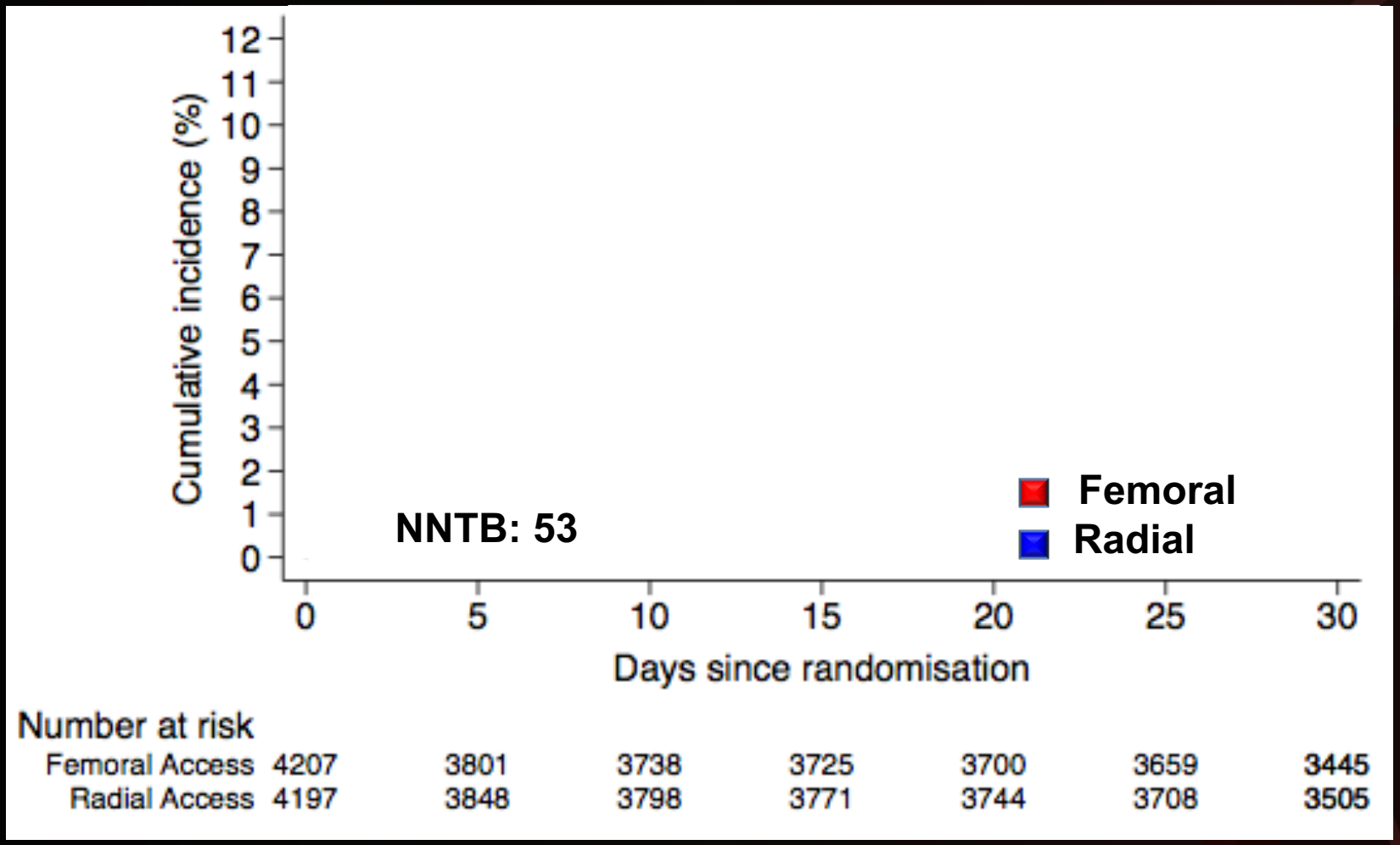
Aspirin+P2Y12 blocker ClinicalTrials.gov NCT01433627

