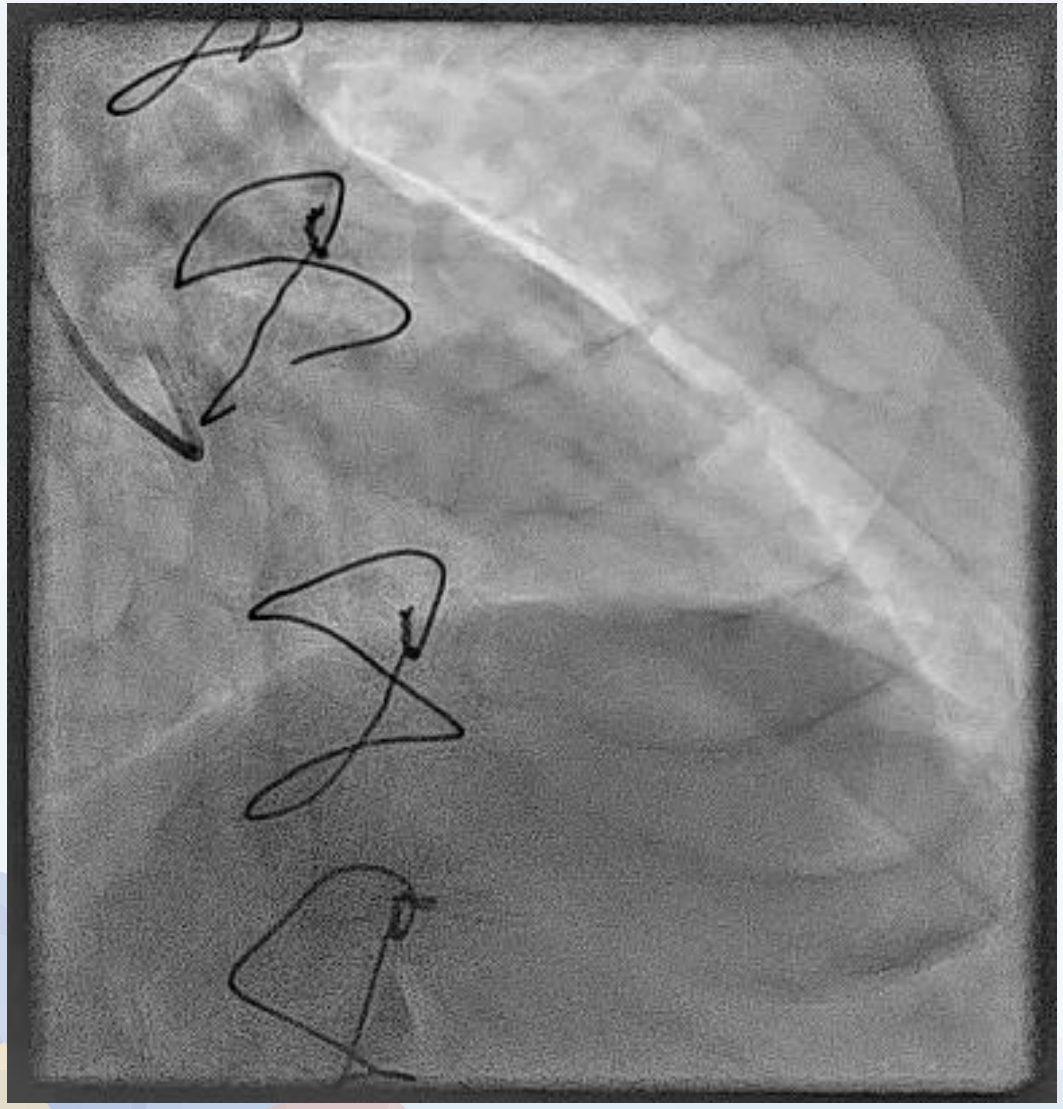
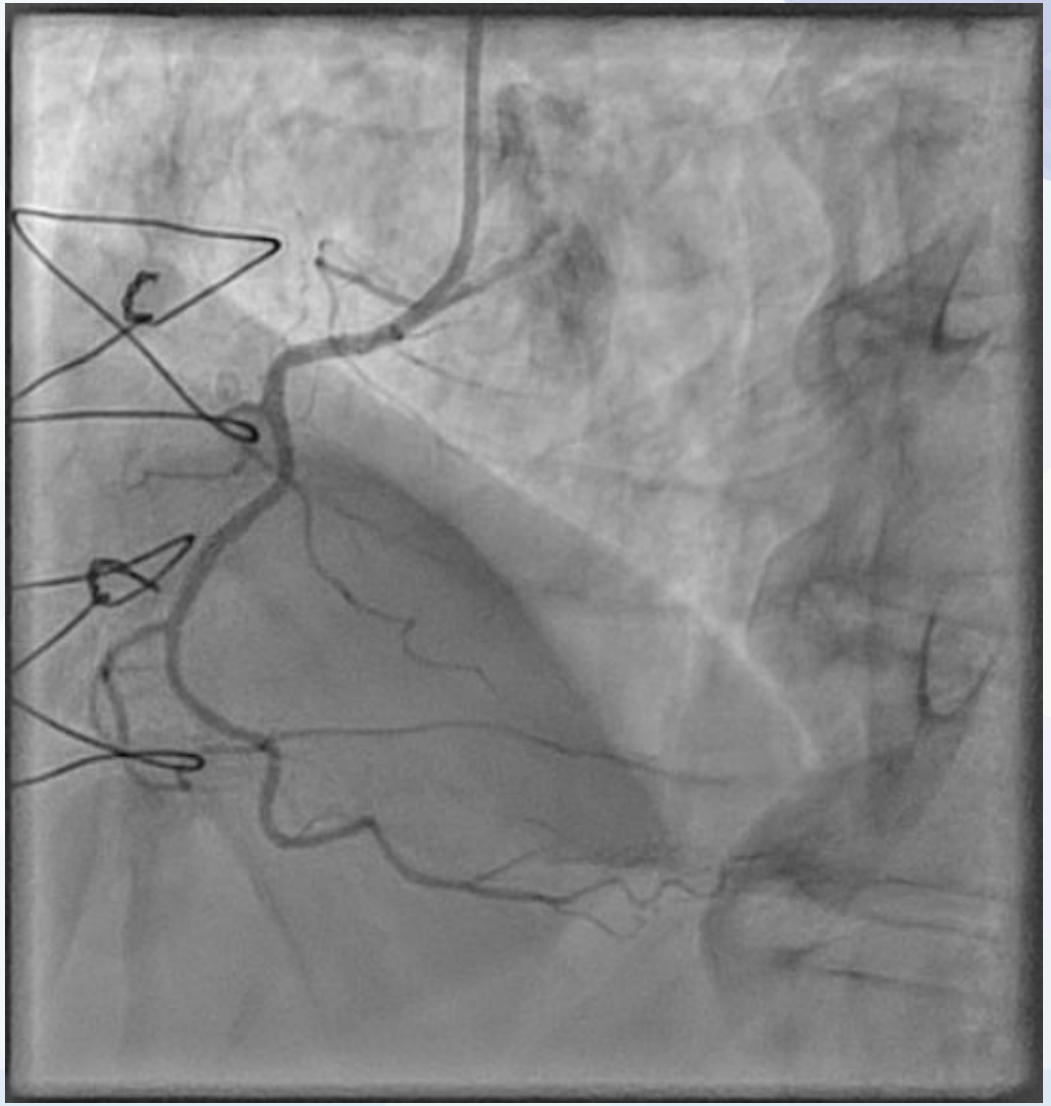
QUÉ HACER Y CÓMO RESOLVER

IAM y shock cardiogénico

Paula Vela Martín y Juan Francisco Oteo Domíngue
Hospital Universitario Puerta de Hierro

Octubre 2024





Diciembre 2021

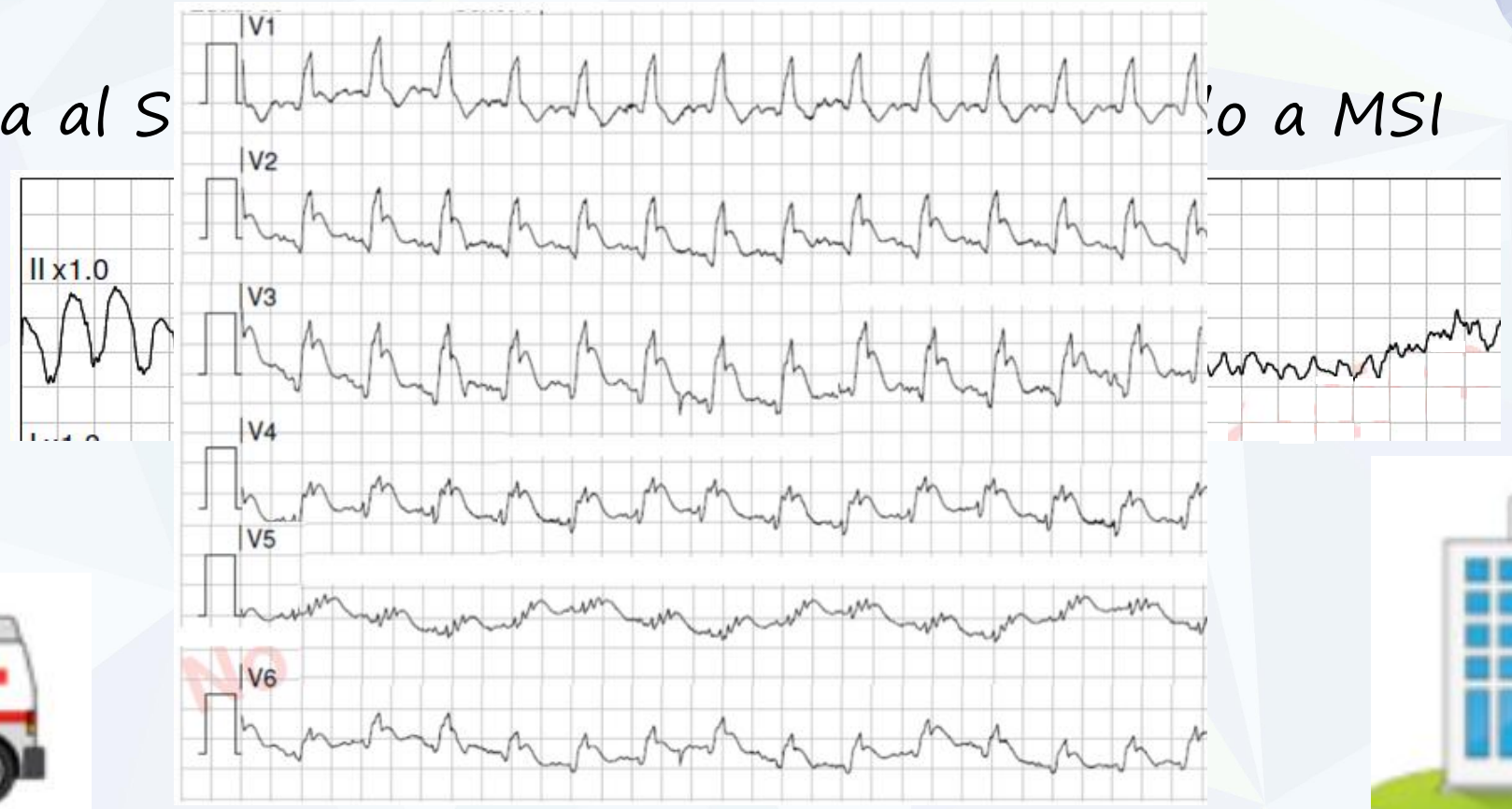
Varón 55 años
Fumador
No HTA, no DM, no DL conocidas
No antecedentes médicos de interés

Padre fallecido a los 74 años por IAM

9 de diciembre 2021

Avisa al S … o a MSI

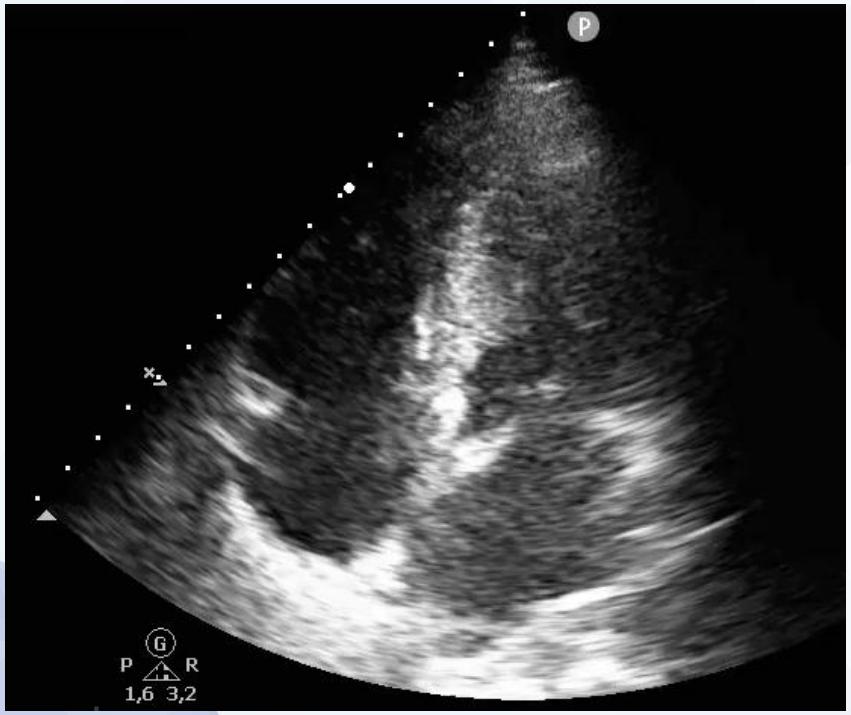
SUMMA:

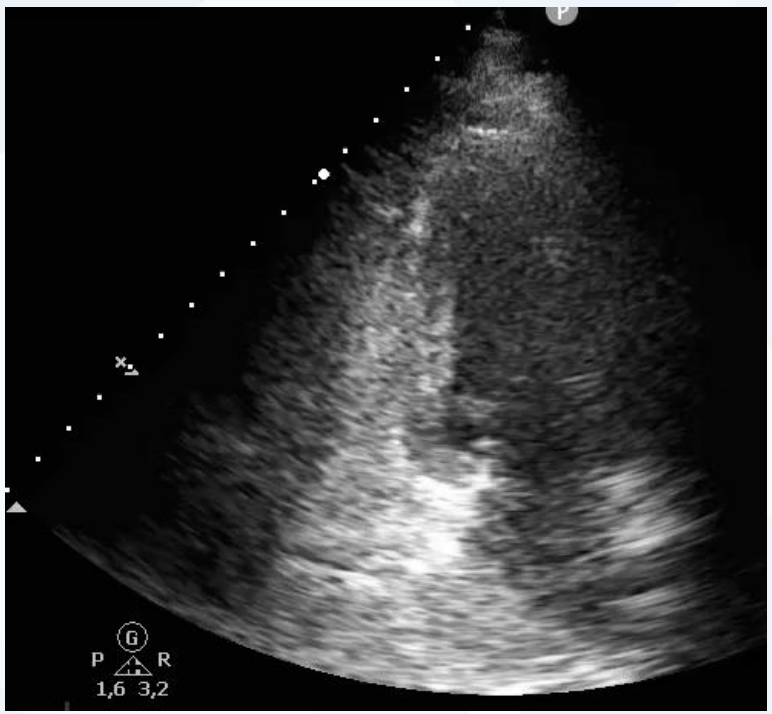


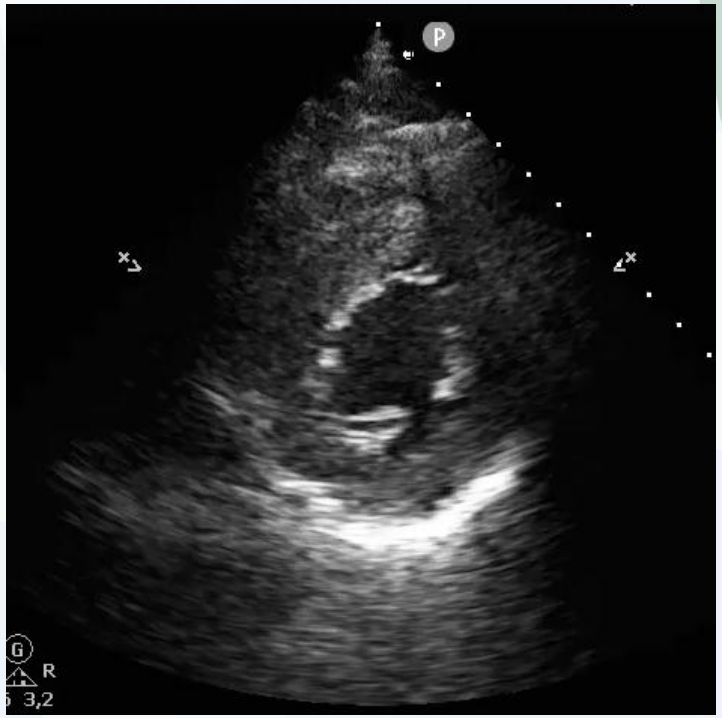
CÓDIGO IAM

9 de diciembre 2021

A su llegada: TA 80/40 mmHg. FC 100 lpm. SatO2 98% basal MEG, frialdad cutánea. Eupneico en reposo.



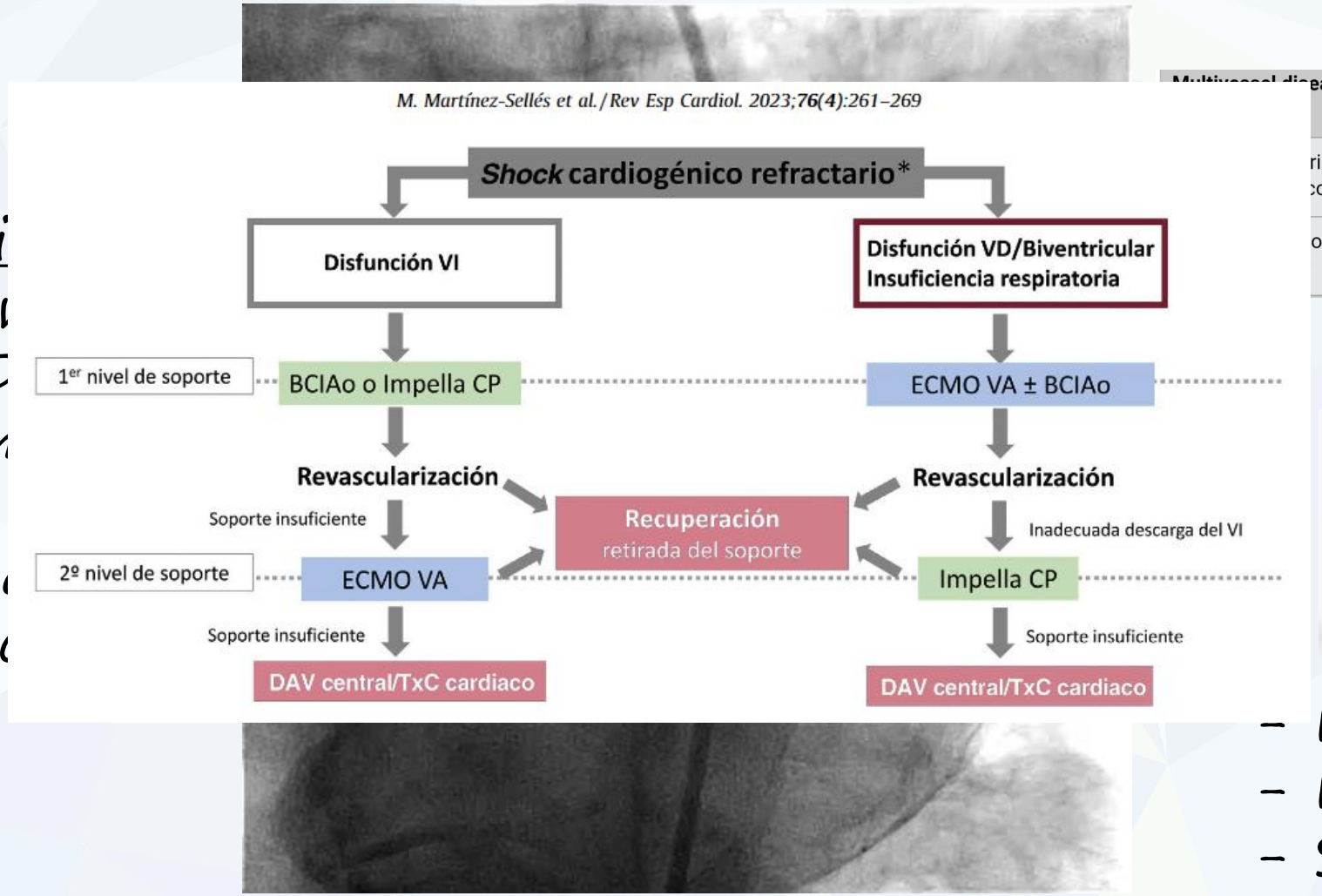




9 de diciembre 2021

SCACEST anteri
Disfunción VI se
Inestabilidad HD
NA 1 mcg/Kg/n

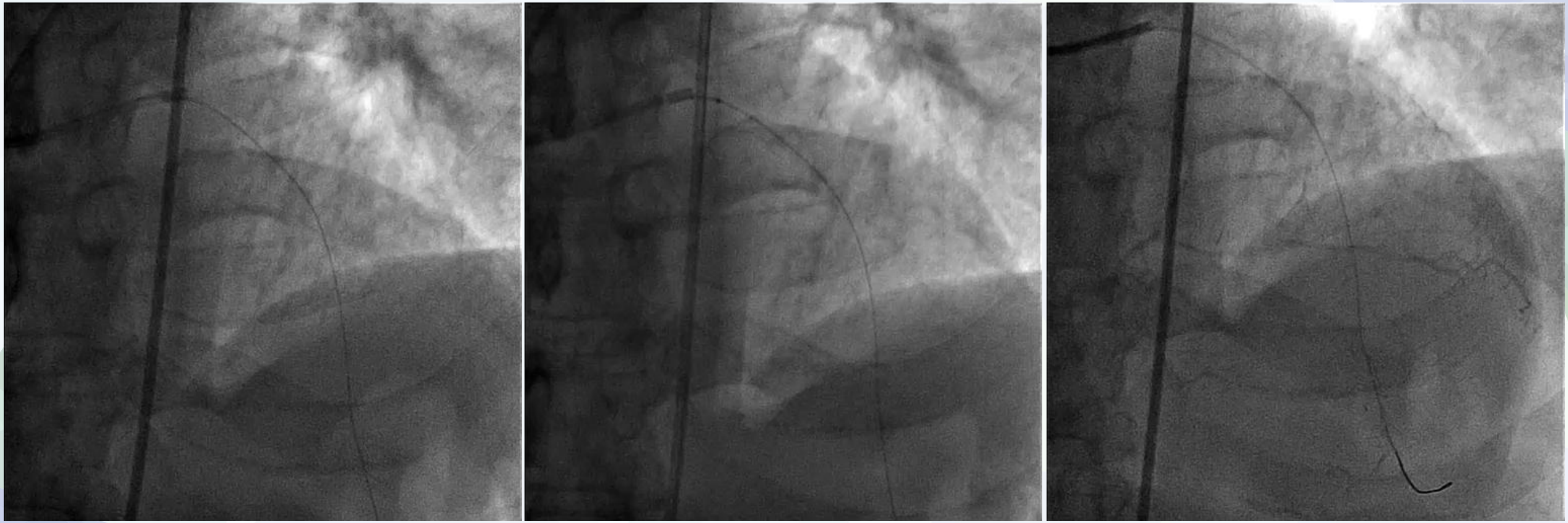
- Oclusión agud
- Estenosis crític
- OCT de CD

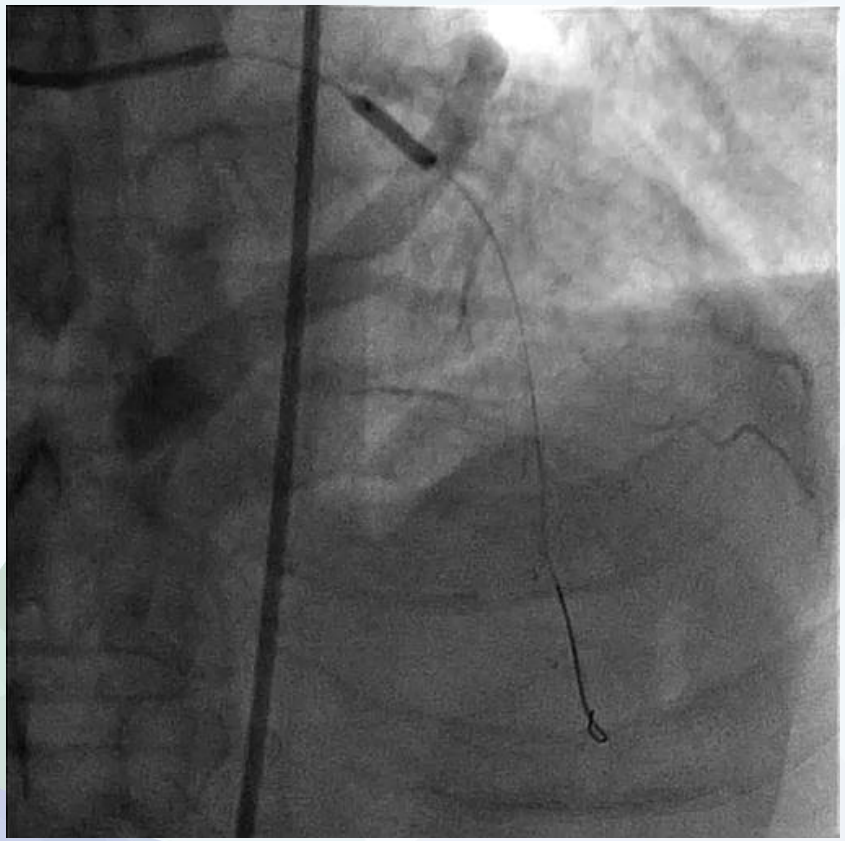


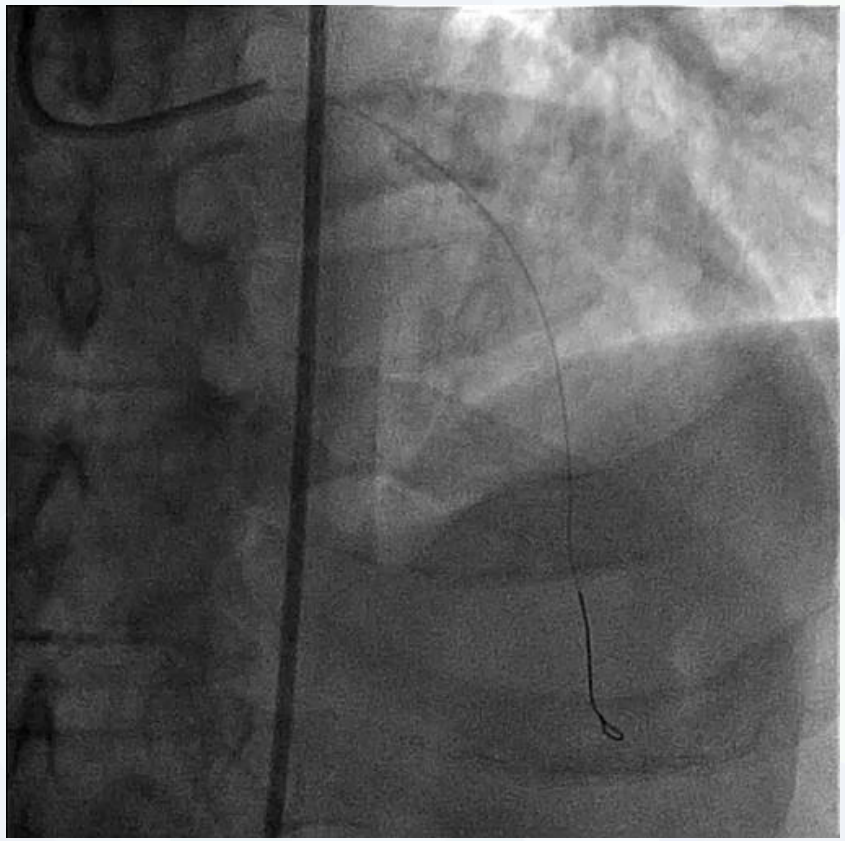
M. Martínez-Sellés et al. / Rev Esp Cardiol. 2023;76(4):261–269

