

***V Curso PROEDUCAR-SOLACI 2014  
para Intervencionistas em Treinamento***

**Buenos Aires -Abril / 2014**

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**Oclusión total crónica.**

***Cuándo debemos tratarlas?***

***Técnicas de tratamiento.***

***Materiales.***

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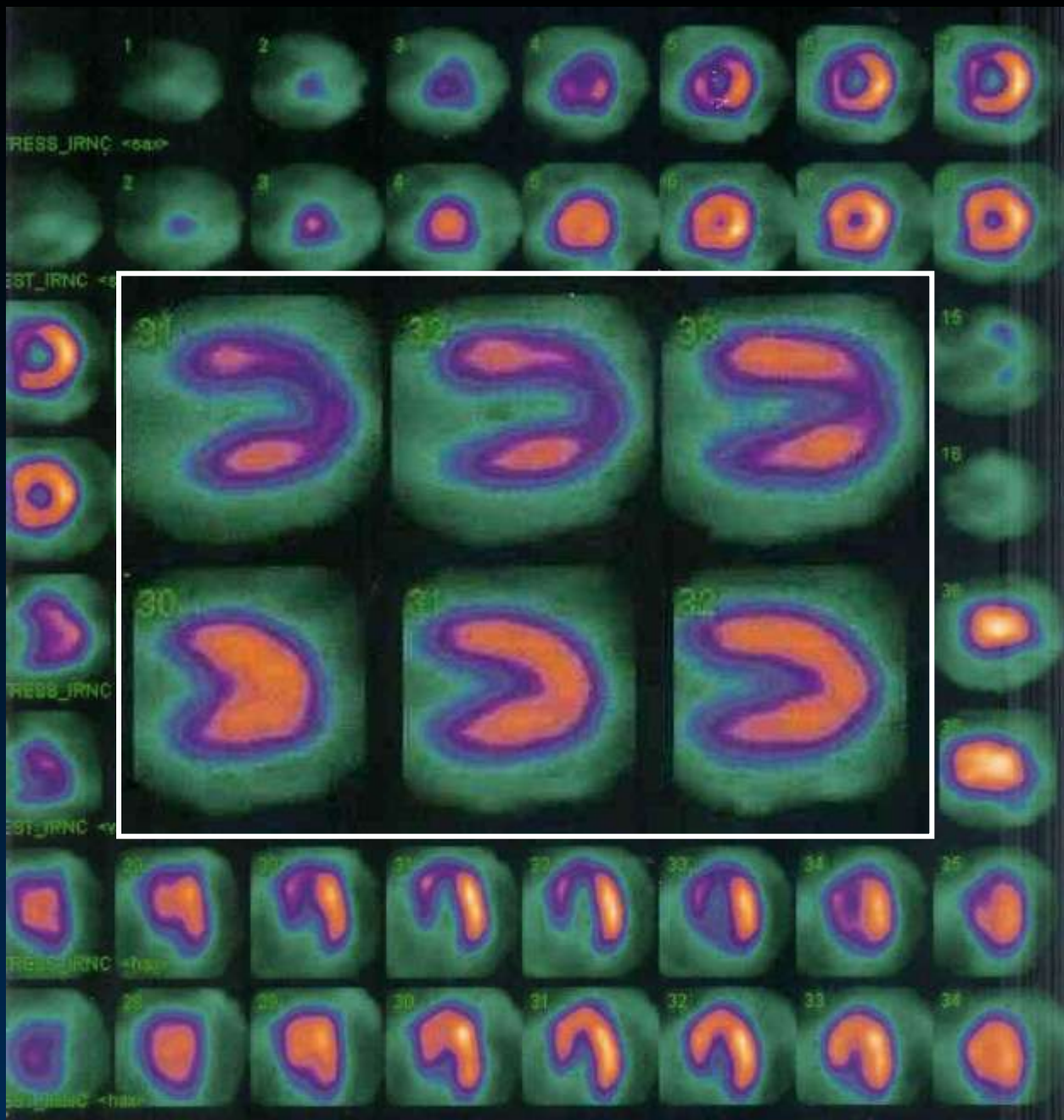
**Fausto Feres**

**Instituto Dante Pazzanese de Cardiologia**

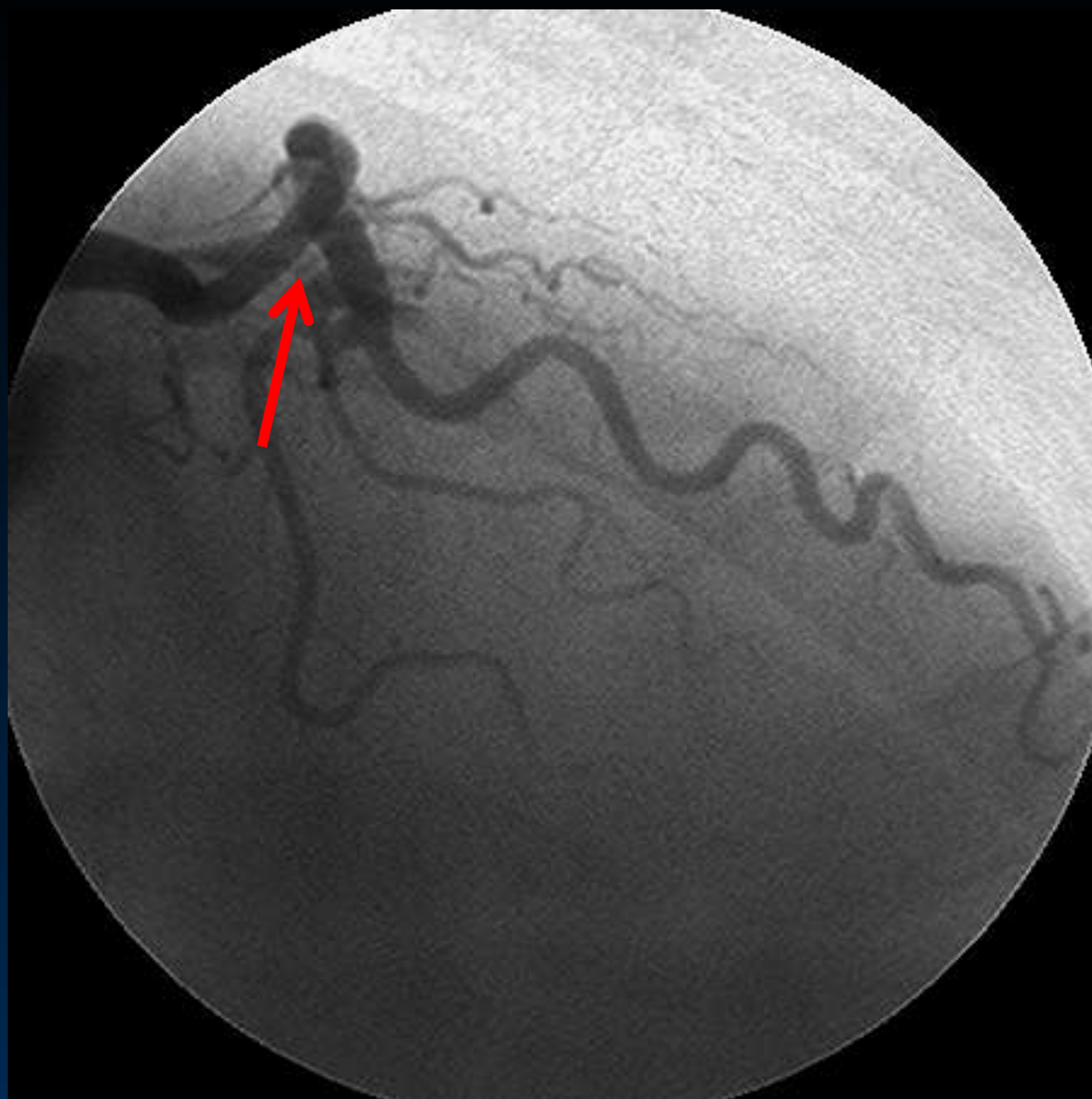
# ***Cuándo debemos tratar este paciente?***

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- **72 anos, Angina Estável, classe II, há 1 ano, em uso da medicação abaixo:**
- **Nitrato, Atenolol, AAS, Ramipril, Estatina**
- **PA : 130/70; FC: 58 bpm**

