

Advances in Thromboaspiration Devices- Primary PCI

CORONARY ARTERY DISEASE: PCI IN HIGH THROMBUS BURDEN

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Thromboaspiration Devices- Primary PCI

No tengo conflicto de interés



Thromboaspiration Devices- Primary PCI

Alta carga de trombo (HTB) en ICP incrementa la posibilidad de:

- Tasa de MACE post ICP.
- Trombosis del stent.
- Fenómeno de No Reflujo.

Consecuencias de No Reflujo:

- Menor supervivencia a 5 años.
- Incremento 3X en mortalidad y hospitalizaciones relacionadas a Insuficiencia cardíaca, en pacientes que desarrollan obstrucción microvascular.



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NO REFLOW DE LA CIUDAD DE MEXICO



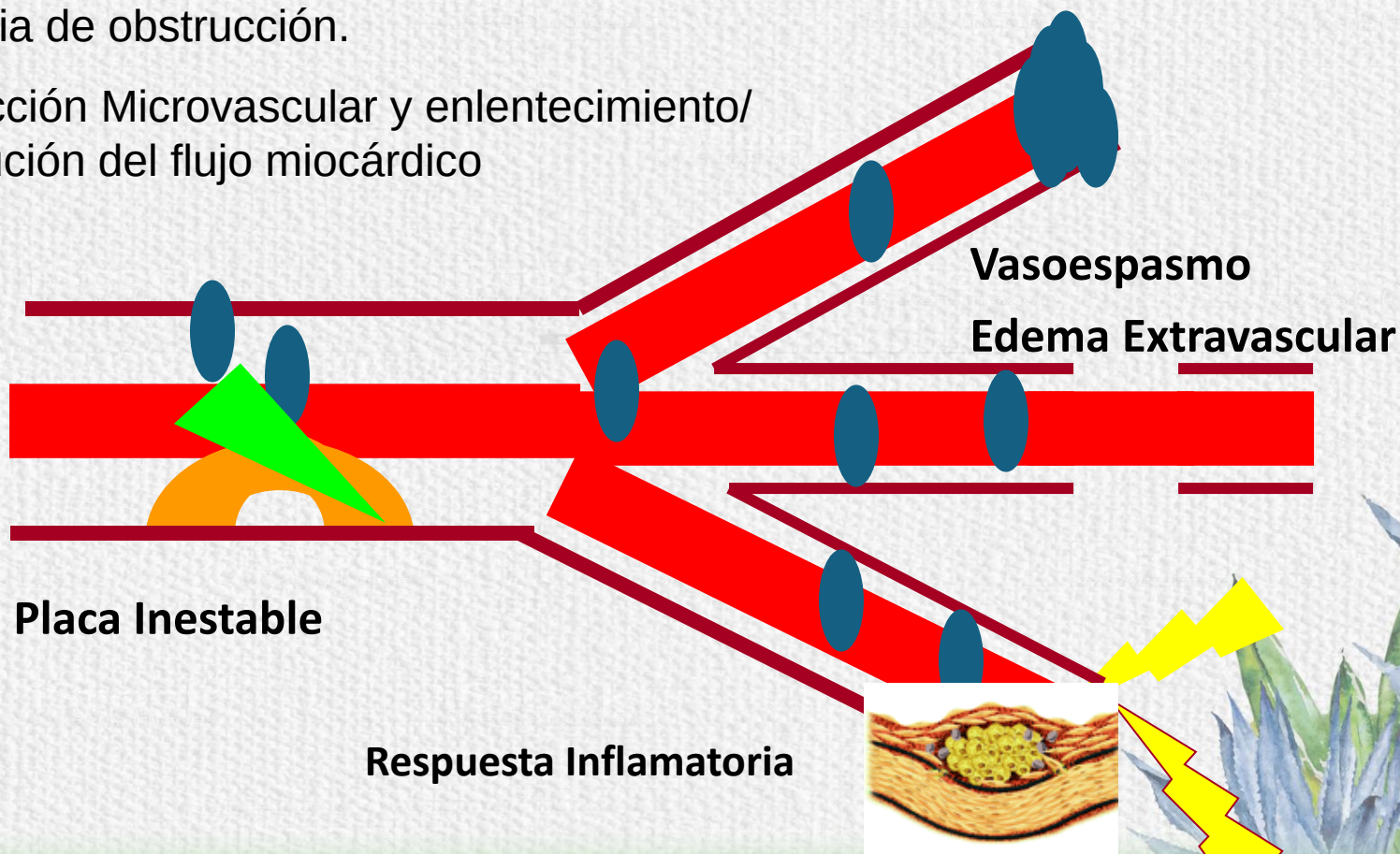
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FENOMENO DE NO REFLOW

Ausencia de obstrucción.

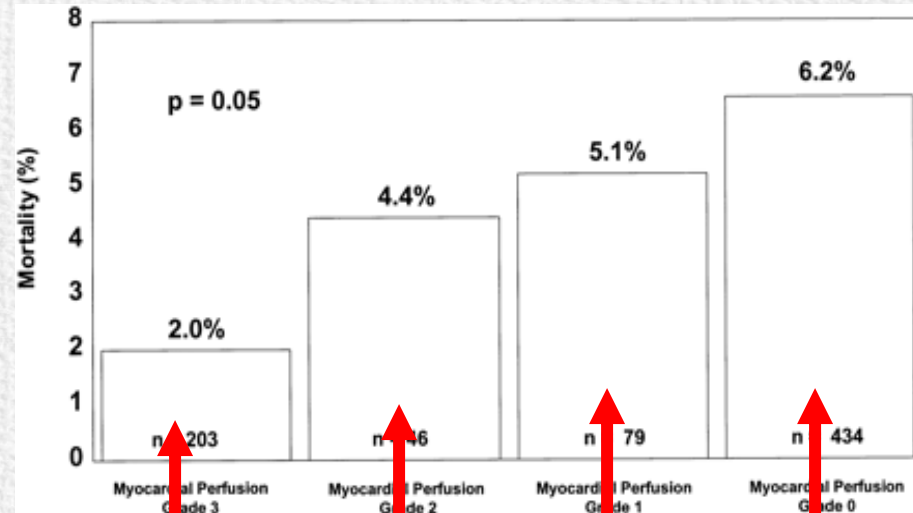
Obstrucción Microvascular y enlentecimiento/
disminución del flujo miocárdico