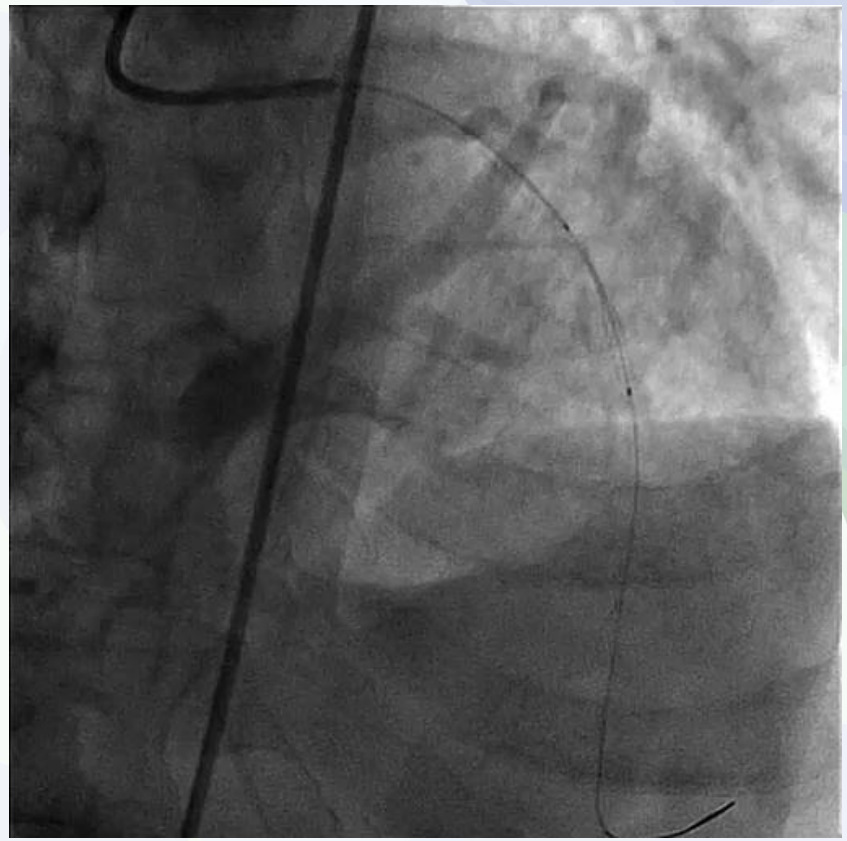
ease in ACS patients presenting in car-		
ring the index commended.	I	B
on-IRA should	IIa	C

- ICP
- ICP + SMC
- SMC + ICP



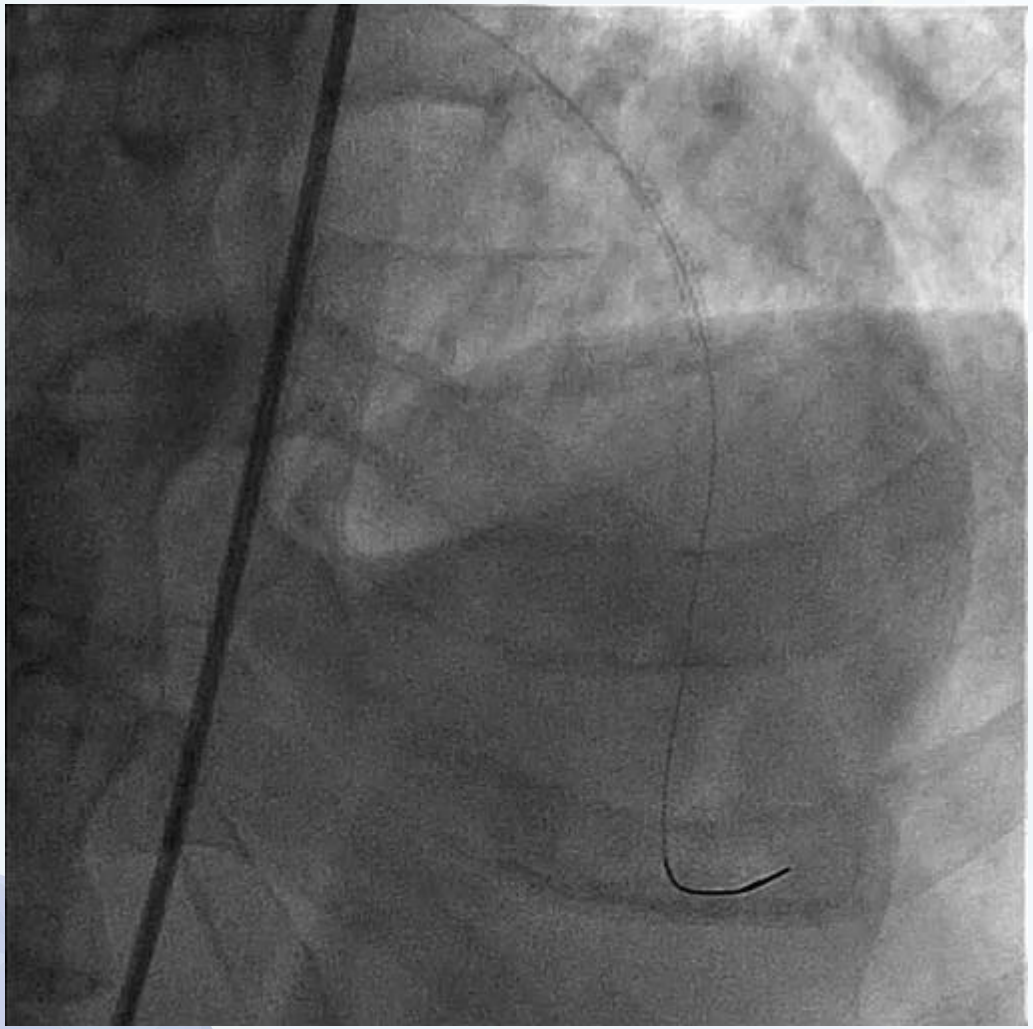


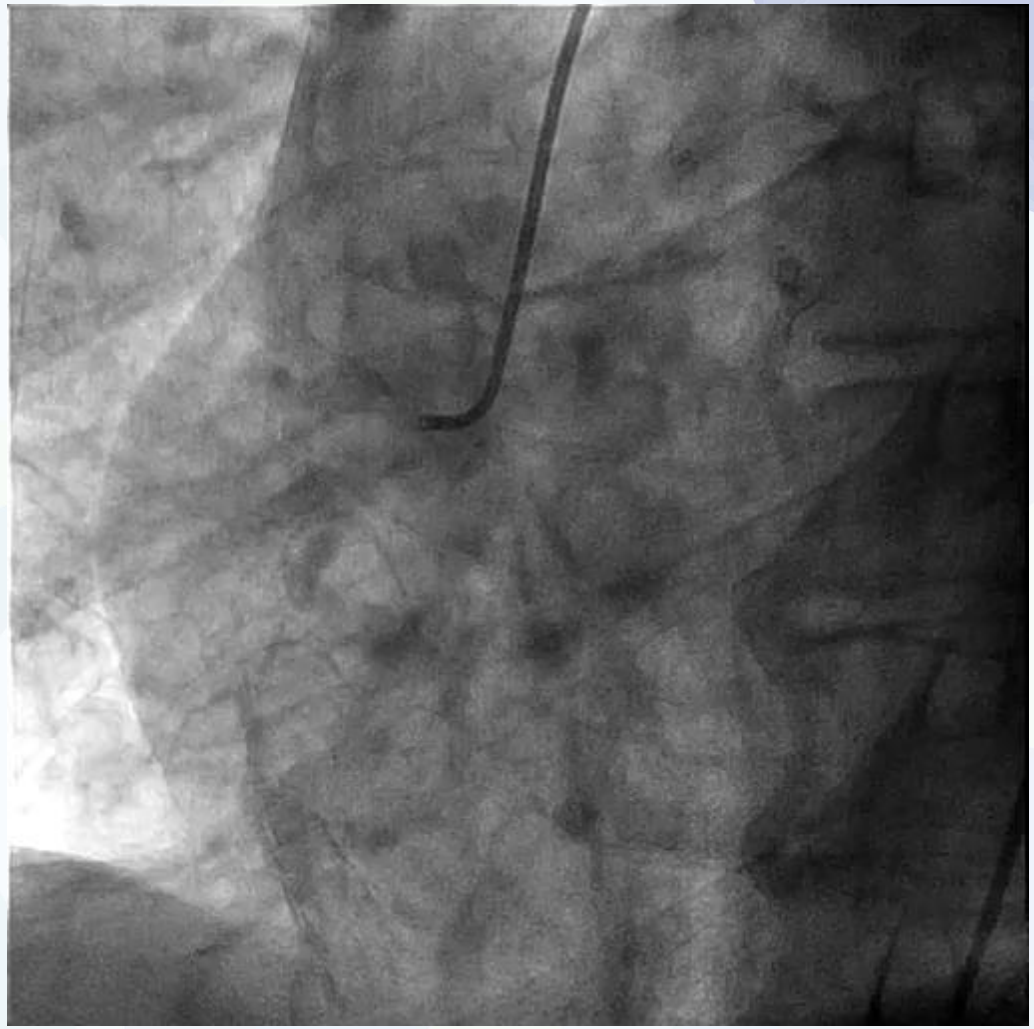




DES 2.75/12mm

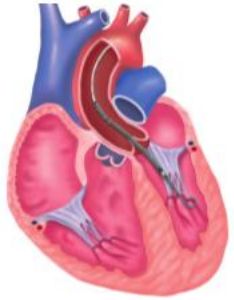
DES 2.5/22mm



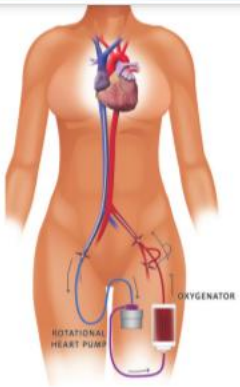


Acute coronary syndrome with unstable presentation		
In patients with ACS and severe/refractory CS, short-term mechanical circulatory support may be considered.	IIb	C
The routine use of an IABP in ACS patients with CS and without mechanical complications is not recommended.	III	B

BCIAo



Impella®



ECMO VA

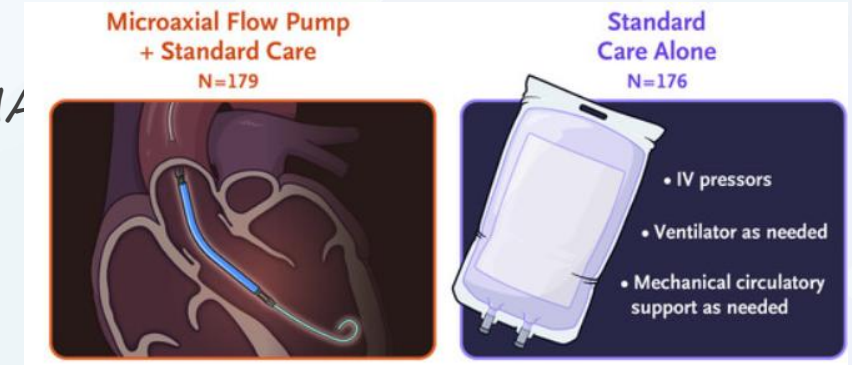
Soporte circulatorio	-	++/+++	++++
Descarga VI	+	+++	-
Ventajas	+ Accesible Facil de implantar	Facil de implantar Ensayos clínicos +	Soporte circulatorio y respiratorio
Contras	Efecto hemodinámico	Hemólisis Complicaciones vasculares	Aumenta postcarga Complicaciones vasculares