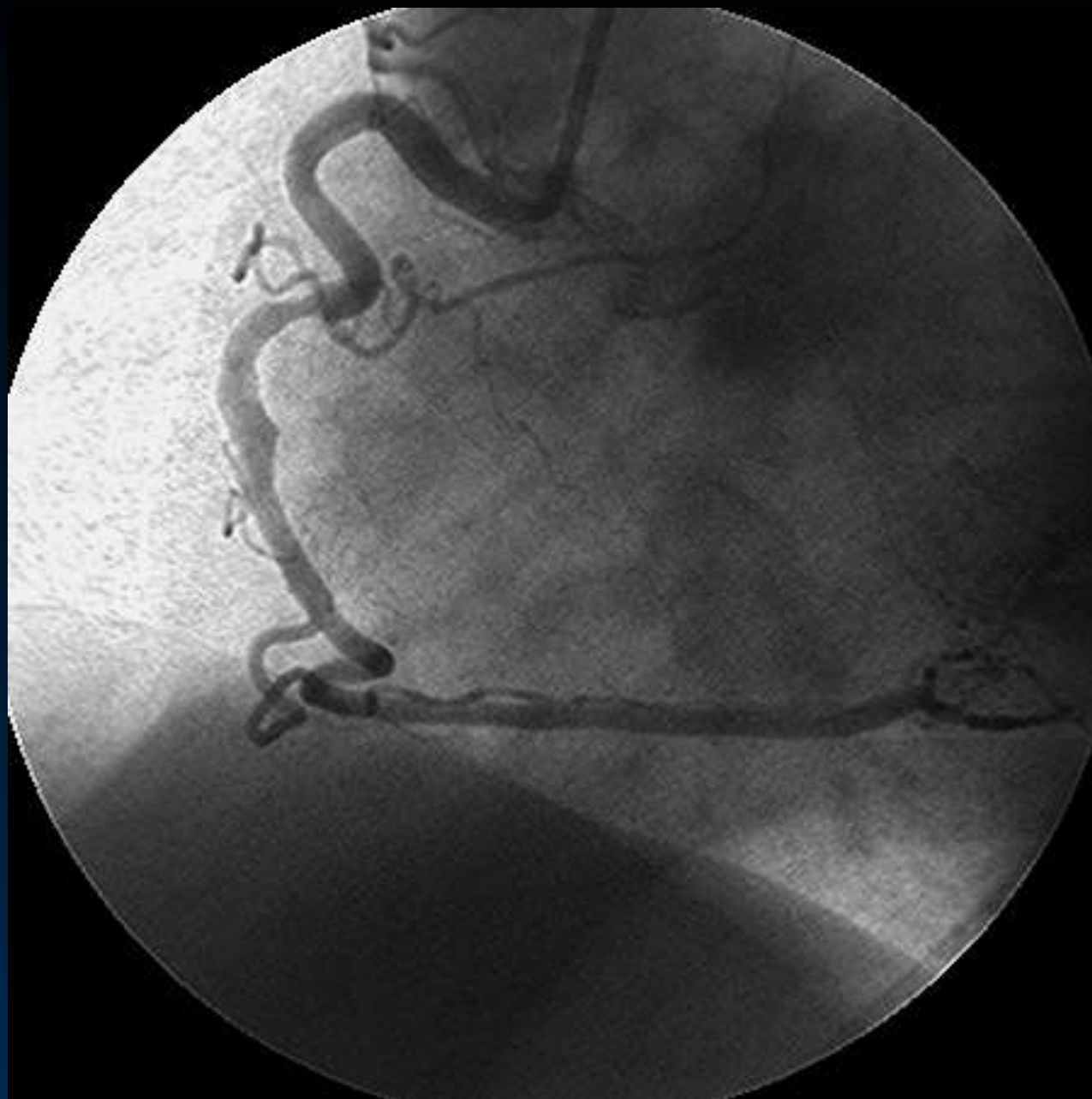


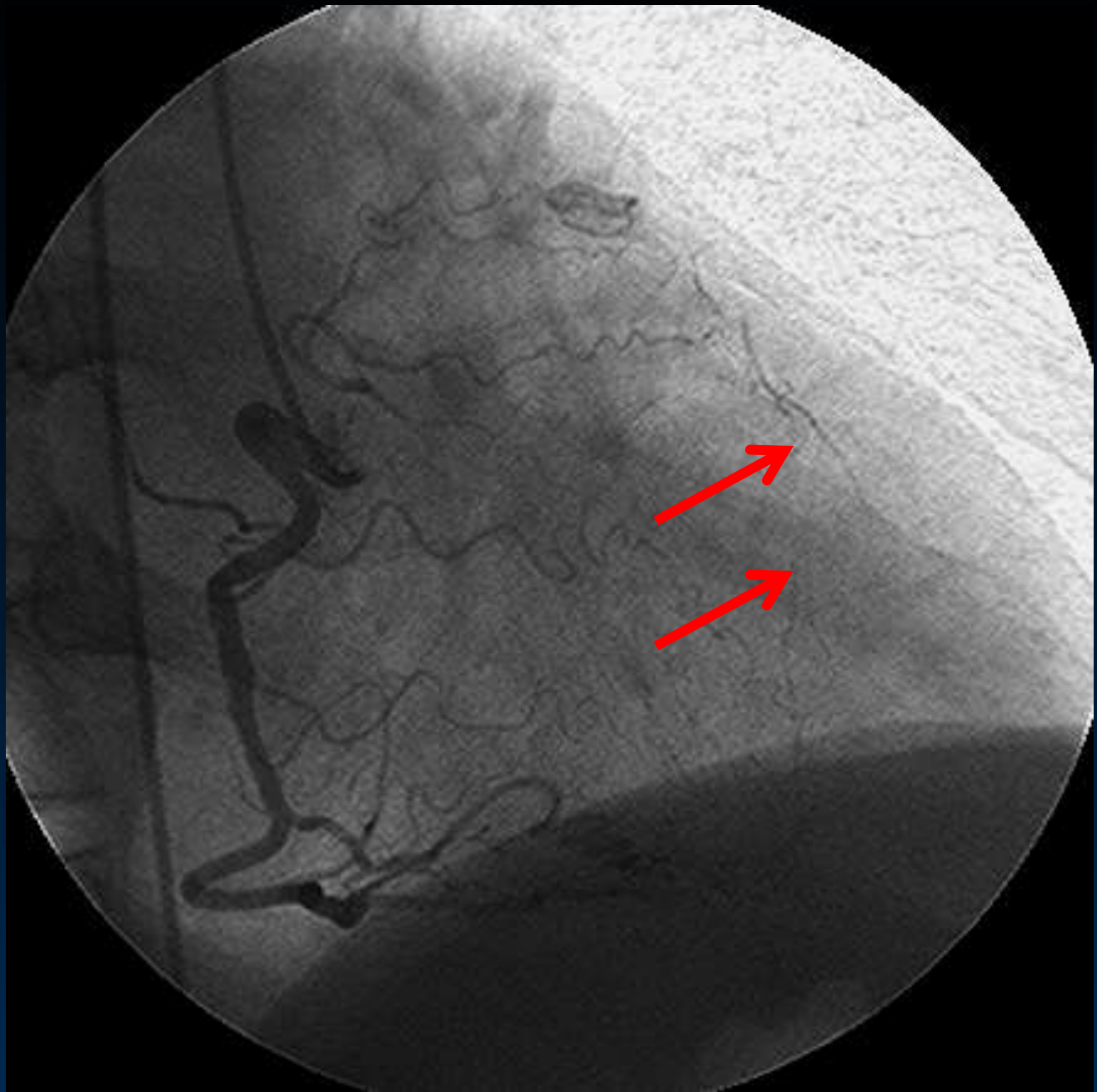
















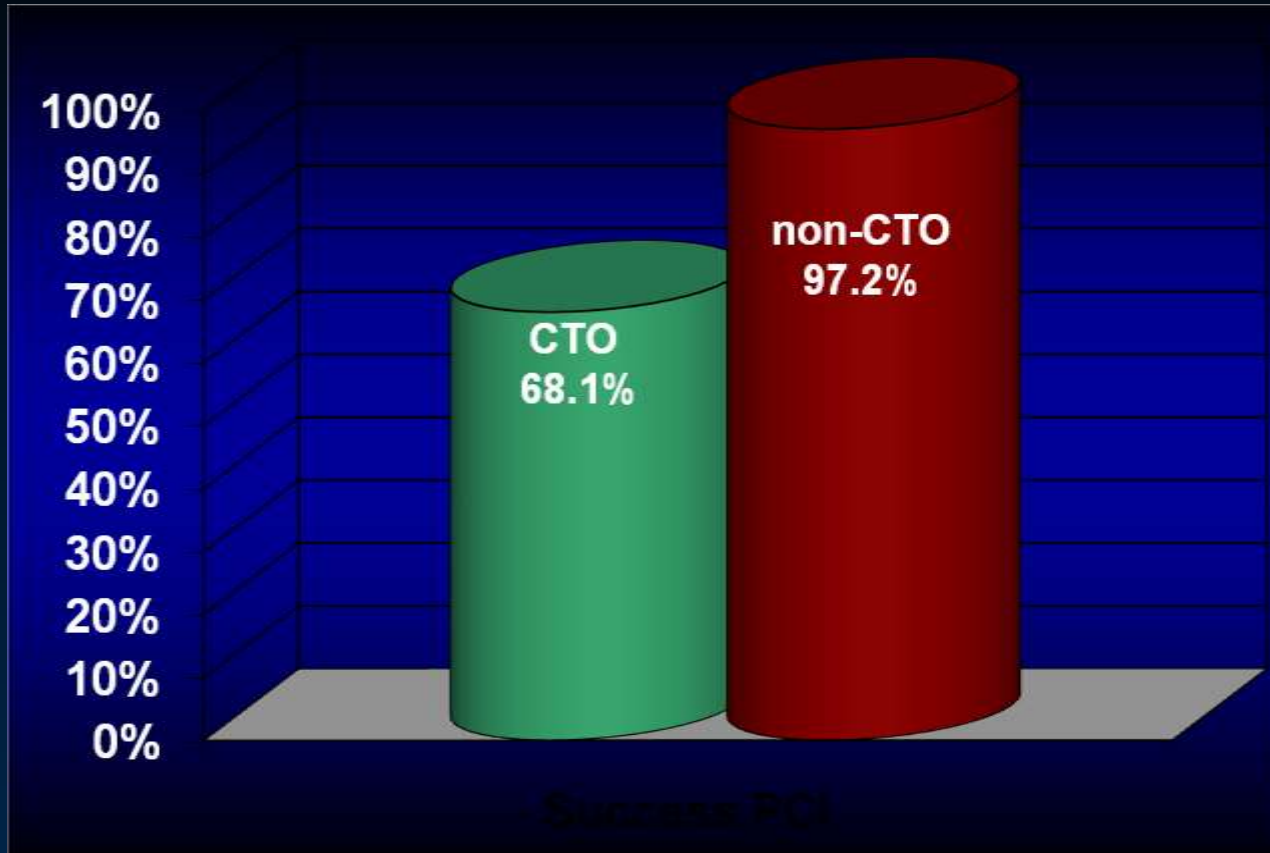
# Oclusão Coronária Crônica: Considerações

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- São lesões complexas identificadas **em 15% a 30%** de todos os pts submetidos à cinecoronariografia.
- **É o maior preditor** para referir os pacientes para a cirurgia de revascularização.
- No estudo Syntax, a prevalência de Oclusão Coronária Crônica no braço randomizado **foi de apenas 10%**, enquanto no **registro da Cirurgia foi de 40%**.

# ICP na Oclusão Coronária Crônica

% Exito no registro Alemão



Werner G. Eurointervention 2010;6:361-366

# ICP na Oclusão Coronária Crônica

*O percentual de êxito é mais baixo que nas artérias não ocluídas cronicamente*

**e mais....**

- Nós temos que estar alertas aos riscos do procedimento.....

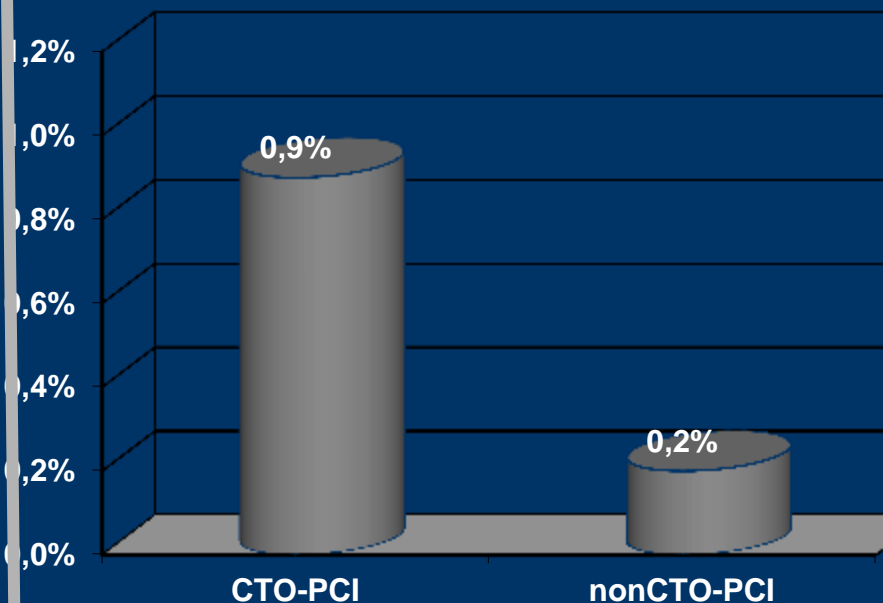
# ICP na Oclusão Coronária Crônica

Preditores de Perfuração grau III  
56 perfurações >24.000 PCIs

	Odds Ratio	95% CI	p
Type B2/C lesion	3.75	1.47-9.60	0.006
<b>Coronary occlusion</b>	<b>1.91</b>	<b>1.02-3.60</b>	<b>0.045</b>
Rotablation performed	3.47	1.59-7.58	0.002
IVUS-guided procedure	5.36	3.10-9.25	0.001

Al Lamee. JACC Intv 2011

% de Perfuração em CTO-  
e não-CTO- ICP do NCDR

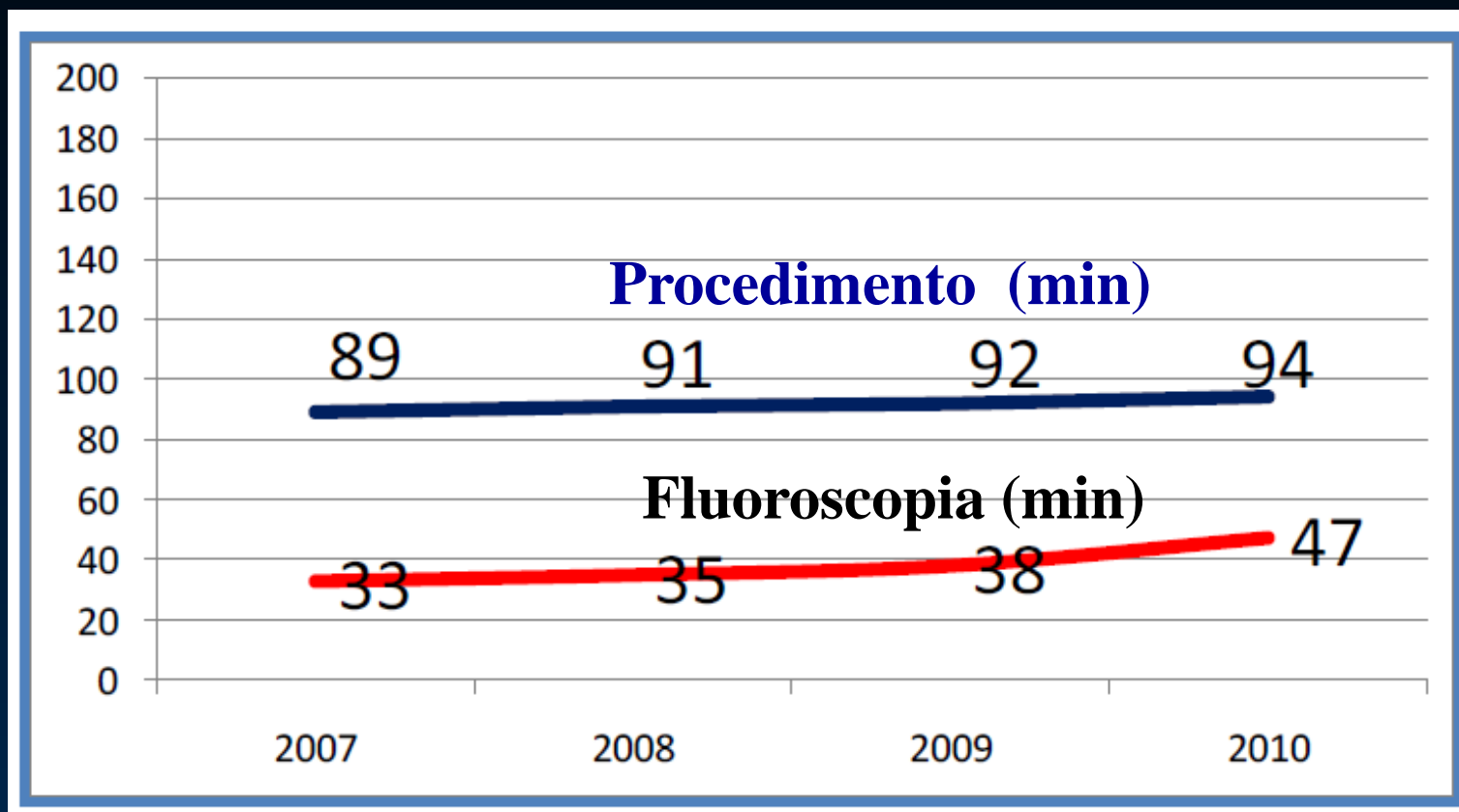


Javaid A. Am J Cardiol 2006;98:911-4.



# ICP na Oclusão Coronária Crônica

Tempo do Procedimento e Radiação  
EURO CTO Registry



# ICP na Oclusão Coronária Crônica

## Outras Complicações...

- Tamponamento
- Dissecção (Aortio – Ostial)
- Danos à ramos e colaterais
- Nefropatia Induzida pelo Contraste

# ICP na Oclusão Coronária Crônica

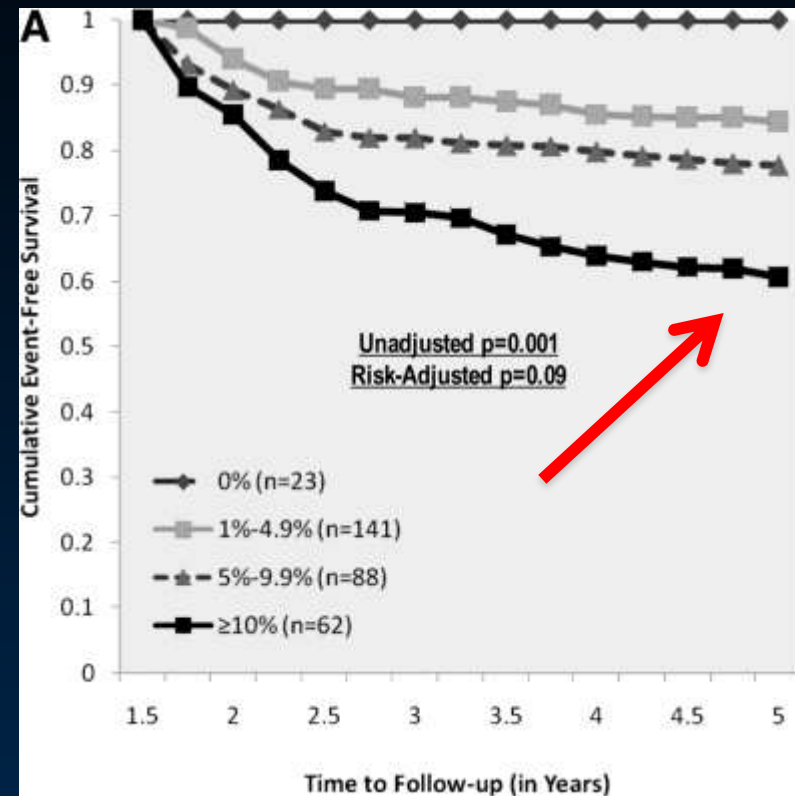
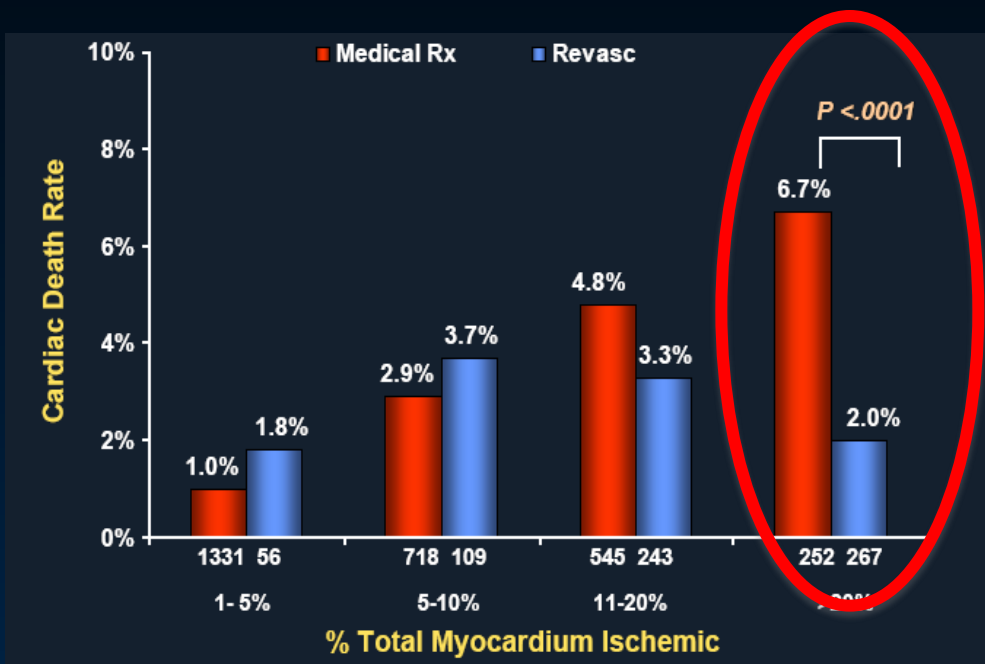
*O percentual de sucesso é mais baixo que nas artérias não ocluídas cronicamente*

**e mais....**

- Nós temos que estar alertas aos riscos do procedimento.....

