A Clinical and Angiographic Scoring System to Predict the Probability of Successful First-Attempt PCI in Patients with Coronary CTO.

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J-CTO score

Predicting successful guidewire crossing through CTO of Native Coronary Lesions Within 30 Minutes

J-CTO SCORE SHEET

Version 1.0

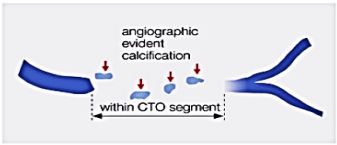
Variables and definitions

Tapered **Blunt**

Entry with any tapered tip or dimple indicating direction of true lumen is categorized as "tapered".

Entry shape
☐ Tapered (0)
☐ Blunt (1)
point

Calcification



Regardless of severity, 1 point is assigned if any evident calcification is detected within the CTO segment.

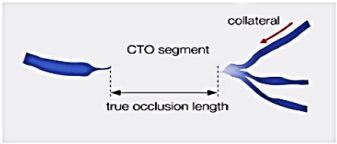
Calcification
☐ Absence (0)
☐ Presence (1)
point

Bending＞45degrees

One point is assigned if bending＞45 degrees is detected within the CTO segment. Any tortuosity separated from the CTO segment is excluded from this assessment.

Bending＞45°
☐ Absence (0)
☐ Presence (1)
point

Occlusion length



Using good collateral images, try to measure "true" distance of occulusion, which tends to be shorter than the first impression.

Occl.Length
☐ ＜20mm (0)
☐ ≥20mm (1)
point

Re-try lesion

Is this Re-try (2nd attempt) lesion ? (previously attempted but failed)

Re-try lesion
☐ No (0)
☐ Yes (1)
point

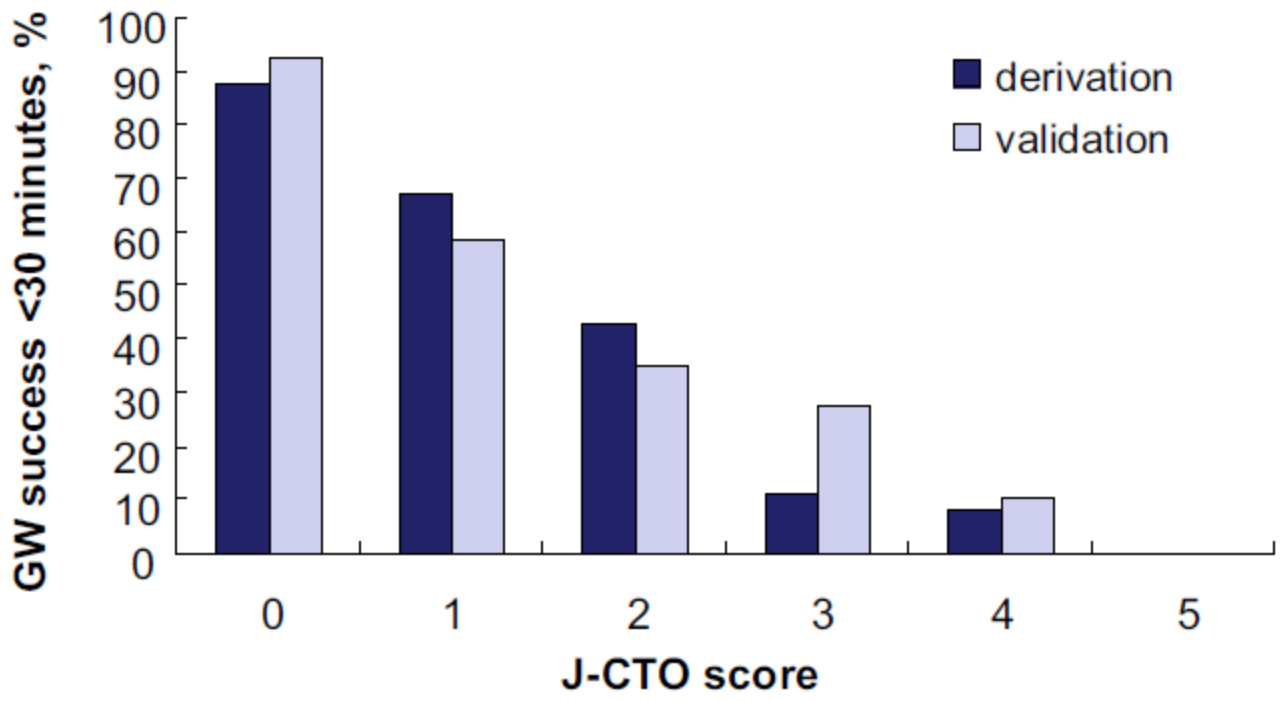
Category of difficulty (total point)
☐ easy (0) ☐ Intermediate (1)
☐ difficult (2) ☐ very difficult (≥3)

