Prise en charge pré-hospitalière du SCA

Journée de médecine de Strasbourg 18/09/2023

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Suspicion de SCA
Douleur thoracique

- **Ampleur du problème**
  - **Services d'urgence**
    - **Royaume Uni: 150 000 admissions aux urgences (30%)**
    - **USA: 1 700 000 admissions pour SCA**
    - **SAU: 5% des passages**

  - **Médecine de ville**
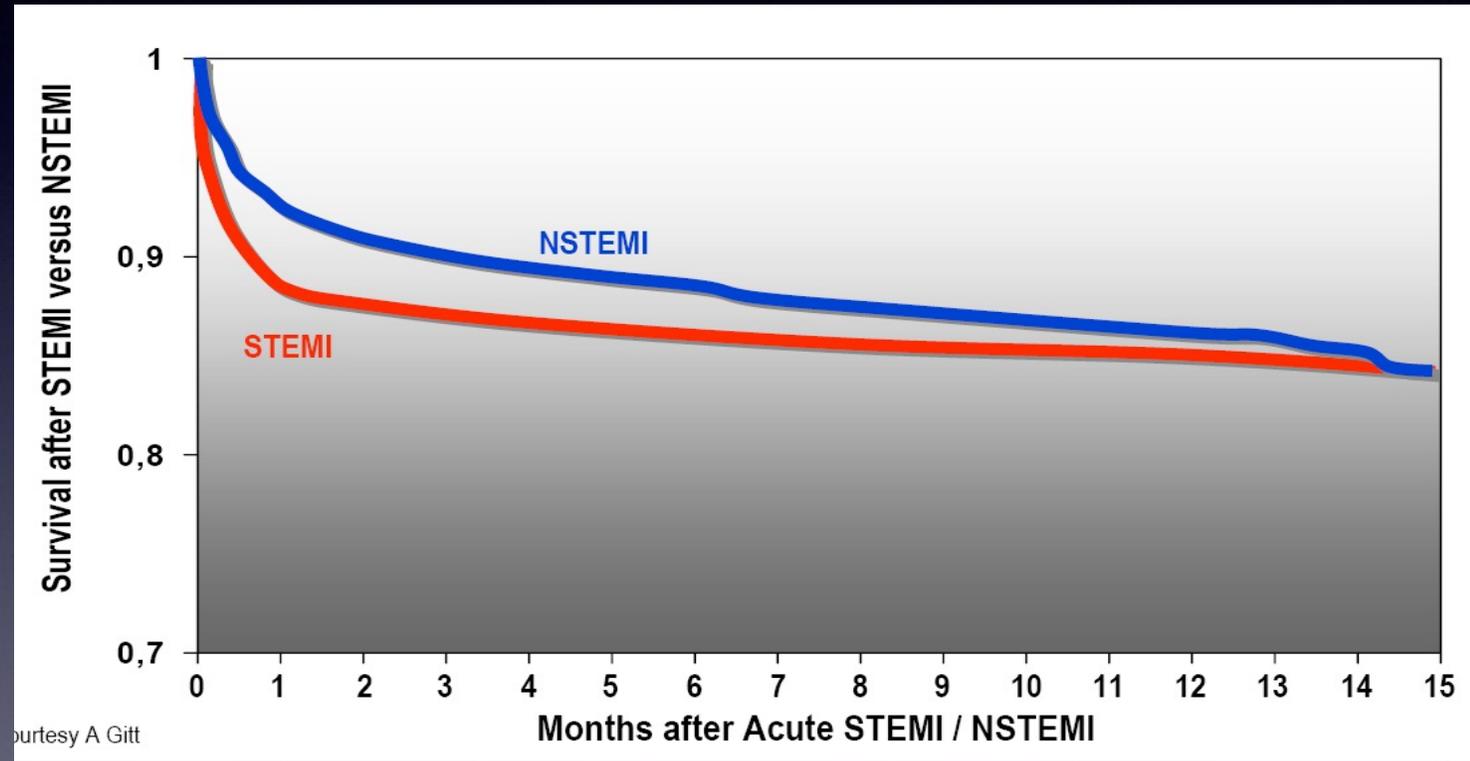   - **SOS médecin: 2-5% des appels**
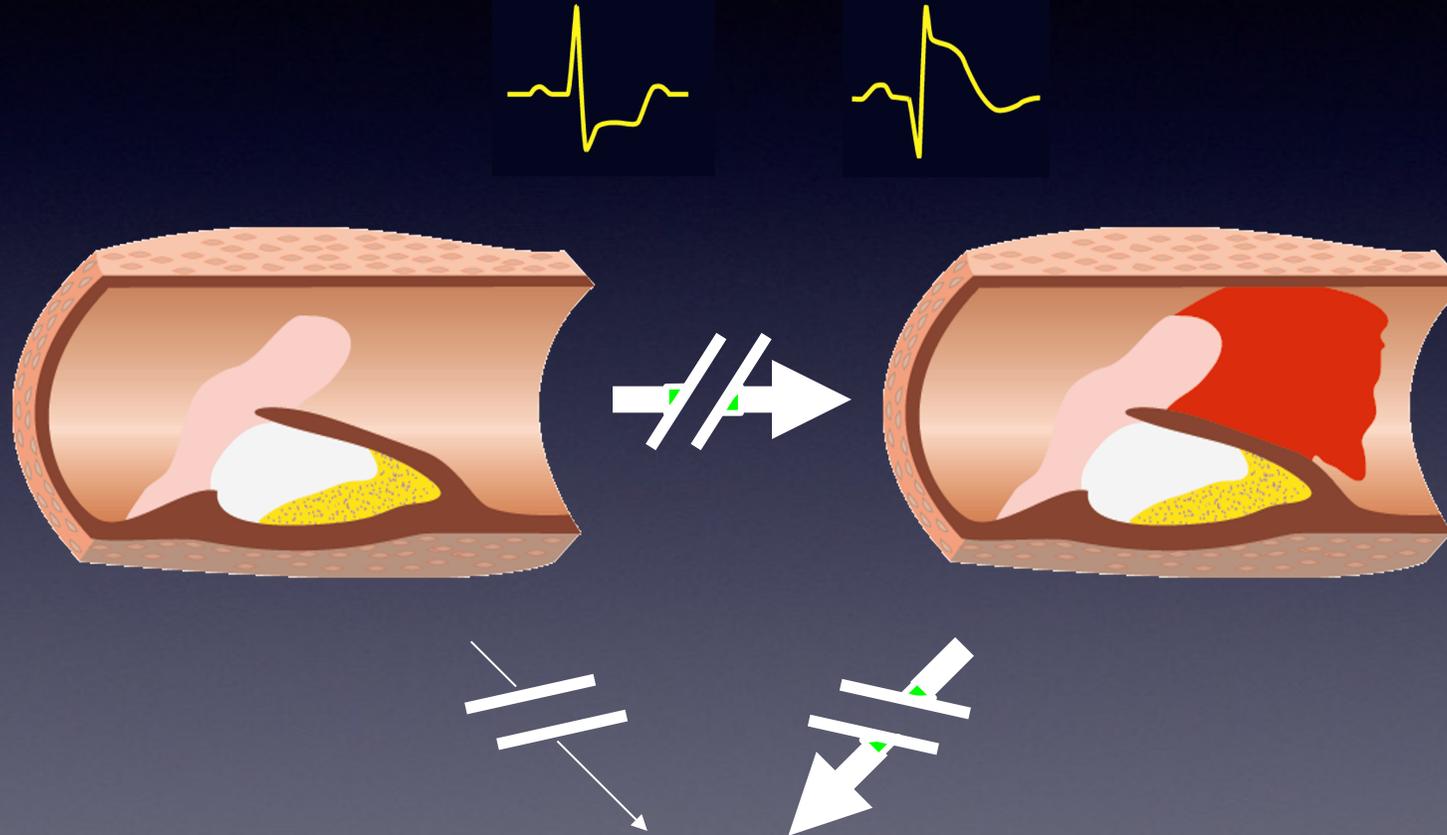
SCA mortalité