**• *Cuándo então debemos tratar  
Oclusion Total Crônica?***

# Isquemia e Revascularização



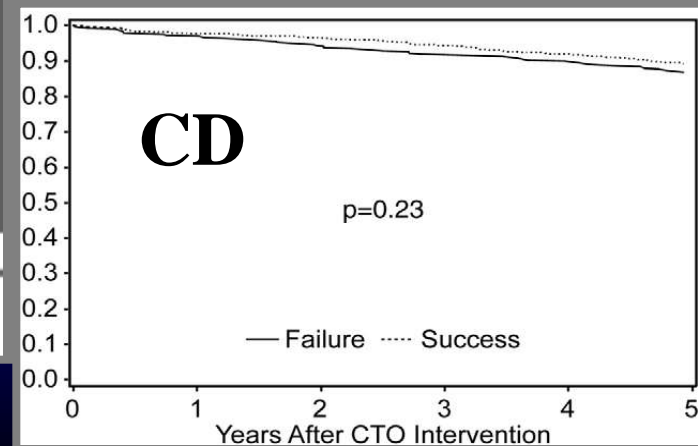
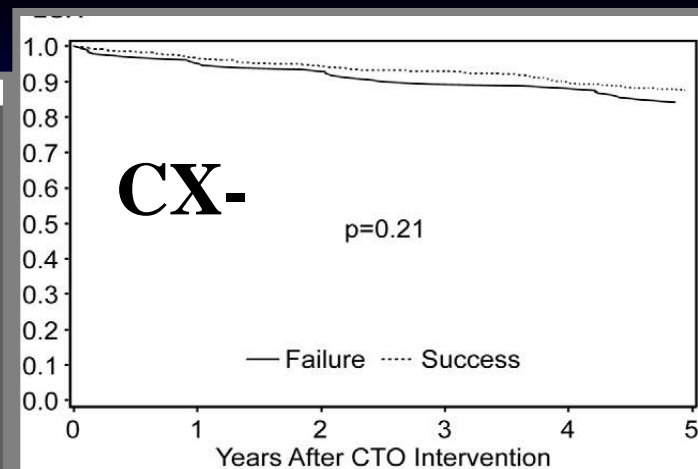
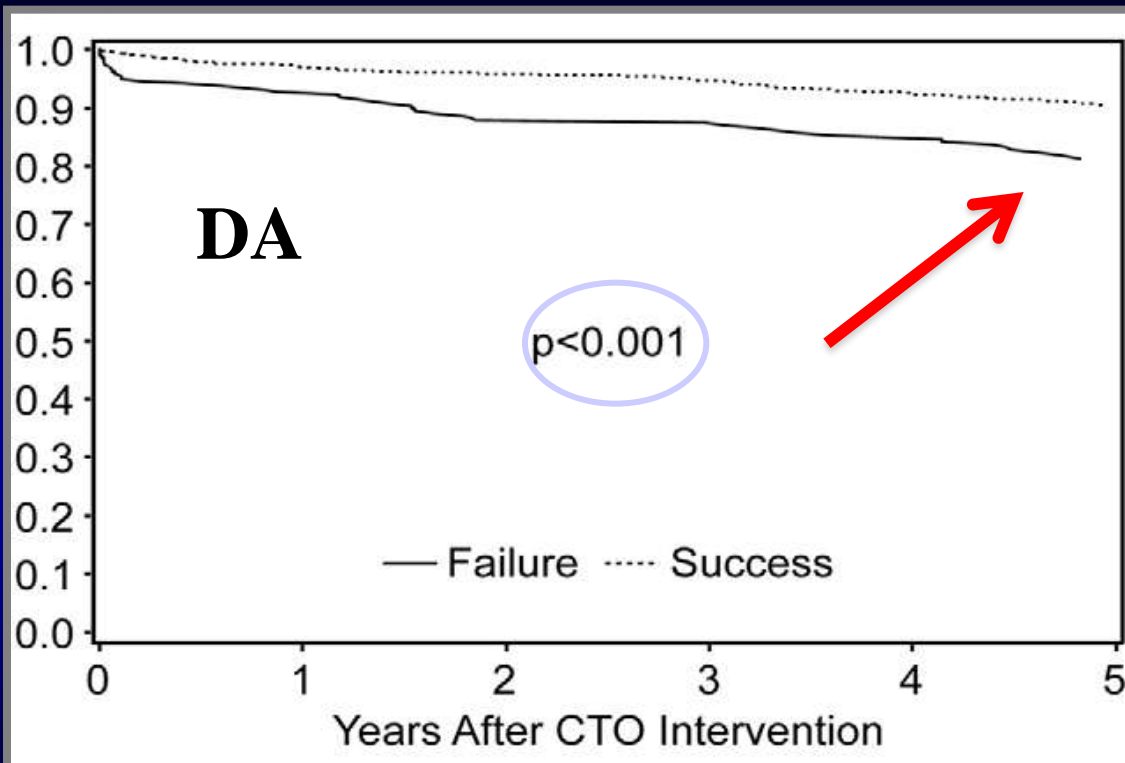
Hachamovitch R, et al., *Circulation*. 2003 Jun 17;107(23):2900-7

Shaw LJ, et al. *Circulation*. 2008 Mar 11;117(10):1283-91.

# Cuándo ICP na Oclusão Coronária Crônica?

## Sobrevida após ICP: DA vs não-DA

Survival @ 5 y FUP





# Melhorando a sobrevida com revascularização com sucesso

Interventional Cardiology

## Effectiveness of recanalization of chronic total occlusions: A systematic review and meta-analysis

Dominique Joyal, MD, FACC,<sup>a</sup> Jonathan Afilalo, MD,<sup>a</sup> and Stéphane Rinfret, MD, SM<sup>b</sup> *Quebec, Canada*

**Background** Chronic total occlusion (CTO) recanalizations remain extremely challenging procedures. With improvements in technology and techniques, success rates for recanalization of CTO continue to improve. However, the clinical benefits of this practice remain unclear. The aim of the study was to determine the effectiveness of CTO recanalization on clinical outcomes.

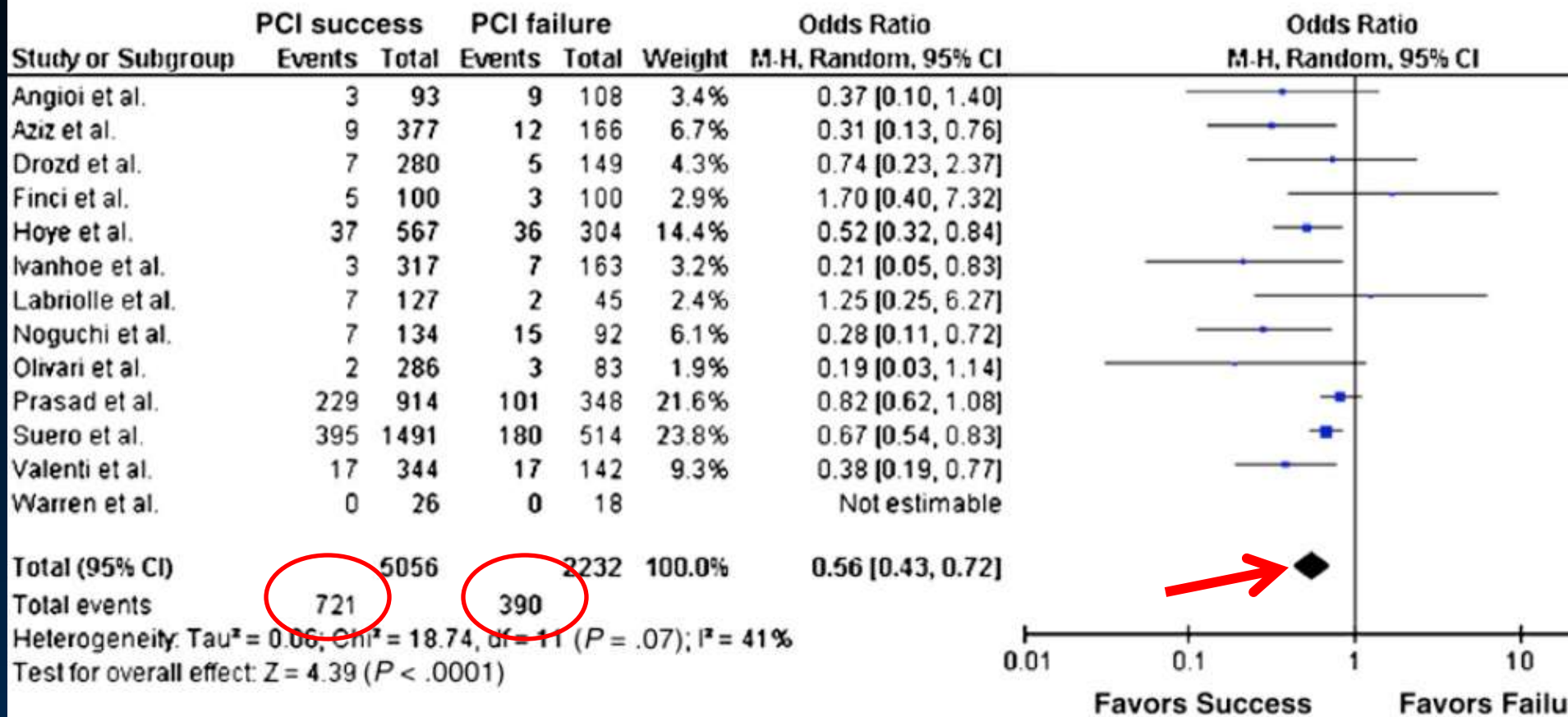
**Methods** We performed a systematic review and meta-analysis of published studies comparing CTO recanalization to medical management. Data were extracted in duplicate and analyzed by a random effects model.

**Results** We did not identify any randomized controlled trials or observational studies comparing CTO recanalization to a planned medical management. We did identify 13 observational studies comparing outcomes after successful vs failed CTO recanalization attempt. These studies encompassed 7,288 patients observed over a weighted average follow-up of 6 years. There were 721 (14.3%) deaths of 5,056 patients after successful CTO recanalization compared to 390 deaths (17.5%) of 2,232 patients after failed CTO recanalization (odds ratio [OR] 0.56, 95% CI 0.43-0.72). Successful recanalization was associated with a significant reduction in subsequent coronary artery bypass graft surgery (CABG) (OR 0.22, 95% CI 0.17-0.27) but not in myocardial infarction (OR 0.74, 95% CI 0.44-1.25) or major adverse cardiac events (OR 0.81, 95% CI 0.55-1.21). In the 6 studies that reported angina status, successful recanalization was associated with a significant reduction in residual/recurrent angina (OR 0.45, 95% CI 0.30-0.67).

**Conclusions** In highly selected patients considered for CTO recanalization, successful attempts appear to be associated with an improvement in mortality and with a reduction for the need for CABG as compared to failed recanalization. However, given the observational nature of the reviewed evidence, randomized clinical trials are needed to confirm these findings. (Am Heart J 2010;160:179-87.)

**Am Heart J 2010;160:179-87**

# Melhorando a sobrevida com revascularização com sucesso



# *Cuándo ICP na Oclusão Coronária Crônica?*

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1) Melhorar a sobrevida

# *Cuándo ICP na Oclusão Coronária Crônica?*

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1) Melhorar a sobrevida

2) Melhorar sintomas e reduzir isquemia

# TOAST-GISE

## 1 ano após o Procedimento

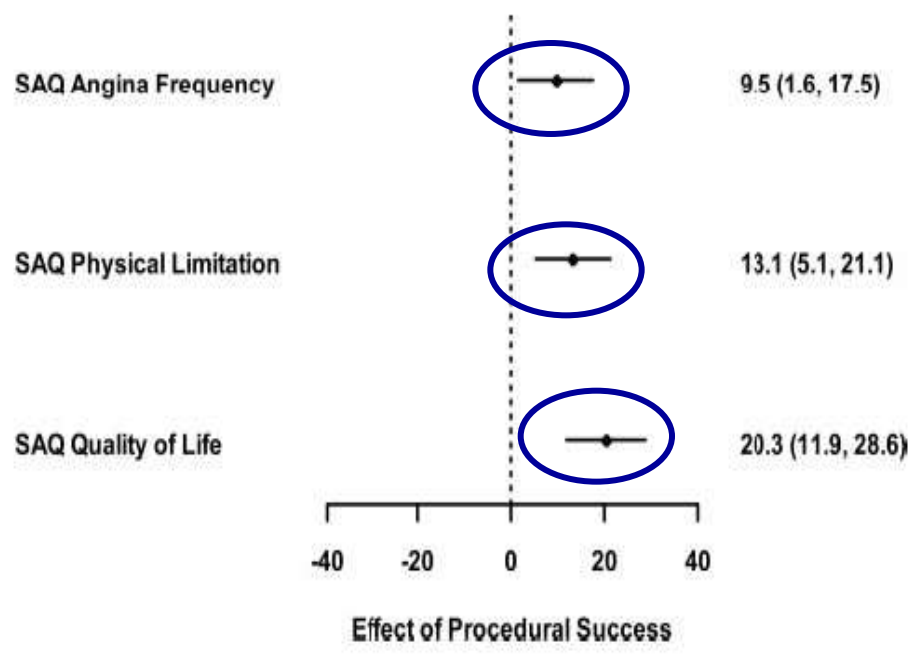
	<b>CTO Success (n = 248)</b>	<b>CTO Failure (n = 60)</b>	<b>P Value</b>
<b>No angina</b>	<b>220 (88.7%)</b>	<b>45 (75.0%)</b>	<b>0.008</b>
<b>ETT performed</b>	<b>210 (84.7%)</b>	<b>42 (70.0%)</b>	<b>0.010</b>
<b>Maximal ETT</b>	<b>155 (62.5%)</b>	<b>20 (33.3%)</b>	<b>&lt;0.0001</b>
<b>Negative ETT</b>	<b>181 (73.0%)</b>	<b>28 (46.7%)</b>	<b>0.0001</b>



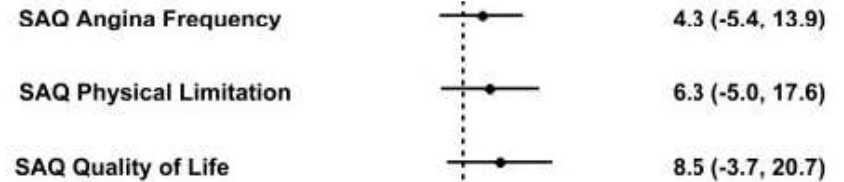
# Cuándo ICP na Oclusão Coronária Crônica?