Total ☐ points

Morino, J. Am. Coll. Cardiol. Intv. 2011;4;213-221

Predicting successful guidewire crossing through CTO of Native Coronary Lesions Within 30 Minutes

Relationship Between J-CTO Score and GW Success <30 Min



Patient number						
329	65	82	92	63	24	3
165	26	48	46	33	10	2

Morino, J. Am. Coll. Cardiol. Intv. 2011;4;213-221

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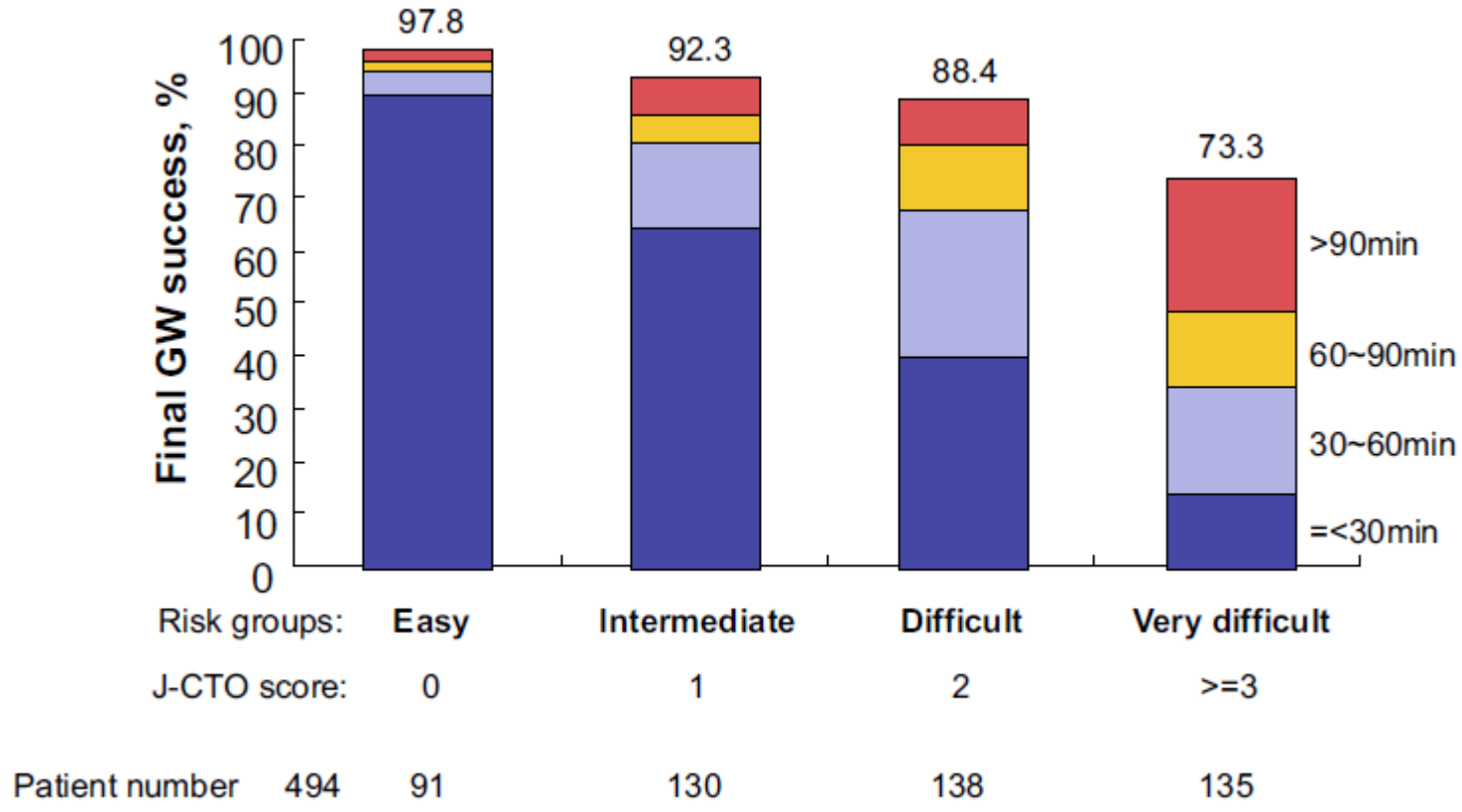
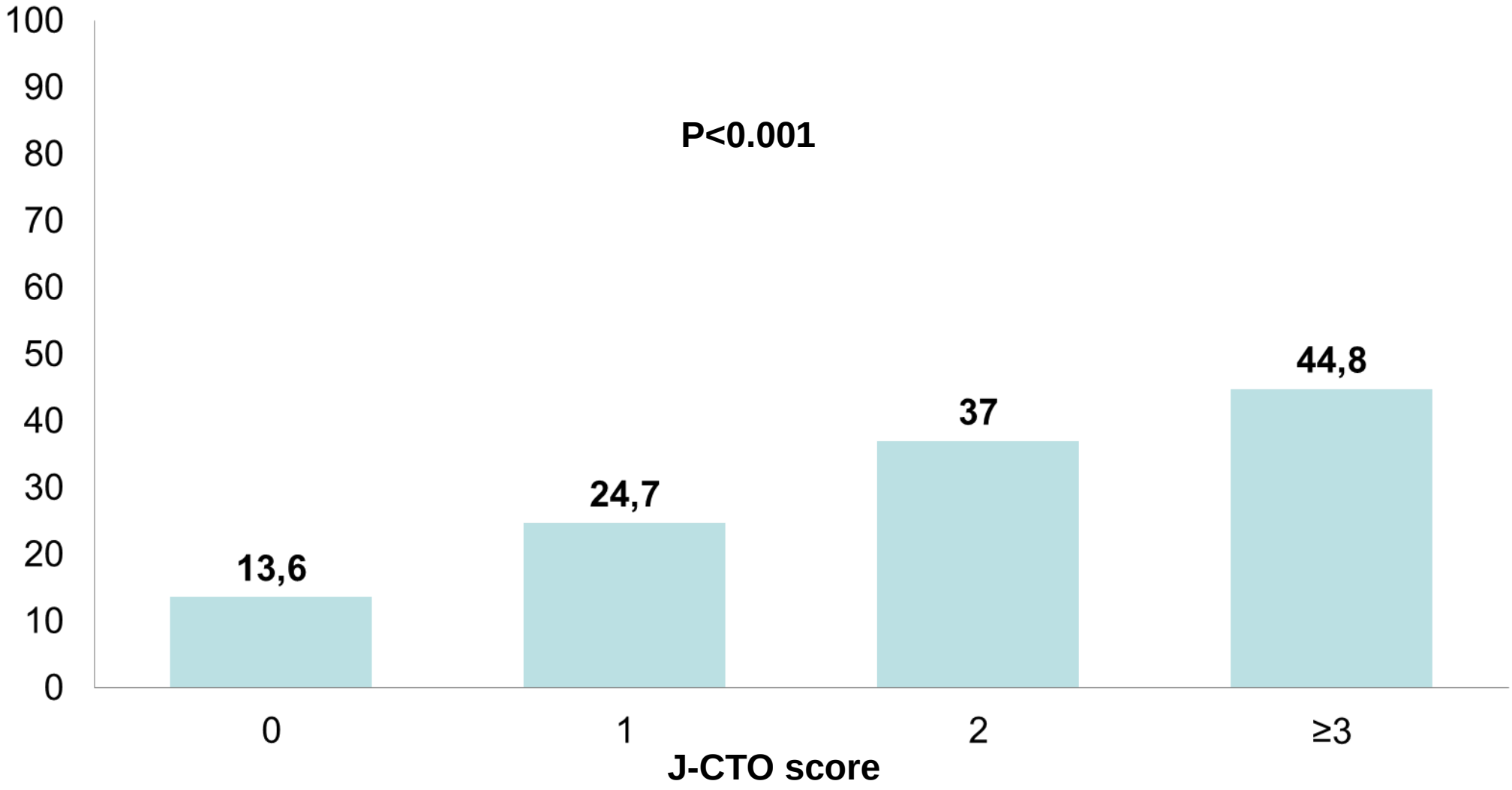
The Risk Groups of Difficulty and Final Procedural Success Rates