Tapones de plaquetas y GR



Thromboaspiration Devices- Primary PCI

IMPORTANCIA DEL FLUJO TIMI Y TMPG EN MORTALIDAD

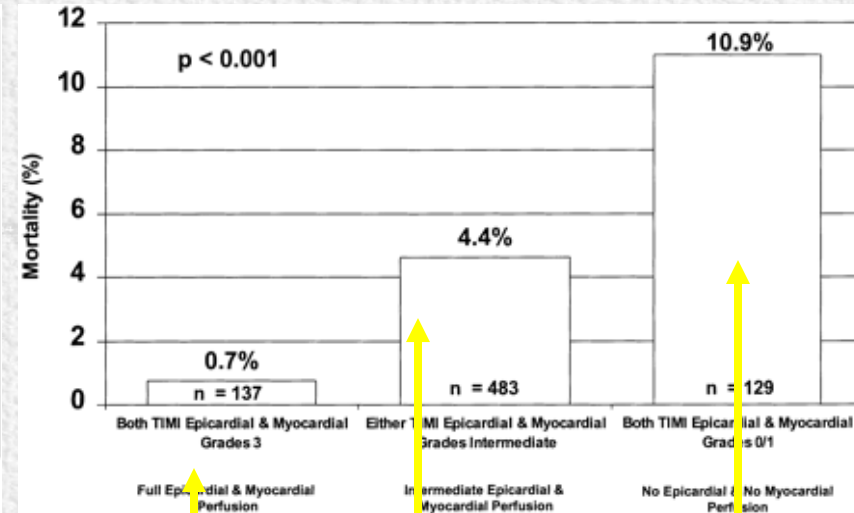


TMPG 3

2

1

0



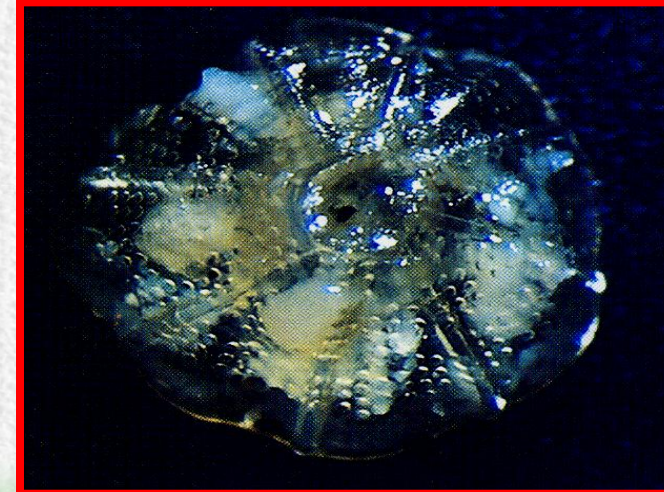
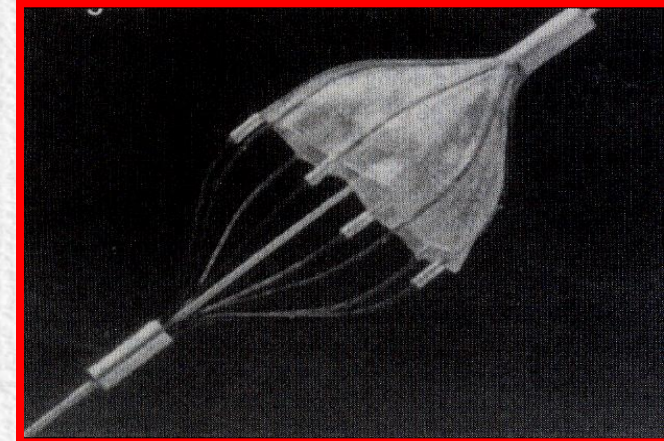
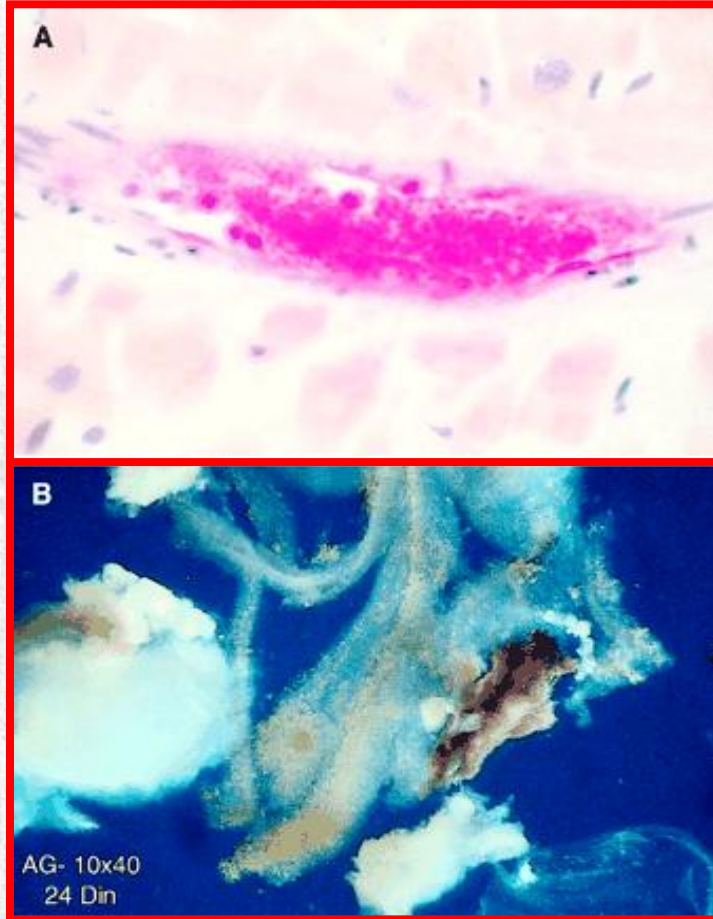
TIMI Y TMPG 0/1

TIMI Y TMPG INTERMEDIOS

TIMI Y TMPG NORMALES

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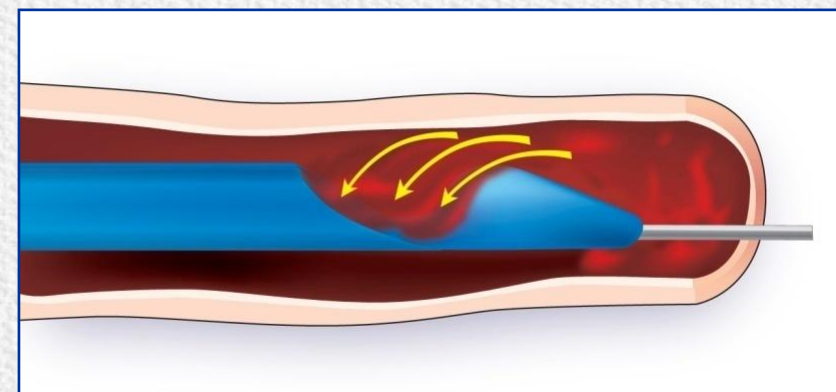
MATERIAL RECUPERADO DE EMBOLISMO DISTAL



Thromboaspiration Devices- Primary PCI

CATETER DE EXTRACCION PRONTO V3

- Simple
- Amigable
- Operador único
- Intercambio rápido
- Compatible 6 F

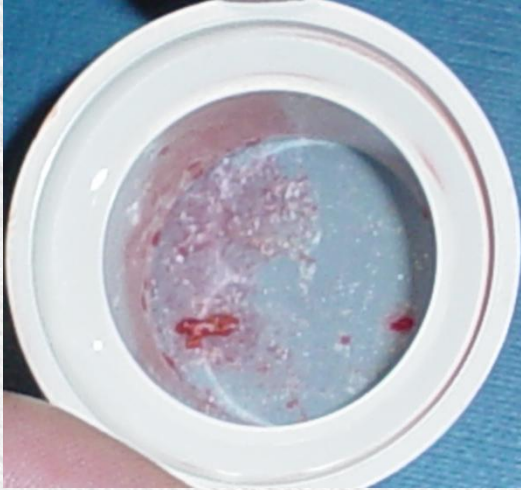


Protección de la pared vascular: (al avanzar y aspirar).

Mayor capacidad de aspiración: (Aspiración distal = Protección dinámica).

Buen perfil de cruce.

Thromboaspiration Devices- Primary PCI



Thromboaspiration Devices- Primary PCI

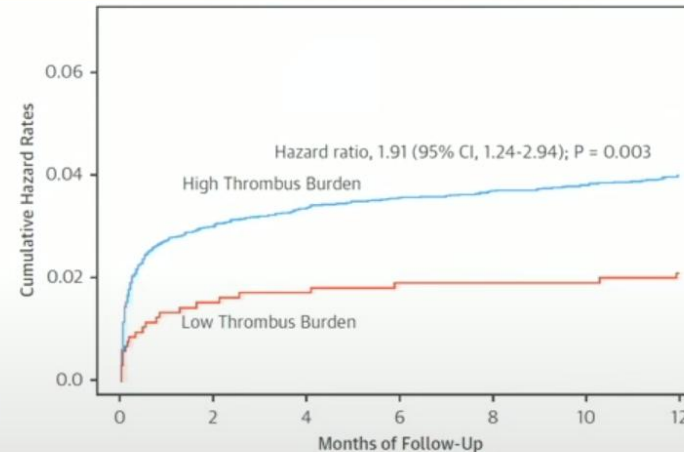
High thrombus burden

TOTAL

Routine manual thrombus aspiration vs. PCI alone in STEMI (n=10,732, HTB: n=8,983, 89%)

Jolly SS, et al., J Am Coll Cardiol. 2018;72(14):1589-1596.

KM CURV Mortalidad en pacientes con alta carga de trombo S BURDEN



↑ ≈2x

No. at Risk							
High Thrombus Burden	8,983	8,643	8,600	8,575	8,526	8,502	8,412
Low Thrombus Burden	1,073	1,046	1,043	1,040	1,038	1,036	1,020

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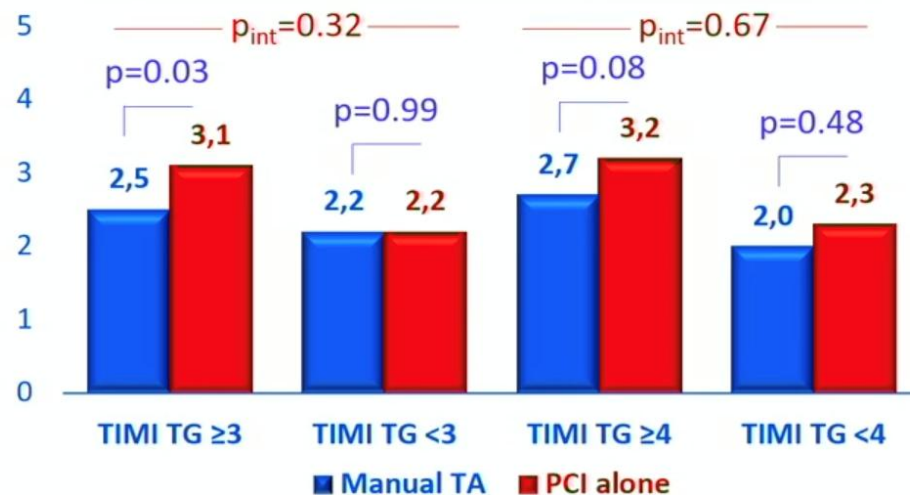
High thrombus burden

IPD META-ANALYSIS

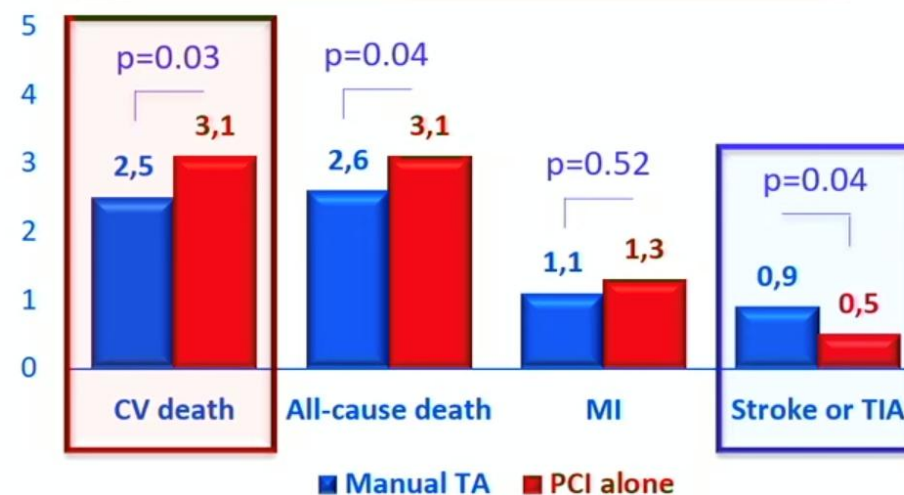
Routine manual thrombus aspiration vs. PCI alone in STEMI (3 trials, n=18,306)

Jolly SS, et al., *Circulation*. 2017;135(2):143-1521596.