## Efeito da ICP na qualidade de vida: 1mês

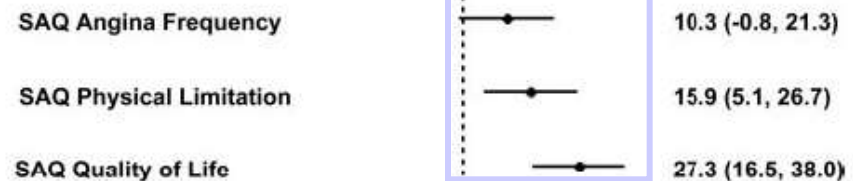
Results from FACTOR trial, 125 pts



Asymptomatic, n=42



Symptomatic, n=83



# *Cuándo ICP na Oclusão Coronária Crônica?*

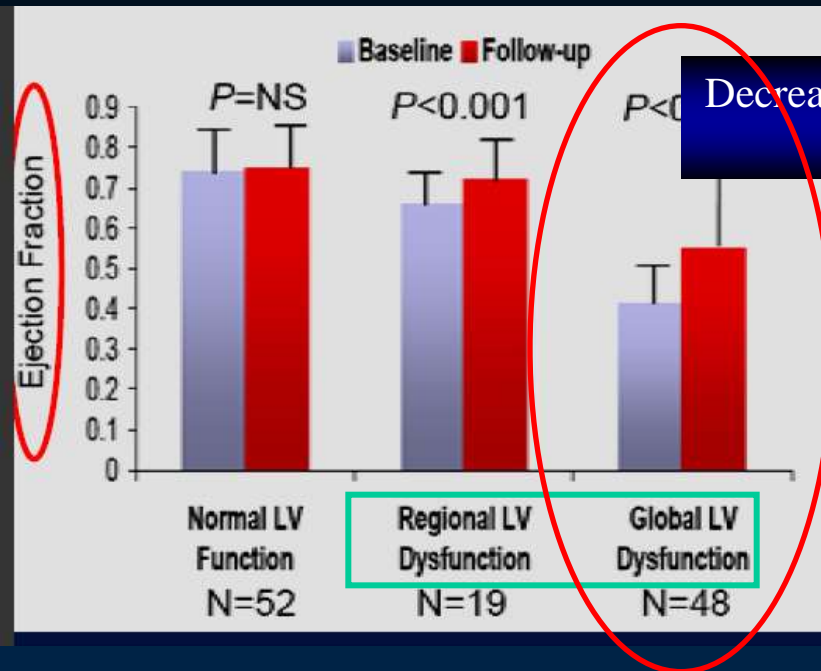
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- 1) Melhorar a sobrevida
- 2) Melhorar sintomas e reduzir isquemia
- 3) Melhorar a função do VE

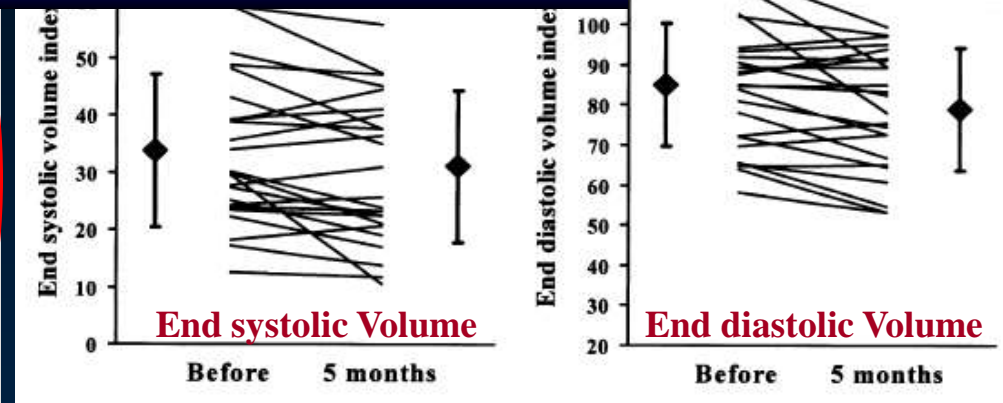
# Cuándo ICP na Oclusão Coronária Crônica?

## Recuperação da FVE após a recanalização de uma oclusão coronária crônica

Increase of LVF after CTP-PCI assessed by LV angiogram



Decrease on end-systolic and end-diastolic volumes assessed by MRI.



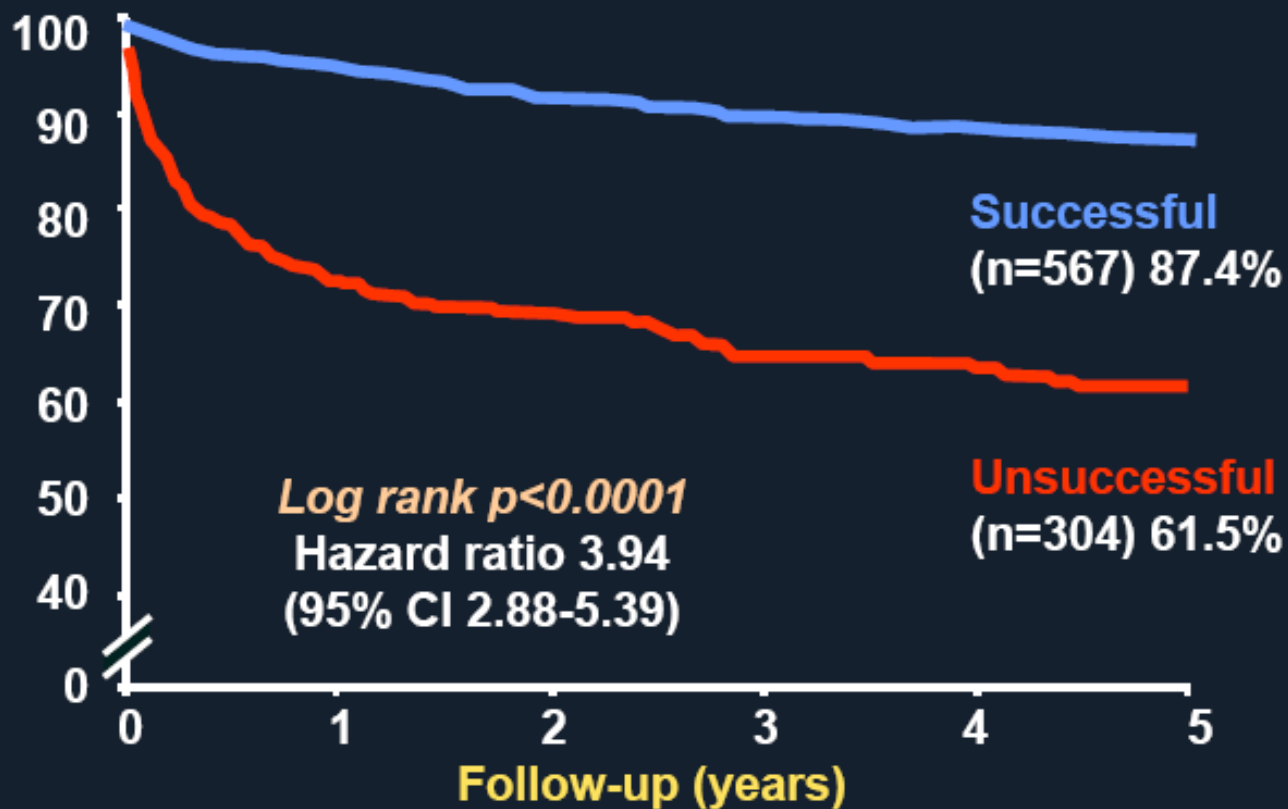
# *Cuándo ICP na Oclusão Coronária Crônica?*

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- 1) Melhorar a sobrevida
- 2) Melhorar sintomas e reduzir isquemia
- 3) Melhorar a função do VE
- 4) Reduzir a necessidade de cirurgia

# Sobrevida livre de Cirurgia em 5 anos

## Experiência de Rotterdam



# *Cuándo ICP na Oclusão Coronária Crônica?*

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- 1) Melhorar a sobrevida
- 2) Melhorar sintomas e reduzir isquemia
- 3) Melhorar a função do VE
- 4) Reduzir a necessidade de cirurgia
- 5) Aumentar a tolerância à progressão da DAC

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*Oclusion Total Crónica:*

*Cuándo não debemos  
tratarlas?*

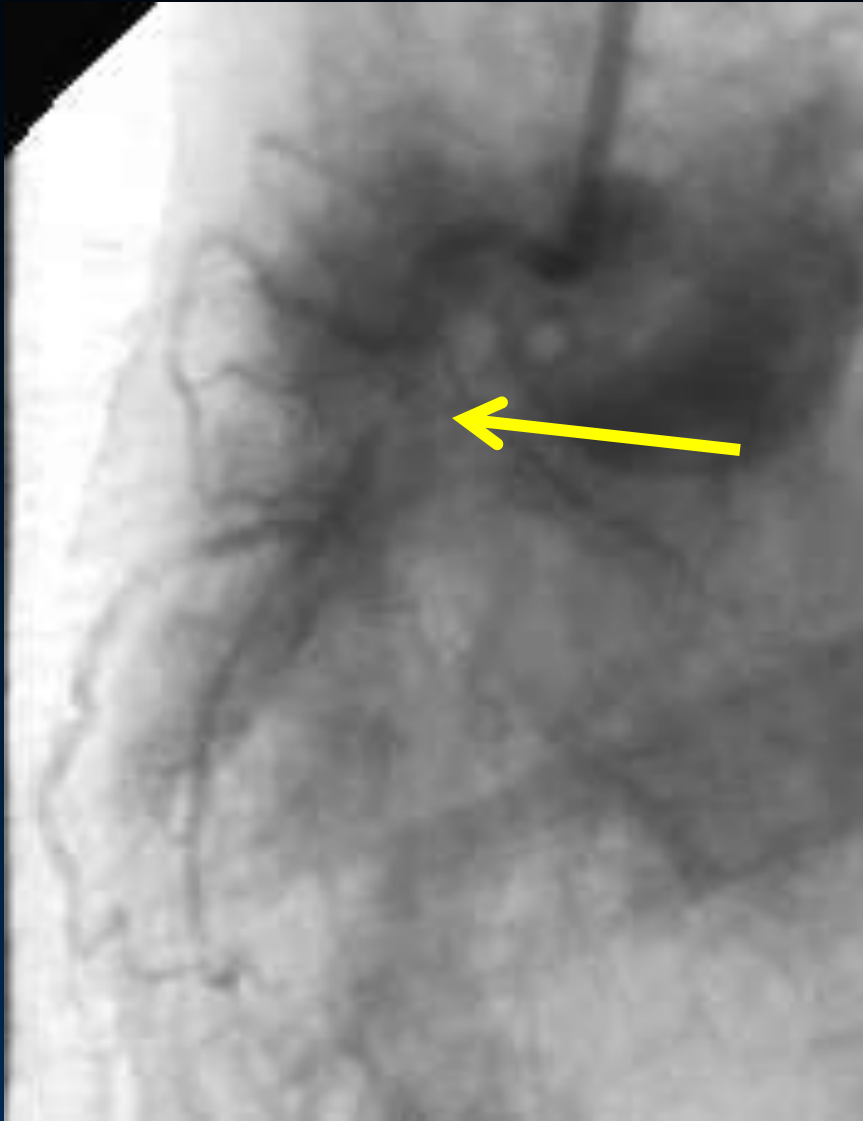
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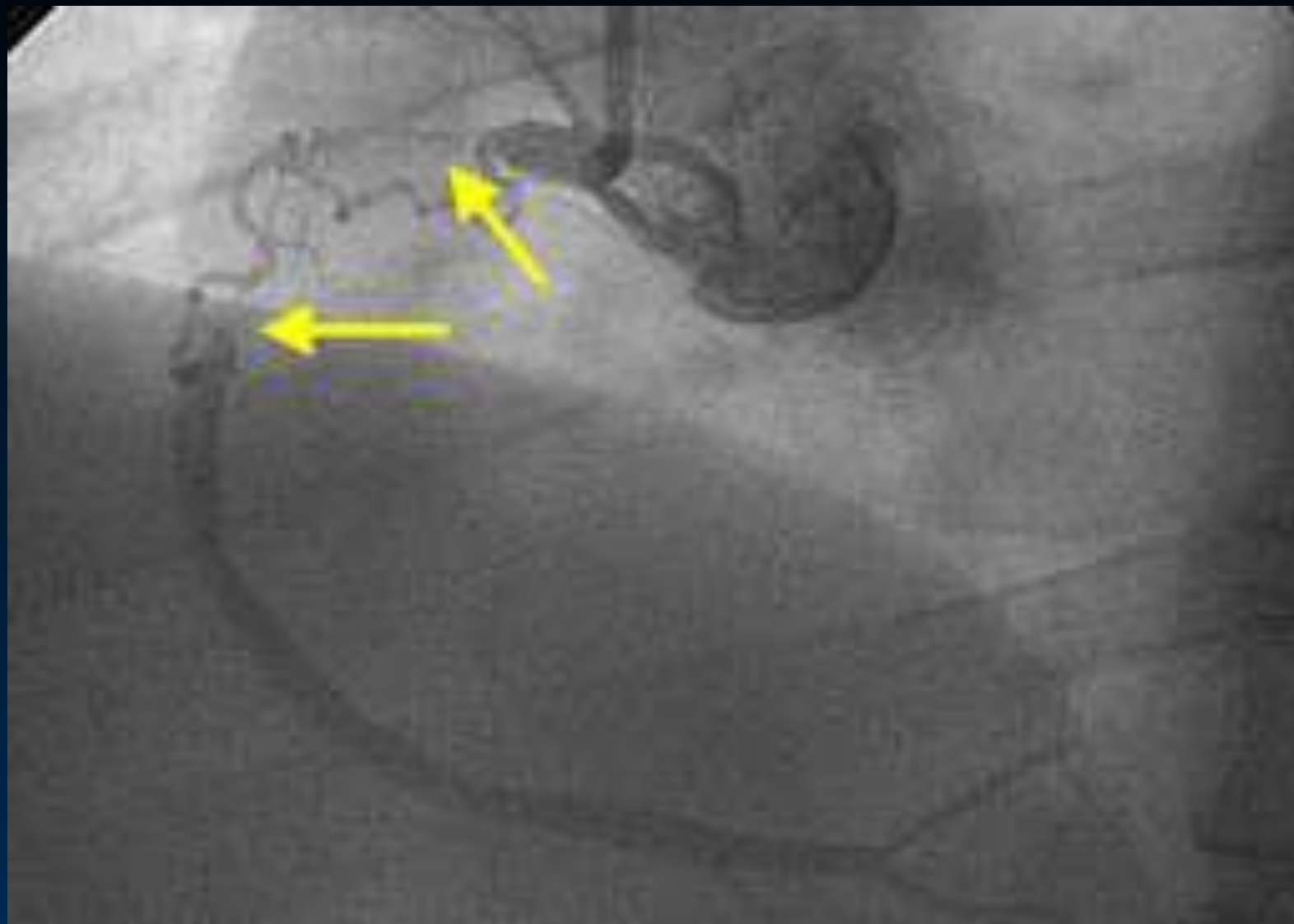
1