Morino, J. Am. Coll. Cardiol. Intv. 2011;4;213-221

J-CTO score external validation

Observed failure rate



G. Ferrante, Y. Louvard, TCT 2010

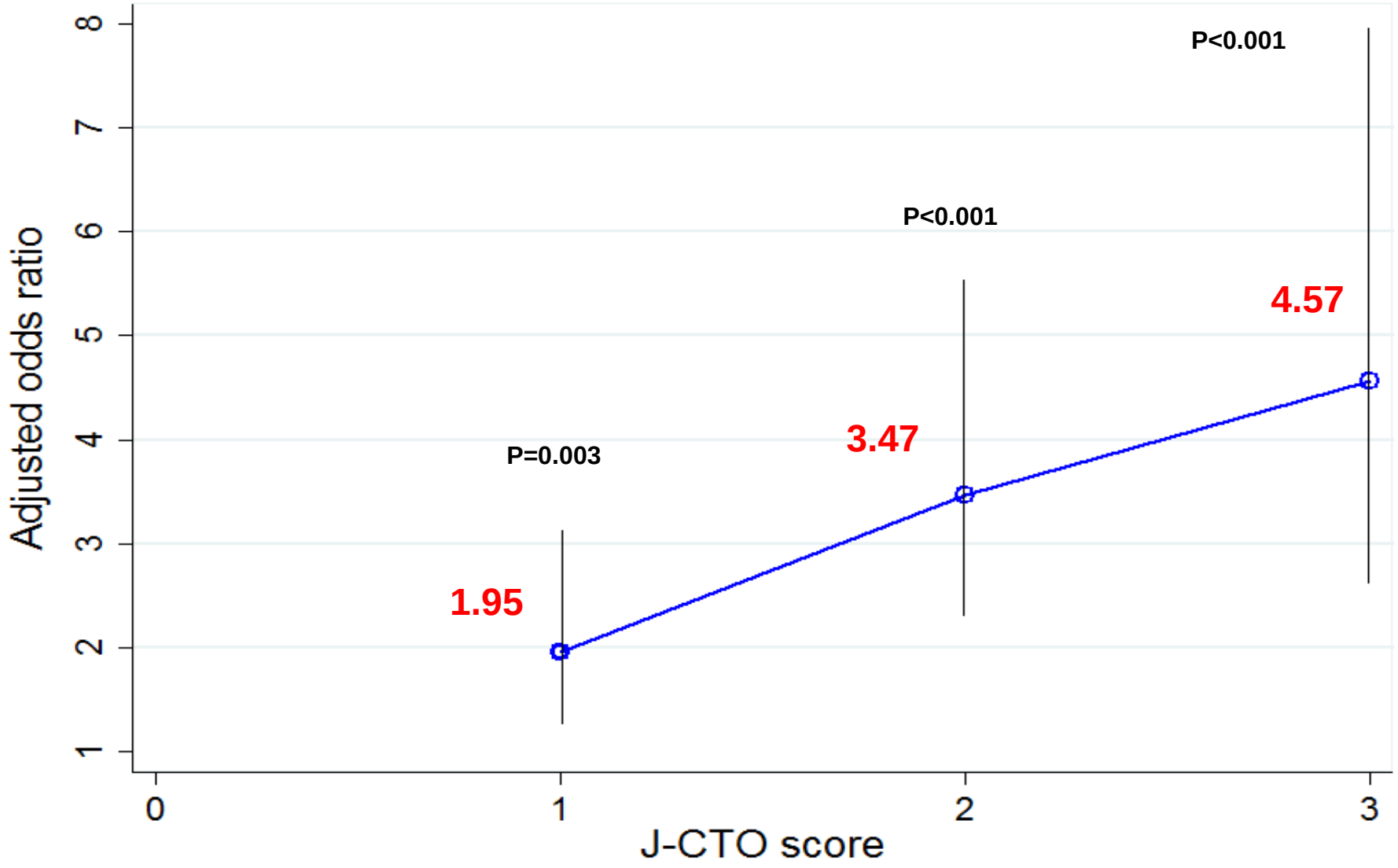
Predictors of failure

1261 pts, 1418 CTO

	Odds Ratio	95% CI	P-value
J-CTO score	1.68	1.43-1.97	<0.001
Culprit vessel	1.17	1.07-1.27	<0.001
Age	1.01	1.001-1.03	0.031
Previous MI	1.65	1.22-2.24	0.001
Previous CABG	2.02	1.27-3.21	0.003
Family history of IHD	0.65	0.44-0.94	0.024
Hypertension	1.33	1.01-1.75	0.038
Retrograde approach	1.78	1.19-2.64	0.004