- **Mortalité des SCA**
  - 5-7% de à 7 jours
  - 12-13 % à 6 mois

CONDUITE DIAGNOSTIQUE

Symptomatologie suspecte de SCA

- **Stratégie de prise en charge « fast track »**

  - **Médicalisation en urgence $\Rightarrow$ monitoring ECG**

  - **Diagnostic rapide**

  - **Thérapeutique rapide « … time is muscle »**

Recommandations Société européenne de cardiologie

ESC GUIDELINES

2017 ESC Guidelines for the management of acute myocardial infarction in patients presenting with ST-segment elevation

The Task Force for the management of acute myocardial infarction in patients presenting with ST-segment elevation of the European Society of Cardiology (ESC)

Authors/Task Force Members: Borja Ibanez* (Chairperson) (Spain), Stefan James* (Chairperson) (Sweden), Stefan Agewall (Norway), Manuel J. Antunes (Portugal), Chiara Bucciarelli-Ducci (UK), Héctor Bueno (Spain), Alida L. P. Caforio (Italy), Filippo Crea (Italy), John A. Goudevenos (Greece), Sigrun Halvorsen (Norway), Gerhard Hindricks (Germany), Adnan Kastrati (Germany), Mattie J. Lenzen (The Netherlands), Eva Prescott (Denmark), Marco Roffi (Switzerland), Marco Valgimigli (Switzerland), Christoph Varenhorst (Sweden), Pascal Vranckx (Belgium), Petr Widimský (Czech Republic)

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SCA ST+

STEMI

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ESC Committee for Practice G ... reviewers: listed in the Appendix.

ESC entities having participate ...
Associations: Acute Cardiovascul ... ardiology (EAPC), European Association of Cardiovascular Imaging (EACVI), European Association of ... Rhythm Association (EHRA), Heart Failure Association (HFA).
Councils: Council on Cardiovascu ... Practice (CCP).
Working Groups: Cardiovascular ... gy and Microcirculation, Myocardial and Pericardial Diseases, Thrombosis.

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ESC GUIDELINES

2020 ESC Guidelines for the management of acute coronary syndromes in patients presenting without persistent ST-segment elevation

The Task Force for the management of acute coronary syndromes in patients presenting without persistent ST-segment elevation of the European Society of Cardiology (ESC)

Authors/Task Force Members: Jean-Philippe Collet * (Chairperson) (France), Holger Thiele * (Chairperson) (Germany), Emanuele Barbato (Italy), Olivier Barthélémy (France), Johann Bauersachs (Germany), Deepak L. Bhatt (United States of America), Paul Dendale (Belgium), Maria Dorobantu (Romania), Thor Edvardsen (Norway), Thierry Folliguet (France), Chris P. Gale (United Kingdom), Martine Gilard (France), Alexander Jobs (Germany), Peter Jüni (Canada), Ekaterini Lambrinou (Cyprus), Basil S. Lewis (Israel), Julinda Mehilli (Germany), Emanuele Meliga (Italy), Béla Merkely (Hungary), Christian Mueller (Switzerland), Marco Roffi (Switzerland), Frans H. Rutten (Netherlands), Dirk Sibbing (

SCA non ST+

NONSTEMI

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ESC Committee for Practice Guidelines (CPG) and National ... Appendix.

ESC entities having participated in the development ...
Associations: Association for Acute CardioVascular Care (... ion of Cardiovascular Imaging (EACVI), European Association of Pr ... (EAPCI), European Heart Rhythm Association (EHRA), Heart Failure Associatio ...
Councils: Council for Cardiology Practice.
Working Groups: Cardiovascular Pharmacotherapy, Cardi ...

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ESC GUIDELINES

2023 ESC Guidelines for the management of acute coronary syndromes

Developed by the task force on the management of acute coronary syndromes of the European Society of Cardiology (ESC)

Authors/Task Force Members: Robert A. Byrne *[†], (Chairperson) (Ireland), Xavier Rossello [‡], (Task Force Co-ordinator) (Spain), J.J. Coughlan [‡], (Task Force Co-ordinator) (Ireland), Emanuele Barbato (Italy), Colin Berry (United Kingdom), Alaide Chieffo (Italy), Marc J. Claeys (Belgium), Gheorghe-Andrei Dan (Romania), Marc R. Dweck (United Kingdom), Mary Galbraith (United Kingdom), Martine Gilard (France), Lynne Hinterbuchner (Austria), Ewa A. Jankowska (Poland), Peter Jüni (United Kingdom), Takeshi Kimura (Japan), Vijay Kunadian (United Kingdom), Margret Leosdottir (Sweden), Roberto Lorusso (Netherlands), Roberto F.E. Pedretti (Italy), Angelos G. Rigopoulos (Greece), Maria Rubini Gimenez (Germany), Holger Thiele (Germany), Pascal Vranckx (Belgium), Sven Wassmann (Germany), Nanette Kass Wenger (United States of America), Borja Ibanez *[†], (Chairperson) (Spain), and ESC Scientific Document Group