# 2 and 3



4



# 5 (Nuestro paciente)



# Oclusión Total Crónica: Técnica y Materiais

- Ótimo Back-up no Cateter-guia
- Injeção Dupla (Contralateral)

**Anterógrada  
Microcateter**

**Retrógrada**

**Cordas Guias:  
Choice PT2, Fielder,  
Cross-wire  
Miracle 3, 6  
Balões 1.5 mm**

**Falso Lumen:  
Cordas Paralelas**

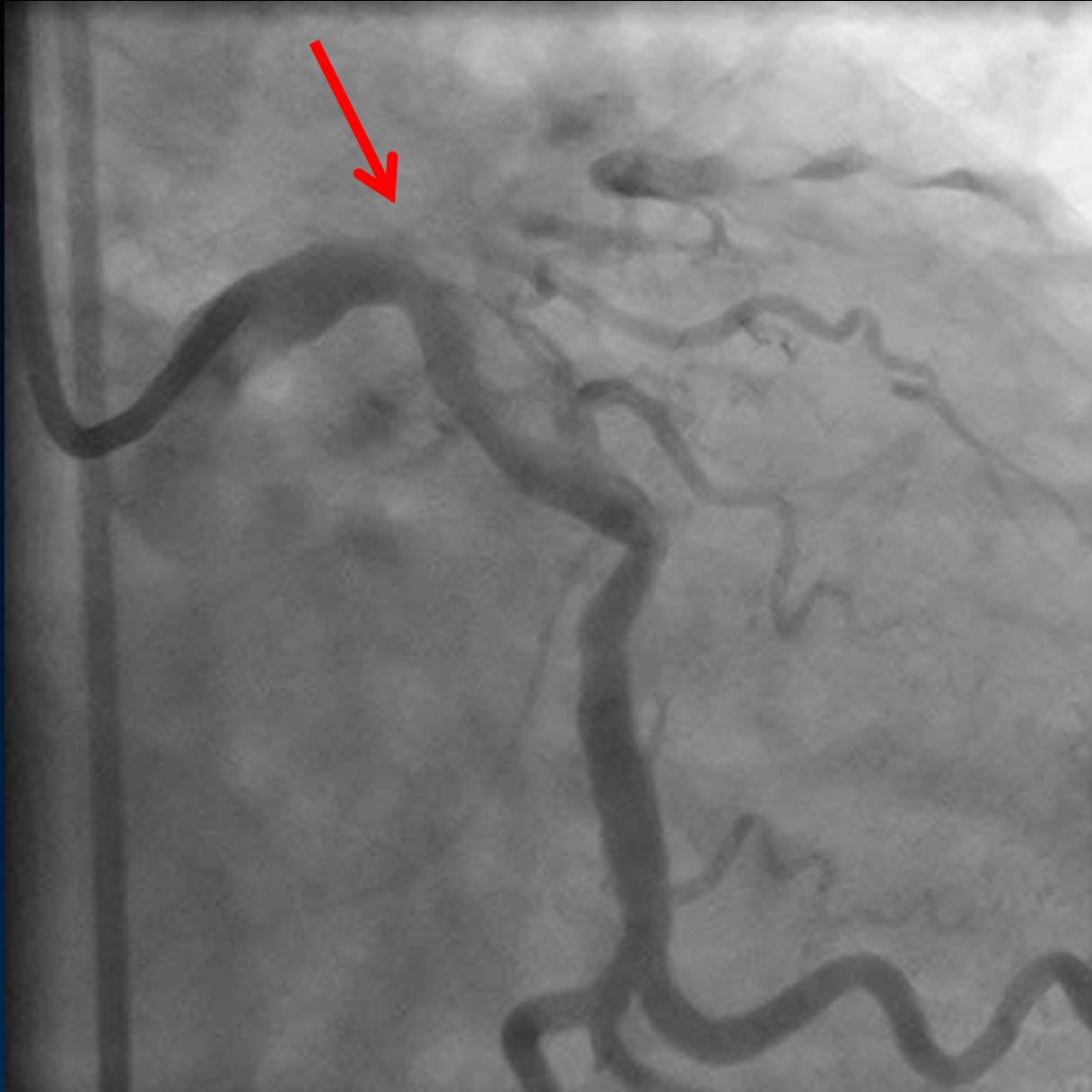
**Lumen  
Verdadeiro**

**Dissecção com  
reentrada**

**DES**

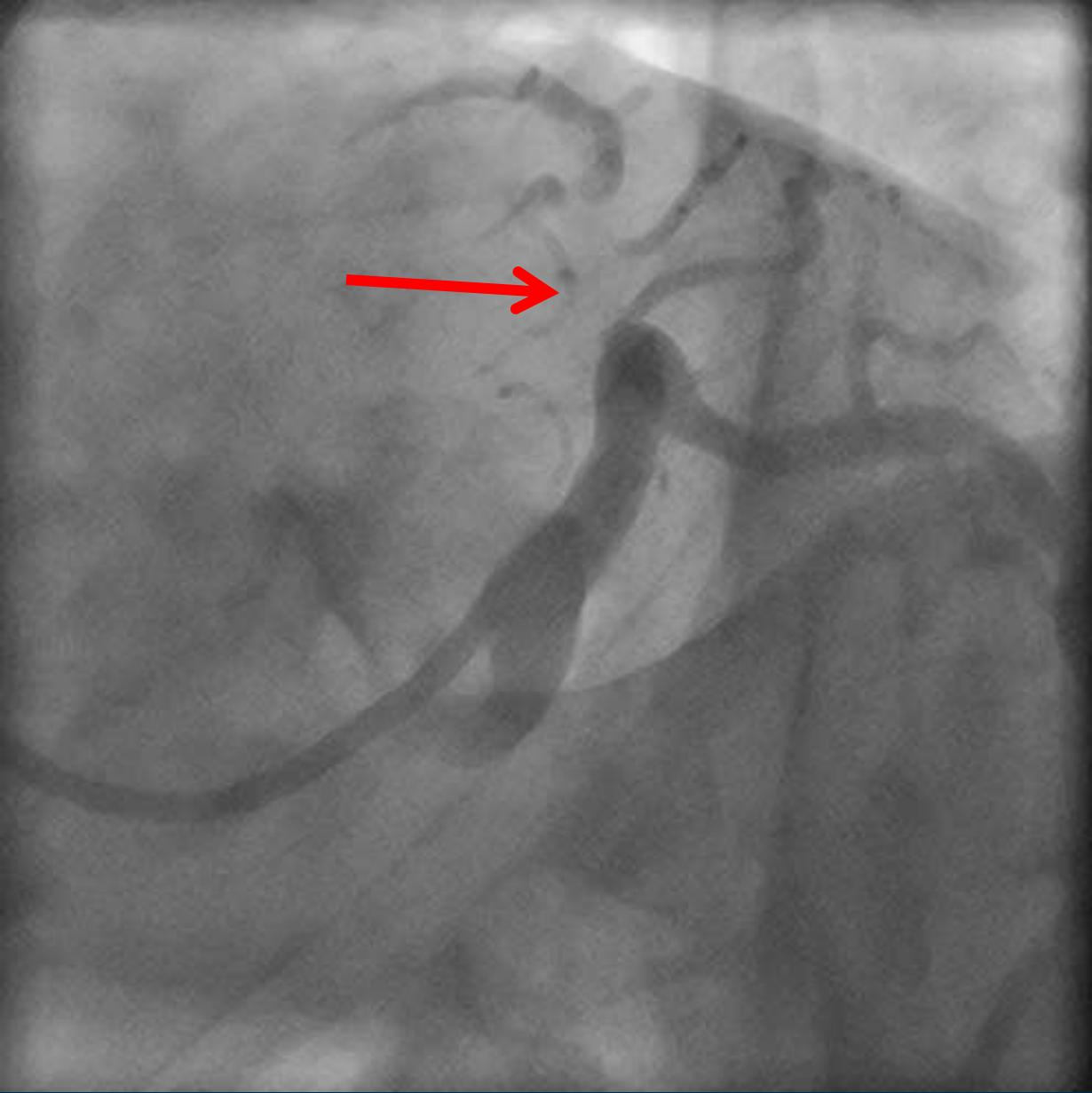
**Insucesso: Clínico,  
CABG ou Outra  
Tentativa 3-4 semanas**