Mortalidad a 30 días según carga de trombo



Eventos CVs con alta carga de trombo



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WHAT DOES EVIDENCE-BASED MEDICINE SAY?

Individual Patient Meta-Analysis of TAPAS, TASTE TOTAL enrolling 18 306 patients

	Thrombus aspiration	No aspiration	OR	95% CI	p
Primary efficacy endpoint:					
CV death 30 days	2.4%	2.9%	0.84	0.70–1.01	0.06
Primary safety endpoint:					
Stroke or TIA at 30 days	0.8%	0.5%	1.43	0.98–2.1	0.06

Jolly SS, et al. Circulation. 2017;135:143–152.

In high thrombus burden (TIMI ≥ 3) **fewer** CV deaths (2.5% vs 3.1%; OR 0.80; 95% CI 0.65–0.98; p=0.03) and **more** CVI/TIA (0.9% vs 0.5%; OR 1.56; 95% CI 1.02–2.42; p=0.04).

Potential benefit in patients with large thrombus burden if systemic embolization is prevented

europcr.com

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19047 pacientes incluidos en TASTE, TAPAS y TOTAL:

- Aspiración rutinaria de trombo en la ICP de IMEST no mejoró evolución.
- En el grupo de HTB, sugiere reducción de muerte CV, con aumento de EVC/ICT, racional para futuros estudios con nuevas tecnologías.



Thromboaspiration Devices- Primary PCI

Recommendations for technical aspects of invasive strategies

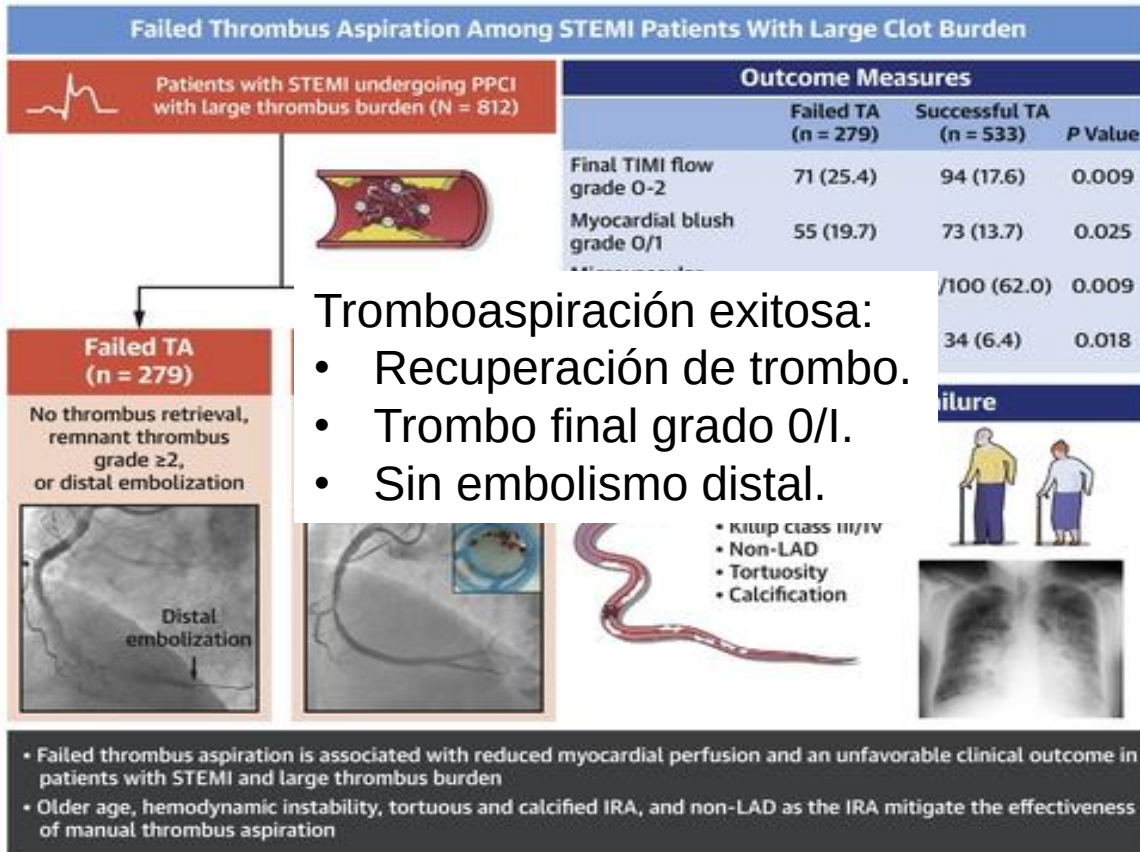


Recommendations (continued)

	Class	Level
Intravascular imaging (preferably optical coherence tomography) may be considered in patients with ambiguous culprit lesions.	IIb	C
The routine use of thrombus aspiration is not recommended.	III	A

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CENTRAL ILLUSTRATION: Definitions, Predictors, and Outcomes of Failed or Successful Thrombus Aspiration



Jeon HS, et al. JACC Cardiovasc Interv. 2024;17(19):2216-2225.

JACC: CARDIOVASCULAR INTERVENTIONS

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VOL. 17, NO. 19, 2024

ORIGINAL RESEARCH

CORONARY

Failed Thrombus Aspiration and Reduced Myocardial Perfusion in Patients With STEMI and Large Thrombus Burden

Ho Sung Jeon, MD,^a Young In Kim, MD,^a Jung-Hee Lee, MD, PhD,^a Young Jun Park, MD,^a Jung-Woo Son, MD,^a Jun-Won Lee, MD, PhD,^a Young Jin Youn, MD, PhD,^a Min-Soo Ahn, MD, PhD,^a Jang-Young Kim, MD, PhD,^a Byung-Su Yoo, MD, PhD,^a Sung Min Ko, MD, PhD,^{b,*} Sung Gyun Ahn, MD, PhD^{a,*}

Conclusions

TA failure is associated with reduced myocardial perfusion in patients with STEMI and LTB. Advanced age, hemodynamic instability, hostile coronary anatomy such as tortuosity or calcification, and non-left anterior descending coronary artery status might attenuate TA performance.

2025: ¿Dónde estamos?

La Alta Carga de Trombo (HTB) durante ICP I para IMEST se asocia con riesgo aumentado de muerte CV.

El manejo óptimo de HTB durante ICP I en pacientes con IMEST sigue siendo un reto y una necesidad clínica no cubierta.

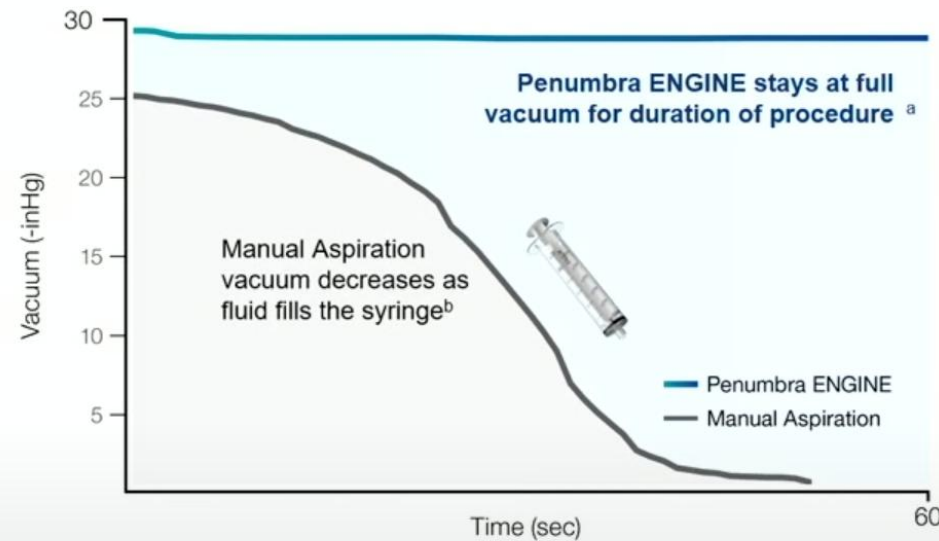
La evidencia sugiere beneficios clínicos potenciales de la trombectomía manual comparada con ICP sola en pacientes con HTB, a costo de riesgo aumentado de ICT/EVC; revelando la necesidad de nuevos dispositivos de aspiración de trombo para mejorar el pronóstico en pacientes con IMEST.