Symptomes

The ACS spectrum

	Oligo/ asymptomatic	Increasing chest pain/symptoms	Persistent chest pain/symptoms	Cardiogenic shock/ acute heart failure	Cardiac arrest
Clinical presentation					
ECG findings					
Working diagnosis					
hs-cTn levels					
Final diagnosis					

ESC

Evaluation des symptômes
en médecine de ville

Principal objectif = décision d'hospitalisation immédiate ou non

- **Interrogatoire +++ 80% de la décision**
  - **Terrain: FDR et antécédents**
  - **Symptômes: douleur typique, douleur atypique, signes associés**

- **Examen clinique: pauvre**

Étape 1
évaluation du risque lié au terrain

- **Facteurs de risque CV**
  - **Hérédité (IDM ou mort subite parent 1er degré H<55 ans, F<65 ans)**
  - **Tabagisme, même minime (1 cig/sem)**
  - **Diabète**
  - **Dyslipidémie**
  - **HTA**
  - **Age**
    - **Pièges**
      - » **Sujet (très) jeune, tabagique**
      - » **Sujet âgé: présentations atypiques**
      - » **Femmes douleurs atypiques**
- **Antécédents**
  - **Coronaropathie connue, IDM, angor**
  - **Angioplastie, pontage**
  - **Terrain vasculaire: AOMI, AVC**

Étape 2
évaluation de la douleur

- **Douleur typique**
  - **Sévère (EVA>5), angoissante**
  - **Médio thoracique et retrosternale large zone antérieure**
  - **Écrasement, serrement, oppression, en étau thoracique antérieure**
  - **Irradiation épaules, bras gauche, bras droit, cou, mâchoire, dents, épigastre, dos**
  - **Bi brachiale**
  - **Survenue spontanée au repos, exacerbée à l'effort**
  - **Réponse à la trinitrine: + si soulagée en 2-3 minutes**
  - **Signes neurovégétatifs associés ou isolés**
    - **malaises lipothymiques, pâleur, sueurs froides, nausées, inconfort abdominal, vomissements, syncope**

- **Douleur atypique: 10-30%**
  - **Sujet âgé, diabétique, femme, insuffisant rénal**
  - **Douleur thoracique peu sévère (EVA<5), simple gène voire absente**
  - **Siège jugulaire ou maxillaire ou brachial gauche ou droit isolé**
  - **Caractère constrictif ou brûlure**
  - **Douleur abdominale aiguë, douleur dorsale, …« indigestion »**
  - **Signes neurovégétatifs isolés**

Chest pain or pressure

80%
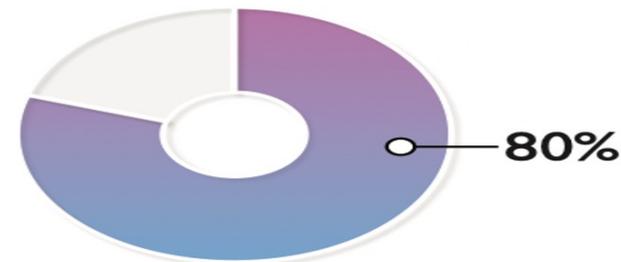
of women and men with ACS present with chest pain or pressure

Sueurs

Douleurs épigastriques « indigestion »

Douleurs épaule bras

Other symptoms, like diaphoresis, indigestion/epigastric pain and shoulder/arm pain occur commonly in both women and men with ACS

Malaise

Nausées Vomissements

Douleurs nuque Douleurs mâchoire

Souffle court

Atypical symptoms « Less likely cardiac symptoms »

Symptômes d'allure non cardiaque

Demander si douleur thoracique associée

ESC guidelines 2023 Acute coronary syndrome

Étape 3: examen physique

- **SCA-infarctus**
  - **Examen pauvre sauf si complication**
    - **Insuffisance cardiaque, OAP, choc cardiogénique**
    - **Souffle d'IM, CIV**