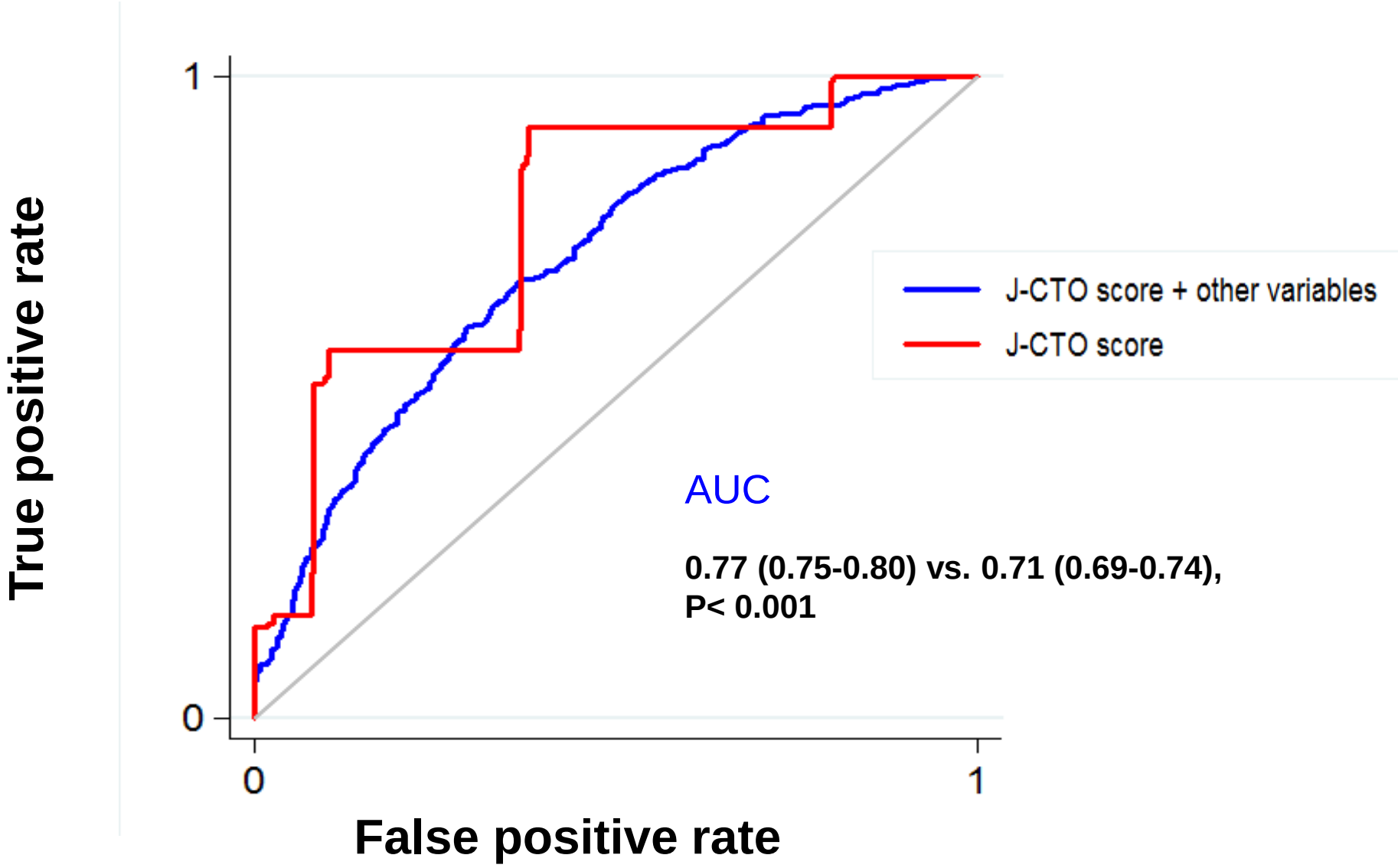
G. Ferrante, Y. Louvard, TCT 2010

Predictive value of the J-CTO score



G. Ferrante, Y. Louvard, TCT 2010

Discrimination



G. Ferrante, Y. Louvard, TCT 2010

Role of operator's experience

* p=0.01
* * p<0.001
† p= 0.014

A new clinical / angiographic CTO score

(multi-operator, western Europe, « Japanese « CTO culture …)