*Que tal voltarmos ao nosso  
paciente do início .....*

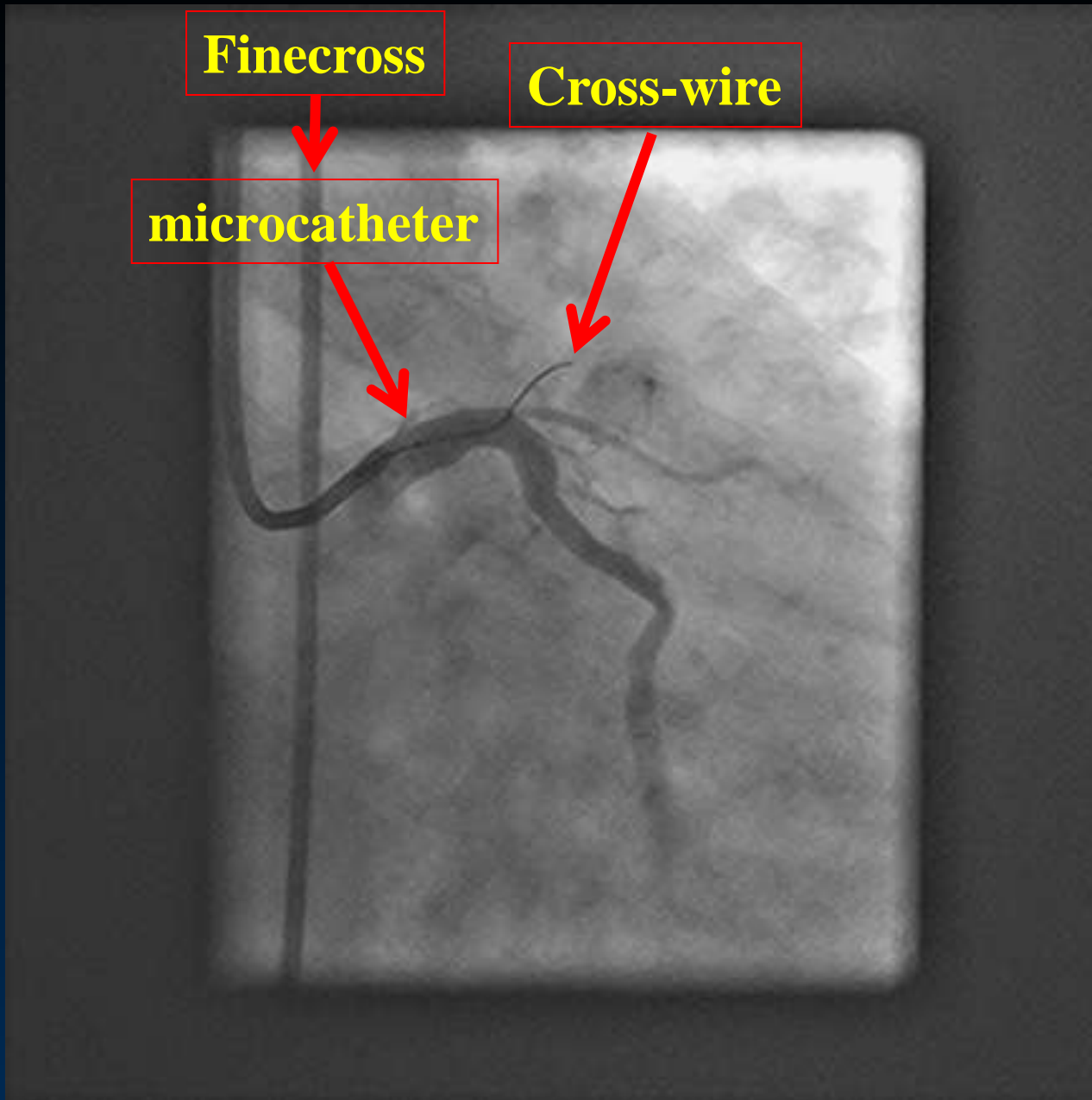




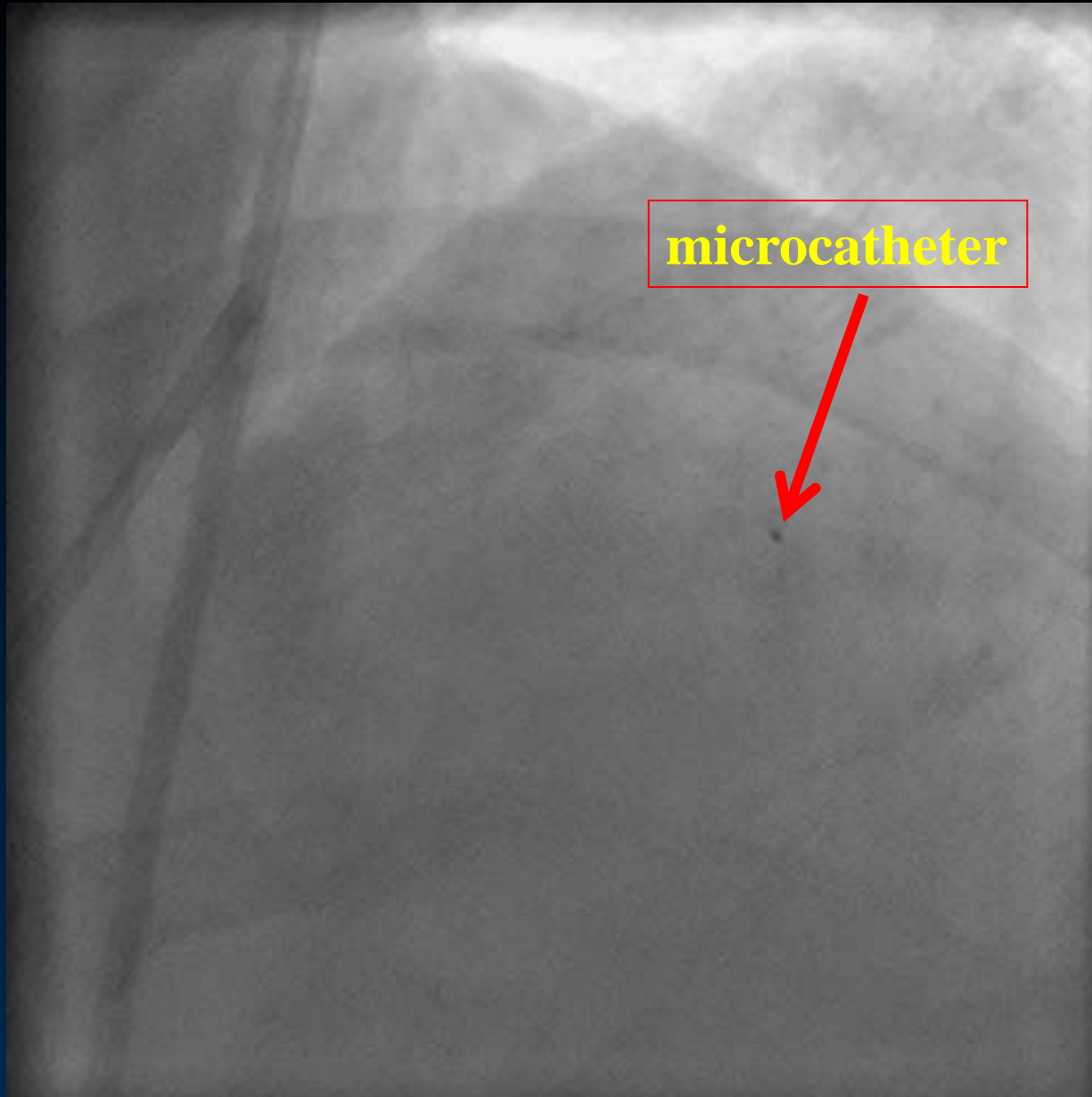




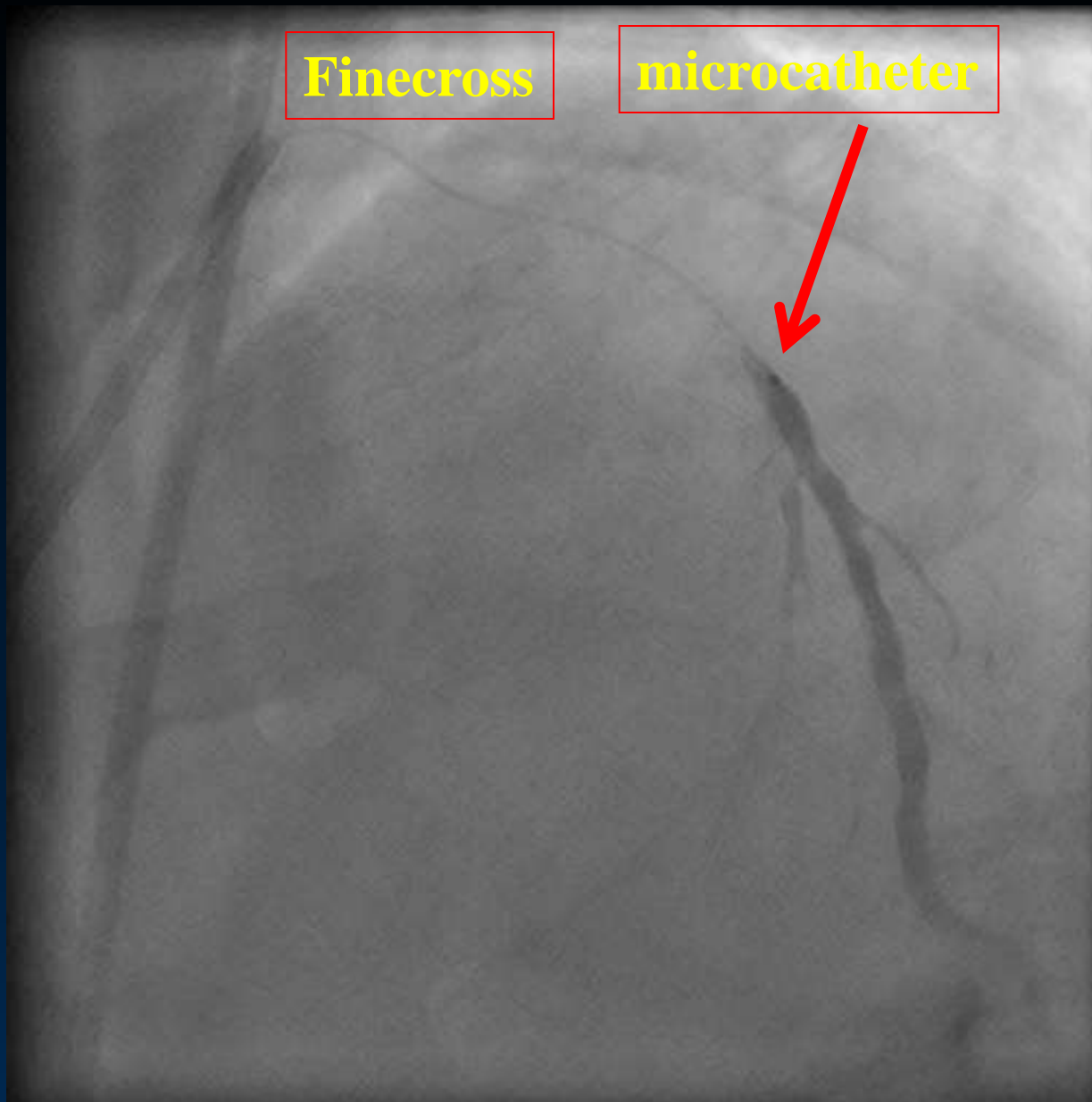
# *Técnicas de tratamento. Materiais*



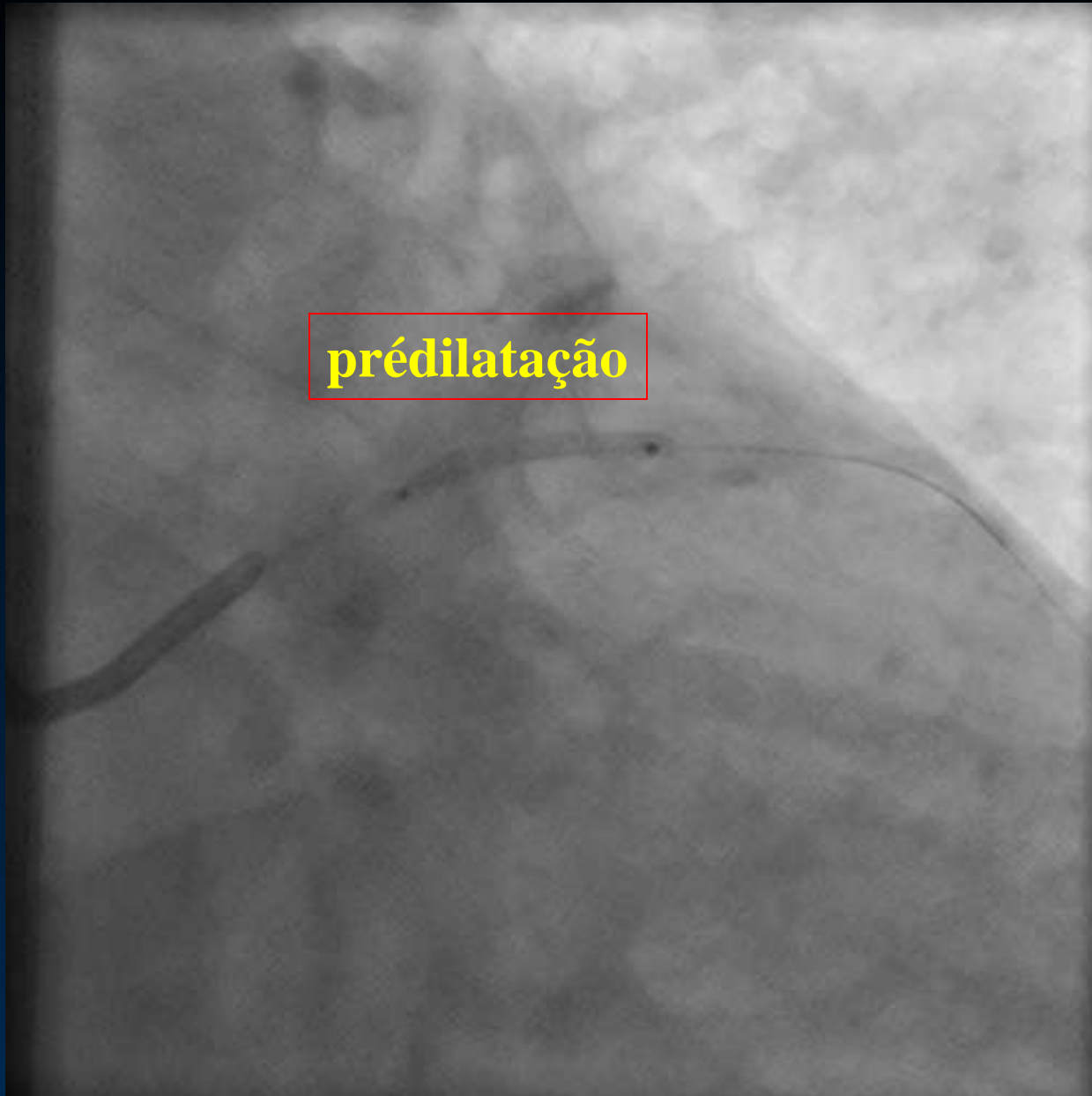
# *Técnicas de tratamento. Materiais*



# *Técnicas de tratamento. Materiais*

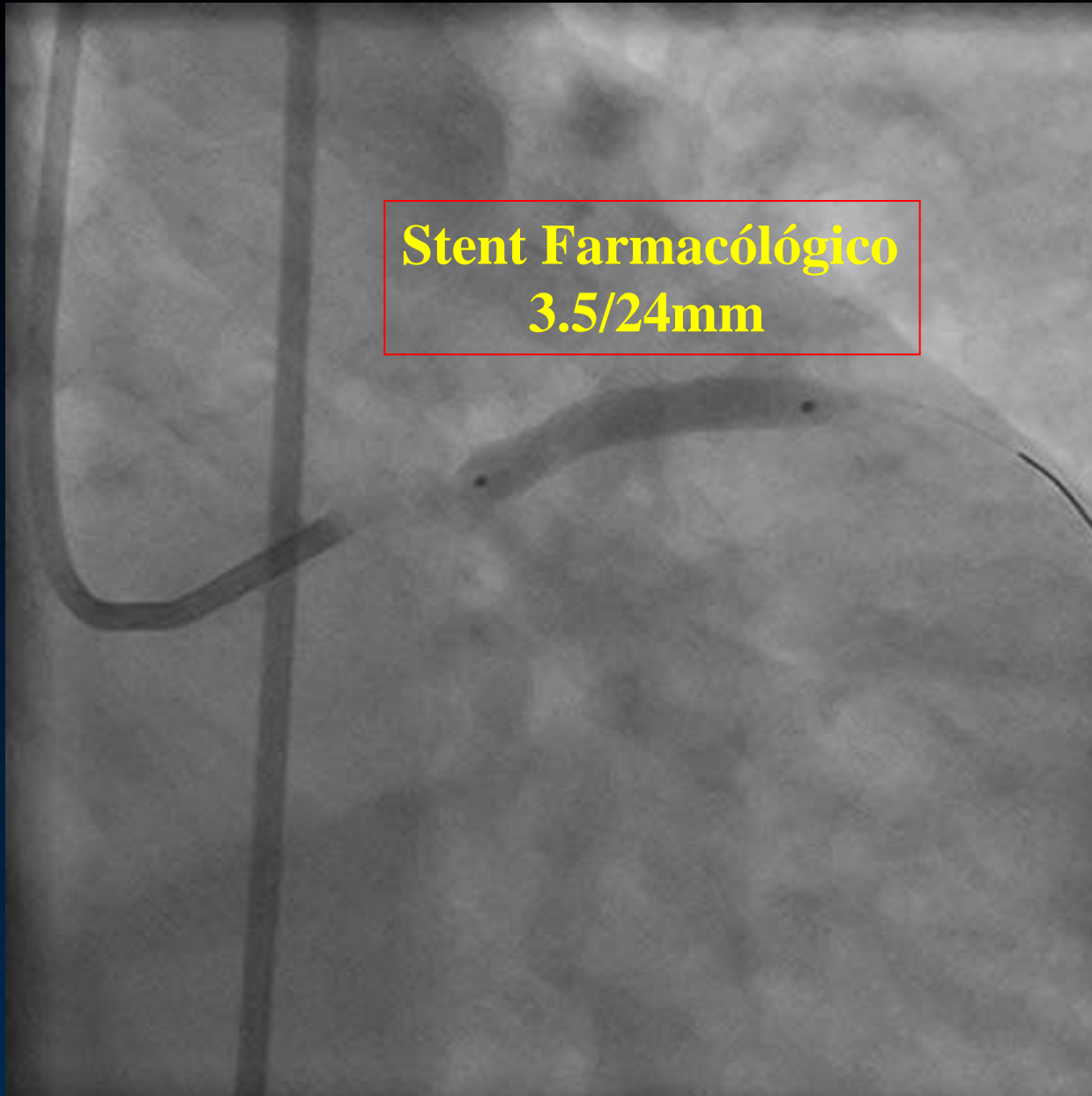


# *Técnicas de tratamento. Materiais*



**pré-dilatação**

# *Técnicas de tratamento. Materiais*



**Stent Farmacológico  
3.5/24mm**



**INTERVENTIONAL CARDIOLOGY**

# **Efficacy and Safety of Drug-Eluting Stents in Chronic Total Coronary Occlusion Recanalization**

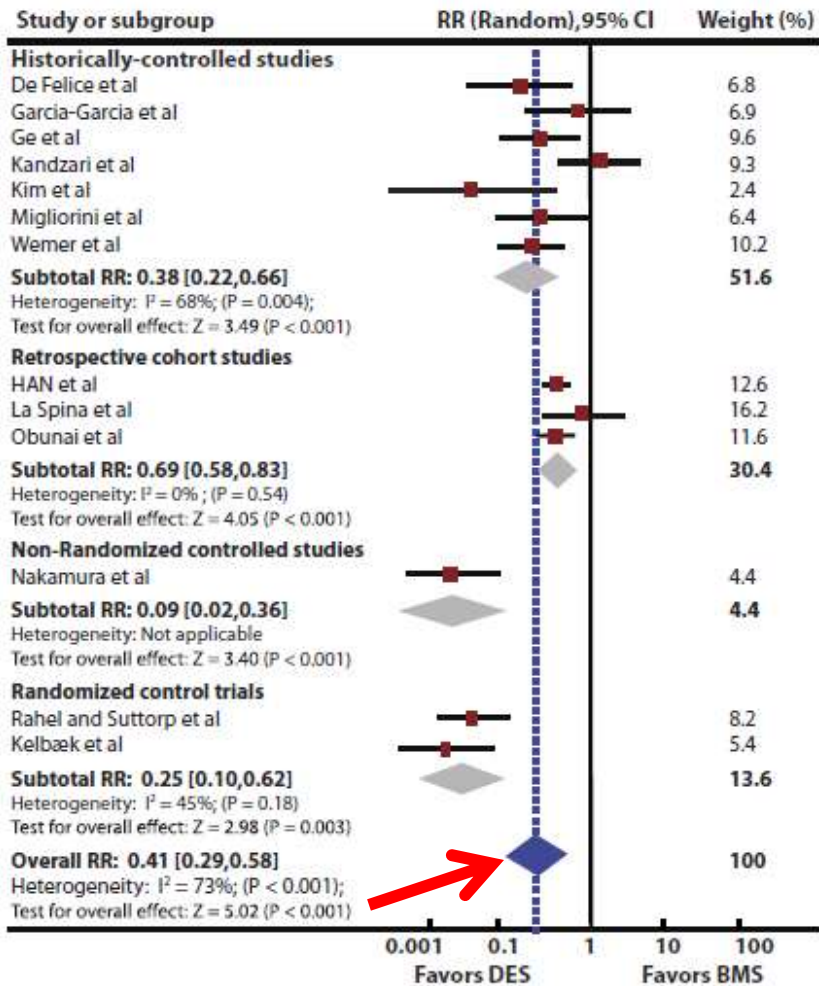
## **A Systematic Review and Meta-Analysis**

Humberto J. Colmenarez, MD,\* Javier Escaned, MD, PhD,\* Cristina Fernández, MD, PhD,†  
Liliana Lobo, MD,\* Sara Cano, MD,† Juan G. del Angel, MD,\* Fernando Alfonso, MD, PhD,\*  
Pilar Jimenez, MD, PhD,\* Camino Bañuelos, MD,\* Nieves Gonzalo, MD,\* Eulogio García, MD,\*  
Rosana Hernández, MD, PhD,\* Carlos Macaya, MD, PhD\*

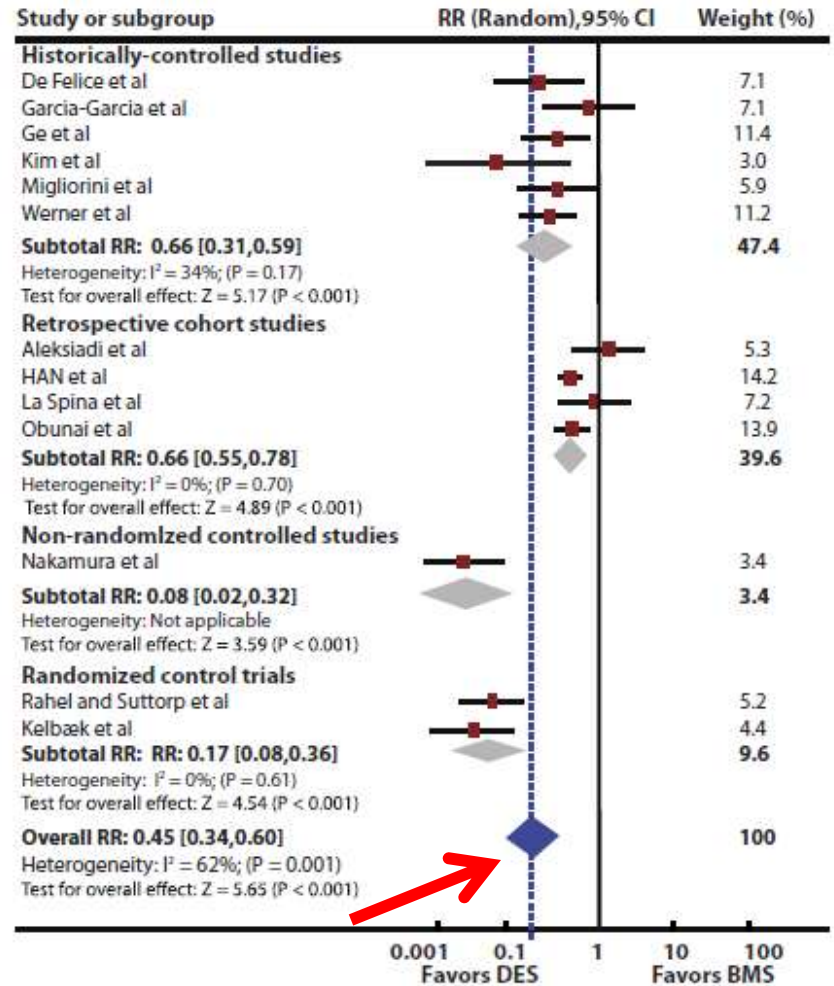
*Madrid, Spain*

- Objectives** The aim of this study was to compare the efficacy and safety of drug-eluting stent (DES) and bare-metal stent (BMS) use in chronic total occlusion (CTO) recanalization.
- Background** The long-term effectiveness and safety of DES use in CTO recanalization are unclear, and performance of randomized clinical trials in the field is complex.
- Methods** Major electronic information sources were explored for articles comparing outcomes with DES and BMS use among patients with CTO. Assessed clinical outcomes were death, myocardial infarction, target vessel revascularization, major adverse cardiac events, and stent thrombosis; angiographic outcomes were stent restenosis and stent reocclusion.