ORIGINAL ARTICLE

Microaxial Flow Pump or Standard Care in Infarct-Related Cardiogenic Shock

DanGer Shock trial

- Randomizado, multicéntrico (Alemania, Dinamarca, Reino Unido
- Shock cardiogénico + IA

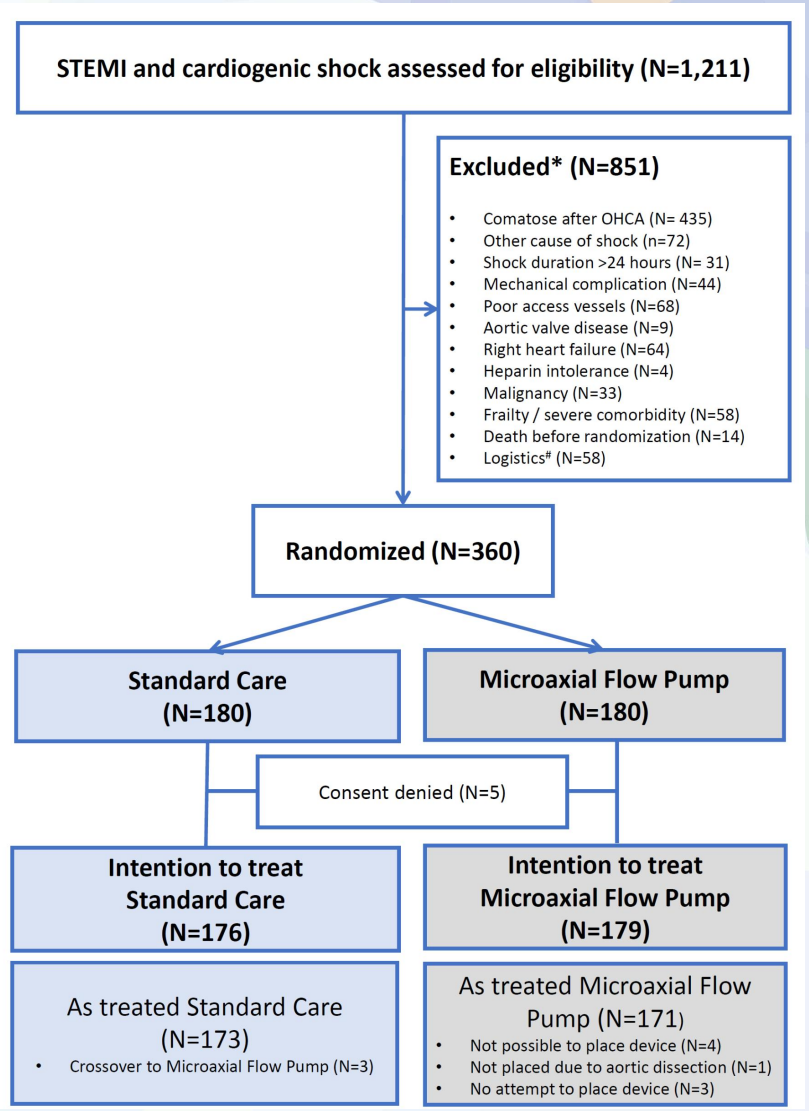


Endpoint primario: muerte por cualquier causa a los 180 d.

Endpoints secundarios: sangrados, isquemia en MMII, hemolisis, fallo dispositivo, IAo

Criterios de exclusión:

- Pacientes recuperados de PCR extrahospitalaria y que permanecieran con bajo nivel de conciencia a su llegada a la sala de hemodinámica.
- Fallo VD.



Møller JE. NEJM. 2024

Characteristic	Microaxial Flow Pump plus Standard Care (N = 179)	Standard Care Alone (N = 176)
Median age (IQR) — yr	67 (58–76)	69 (61–76)
Male sex — no. (%)	142 (79.3)	139 (79.0)
Medical history — no. (%)		
Hypertension	89 (49.7)	94 (53.4)
Diabetes	33 (18.4)	47 (26.7)
Myocardial infarction	29 (16.2)	28 (15.9)
Heart failure	16 (8.9)	17 (9.7)
Chronic kidney disease	17 (9.5)	18 (10.2)
Median systolic blood pressure (IQR) — mm Hg	84 (72–91)	82 (72–91)
Median of the mean arterial blood pressure (IQR) — mm Hg	63 (55–72)	64 (55–73)
Median heart rate (IQR) — beats/min	94 (77–110)	95 (76–111)
Median arterial lactate level (IQR) — mmol/liter	4.6 (3.4–7.1)	4.5 (3.2–6.9)
Median left ventricular ejection fraction (IQR) — %	25 (20–31)	25 (15–30)
Resuscitation before randomization — no. (%)	39 (21.8)	33 (18.8)
Intubation before randomization — no. (%)	35 (19.6)	28 (15.9)
Transfer from outside hospital — no. (%)	51 (28.5)	48 (27.3)
Anterior myocardial infarction — no. (%)	126 (70.4)	129 (73.3)
SCAI–CSWG stage at admission — no. (%)†		
C	100 (55.9)	97 (55.1)
D	51 (28.5)	50 (28.4)
E	28 (15.6)	29 (16.5)
No. of diseased vessels on coronary angiography — no. (%)		
0	1 (0.6)	0
1	52 (29.1)	47 (26.7)
2	70 (39.1)	64 (36.4)
3	56 (31.3)	65 (36.9)
Timing of randomization		
Median time from symptom onset to randomization (IQR) — hr	4.8 (2.4–12.8)	3.8 (2.2–9.4)
Randomization performed before revascularization — no. (%)	99 (55.3)	102 (58.0)
Randomization performed in the catheterization laboratory but after revascularization — no. (%)	48 (26.8)	48 (27.3)
Randomization performed ≤12 hr after departure from the catheterization laboratory — no. (%)	32 (17.9)	26 (14.8)

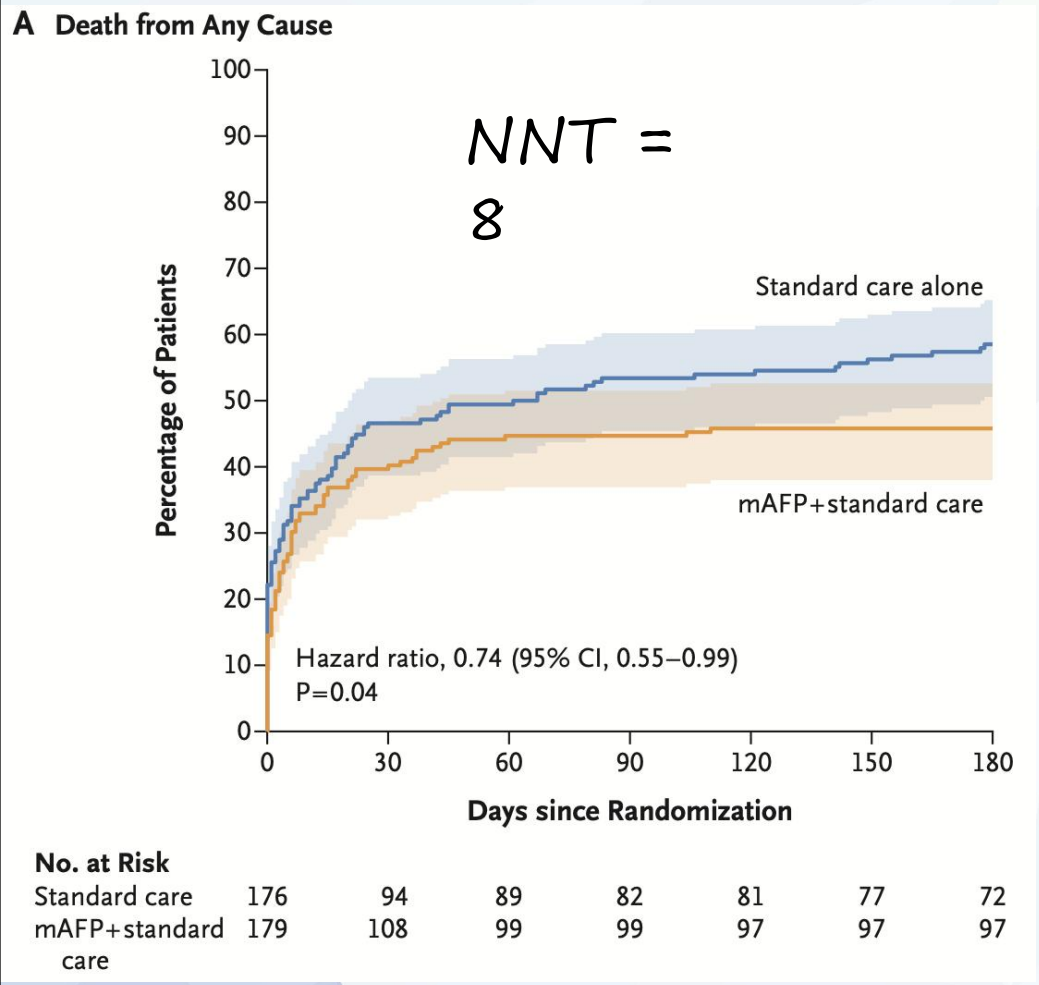
Møller JE. NEJM. 2024

Escalation to additional mechanical circulatory support		
Placement of Impella 5.0 device — no. (%)	7 (3.9)	5 (2.8)
Placement of Impella CP for venting during venoarterial ECMO therapy — no. (%)	0	4 (2.3)
Placement of Impella 2.5 device — no. (%)	0	1 (0.6)
Placement of Impella RP device — no. (%)	0	0
Venoarterial ECMO — no. (%)	21 (11.7)	33 (18.8)
Median time from randomization to placement of venoarterial ECMO (IQR) — hr	14 (4–54)	2 (1–5)
Placement of permanent LVAD — no. (%)	10 (5.6)	4 (2.3)
Any escalation to additional mechanical circulatory support — no. (%)	28 (15.6)§	37 (21.0)¶