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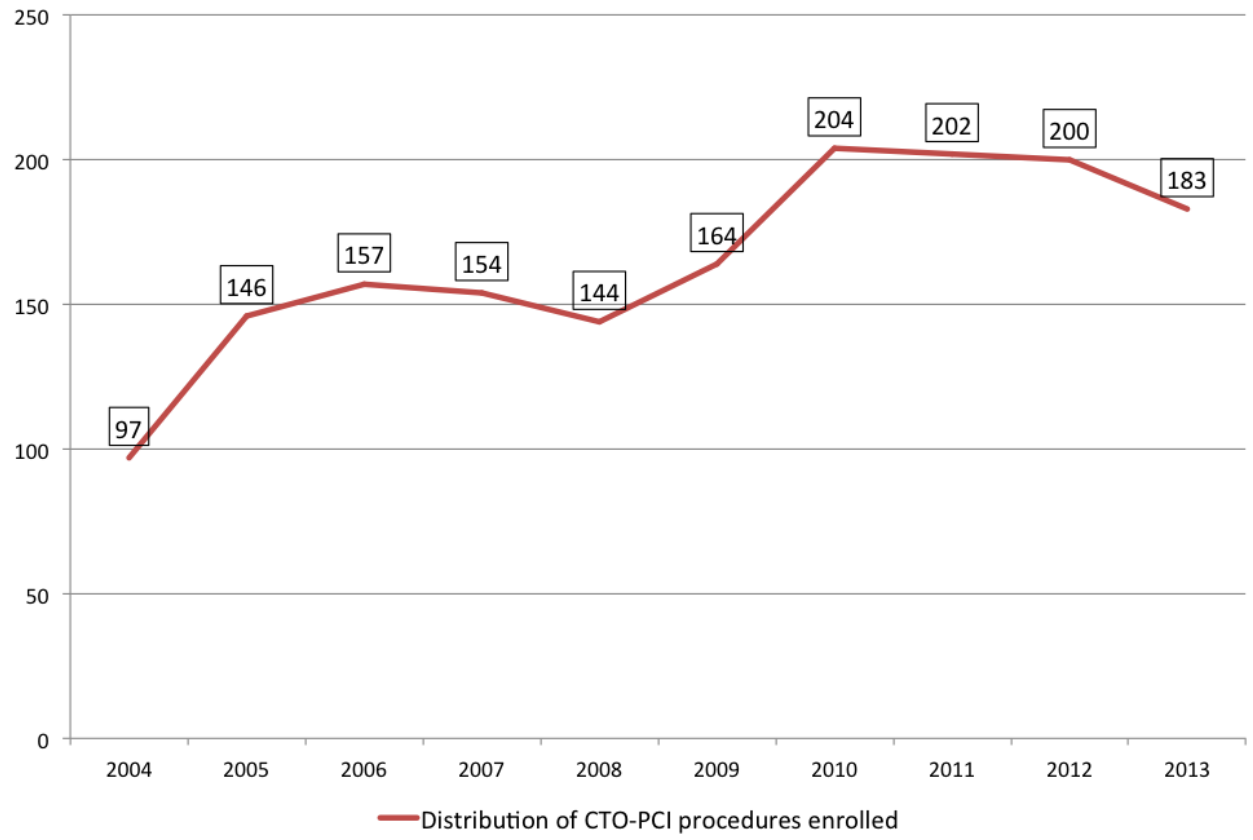
Annual distribution of first intention CTO-PCI procedures enrolled



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Univariable analysis: clinical and lesion related characteristics according to procedural outcome