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3/24

Power Aspiration vs. Manual Aspiration



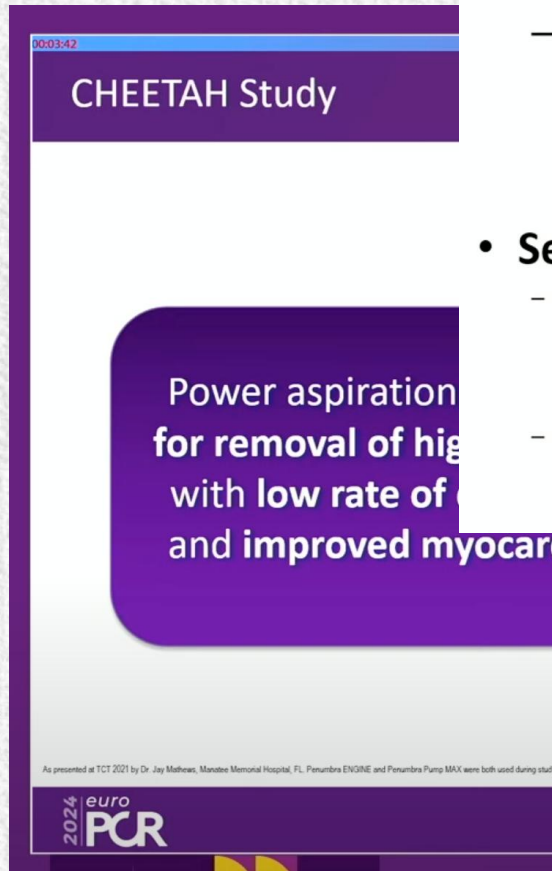
112%

more aspiration efficiency compared with a syringe^c

-29 in Hg^a



Thromboaspiration Devices- Primary PCI



- **Primary Endpoint:**

- Major Adverse Cardiovascular Events, a composite of 30 day cardiovascular death, recurrent myocardial infarction, cardiogenic shock, or new or worsening New York Heart Association Class IV heart failure

- **Secondary Endpoints:**

- **Procedure:**
 - Final TIMI Flow Grade
 - Final TIMI Thrombus Grade
 - Myocardial Blush Grade
 - Distal Embolization Rate
- **Within 30 days:**
 - Stroke
 - Major Bleeding
- **Within 180 days:**
 - Stent Thrombosis
 - All-Cause Mortality
 - Cardiovascular Death
 - Recurrent MI
 - Cardiogenic Shock
 - Class IV Heart Failure
 - Incident of Device Related SAEs

- **Objective:**

- Demonstrate the safety and performance of the Indigo Aspiration System using the CAT **RX** aspiration catheter in a population presenting with acute high thrombus burden coronary vessel occlusion who are referred for Percutaneous Coronary Intervention (PCI)

- **Design:**



Prospective Study



400 Patients



25 Sites



High Thrombus Burden in ACS

- **Study Population:**

- Frontline treatment with Indigo Aspiration System using the CAT **RX** Aspiration Catheter, prior to PCI

Thromboaspiration Devices- Primary PCI

Estudio CHEETAH

Primary Composite Endpoint Met
Safe in High-Risk Patient Population

96.5%

Freedom from MACE
at 30 days^a

0

Device related SAEs
(including stroke^b)

Successful Thrombus Removal

High Rates of Flow Achieved

Core lab adjudicated

85%

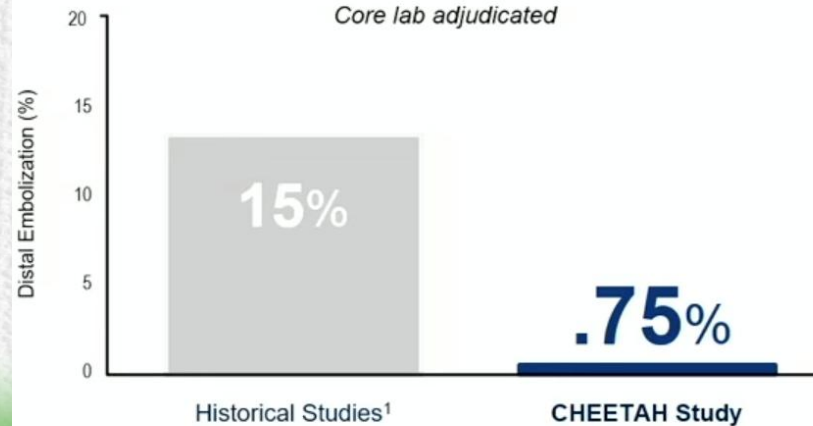
TIMI 2–3 flow
post CAT **RX**

97.5%

TIMI 3 flow at
final angiography

Low Distal Embolization Rate

Core lab adjudicated



Improved Myocardial Perfusion

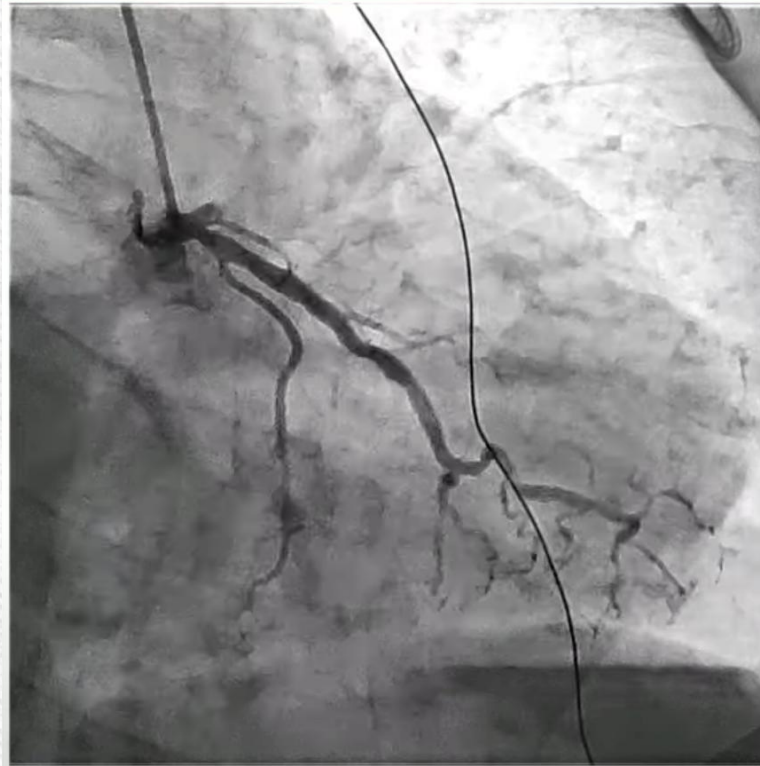
Core lab adjudicated

Achieving high myocardial blush grade (MBG 3) during PCI has been associated with improved outcomes in acute MI²

99.8% of patients with MBG 3
at final angiography

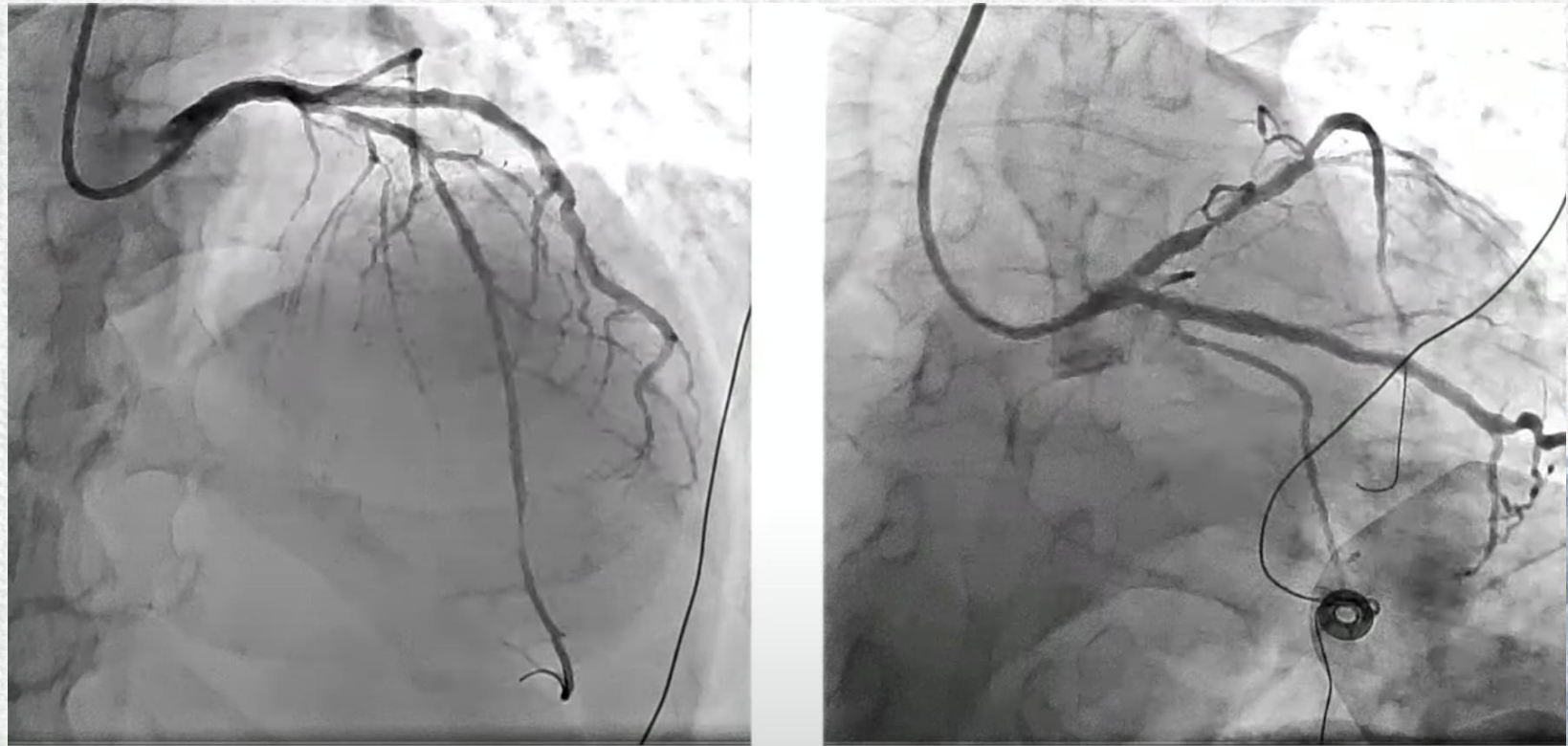
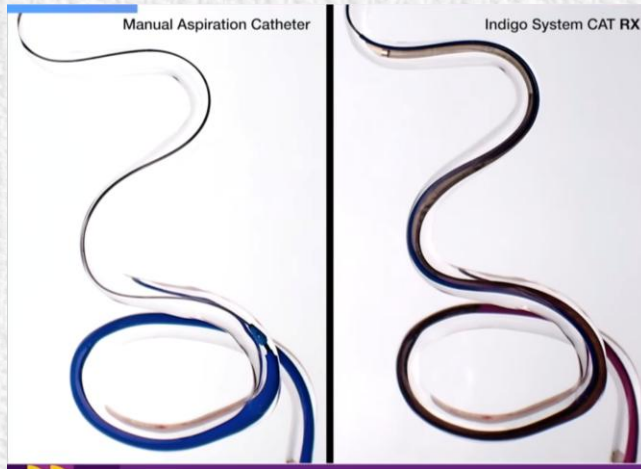
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Femenino 76 años,
DM, HTA, Hipercolesterolemia.
Dolor precordial anginoso de 6 hrs.
Elevación ST en V1-4, DI y aVL.