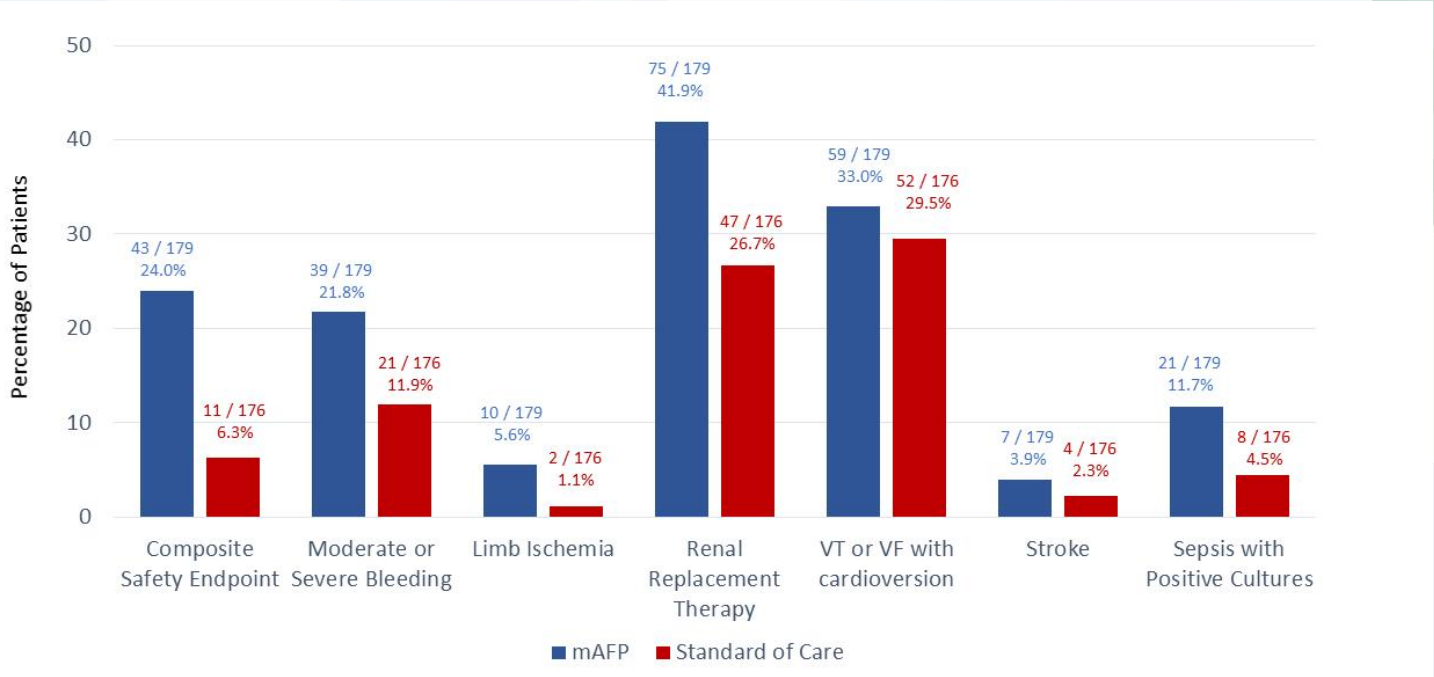
Møller JE. NEJM. 2024

ORIGINAL ARTICLE

Microaxial Flow Pump or Standard Care in Infarct-Related Cardiogenic Shock

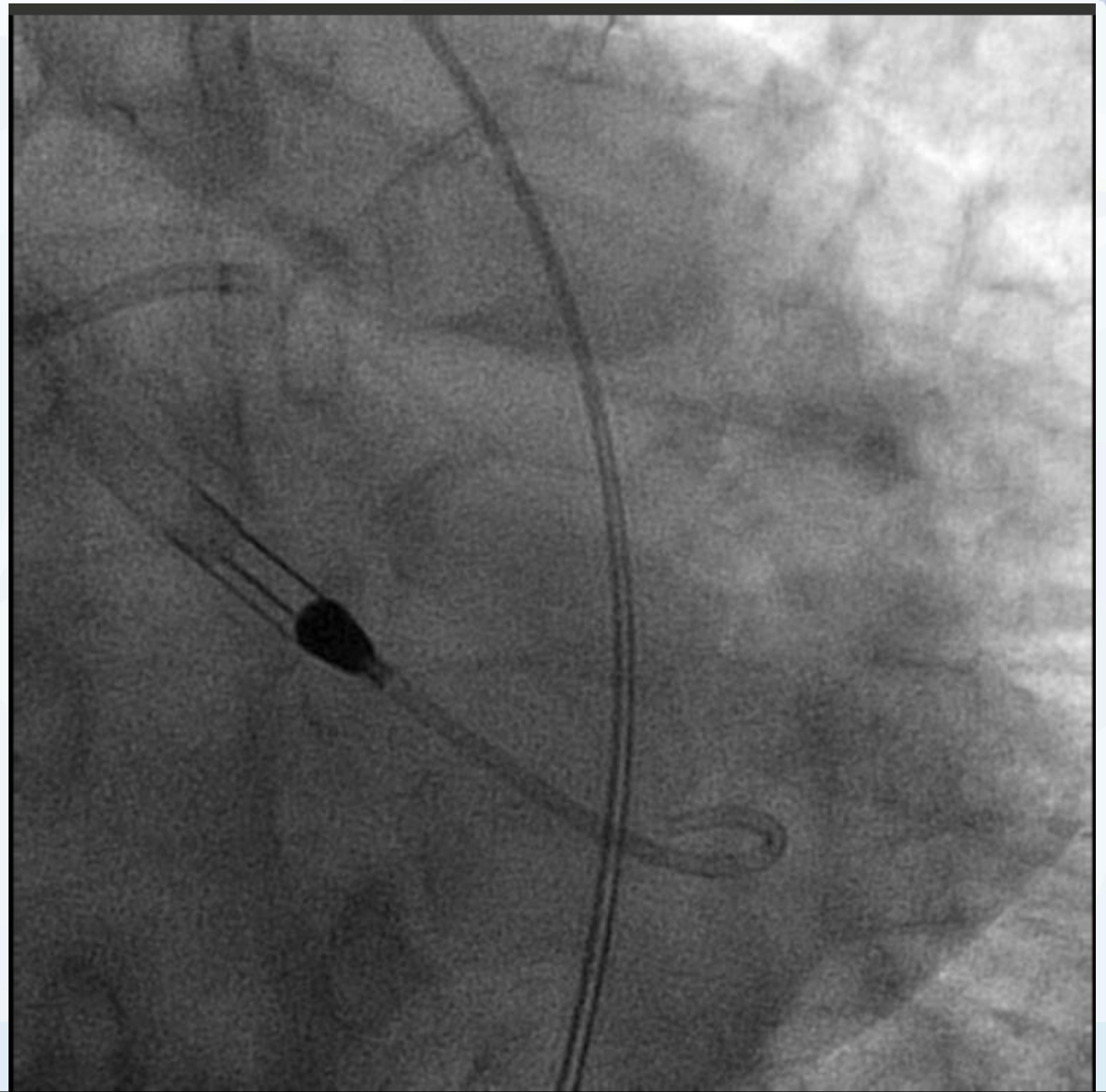


NNT = 8

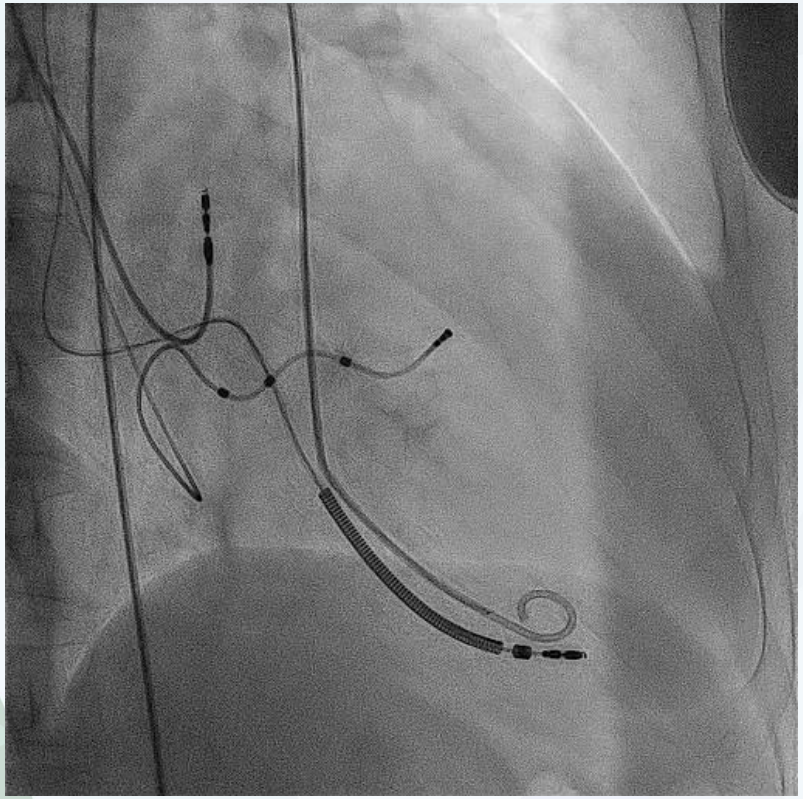


Møller JE. NEJM. 2024

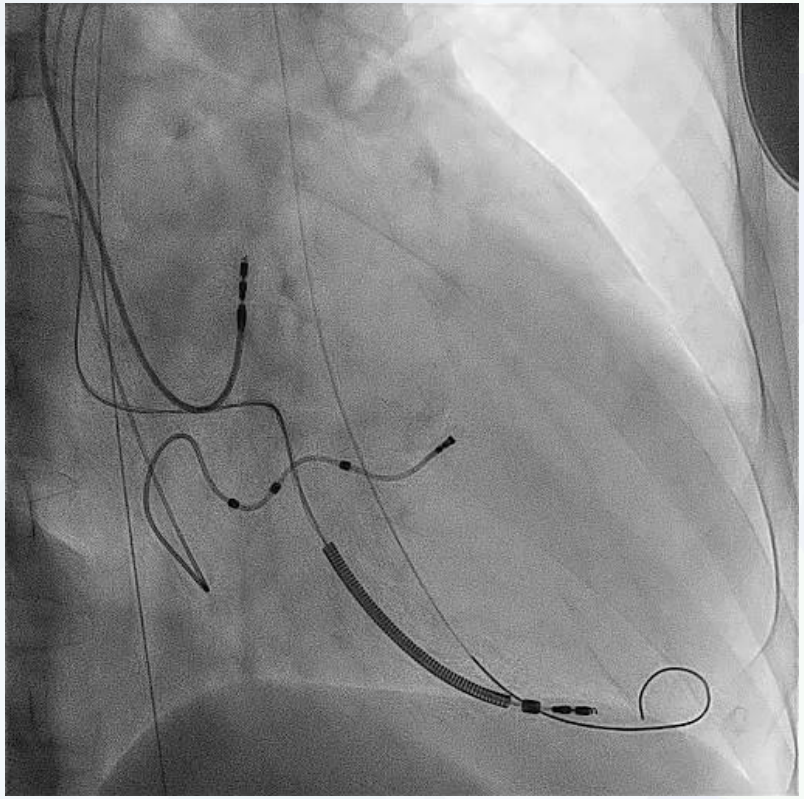
Implante de IMPELLA CP



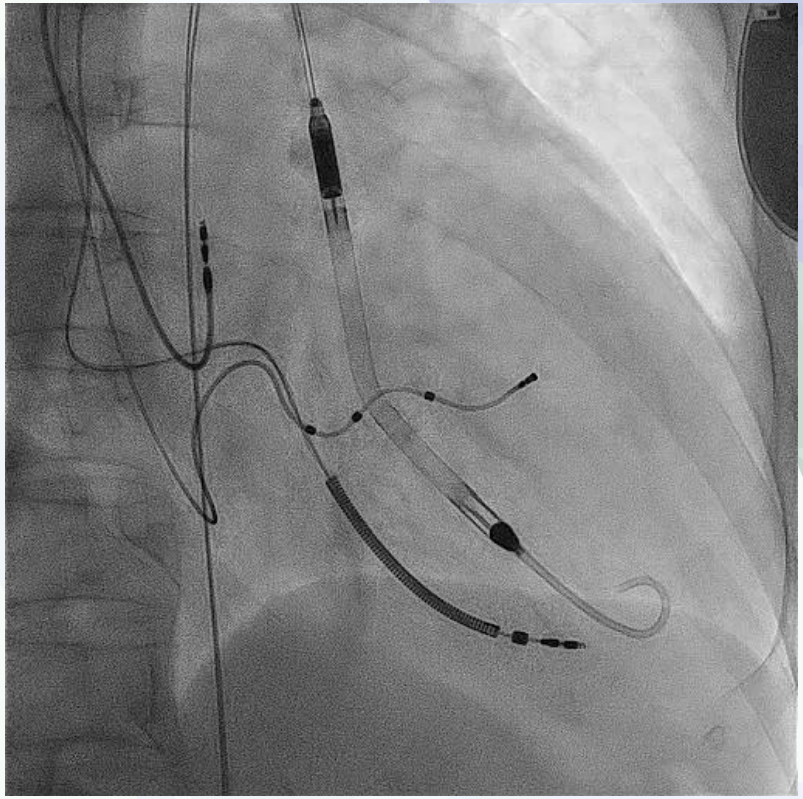
Implante Impella



Pigtail hasta la punta del VI

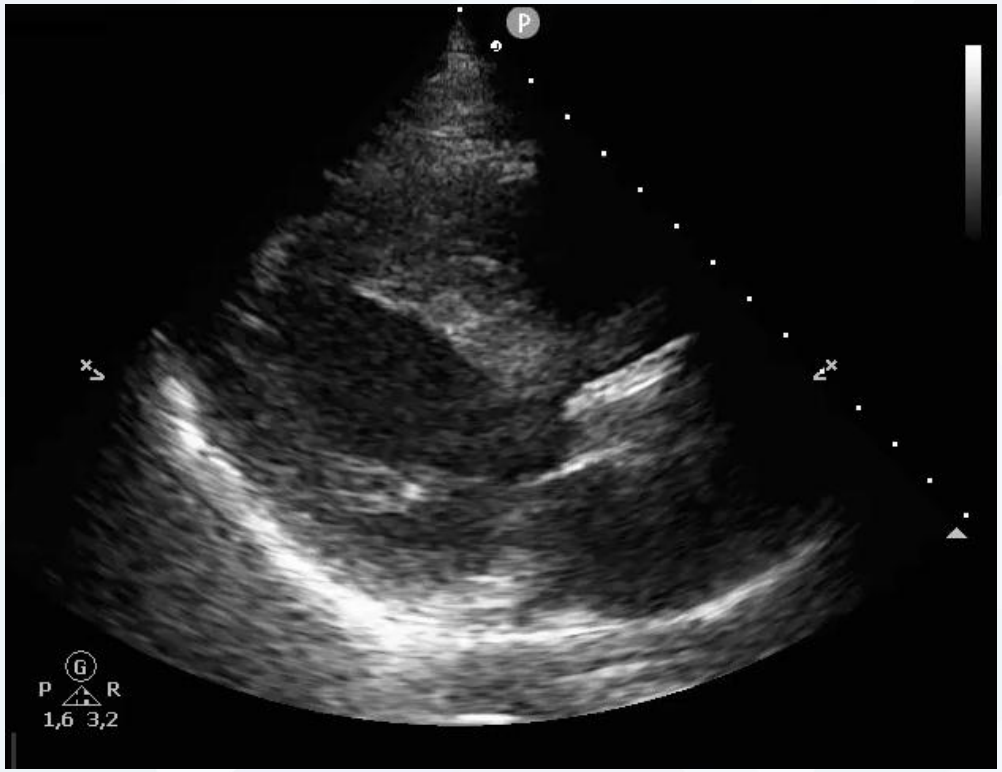


Guía de alto soporte (0.018")



Se avanza Impella y se retira guía

Comprobar posición en ETT y curvas



Evolución

9/1

2

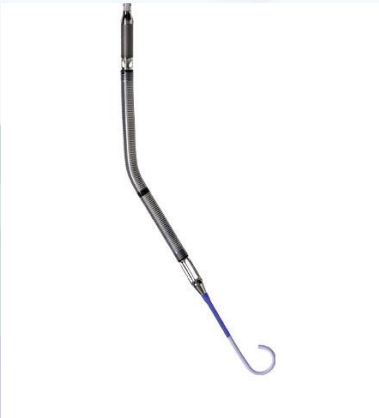
ICP DA
IMPELLA CP

- NRL: consciente y orientado con Remifentanilo 1.2 mcg/Kg/min
- RESP: eupneico, SatO2 98% con GN 2L
- HD: TAM 70mmHg con NA 0.5 mcg/Kg/min + DBT 2.3 mcg/Kg/min
  Impella P8, 3.5L
  *Láctico 4.5 → 3.8 mmol/l
- NEF: FRA (cr 1.09 → 1.6) y oligoanuria a pesar de Furosemida iv
- Elevación de transaminasas: GPT 214, GOT 953. Troponina (TnIhs) 558000 ng/L (<72)