- **Dissection aortique**
  - **Douleur à début brutal, à type de déchirement intense, irradiant dans le dos, migratrice, terrain d'HTA**
  - **Souffle diastolique d'insuffisance aortique**
  - **Ischémie MS, MI, cérébrale, viscérale**
  - **Asymétrie tensionnelle**

- **Embolie pulmonaire**
  - **douleur basi-thoracique, latéralisée, majorée en inspiration, synd pleural, dyspnée**
  - **Insuffisance cardiaque droite**
  - **Signes de phlébite**

- **Péricardite, myo-péricardite**
  - **Sujet jeune, douleur pseudo-angineuse, ↑ en inspiration profonde, ↓ en position assise ou en anté-flexion du tronc, contexte grippal**
  - **Frottement péricardique**

The ACS spectrum

ECG

Clinical presentation

| Oligo/asymptomatic | Increasing chest pain/symptoms | Persistent chest pain/symptoms | Cardiogenic shock/acute heart failure | Cardiac arrest |

ECG findings

| Normal | ST segment depression | ST segment elevation | Malignant arrhythmia |

Working diagnosis

hs-cTn levels

Final diagnosis

ESC

ECG

ECG pattern	Criteria	Signifying	Figure
i STEMI	New ST-elevation at the J-point in ≥ 2 contiguous leads[a] ≥2.5 mm in men <40 years, ≥2 mm in men ≥40 years, or ≥1.5 mm in women regardless of age in leads V2–V3 and/or ≥1 mm in the other leads (in the absence of LV hypertrophy or left bundle branch block) [a]Including V3R and V4R	Ongoing acute coronary artery occlusion	J point
ii Posterior STEMI	ST-segment depression in leads V1–V3, especially when the terminal T-wave is positive (ST-segment elevation equivalent), and concomitant ST-segment elevation ≥0.5 mm recorded in leads V7–V9	Posterior STEMI	V1-V3
iii LCx occlusion/ right ventricular MI	ST-segment elevation in V7–V9 and V3R and V4R, respectively	Left circumflex (LCX) artery occlusion or right ventricular MI	V7-V9, V3R and V4R
iv Multivessel ischaemia/ left main obstruction	ST depression ≥1mm in six or more surface leads (inferolateral ST depression), coupled with ST-segment elevation in aVR and/or V1	Multivessel ischaemia or left main coronary artery obstruction, particularly if the patient presents with haemodynamic compromise	ST depression ≥ 1 mm in six or more surface leads / ST elevation in aVR and/or V1
v Left bundle branch block/ paced rhythm	QRS duration greater than 120 ms Absence of Q wave in leads I, V5 and V6 Monomorphic R wave in I, V5 and V6 ST and T wave displacement opposite to the major deflection of the QRS complex	Patients with a high clinical suspicion of ongoing myocardial ischaemia should be managed in a similar way to STEMI patients	
vi Right bundle branch block	QRS duration greater than 120 ms rsR' "bunny ear" pattern in the anterior precordial leads (leads V1-V3) Slurred S waves in leads I, aVL and frequently V5 and V6	Patients with a high clinical suspicion of ongoing myocardial ischaemia should be managed in a similar way to STEMI patients	R' R
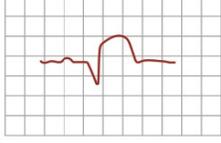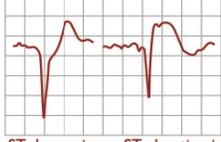
ECG pattern	Criteria	Signifying	Figure
a Isolated T-wave inversion	T-wave inversion >1 mm in ≥5 leads including I, II, aVL, and V2–V6	Only mildly impaired prognosis	I, II, aVL,or V2 to V6
b ST-segment depression	J point depressed by ≥0.05 mm in leads V2 and V3 or ≥1 mm in all other leads followed by a horizontal or downsloping ST-segment for ≥0.08 s in ≥1 leads (except aVR)	More severe ischaemia	≥ 1 leads ≥ 1 leads
c Transient ST-segment elevation	ST segment elevation in ≥2 contiguous leads of ≥2.5 mm in men <40 years, ≥2 mm in men ≥ 40 years, or ≥1.5 mm in women regardless of age in leads V2–V3 and/or ≥1 mm in the other leads lasting <20 min	Only mildly impaired prognosis	<20min ≥ 2 contiguous leads
d De Winter ST-T	1–3 mm upsloping ST-segment depression at the J point in leads V1–V6 that continue into tall, positive, and symmetrical T waves	Proximal LAD occlusion/ severe stenosis	V1–V6
e Wellens sign	Isoelectric or minimally elevated J point (<1 mm) + biphasic T wave in leads V2 and V3 (type A) or symmetric and deeply inverted T waves in leads V2 and V3, occasionally in leads V1, V4, V5, and V6 (type B)	Proximal LAD occlusion/ severe stenosis	type A (V1-)V2-V3(-V4) type B (V1-)V2-V3(-V4)
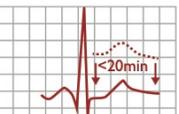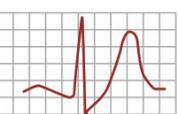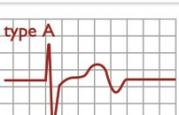
ACS ESC guidelines *Eur H J 2023* p3720