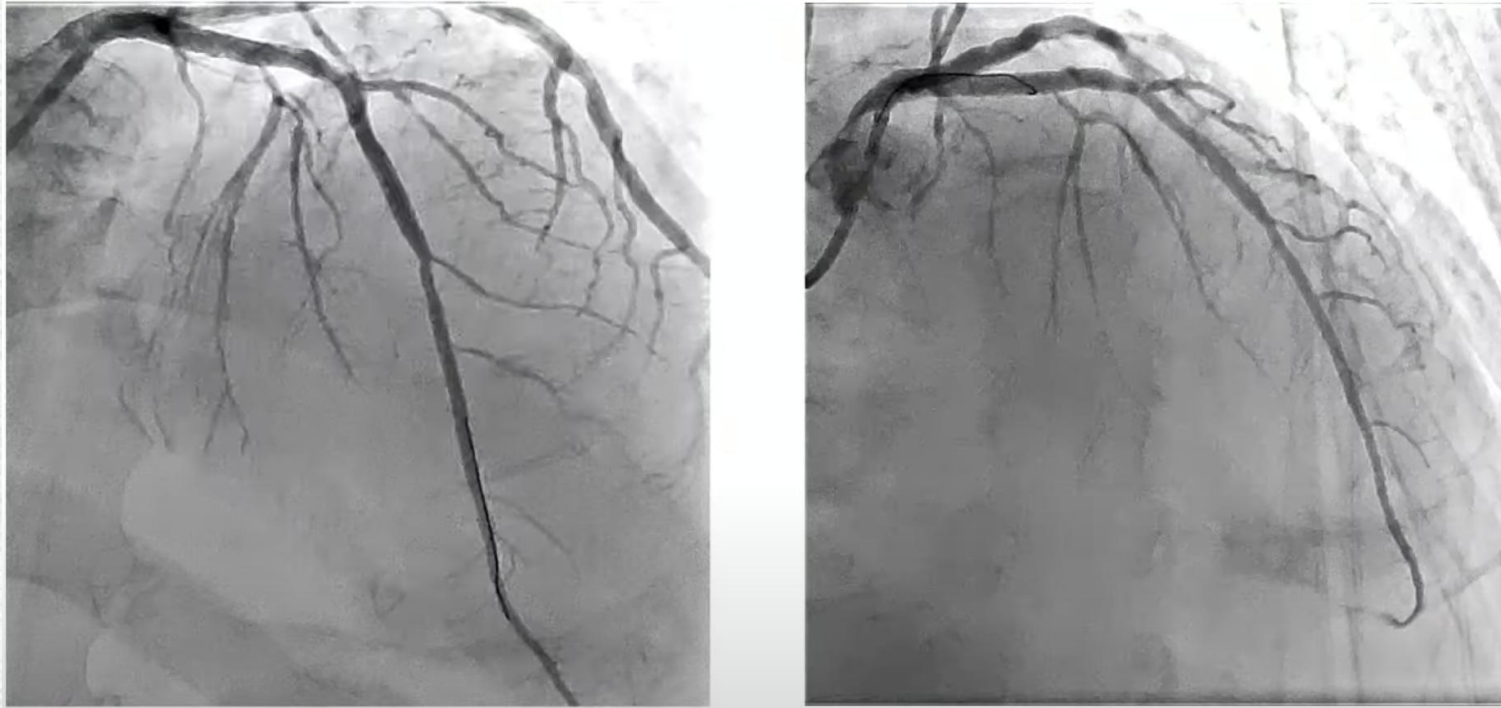
Thromboaspiration Devices- Primary PCI

CAT RX Aspiration System setup (Penumbra Inc., CA, USA)