Randomization stratified for type of ACS



Am Heart J. 2014

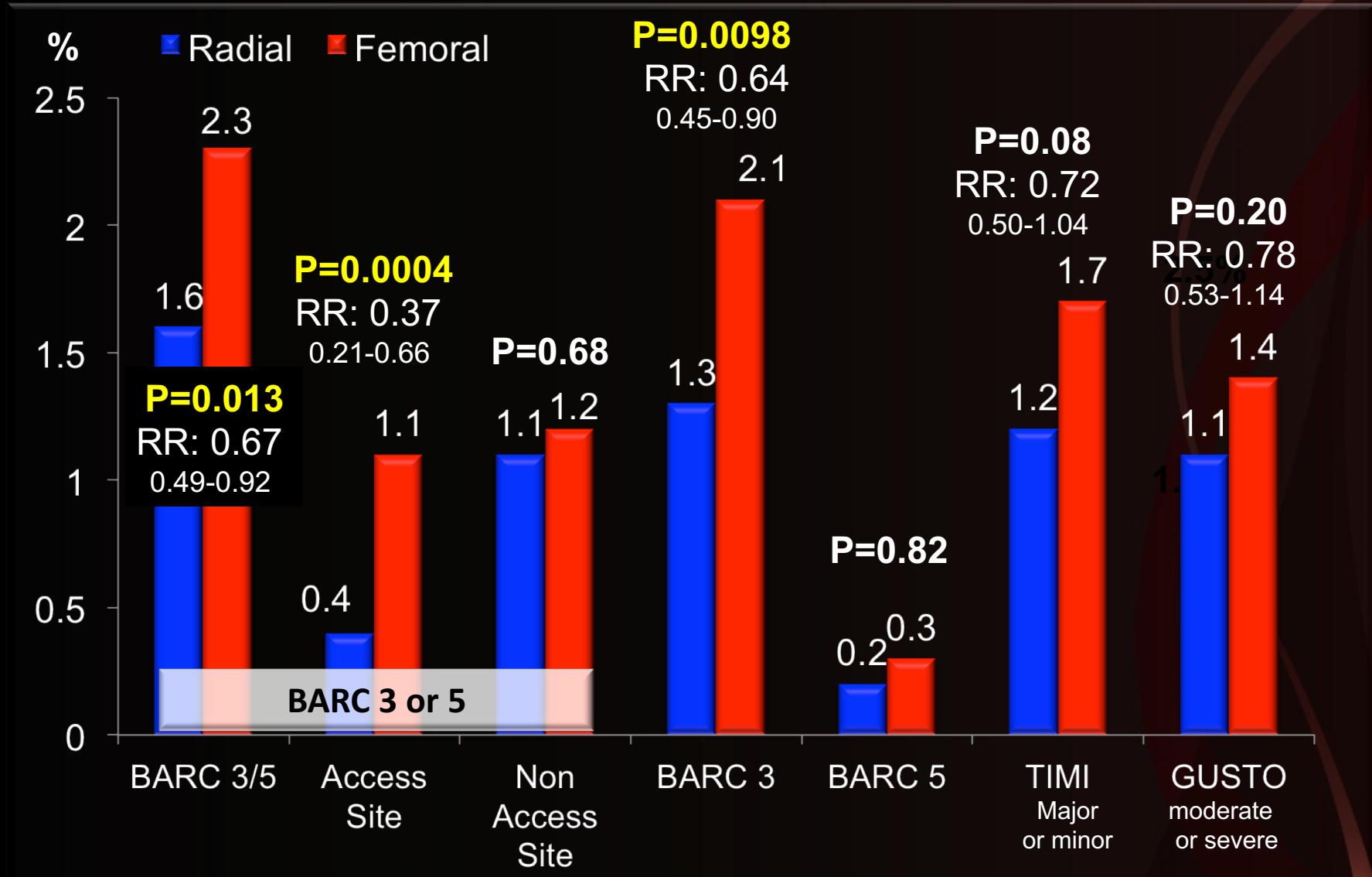
Results of the main study: NACE



Valgimigli, Lancet 2015

Bleeding endpoints:

BARC, TIMI, GUSTO, access vs non-access related



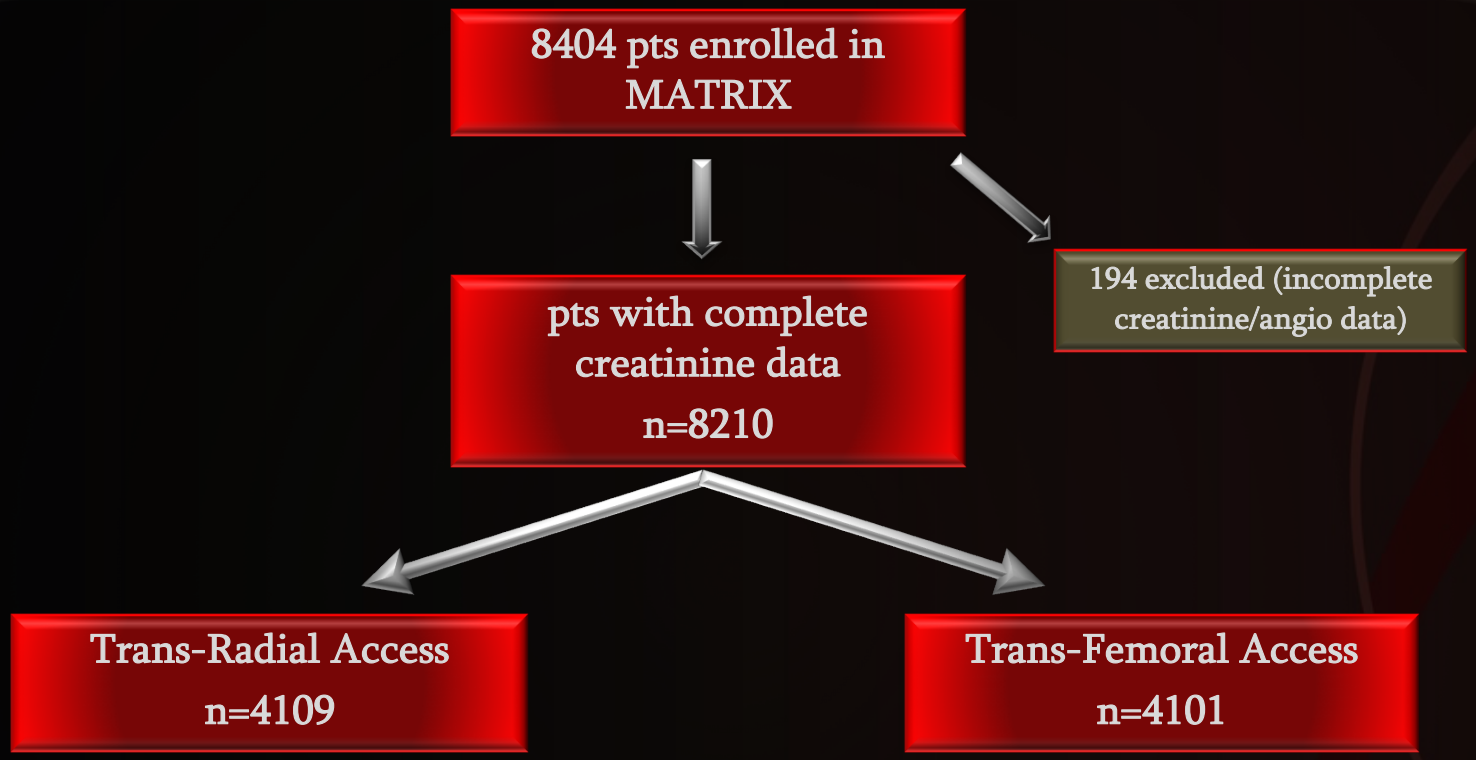
Objectives of AKI-MATRIX

It remains unclear whether radial access (RA) compared with femoral access (FA) mitigates the risk of acute kidney injury (AKI).

We aimed to assess the incidence of AKI in patients with acute coronary syndrome (ACS) enrolled in the MATRIX-Access trial.