Evolución

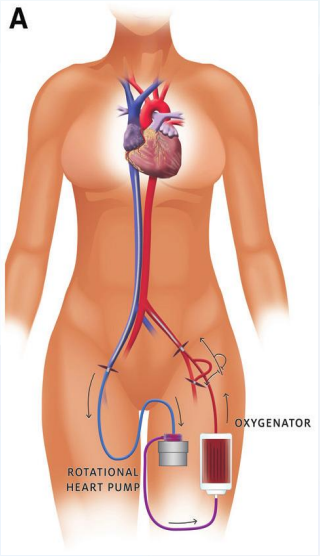
9/12

ICP DA
IMPELLA CP



10/12

ECMO
VA
periféric

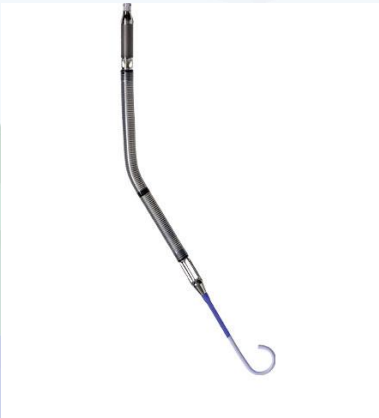


- NRL: consciente y orientado con Dexdor
- RESP: eupneico, SatO2 98% con GN 4L y ECMO FiO2 0.8
- HD: TAM 75mmHg con Nicardipino 3ml/h + DBT 1.5 mcg/Kg/min + LVS 15ml/h
  - Impella P5, 3L
  - ECMO 3600rpm, 3.2L
  - *Láctico 0.6
- NEF: diuresis ok con furosemida iv. Cr 1.2