- Results** Fourteen comparative studies were identified (a total of 4,394 patients). When compared with BMS, DES significantly reduced risk of major adverse cardiac events (relative risk [RR]: 0.45, 95% confidence interval [CI]: 0.34 to 0.60,  $p < 0.001$ ) and TVR (RR: 0.40, 95% CI: 0.28 to 0.58,  $p < 0.001$ ) without increasing death (RR: 0.87, 95% CI: 0.66 to 1.16,  $p = 0.88$ ) or myocardial infarction (RR: 0.89, 95% CI: 0.54 to 1.46,  $p = 0.80$ ). This benefit was sustained at  $\geq 3$  years of follow-up. Lower RRs for restenosis (RR: 0.25, 95% CI: 0.16 to 0.41,  $p < 0.001$ ) and stent reocclusion (RR: 0.30, 95% CI: 0.18 to 0.49,  $p < 0.001$ ) were also observed in the DES group. A strong trend toward a higher rate of stent thrombosis was documented in DES-treated patients (RR: 2.79, 95% CI: 0.98 to 7.97,  $p = 0.06$ ).
- Conclusions** DES use in CTO recanalization is associated with significantly fewer major adverse cardiac events and fewer occurrences of target vessel revascularization, restenosis, and stent reocclusion than with BMS. Although a statistical trend toward a higher risk of stent thrombosis was observed, the use of DES in this context seems to be safe, with an overall benefit sustained in the long term. (J Am Coll Cardiol 2010;55:1854-66) © 2010 by the American College of Cardiology Foundation

# DES in CTO

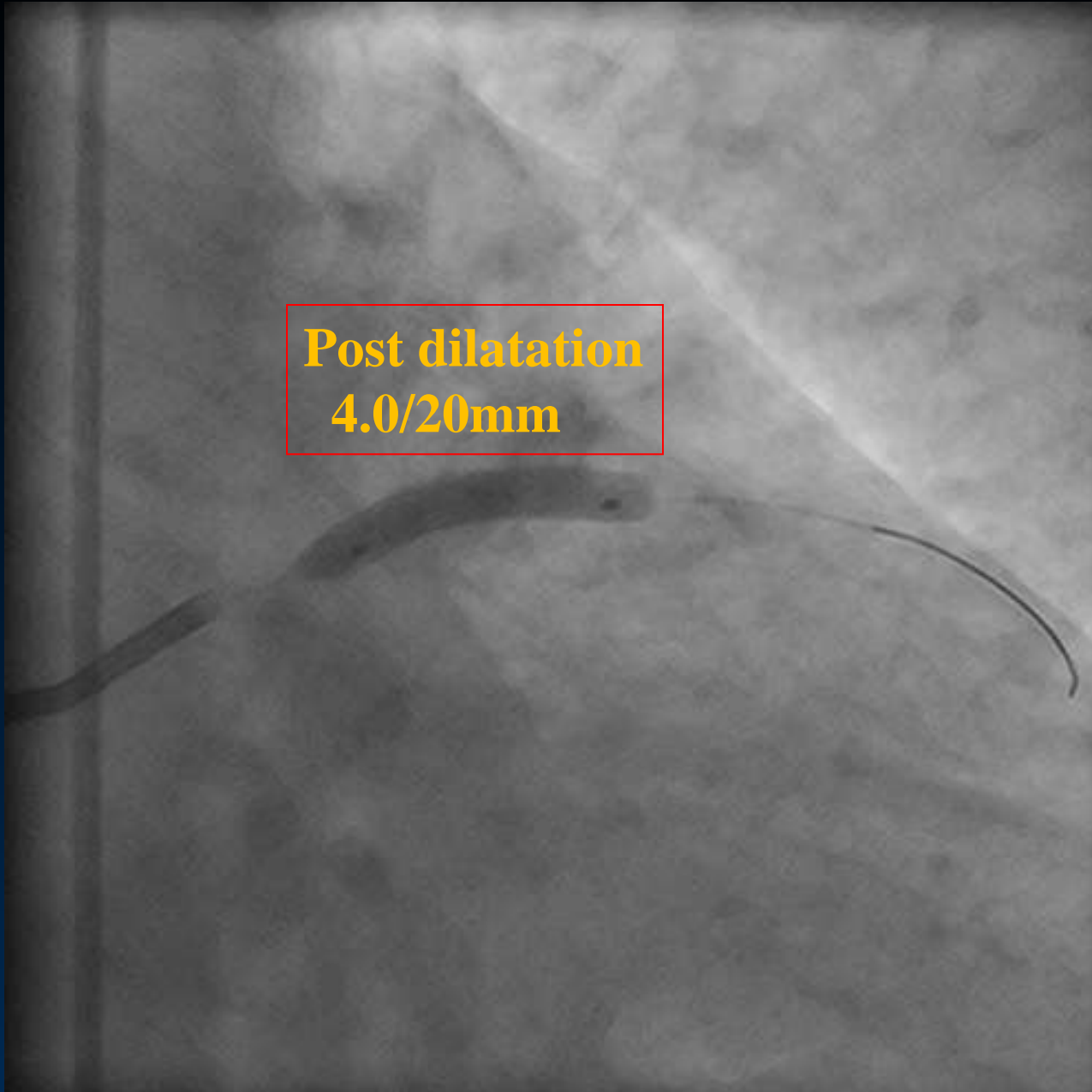


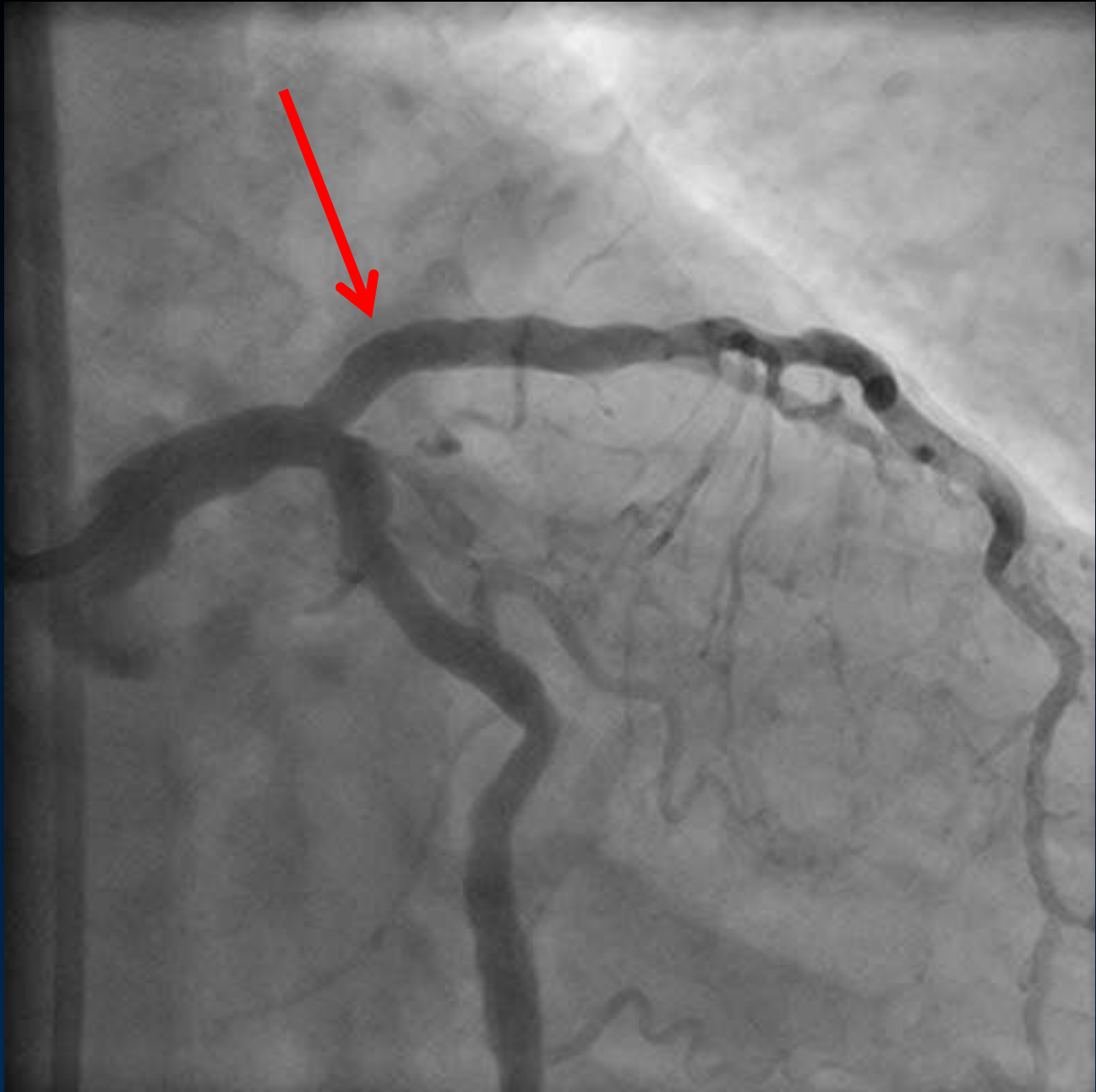
Major adverse cardiac events



Target vessel revascularization

**Post dilatation  
4.0/20mm**









## Summary of Large Contemporary Registry Publications of Percutaneous Coronary Interventions of Chronic Total Occlusions