Andò, Cortese, Cath Cardiovasc Int '15

AKI-MATRIX



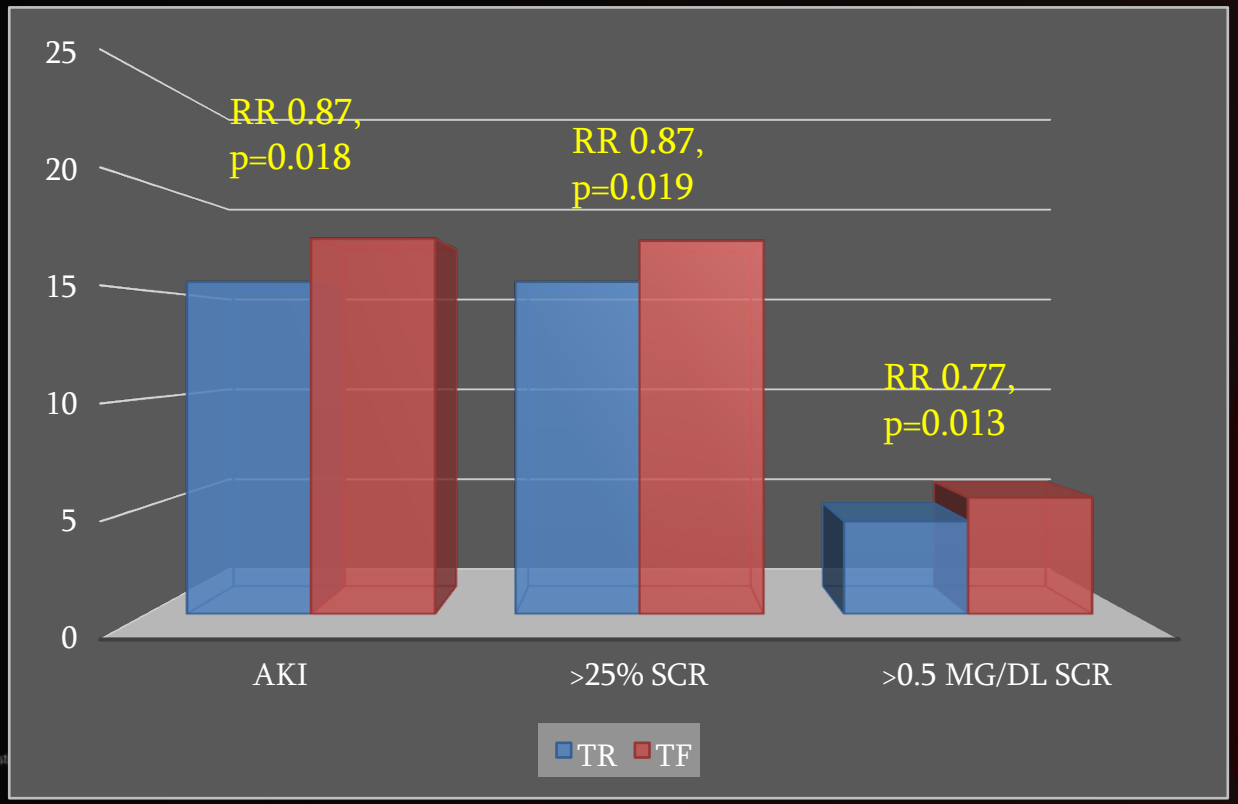
This substudy had one pre-specified primary superiority endpoint:

incidence of AKI: absolute (>0.5 mg/dl) or relative (>25%) increase of sCr within hospitalization vs. pre-angio value.