ECG

ECG pattern	Criteria	Signifying	Figure
(i) STEMI	New ST-elevation at the J-point in ≥ 2 contiguous leads[a] ≥2.5 mm in men <40 years, ≥2 mm in men ≥40 years, or ≥1.5 mm in women regardless of age in leads V2–V3 and/or ≥1 mm in the other leads (in the absence of LV hypertrophy or left bundle branch block) [a]Including V3R and V4R	Ongoing acute coronary artery occlusion	J point
(d) De Winter ST-T	1–3 mm upsloping ST-segment depression at the J point in leads V1–V6 that continue into tall, positive, and symmetrical T waves	Proximal LAD occlusion/ severe stenosis	V1–V6
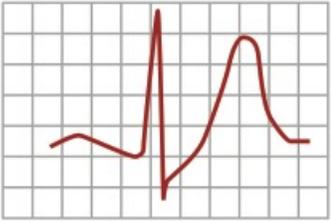
Evaluation de la douleur thoracique
en médecine de ville

Principal objectif = décision d'hospitalisation immédiate ou non par SAMU

- **Interrogatoire +++ 80% de la décision**
  - **Terrain: FDR et antécédents**
  - **Symptômes: douleur typique, douleur atypique, signes associés**

- **Examen clinique: pauvre**

- **ECG (18D)**
  - **Presque inutile si la douleur est typique**
  - **Utile en cas de présentation atypique et si anormal**
  - **Pb:**
    - **Sensibilité 80%: <u>faux négatifs:</u> phase inter-critique, territoire CX muet à l'ECG**
    - **Disponibilité**
    - **Difficultés d'interprétation**

Cas clinique
Pièges des SCA

- **Patient de 56 ans**

- **HTA, dyslipémie, tabagisme actif**

- **EP sur phlébite en 2015**

- **Mutation facteur V HZ**

- **En arrêt de travail depuis 1 mois pour des douleurs thoraciques**

- **Scintigraphie myocardique pour douleurs thoraciques atypiques en oct 2023, 160 W 87% de la FMT, négative cliniquement , électriquement et scintigraphiquement –**

- **Appel du 15 pour Dt à 3h15**
  - **ECG normal, scintigraphie rassurante**
  - **Le SAMU s'en va…**
  - **Au passage de la porte: ACR en FV**
  - **MCE, MCE pdt 6 min, adrenaline 1 mg, CEE, ROSC**

- **ECG post CEE: sus ST**

Coronarographie

Troponine

The ACS spectrum

Clinical presentation	Oligo/asymptomatic	Increasing chest pain/symptoms	Persistent chest pain/symptoms	Cardiogenic shock/acute heart failure	Cardiac arrest
ECG findings	Normal	ST segment depression		ST segment elevation	Malignant arrhythmia
Working diagnosis		NSTE-ACS		STEMI	
hs-cTn levels					
Final diagnosis					

ESC

Cycle de troponine

Patient presents with a suspected NSTEMI and without an indication for immediate invasive angiography

Take hs-cTn at 0 h and 1 h/2 h

Very low initial hs-cTn[a] OR Low initial hs-cTn and no increase in 1 h/2 h hs-cTn	Patients who do not meet the criteria for either of the other two pathways	High initial hs-cTn OR Increase in 1 h/2 h hs-cTn
Troponine normale	**Zone grise: troponine faiblement élevée**	**Troponine franchement élevée 5-10 x la normale**
Rule-out pathway	Observe pathway	Rule-in pathway

La troponine
Faut-il la doser en ville ??