Author	Year	N (CTO lesions)	Prior CABG	Diabetes	Retrograde	Technical Success	Major complications	Death	Tamponade	Fluoroscopy time (minutes)	Contrast use, (ml)
Rathore	2009	904	12.6	40.0	17	87.5	1.9	0.6	0.6	NR	NR
Morino	2010	528	9.6	43.3	26	86.6	NR	0.4	0.4	45 (1-301)*	293 (53-1,097)*
Galassi	2011	1983	14.6	28.8	14	82.9	1.8	0.3	0.5	42.3±47.4	313 ±184
U.S Registry*	2013	1361	37.0	40.0	34	85.5	1.8	0.22	0.6	42±29	294 ±158

*1 ano após....*



Idade: 71 anos Sexo:  Fem.  Masc Data: 19, 07, 20 Nº do exame: 69531

Freqüência Cardíaca Sub-Máxima: 125 Freqüência Cardíaca Máxima: 142

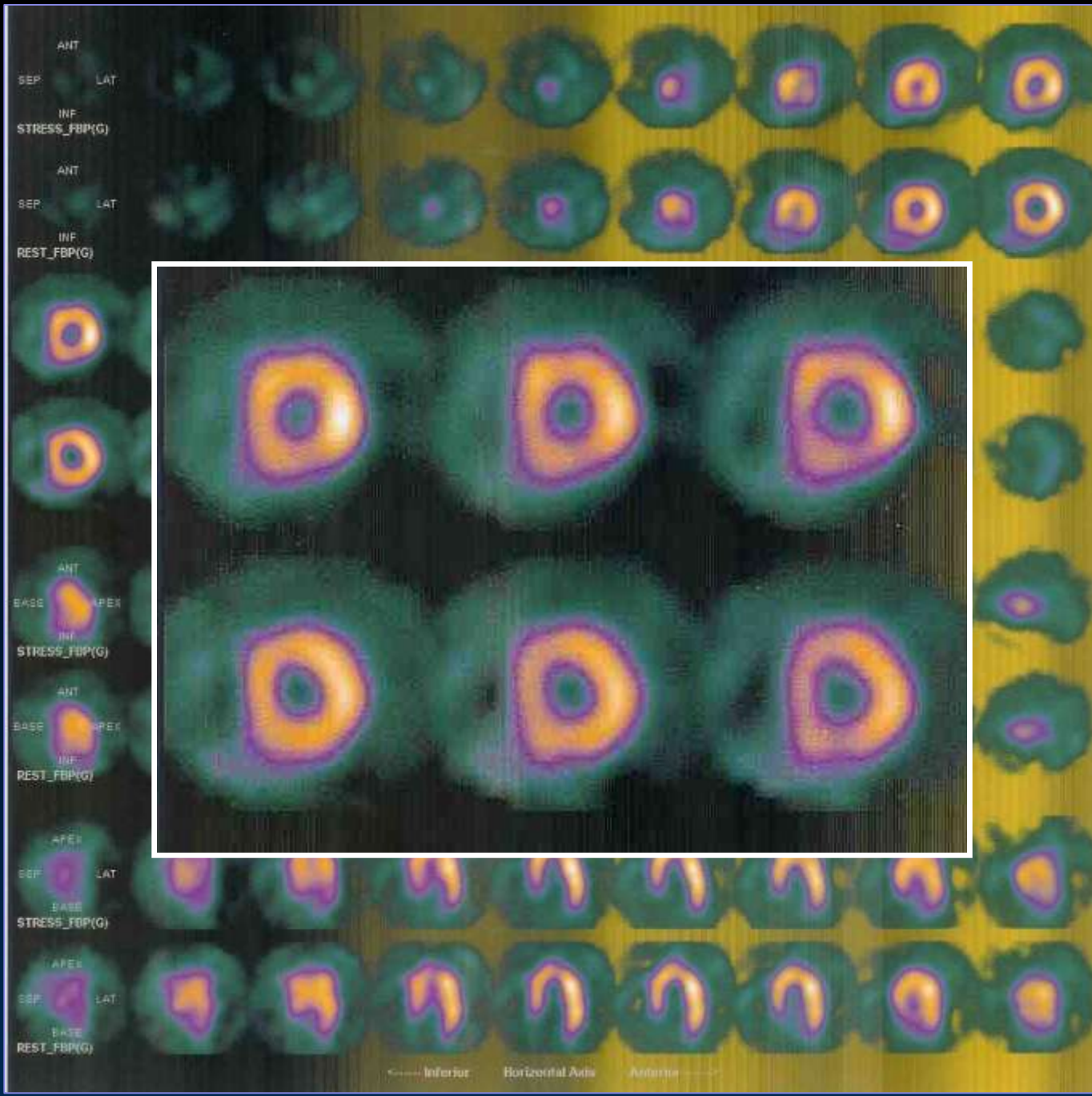
DEITADO: Freq. Cardíaca 66 Pressão Arterial 140, 80 Protocolo: Bruce

EM PÉ: Freq. Cardíaca 68 Pressão Arterial 140, 80 FC Injeção MIBI: 150

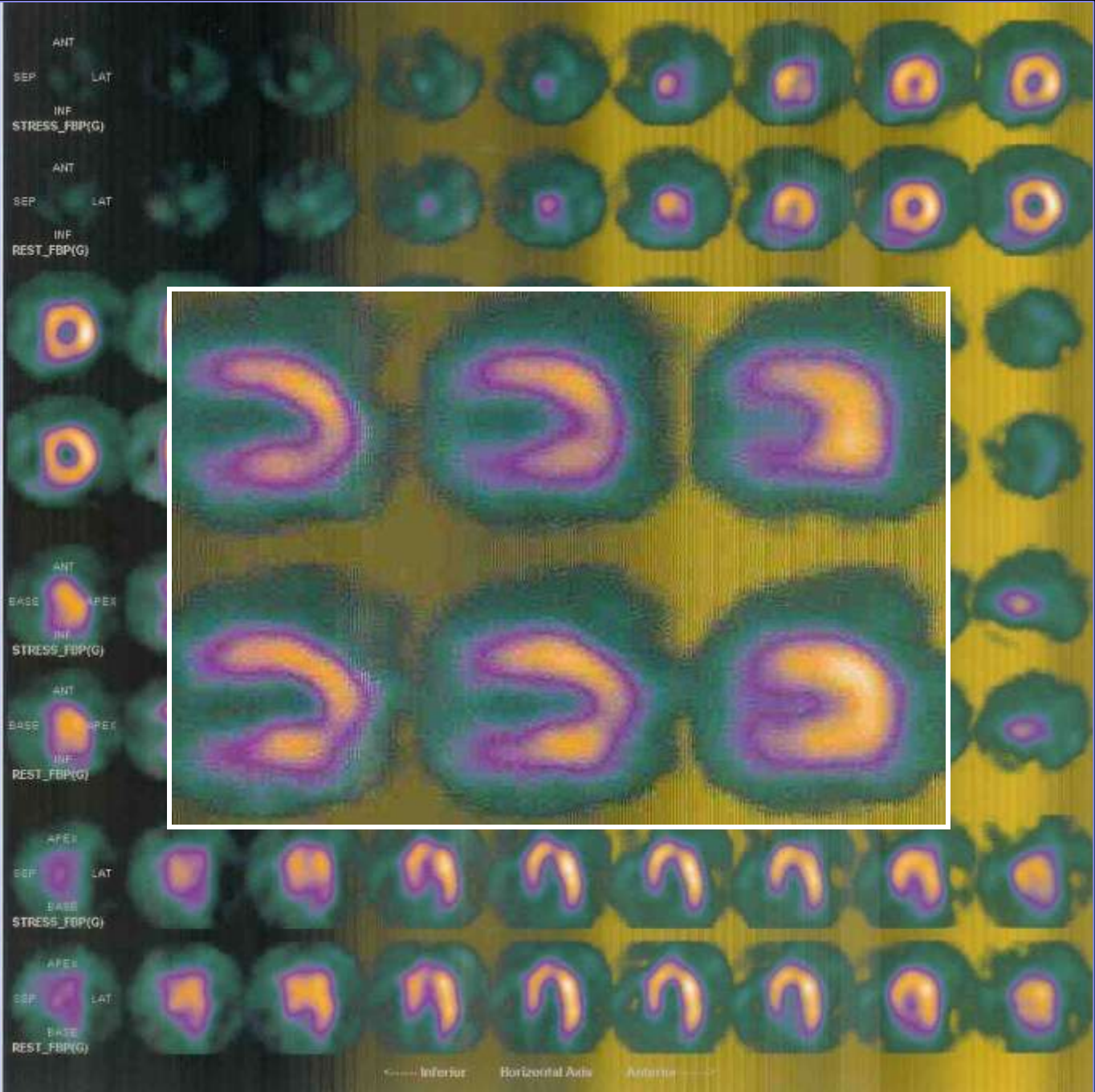
Exame Físico: normal

CONTROLES DURANTE ESFORÇO						CONTROLES - RECUPERAÇÃO (Passiva)		
Minutos	Carga	F.C.	P.A.	BORG	Observações	Minutos	F.C.	P.A.
3'	17   10%	131	160   80	11		1	129	160   80
3'	25   12%	150	-	17		2	110	150   80
3'	34   14%	156	-	19		4	92	140   80
						6	90	150   80



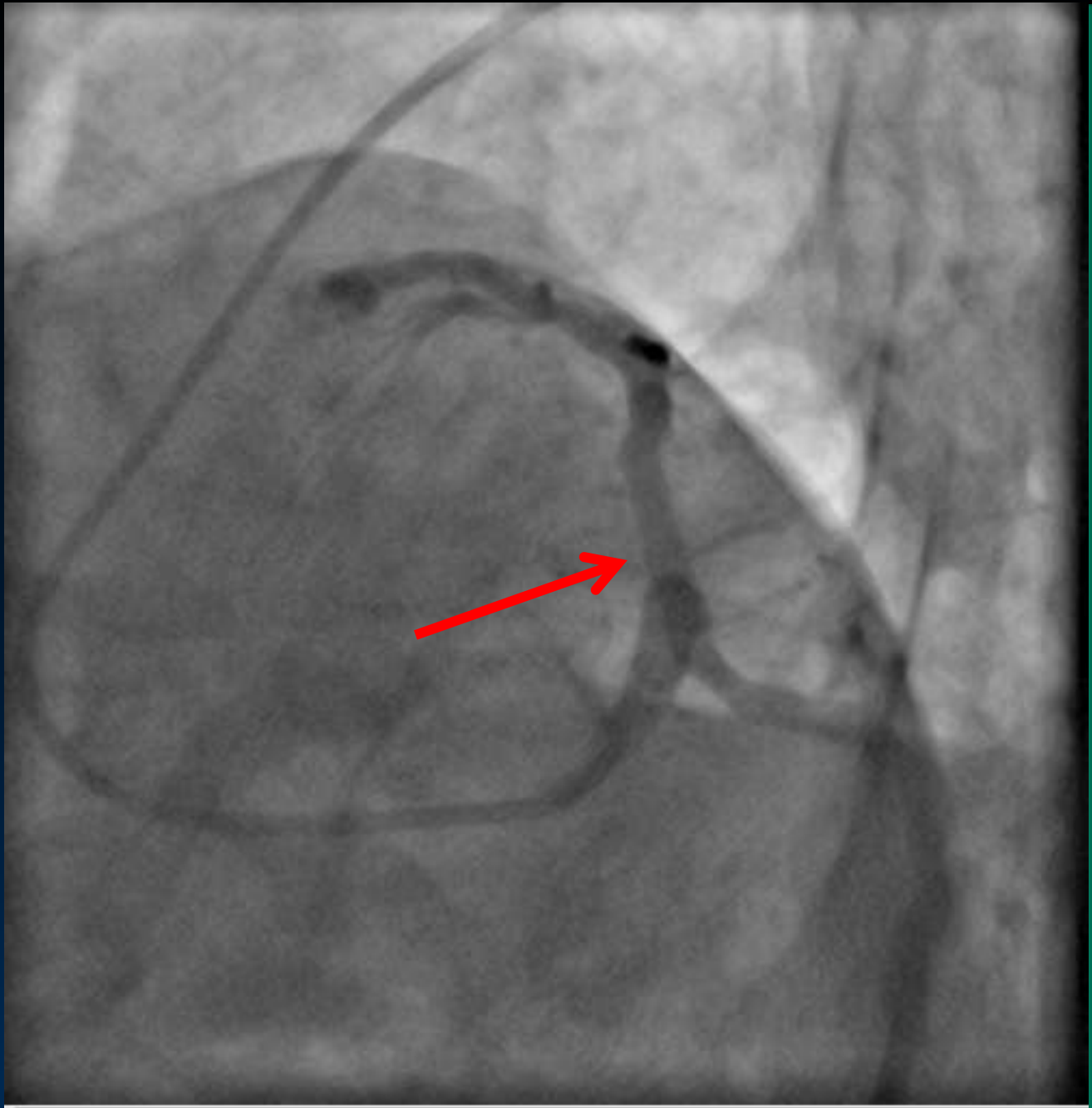






*1 ano após....*





# *ICP na Oclusão Coronária Crônica*

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- 1. Objetivo do Tratamento:**
- 2. Sintomas ou FVE?**
- 3. Isquemia/Viabilidade demonstradas**
- 4. Consideração Anatômica**

- Seleção Meticulosa

- Não são todas as oclusões que podem e precisam ser abertas!

- Procedimento Planejado!

*"Always show your superior judgment,  
so you don't have to show  
your superior skill".*

**W. Lombardi**