Evolución

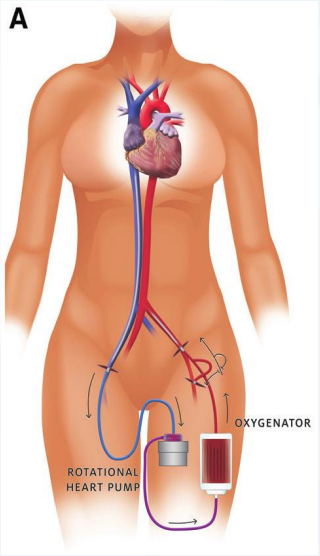
9/12

ICP DA
IMPELLA CP



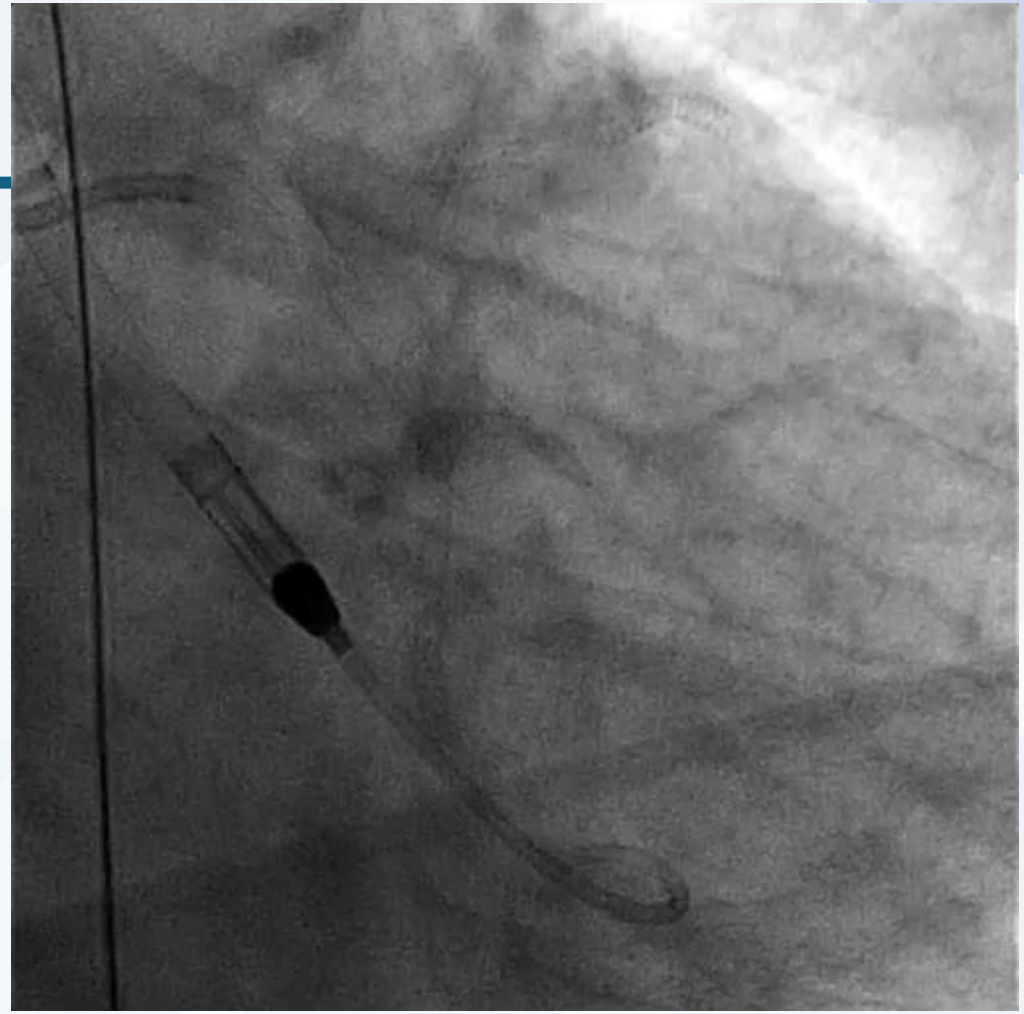
10/12

ECMO
VA
periféric



11/12

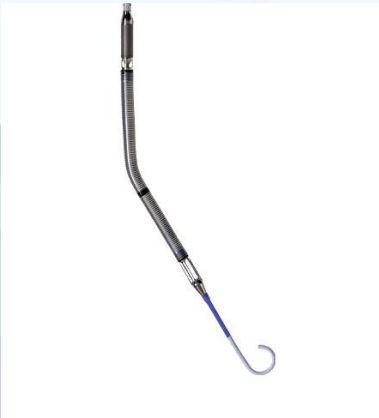
ICP CXp



Evolución

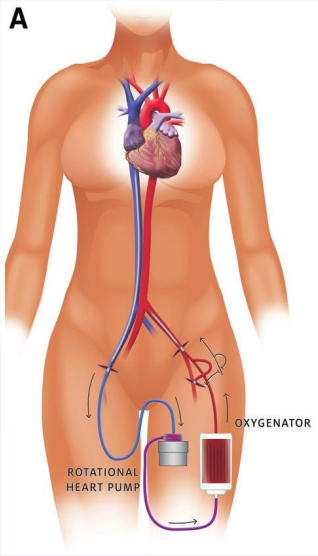
9/12

ICP DA
IMPELLA CP



10/12

ECMO
VA
periféric



11/12

ICP CXp

- Recovery
- Heart replacement therapy
- Palliative care

Evolución

9/12

ICP DA IMPELLA CP

10/12

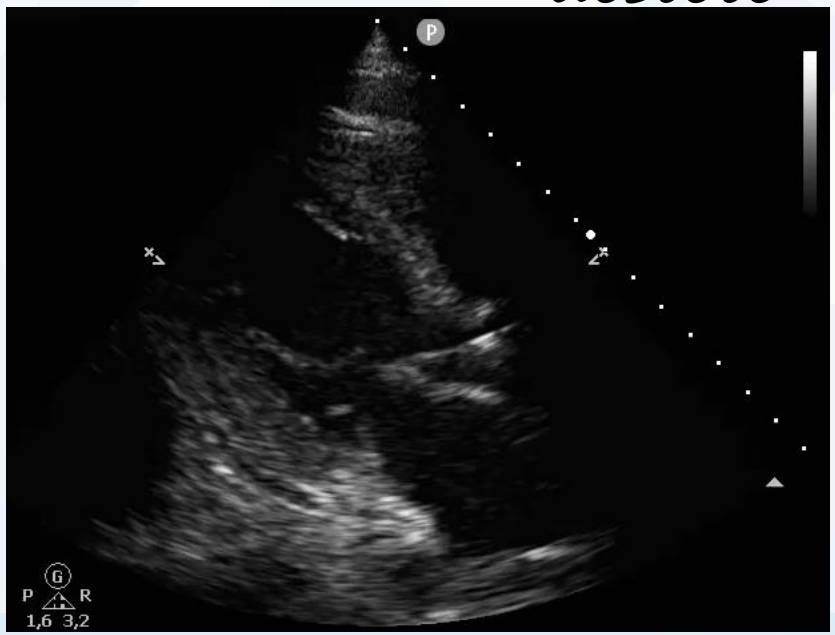
ECMO VA periférico

11/12

ICP CXp

16/12

Prueba de destete



Evolución

9/12

ICP DA IMPELLA CP

10/12

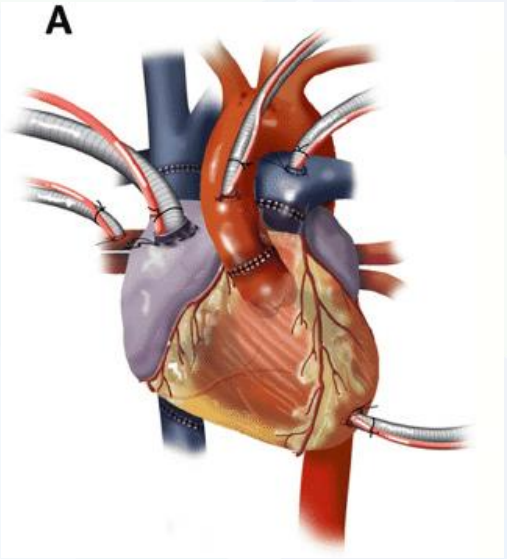
ECMO VA periférico

11/12

ICP CXp

17/12

Centrimag



Evolución

9/12

ICP DA IMPELLA CP

10/12

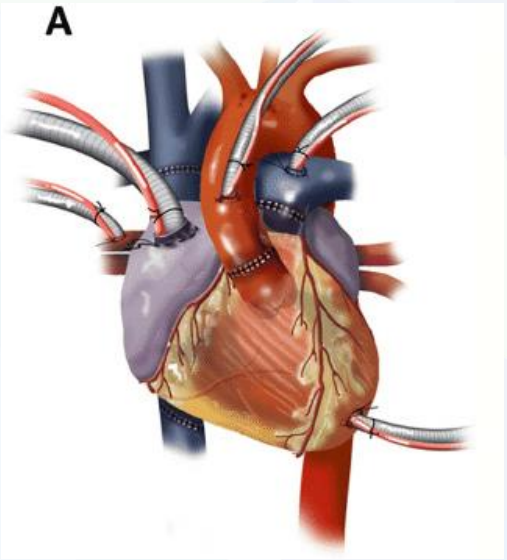
ECMO VA periférico

11/12

ICP CXp

17/12

Centrimag



22/12-26/12

15-01

Inclusión en lista de Tx cardiaco urgencia 0

Evolución

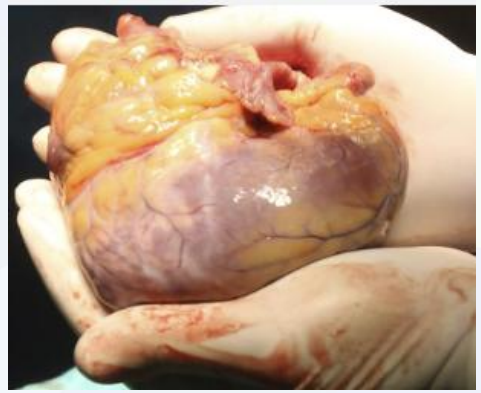
ICP DA IMPELLA CP

ECMO VA periférico

ICP CXp

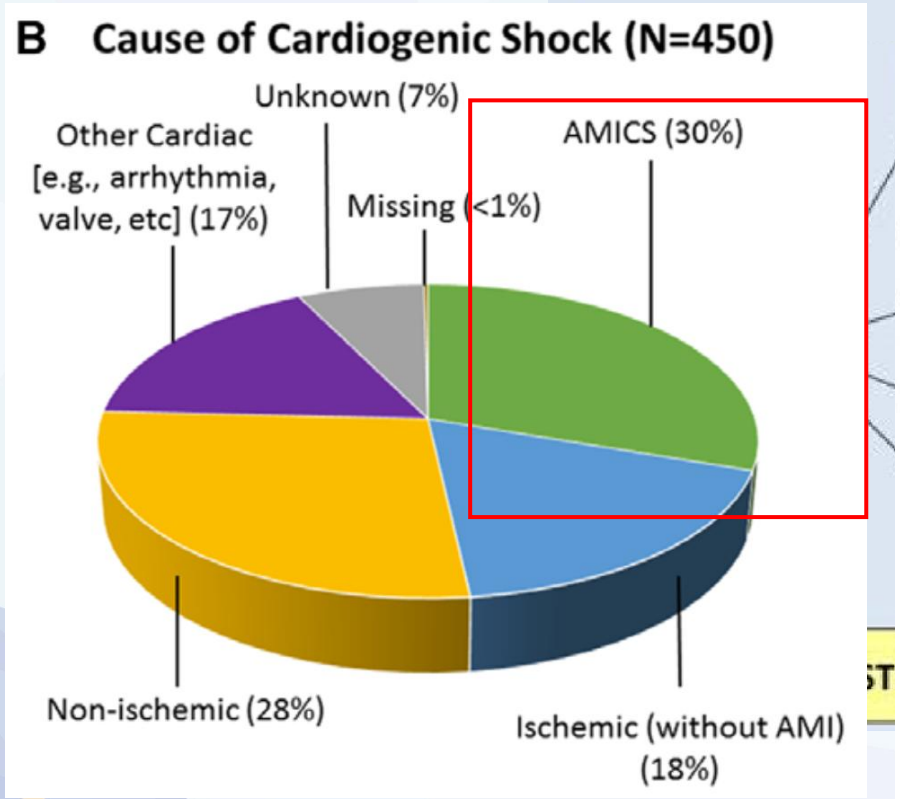
Centrimag

Tx cardiaco

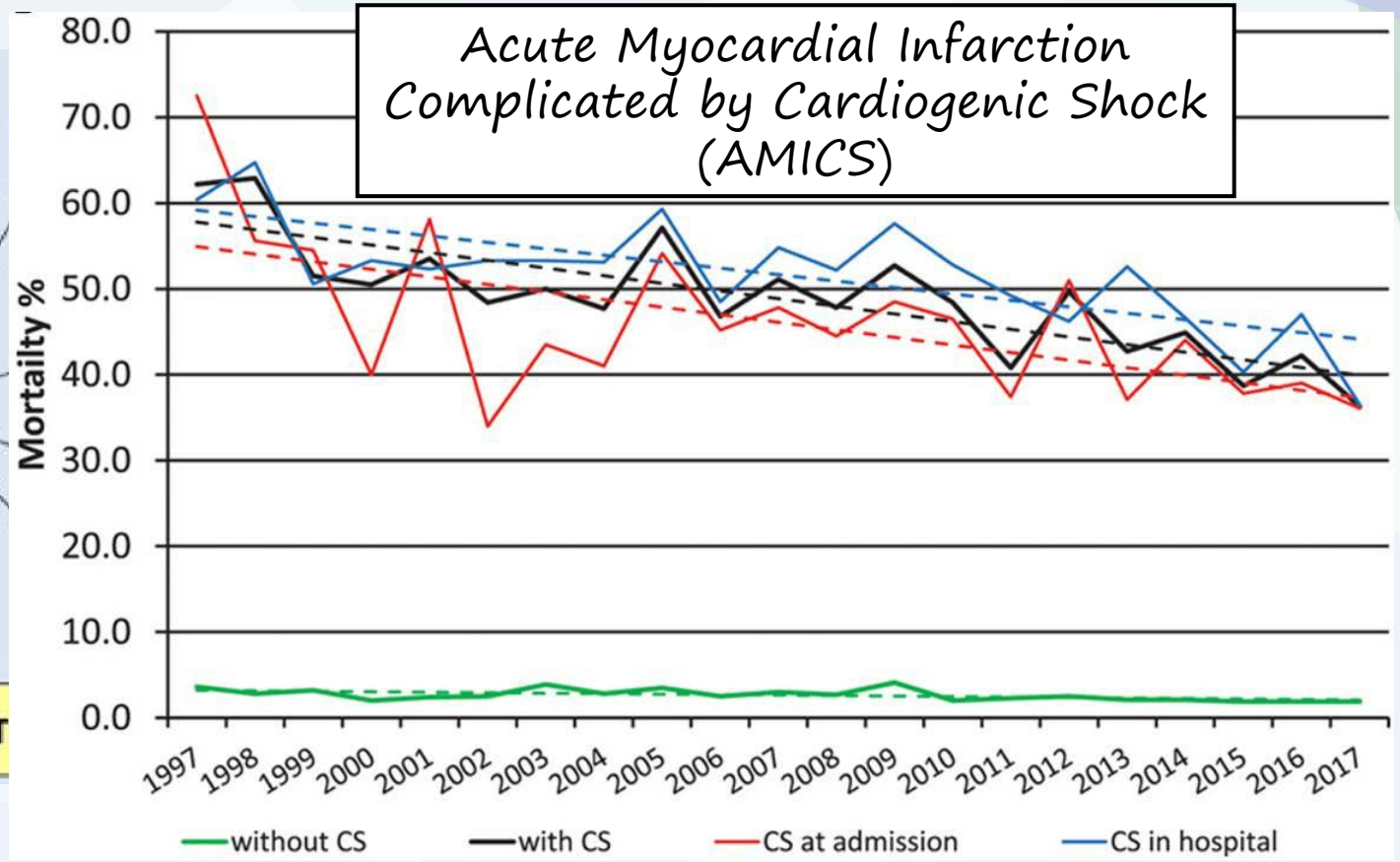


Shock cardiogénico

Condición aguda y potencialmente letal que consiste en la incapacidad para proporcionar una adecuada perfusión tisular que consiga satisfacer las demandas metabólicas y provoca un fallo multiorgánico

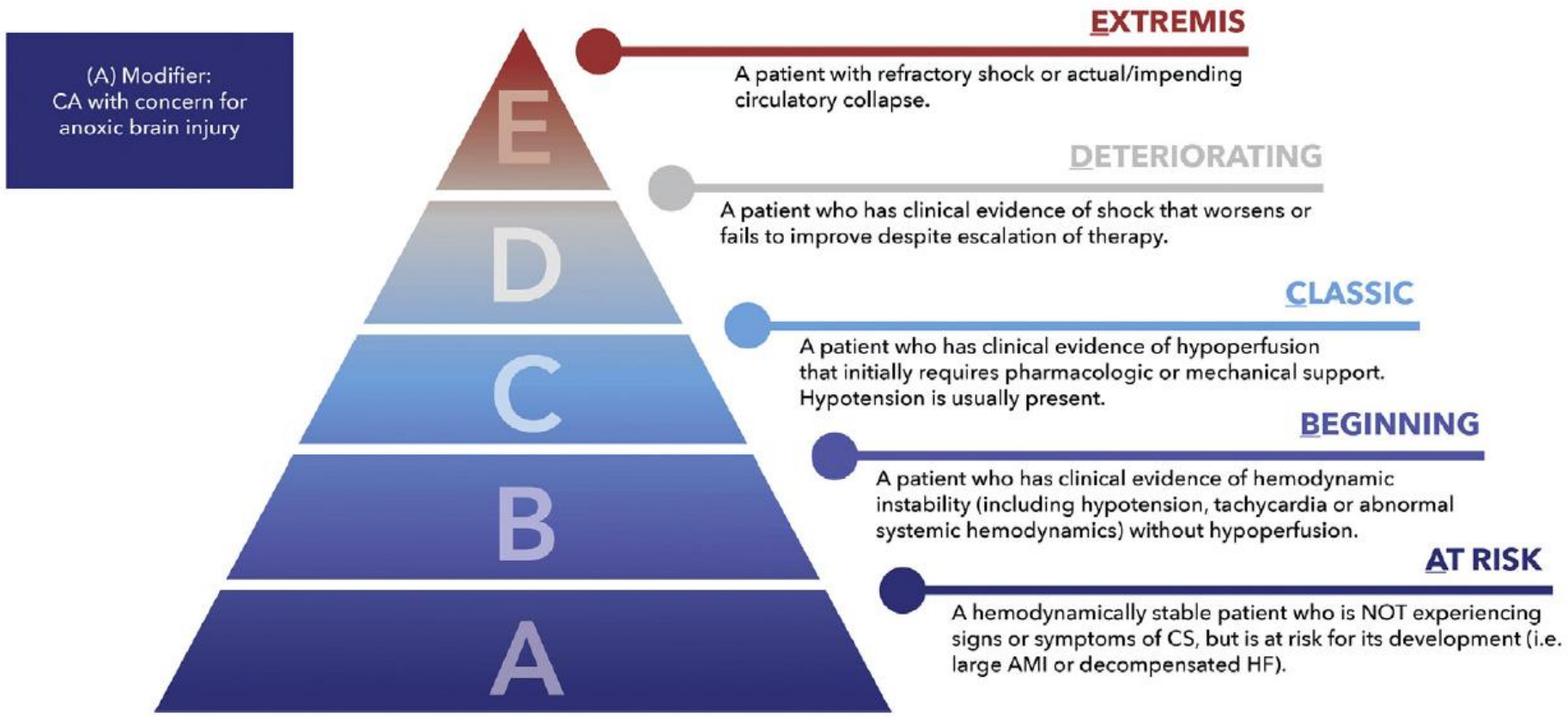


Berg DD et al. Circ Cardiovasc Qual Outcomes. 2019



Henry T el al. Circulation. 2021

FIGURE 4 Updated SCAI SHOCK Classification Pyramid

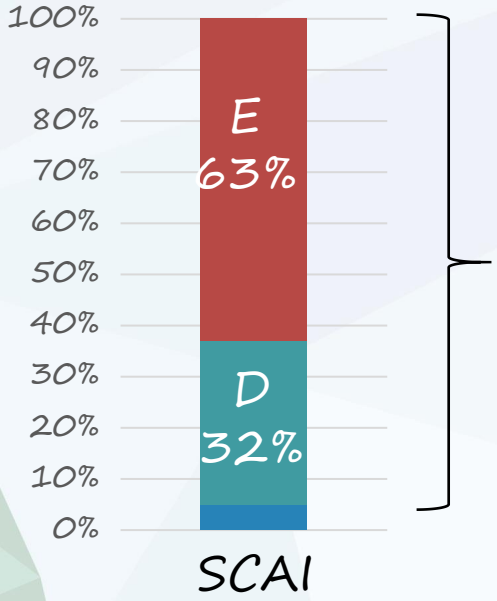


AMI = acute myocardial infarction; CS = cardiogenic shock; HF = heart failure; SCAI = Society for Cardiovascular Angiography and Interventions.

Puerta de Hierro Hub & Spoke

8 years
Sept 2014 – Aug 2022

CARDIOLOGIA
HOSPITAL PUERTA DE HIERRO



95 % SCAI D-E

255
"CS code"

2 patients - 2 episodes of CS
AMI y PGF
Electrical storm & ADHF

253
pacientes en SC

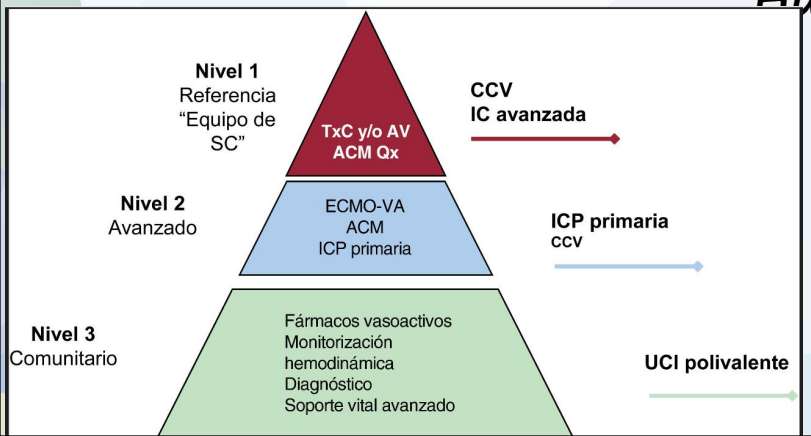
110 local patients

Level 1 Hub

143 spoke patients

- 2 patients — Not CS criteria
- 12 patients — Futility
- 23 patients — Collaborative
- 1 paciente — Logistic