Post CAT RX segundo paso

Thromboaspiration Devices- Primary PCI



Resultado final post stent

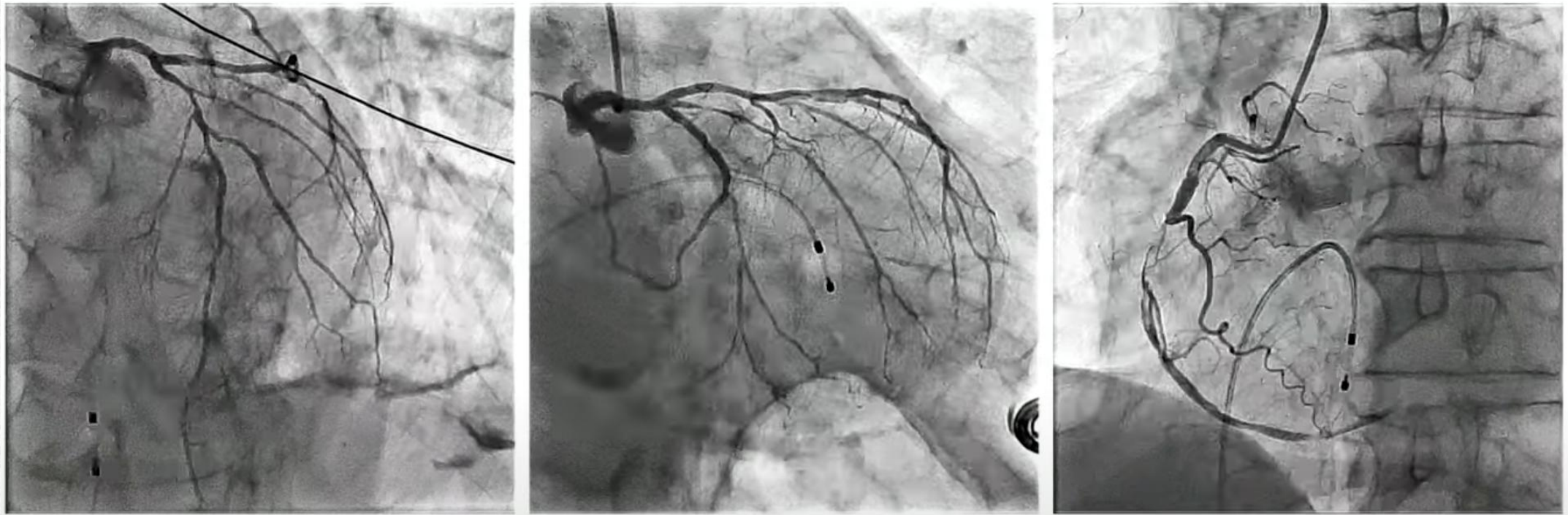


Thromboaspiration Devices- Primary PCI

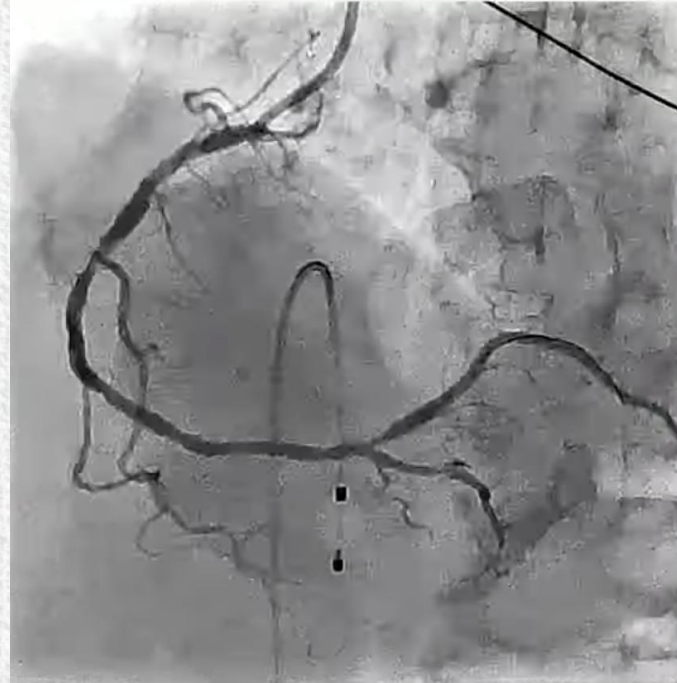
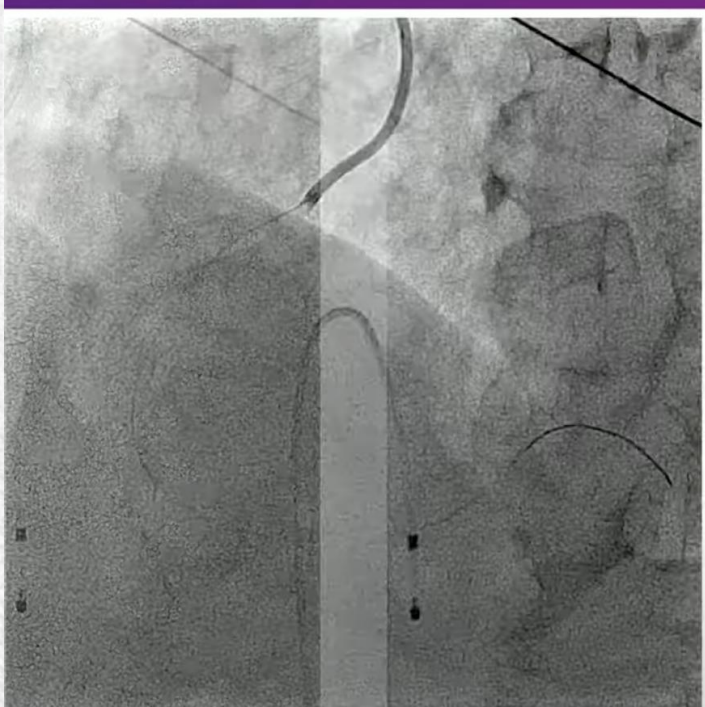


Thromboaspiration Devices- Primary PCI

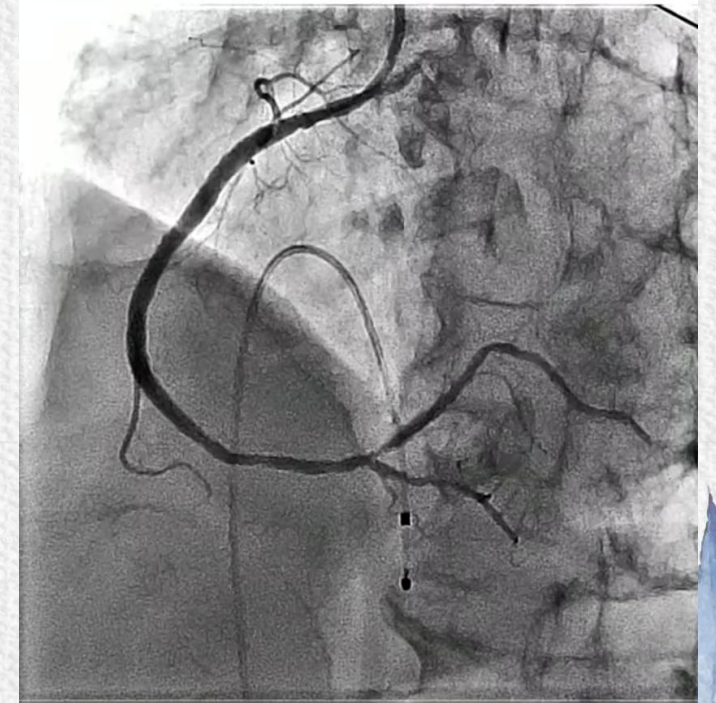
Masculino 65 años, IMEST posteroinferior en evolución: Angiografía diagnóstica.



Thromboaspiration Devices- Primary PCI



Post CAT RX un paso



Resultado final post stent

Thromboaspiration Devices- Primary PCI

JACC: ADVANCES

VOL. 4, NO. 7, 2025

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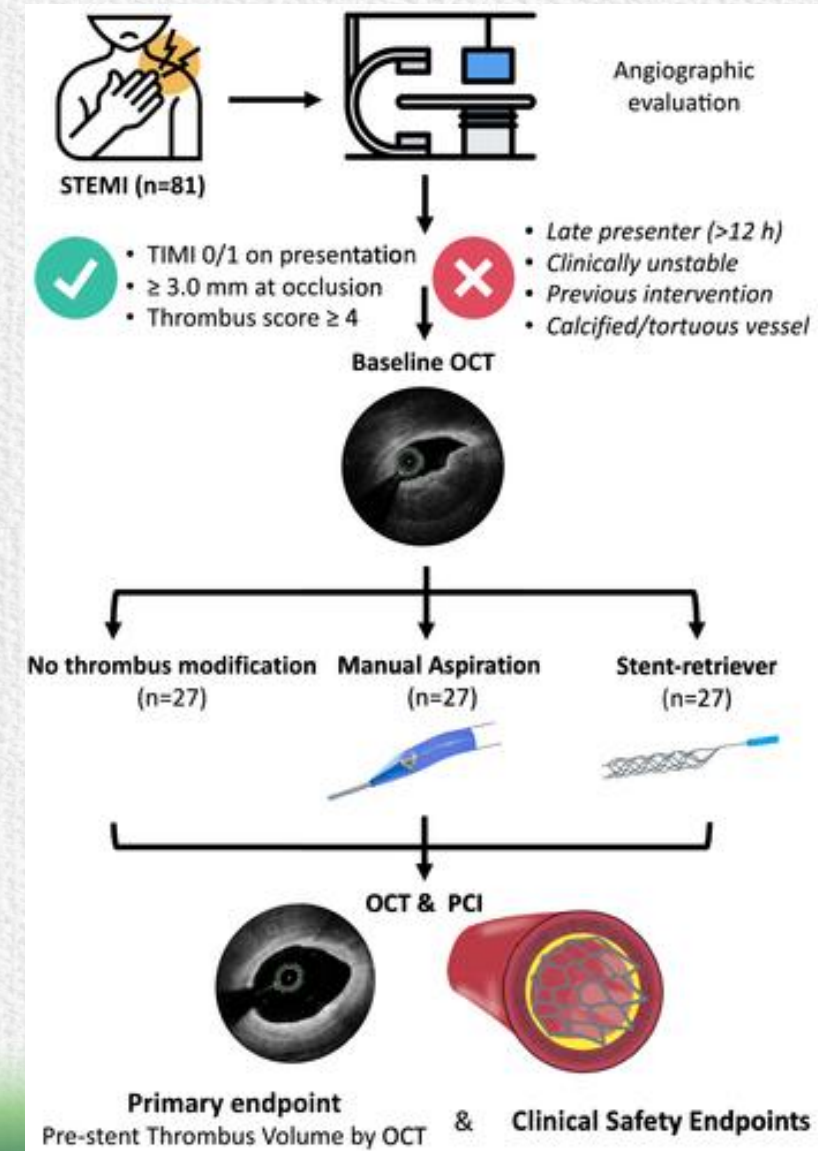
ORIGINAL RESEARCH