	Failure n=455	Success n=1202	p
Clinical characteristic:			
Age, years old	64,9 ± 10,8	63,6 ± 11,2	0,034
Female, n (%)	68 (14,9)	189 (15,7)	0,75
BMI, kg/m^2	27,5 ± 4,3	27,2 ± 4,05	0,18
Hypertension, n (%)	301 (66,1)	694 (57,7)	0,0022
Dyslipidemia n, (%)	305 (67)	737 (61,3)	0,036
Diabetes n, (%)	150 (33)	334 (27,8)	0,044
Smoking n, (%)	136 (29,9)	315 (26,2)	0,15
Previous MI n, (%)	128 (28,1)	224 (18,63)	<0,0001
Previous PCI n, (%)	196 (43)	429 (35,7)	0,0067
Previous Stroke n, (%)	7 (1,5)	14 (1,1)	0,71
Previous CABG n, (%)	58 (12,7)	66 (5,5)	<0,0001
LVEF<40% n, (%)	67 (14,7)	186 (15,5)	0,76
Stable Angina n, (%)	235 (51,6)	699 (58,1)	0,019
IV class CKD n, (%)	3 (0,7)	4 (0,3)	0,62
Multivessel CAD n, (%)	279 (61,3)	647 (53,8)	0,007
Lesion-related characteristics:			
CTO Site:			
LAD n (%)	105 (23)	401 (33,3)	<0,0001
RCA n, (%)	230 (50.5)	534 (44,4)	0,029
LCX n, (%)	116 (25,5)	265 (22)	0,15
LM n, (%)	4 (0,9)	2 (0,1)	0,089
Non LAD n, (%)	350 (76.9)	801 (66.6)	P<0.0001
Ostial CTO n, (%)	19	40	0,2
Blunt Stump (%)	273 (60)	602 (50)	0,0004
Tortuous n, (%)	84 (18,4)	167 (13,9)	0,009
Calcified lesion			
Mild n, (%)	133 (29,2)	350 (29,1)	0,98
Moderate n, (%)	90 (19,8)	209 (17,4)	0,29
Severe n, (%)	79 (17,3)	82 (6,8)	<0,0001
Lesion Lenght ≥20 mm n, (%)	214 (47)	366 (30,4)	<0,0001
Lesion Lenght, mm			
Rentrop Class 3 n, (%)	205 (45)	527 (43,8)	0,7
Intrastent CTO n, (%)	47 (10,3)	119 (10)	0,83

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Multivariable analysis

	Overall Population Univariate Analysis			Stepwise Logistic regression P<0.0001		
	Failure (455)	Success (1202)	p	Odds Ratio	95% CI	p
Hypertension, n (%)	301 (66,1)	694 (57,7)	0,0022			
Previous MI n, (%)	128 (28,1)	224 (18,63)	<0,0001	1,5633	1,1955 to 2,0443	0,0011
Previous PCI n, (%)	196 (43)	429 (35,7)	0,0067			
Previous CABG n, (%)	58 (12,7)	66 (5,5)	<0,0001	2,2809	1,5299 to 3,4005	0,0001
Multivessel CAD n, (%)	279 (61,3)	647 (53,8)	0,007			
Non LAD n (%)	105 (23)	401 (33,3)	<0,0001	1,5821	1,2135 to 2,0626	0,0007
Blunt Stump (%)	273 (60)	602 (50)	0,0004	1,5738	1,2444 to 1,9905	0,0002
Tortuous lesion n, (%)	84 (18,4)	167 (13,9)	0,009			
Severe Calcification n, (%)	79 (17,3)	82 (6,8)	<0,0001	2,9569	2,0815 to 4,2005	<0,0001
Lesion Length >20 mm n, (%)	214 (47)	366 (30,4)	<0,0001	2,0480	1,6204 to 2,5884	<0,0001

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Independent predictive variables scored according to OR

Indipendent Variables	Odds Ratio	Score
Severe Calcified lesion	2,95	+ 2
Previous CABG	2,28	+ 1,5
Lesion Length ≥ 20 mm	2.0	+ 1,5
Previous MI	1,56	+ 1
Blunt Stump	1,57	+ 1
Non LAD CTO location	1,58	+ 1

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Events reported in the periprocedural period (<24h after CTO-PCI)

Events in the overall population	
Death n, %	0
MI n, (%)	34 (2)
Ostial Dissection n, (%)	17 (2,8)
Pericardiocentesis n, (%)	20 (1,3)