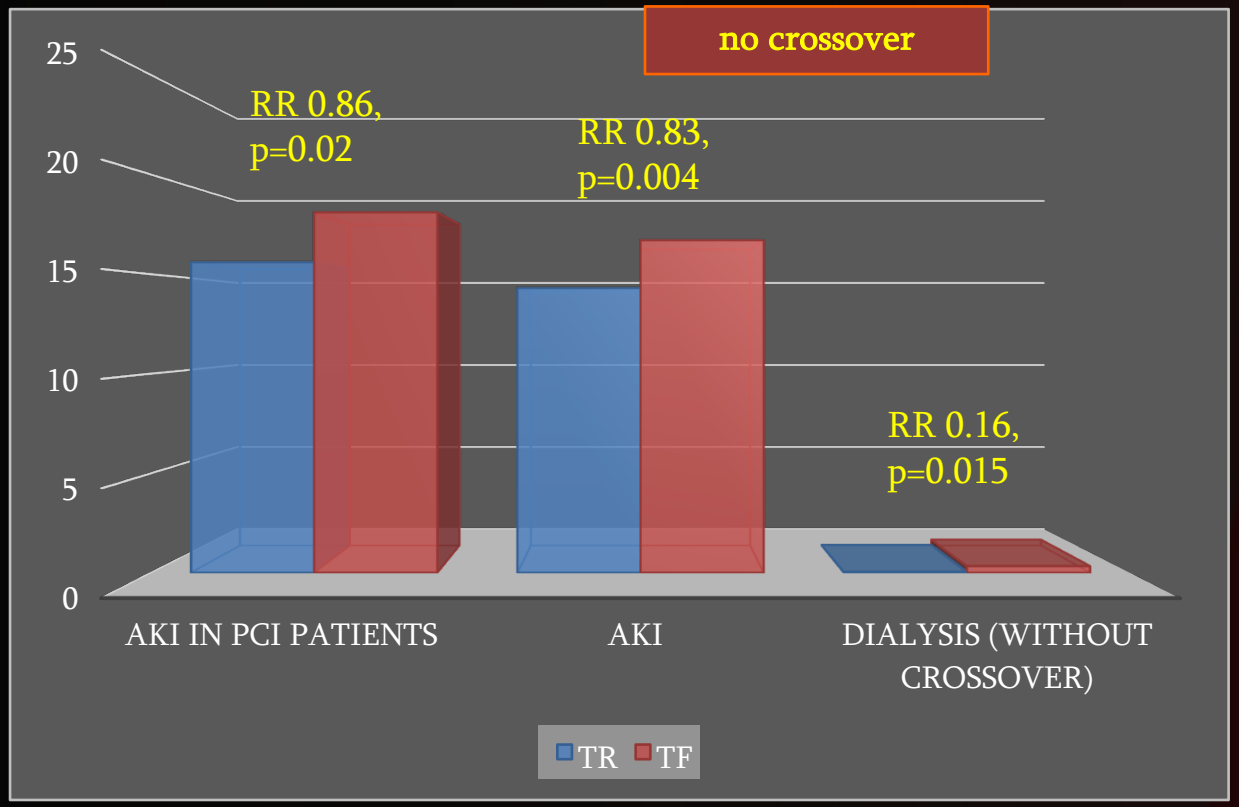
Andò, Cortese, Cath Cardiovasc Int '15

AKI-MATRIX main results

	TR (n=4109)	TF (n=4101)	p
pre-angio sCr	0.97+/- 0.36	0.98+/-0.32	0.74
Pre-angio eGFR	84.2+/-25.4	83.5+/-25.5	0.18