EMERGING TECHNOLOGIES AND INNOVATIONS

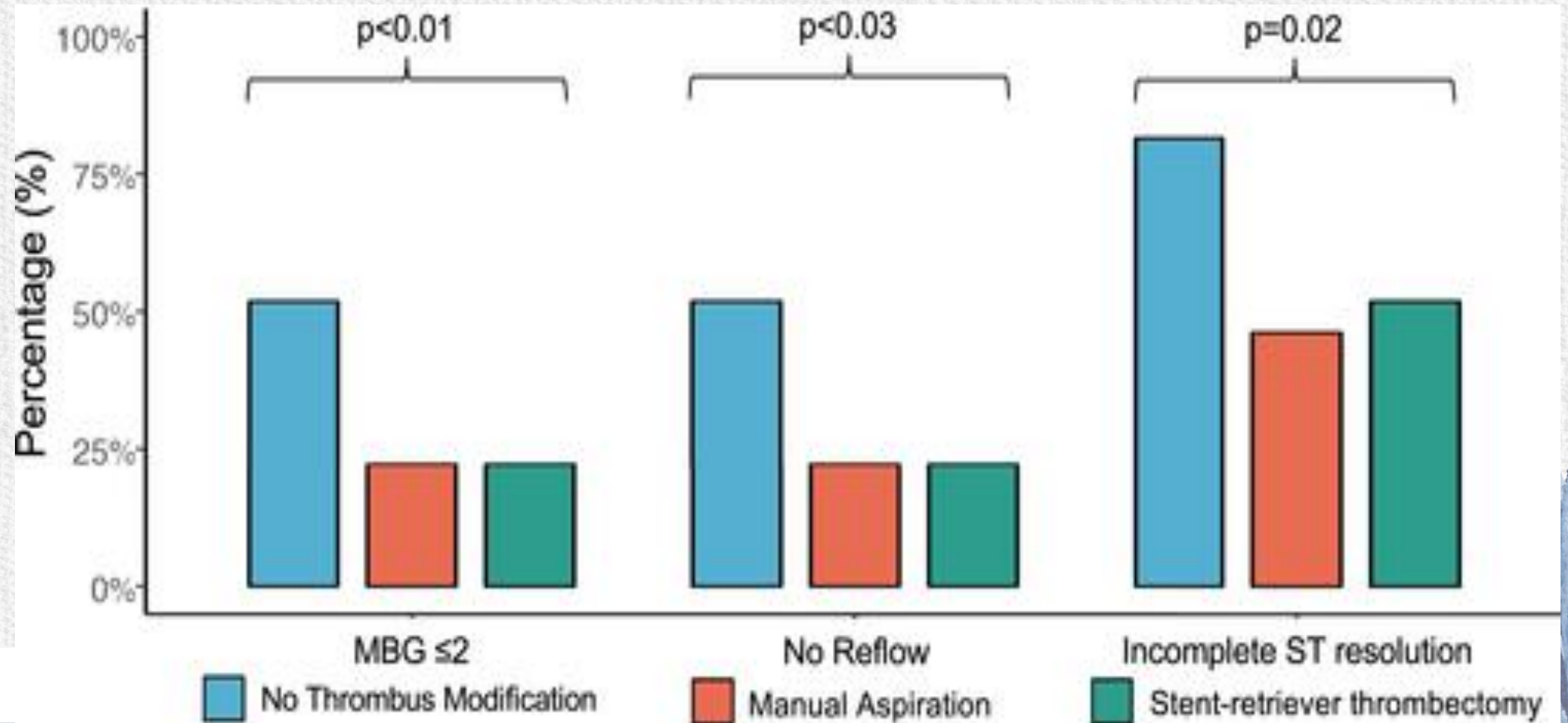
Stent-Retriever Thrombectomy in STEMI With Large Thrombus Burden

The RETRIEVE AMI Randomized Trial

Rafail A. Kotronias, MBChB, MSc,^{a,b,*} Jason L. Walsh, MBChB,^{a,b,*} Stefano Andreaggi, MD,^a Leonardo Portolan, MD,^{a,b} Alessandro Maino, MD,^{a,b} Federico Marin, MD,^a Jason Chai, MBChB,^a Ikboljon Sobirov, MSc,^b Muhammad Sheikh, MD,^a Thomas J. Cahill, MBBS, DPhil,^a Andrew J. Lucking, MBChB, PhD,^a Max Costello, BSc,^a Eva Fraile Moreno, MScNurs,^a Vrinda Haridas, BNurs,^a Anisha Shaji, BNurs,^a Hector M. Garcia-Garcia, MD, PhD,^c Keith M. Channon, MBChB, MD,^{a,b} Adrian P. Banning, MBChB, MD,^{a,b} Jeremy P. Langrish, MBChB, PhD,^a Giovanni Luigi De Maria, MD, PhD,^{a,b} the OXAMI and RETRIEVE AMI Investigators

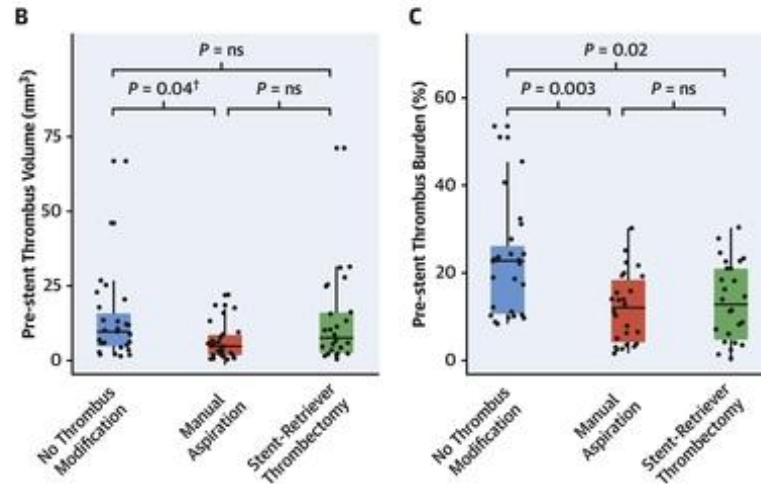


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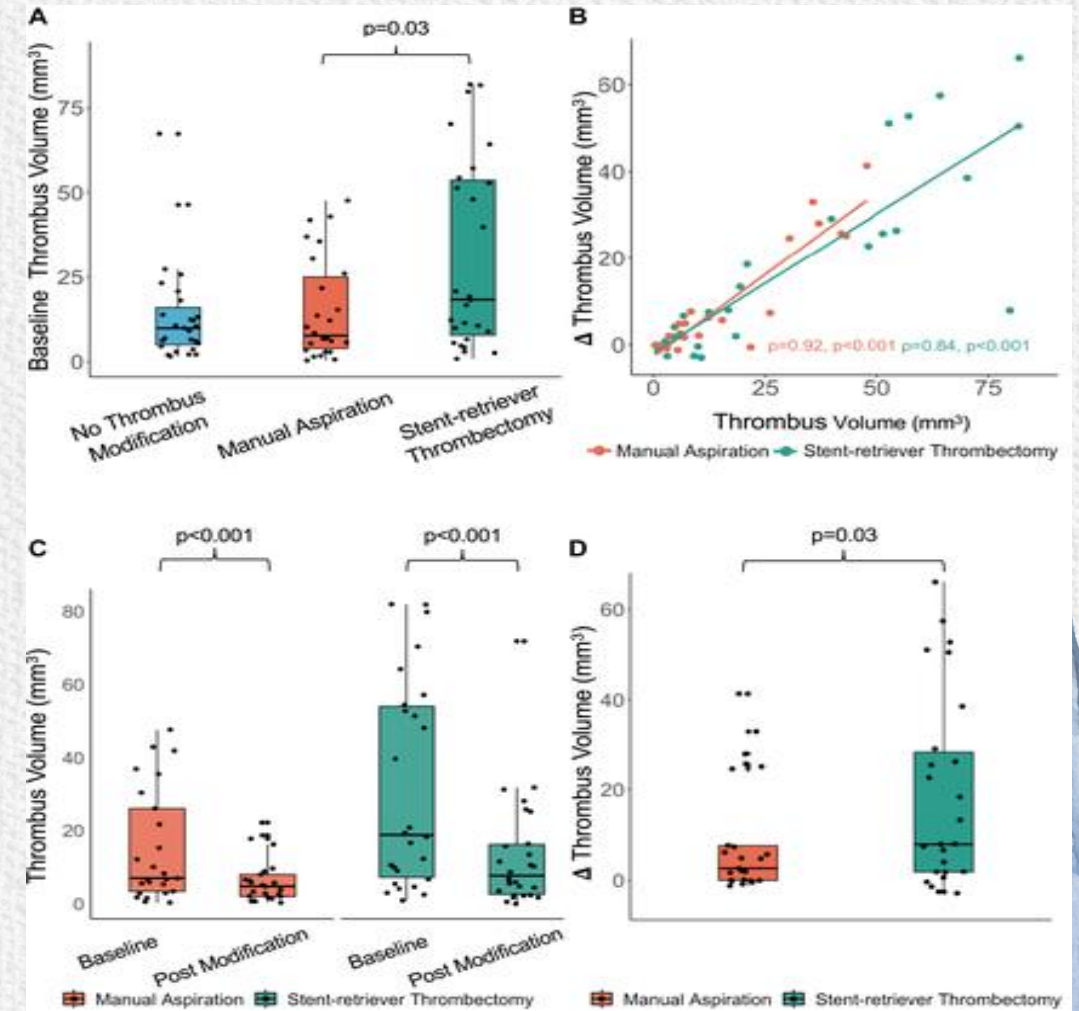


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CENTRAL ILLUSTRATION: Comparison of Stent-Retriever Thrombectomy and Manual Aspiration in LTB STEMI



Kotronias RA, et al. JACC Adv. 2025;4(7):101893.



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COMPETENCY IN MEDICAL KNOWLEDGE: RETRIEVE AMI is the first randomized trial to establish the safety and feasibility of SRT in STEMI patients with large thrombus burden. Despite not finding differences in pre-stent thrombus volume with SRT, the study demonstrates the capacity of SRT in extracting larger volumes of thrombus compared to manual aspiration thrombectomy, as assessed by OCT. Finally, thrombus modification is associated with improved myocardial perfusion.

COMPETENCY IN PRACTICE BASED LEARNING: TIMI thrombus grade often overestimates thrombus burden when compared to evaluations performed using OCT.