105 pacientes transferred



71 patients
68%

Level 2 CVS

34 patients
32%

Level 3 ICU

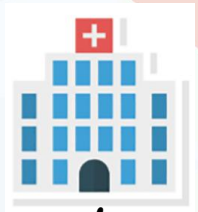
F.J. Hernández-Pérez, mayo 2023

Transfer: stabilization

CARDIOLOGIA
HOSPITAL PUERTA DE HIERRO

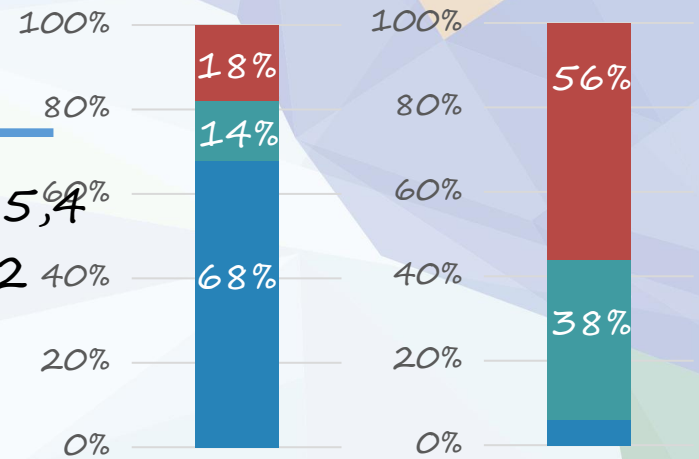
- SCAI E
- SCAI D
- SCAI C

Level 1
Hub



Level 2
CVS

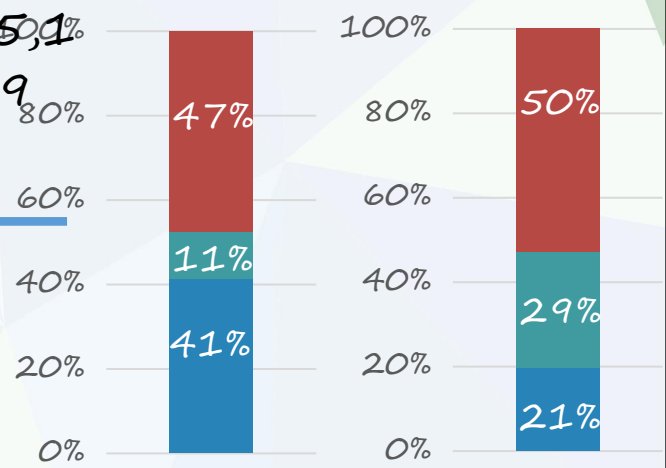
Lactate 3,8±5,4
VIS 27±32



p<0,01

Lactate 5,1±5,1
VIS 35±39

Level 3 ICU

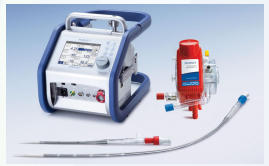


Patients transferred from level 2 centers arrive more stable

Transfer: stabilization

CARDIOLOGIA
HOSPITAL PUERTA DE HIERRO

- SCAI E
- SCAI D
- SCAI C



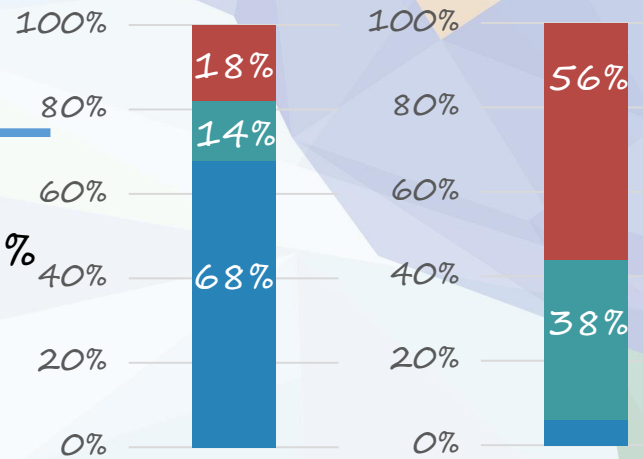
Level 1
Hub

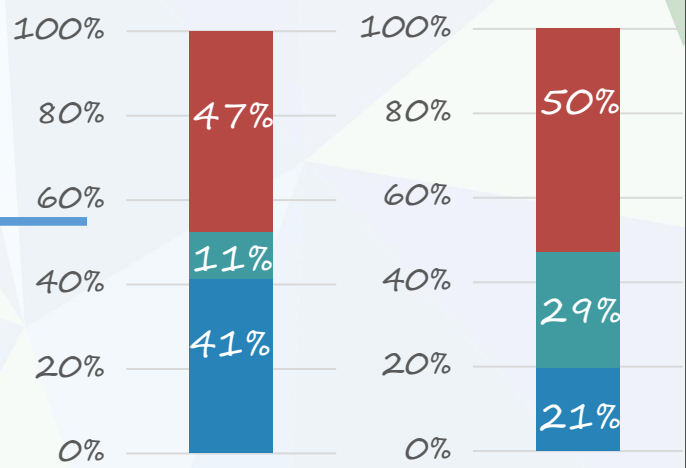
Level 2
CVS

IABP 25%
ECMO 37% MCS 78%
T-VAD 16%

Level 3 ICU

IABP 35%



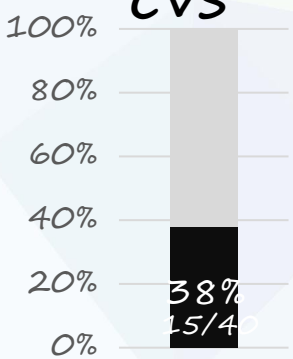


★ Stability is associated with increased use of MCS

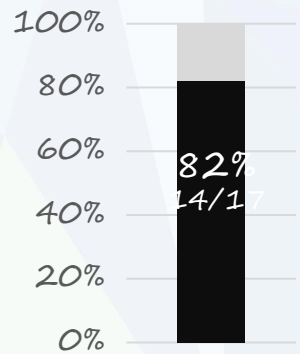
SCAI E
SCAI D
SCAI C

Level 1
Hub

Level 2
CVS

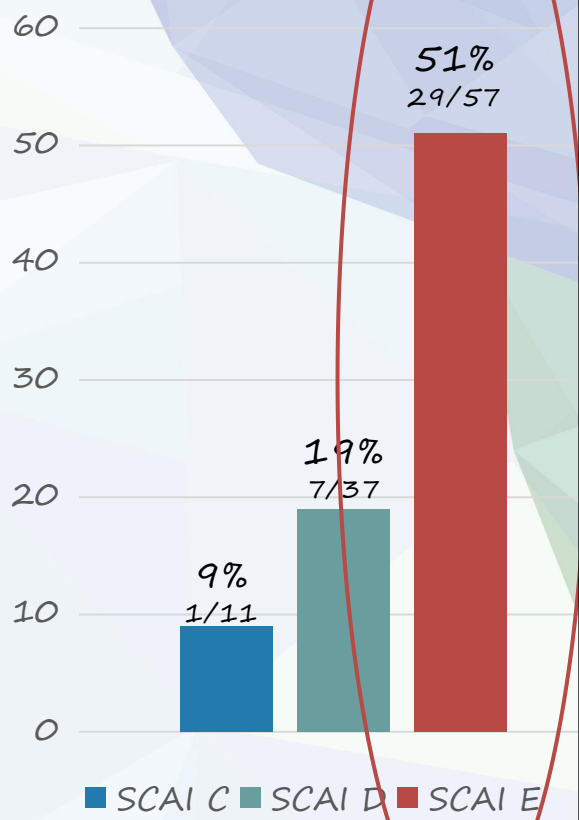


p<0,01



Level 3 ICU

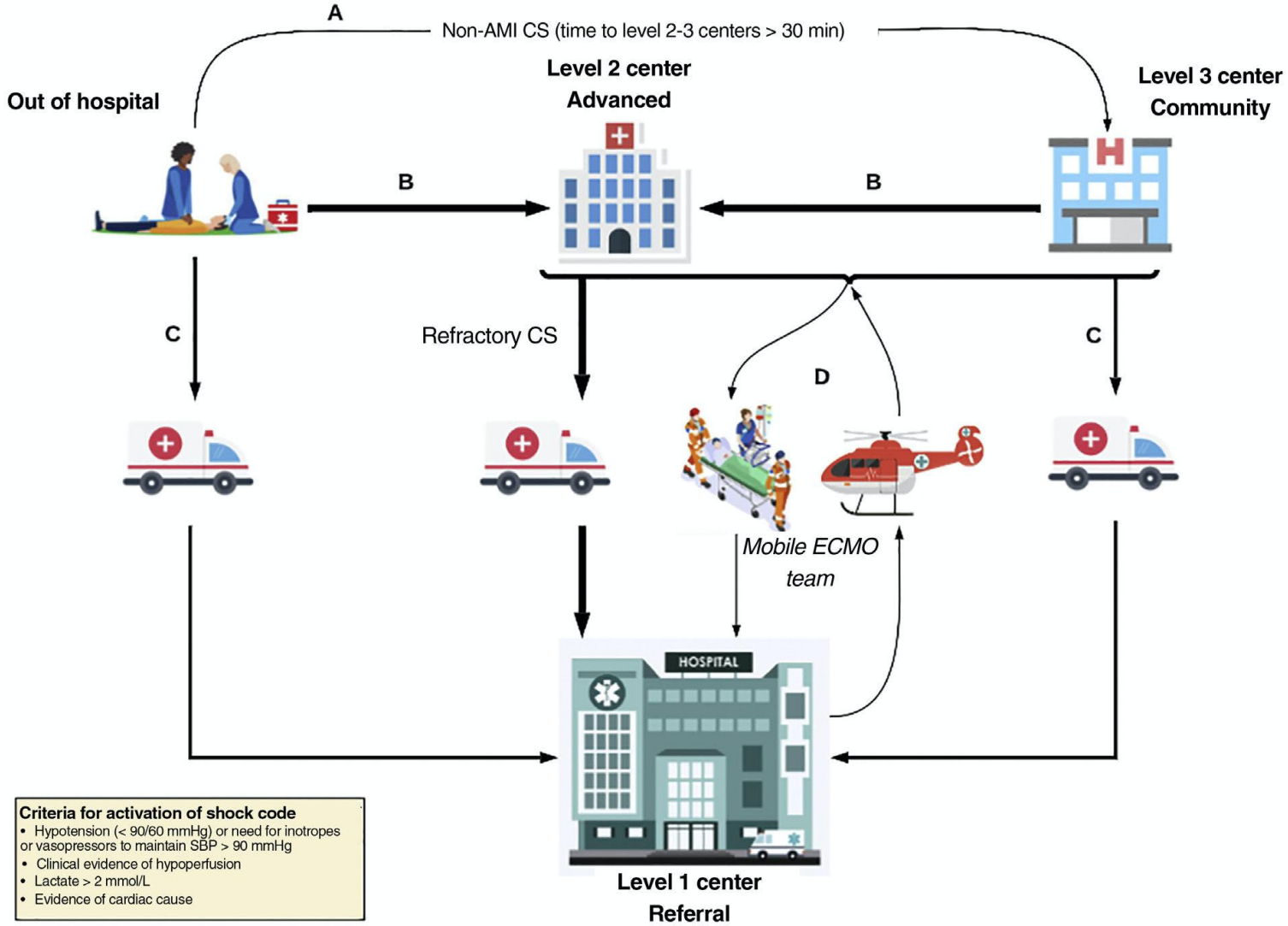
Mortality dx SCAI



★ Transferring SCAI E patients from level 3 patients is associated with a prohibitive mortality

CARDIOLOGIA
HOSPITAL PUERTA DE HIERRO

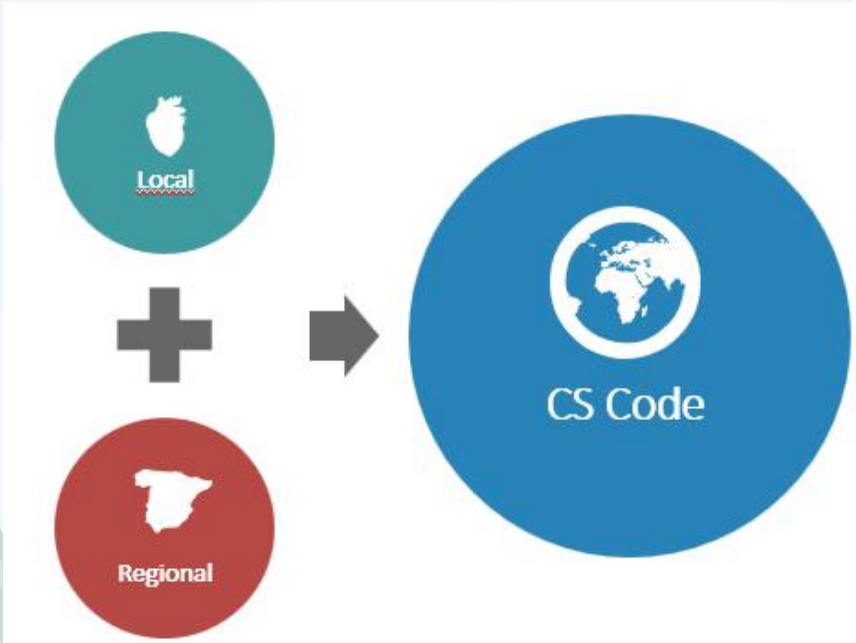
Propuesta código shock cardiogénico



Mail goals

1. Early detection
2. Expedited transfers to level 1-2 centers
3. Exit strategies

Martínez-Sellés M, Hernández-Pérez FJ, et al. Rev Esp Cardiol. 2023;76(4):261-268



CARDIOLOGIA
HOSPITAL PUERTA DE HIERRO

Shock team

ONT
ORGANIZACIÓN NACIONAL DE TRASPLANTES

1. Early detection & characterization
2. Revascularization and MCS
3. Exit strategies

Advanced HF
Coordination
HT & LVADs
ONT

CICU
Diagnosis & triage
Medical treatment
Invasive hemodynamics
MCS Management

Interventional Cardiology
Primary angioplasty 24/7
pMCS

Cardiac Surgery
ECMO
Temporary-VAD
LVAD
HT

Adapt Doll et al. CCI 2016:88;424-433

Puerta de Hierro

Take home messages

- En los casos de shock cardiogénico en contexto de un IAM, la ICP primaria puede no ser suficiente, debemos disponer de dispositivos de soporte mecánico circulatorio en las salas de hemodinámica adheridas al programa de código IAM.

- Impella ha demostrado en estos pacientes reducir la mortalidad vs el tratamiento médico convencional.

- Sin embargo, la mortalidad de estos pacientes sigue siendo elevada.

- La coordinación mediante el CÓDIGO SHOCK de los distintos centros sanitarios puede mejorar la supervivencia de los pacientes en shock cardiogénico.