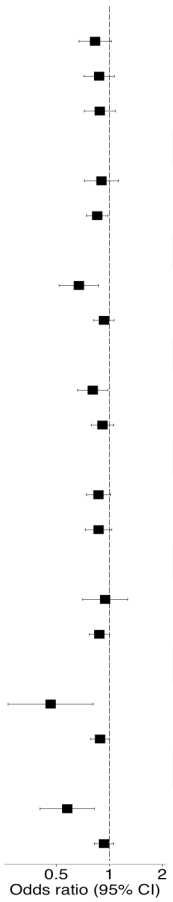


AKI-MATRIX sensitivity analysis



patients subgroups

AKI during index hospitalization	Randomised to Radial Access	Randomised to Femoral Access	Odds Ratio (95% CI)	p Value	p Value for interaction	Numbers needed to treat to prevent one AKI
Centre's proportion of radial PCI					0.70*	
Low (14.9-64.4%)	181/1391	225/1473	0.83 (0.67-1.02)	0.083		45 (21 to ∞)
Intermediate (65.4-79.0%)	230/1433	251/1400	0.88 (0.72-1.07)	0.18		54 (22 to ∞)
High (80.0-98.0%)	223/1285	236/1228	0.88 (0.72-1.08)	0.23		54 (21 to ∞)
Diabetes					0.68	
Yes	191/936	203/917	0.90 (0.72-1.13)	0.36		58 (19 to ∞)
No	443/3173	509/3184	0.85 (0.74-0.98)	0.024		50 (27 to 369)
Estimated glomerular filtration rate (eGFR)					0.027	
<60 mL/min	126/688	174/695	0.67 (0.52-0.87)	0.0025		15 (10 to 42)
≥60 mL/min	508/3406	538/3396	0.93 (0.82-1.06)	0.29		108 (38 to ∞)
Age					0.31	
≥75 years	239/1040	291/1076	0.80 (0.66-0.98)	0.031		25 (13 to 265)
<75 years	395/3069	421/3025	0.91 (0.79-1.06)	0.23		96 (37 to ∞)
Clinical presentation					0.98	
STEMI	354/1977	397/1975	0.87 (0.74-1.02)	0.079		46 (22 to ∞)
NSTEACS	280/2132	315/2126	0.87 (0.73-1.03)	0.11		60 (27 to ∞)
LVEF under 40%					0.65	
<40%	122/397	135/423	0.95 (0.70-1.27)	0.71		85 (14 to ∞)
≥40%	500/3566	552/3522	0.88 (0.77-1.00)	0.051		61 (31 to ∞)
Killip class					0.026	
Killip class III or IV	34/129	44/101	0.46 (0.27-0.81)	0.0066		6 (4 to 21)
Killip class I or II	600/3980	668/4000	0.89 (0.79-1.00)	0.047		62 (31 to 4767)
Mehran score					0.013	
>10 points	79/274	111/269	0.58 (0.40-0.82)	0.0025		9 (5 to 23)
≤10 points	550/3754	587/3774	0.93 (0.82-1.06)	0.27		111 (40 to ∞)



* P value for trend accross ordered groups

Preliminary interpretation of the AKI MATRIX trial results

The observed increase in AKI with TF approach:

-ats/chol debris mobilization with catheter passage;
-the reduction in bleeds with TR approach (impairment in renal perfusion, Nicolski; Ohno, JACC '13);
-blood transfusion.

Limitations of AKI MATRIX

- Highly experienced TR centres;
- results not adjusted for: type of CM, hydration;
- time of sCr collection unavailable;
- AKI definition was “per protocol” and did not follow the more modern KDIGO definition.

5 golden rules to reduce (CI-)AKI

- Discontinue nephrotoxic drugs
- Identify high-risk patients
- Hydrate them
- Choose “ideal” contrast medium
- Adapt dose of contrast medium
- Use a TR approach

CONCLUSIONS

- The results of this pre-specified substudy of the MATRIX Program show how a TR access results in fewer AKIs in ACS patients (both STE and not).
- Our findings are consistent in several subgroups.

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Acute Kidney Injury After Radial or Femoral Access for Invasive Acute Coronary Syndrome Management

AKI-MATRIX

Giuseppe Andò, MD, PhD,[a] Bernardo Cortese, MD,[b] Filippo Russo, MD,[c] Martina Rothenbühler, MSc,[d] Enrico Frigoli, MD,[e] Giuseppe Gargiulo, MD,[f,aa] Carlo Briguori, MD,[g] Pascal Vranckx, MD, PhD,[h] Sergio Leonardi, MD, MHS,[i] Vincenzo Guiducci, MD,[j] Flavia Belloni, MD,[k] Fabio Ferrari, MD,[l] Jose Maria de la Torre Hernandez, MD,[m] Salvatore Curello, MD,[n] Francesco Liistro, MD,[o] Andrea Perkan, MD,[p] Stefano De Servi, MD,[q] Gavino Casu, MD,[r] Antonio Dellavalle, MD,[s] Dionigi Fischetti, MD,[t] Antonio Micari, MD,[u] Bruno Loi, MD,[v] Fabio Mangiacapra, MD,[w] Nunzio Russo, MD,[x] Fabio Tarantino, MD,[y] Francesco Saia, MD, PhD,[z] Dik Heg, PhD,[d] Stephan Windecker, MD,[aa] Peter Jüni, MD,[aa,bb] Marco Valgimigli, MD, PhD,[aa]
for the MATRIX Investigators