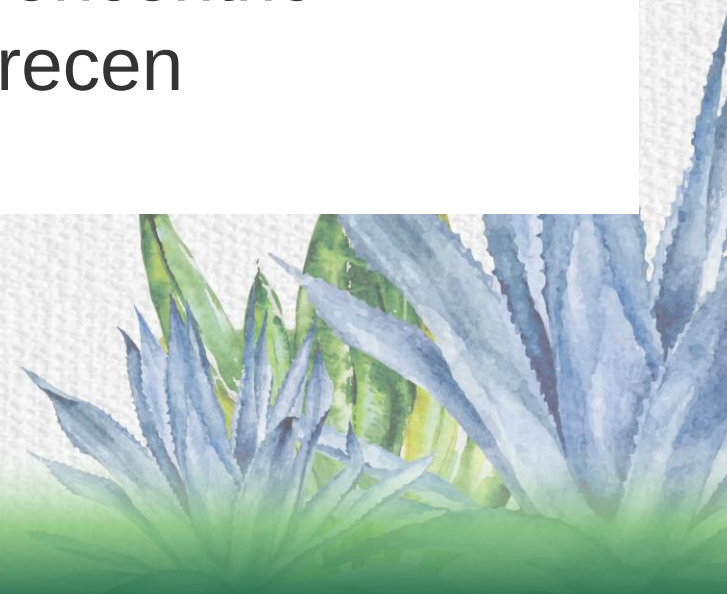
TRANSLATIONAL OUTLOOK: Future research should focus on refining thrombus modification strategies for STEMI, integrating intravascular imaging to improve patient selection.

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Dispositivos de aspiración “sostenida” tienen menor riesgo de EVC, son más efectivos y seguros.

El dispositivo Indigo CAT RX device (Penumbra), con aspiración mecánica continua, parece prometedor.

Los stent retrievers desarrollados para EVC (NeVA MTD [Vesalio], Solitaire Platinum [Medtronic], Trevo XP or Pro 4 [Concentric Medical], ERIC Retrieval Device [MicroVention]) parecen prometedores.



Thromboaspiration Devices- Primary PCI

POR DEFINIR:

Aspiración de trombo en STEMI;

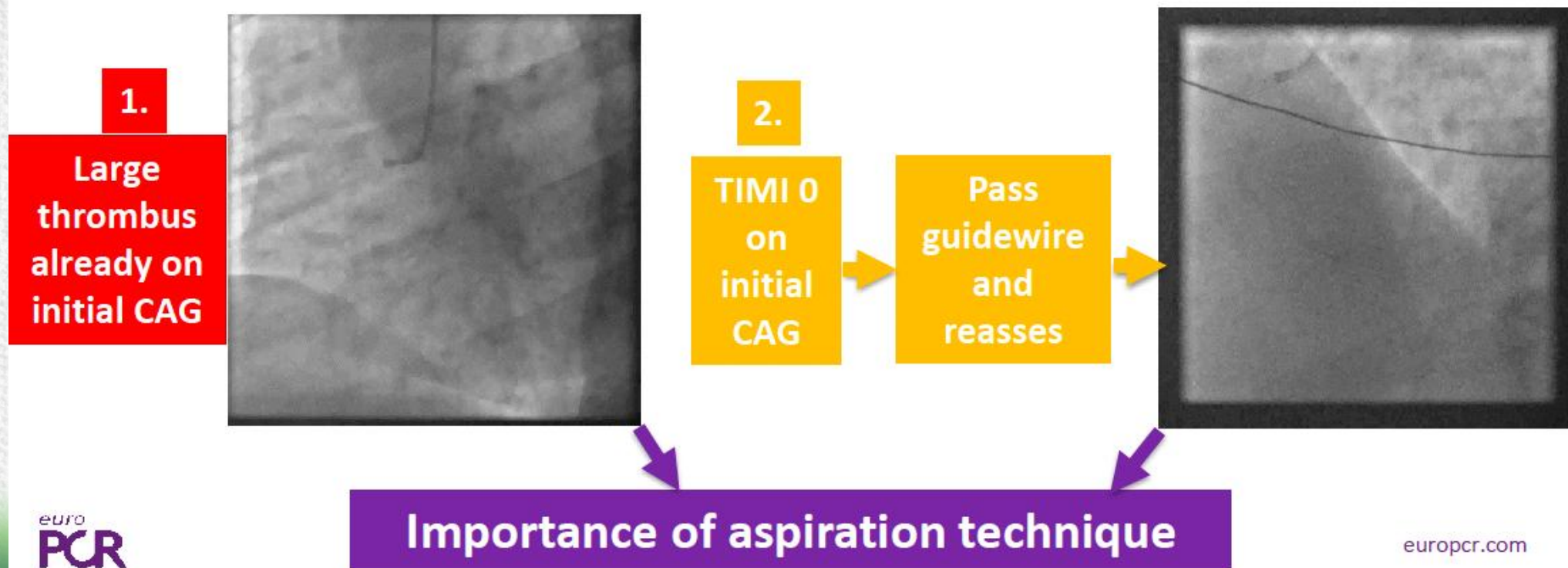
- Hacerlo de rutina Vs. “HTB”.
- Todo dispositivo, aumenta el riesgo.
- Evaluación de EVC:
 - Tiempo para EVC o ICT no analizado.
- Cantidad de trombo antes o después de la guía.
- Sin capacidad de definir reducción de mortalidad a 30 días.



Thromboaspiration Devices- Primary PCI

MY CLINICAL PRACTICE?

- I do not routinely aspirate-only if significant thrombus present
- How do I estimate thrombus burden ?

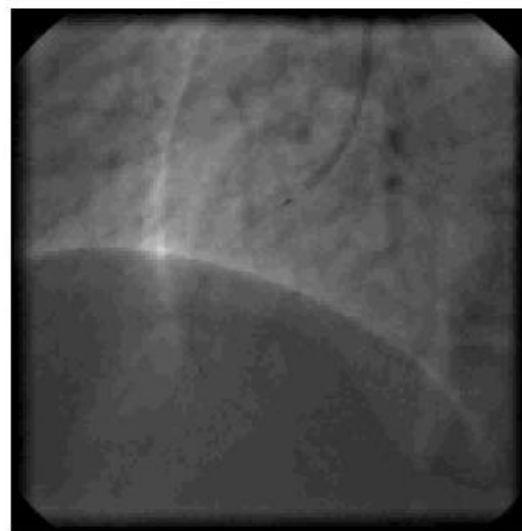


Thromboaspiration Devices- Primary PCI

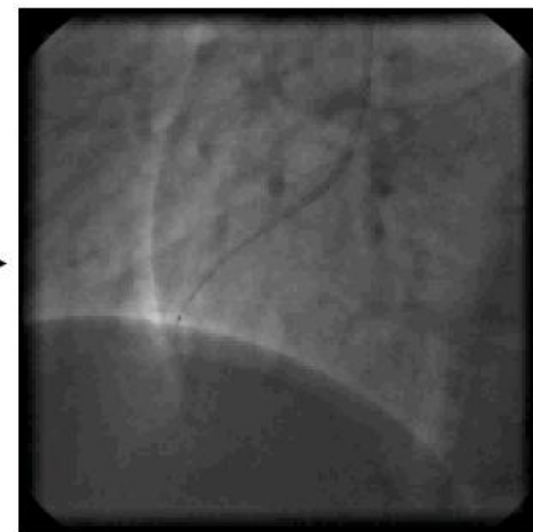
HOW TO MAKE ASPIRATION SAFE AND EFFECTIVE?

- Appropriate guide selection to allow good engagement
- No side holes
- Consider 7 Fr if large vessel/thrombus
- Control guide position in the ostium during entire procedure to avoid systemic embolization

„Anterograde“ aspiration
starting before thrombus



„Retrograde“ aspiration
from the „bottom to top“



Thromboaspiration Devices- Primary PCI

TIPS AND TRICKS DURING ASPIRATION

- Observe backflow in the syringe



No backflow ?

Gradually pull back aspiration catheter, if flow reappears, continue with aspiration

If still no flow, maintain negative pressure in the syringe and completely remove aspiration catheter from the guide

- No backflow-no suction-no aspiration-distal embolization if catheter is pushed forward

Thromboaspiration Devices- Primary PCI

AFTER REMOVAL OF ASPIRATION CATHETER ?

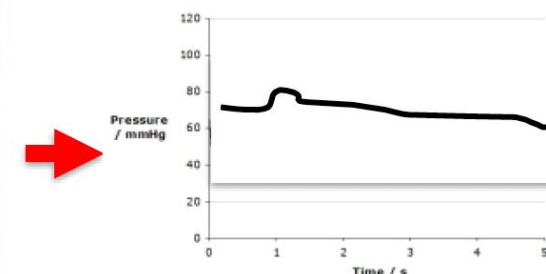
Flush aspiration catheter and observe for thrombus



Check for the thrombus in the guide-allow «back-bleed» and check pressure tracing before any further injection



No back-bleed/pressure dumping-aspirate or remove the guide and flush



Thromboaspiration Devices- Primary PCI

CONCLUSIONES:

El manejo de Carga Alta de Trombo es complejo.

El uso rutinario de tromboaspiración no esta indicado;
puede ser útil en casos seleccionados.

Requiere técnica meticulosa.

Nuevos dispositivos con resultados alentadores.

Esperar estudios clínicos aleatorizados para pacientes
con HTB.

¡MUCHAS GRACIAS!



Thromboaspiration Devices- Primary PCI