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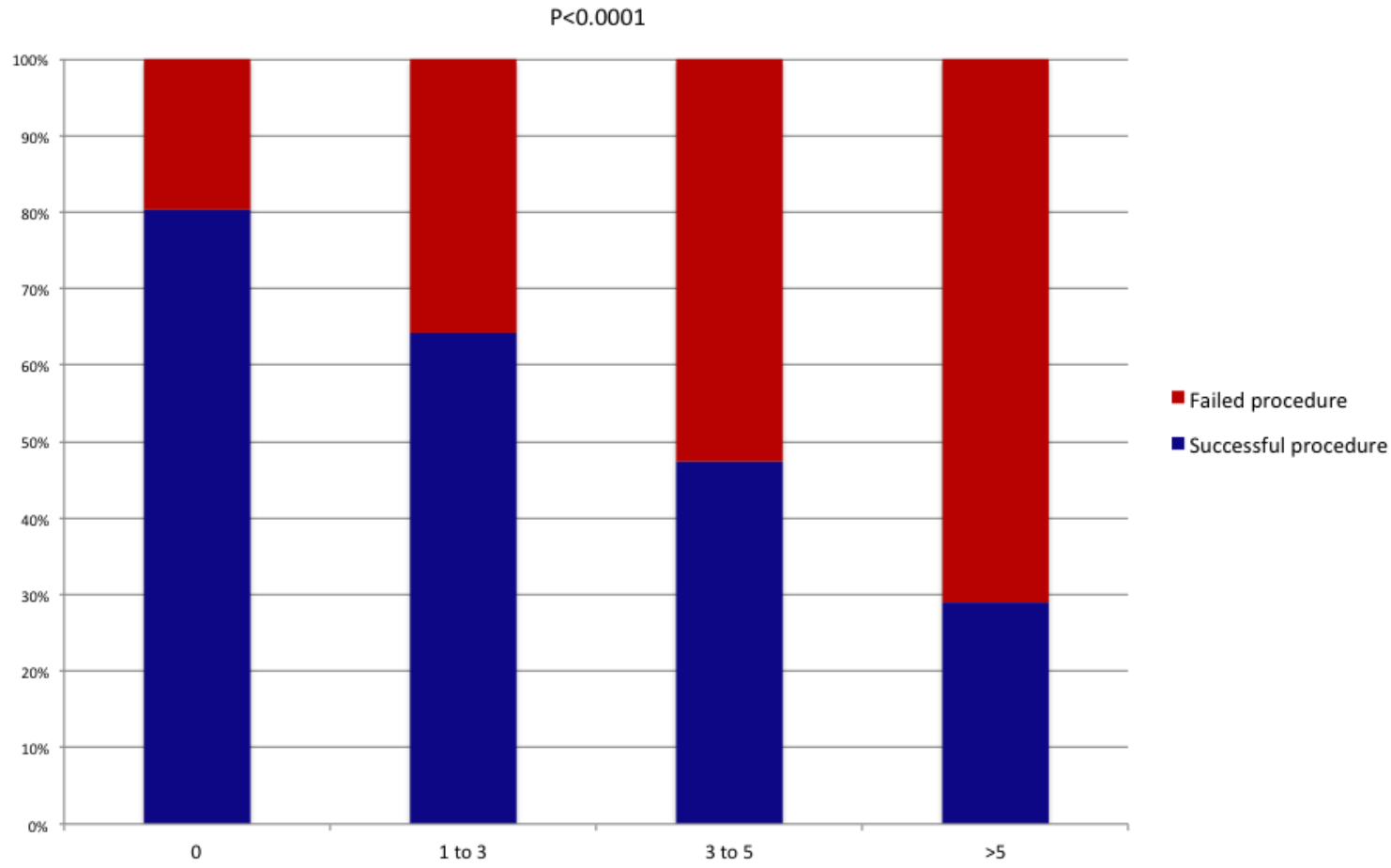
Procedural success rate according to CL-SCORE value



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Conclusions

- Success rate in CTO PCI is clearly related to experience of the operator: dedicated operators ?
- More and more evidence that major coronary vessels CTO's with viability (?) has to be opened
- Regarding the number of lesions to be treated, multiple large volume operators will be trained and involved in CTO PCI (Karmpaliotis, CCI 2012)
- Selection and distribution of patients among operators may be done with a clinical / angio / experience score