- **Idéalement non**: tout patient suspect de SCA doit être hospitalisé

- **En pratique: difficile de résister à la pression**

- **Intérêt**
  - « repêcher » les cas difficiles (idem D-Dimer dans la dissection aortique)
  - Ne remplace pas la clinique ni l'ECG

- **Conditions**
  - Présentation atypique
  - Terrain non à risque
  - ECG normal
  - Dosage rapide, récupération rapide du résultat
  - Interpréter les résultats en fonction de la durée de la douleur:
    - → pas d'élévation avant H3
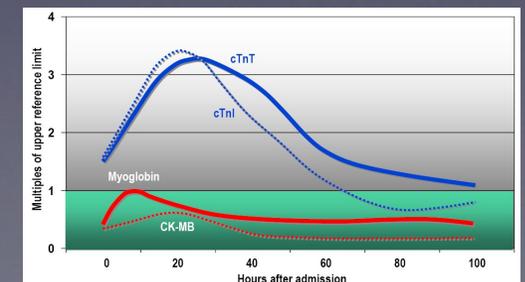
PRISE EN CHARGE THÉRAPEUTIQUE

Prise en charge thérapeutique
en pré-hospitalier

- **1. Appel du 15**

- **2. Monitoring ECG**

- **3. Test à la TNT si TA > 110-120**

- **4. Aspirine 250 mg per os**

- **5. Dose de charge d'anti-P$_2$Y$_{12}$?**

  - **Clopidogrel (Plavix®): 4-8cps**

  - **Ticagrelor (Brilique®): 2 cps**

  - **Prasugrel (Efient®): 6cps**

Guidelines ESC 2023
Non: pas de dose de charge d'anti-P$_2$Y$_{12}$

2017 and 2020	Class	Level	2023	Class	Level
Recommendations for antiplatelet and anticoagulant therapy in STEMI					
A potent P2Y$_{12}$ inhibitor (prasugrel or ticagrelor), or clopidogrel if these are not available or are contraindicated, is recommended before (or at latest at the time of) PCI, and maintained over 12 months, unless there are contraindications such as excessive risk of bleeding.	I	A	Pre-treatment with a P2Y$_{12}$ receptor inhibitor may be considered in patients undergoing a primary PCI strategy.	IIb	B

Guidelines ESC 2023
Non: pas de dose de charge d'anti-P$_2$Y$_{12}$

ATLANTIC randomized double blind: 1 862 patients

(p = 0.63)

86.8 — 87.6

≥70% ST-segment resolution

Ambulance ticagrelor
Ambulance placebo
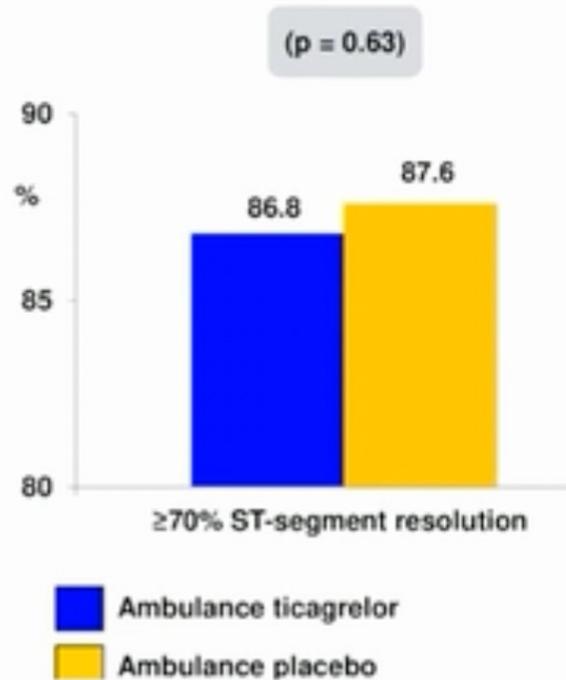
Montalescot et al N Engl J Med 2014;371:1016-27.

SWEDEHART registry: 7 433 patients

NS

No. at risk
Treatment 5435 / 5240 / 5201 / 5188
No Treatment 1995 / 1940 / 1917 / 1904

No Ticagrelor pre-treatment — Ticagrelor pre-treatment
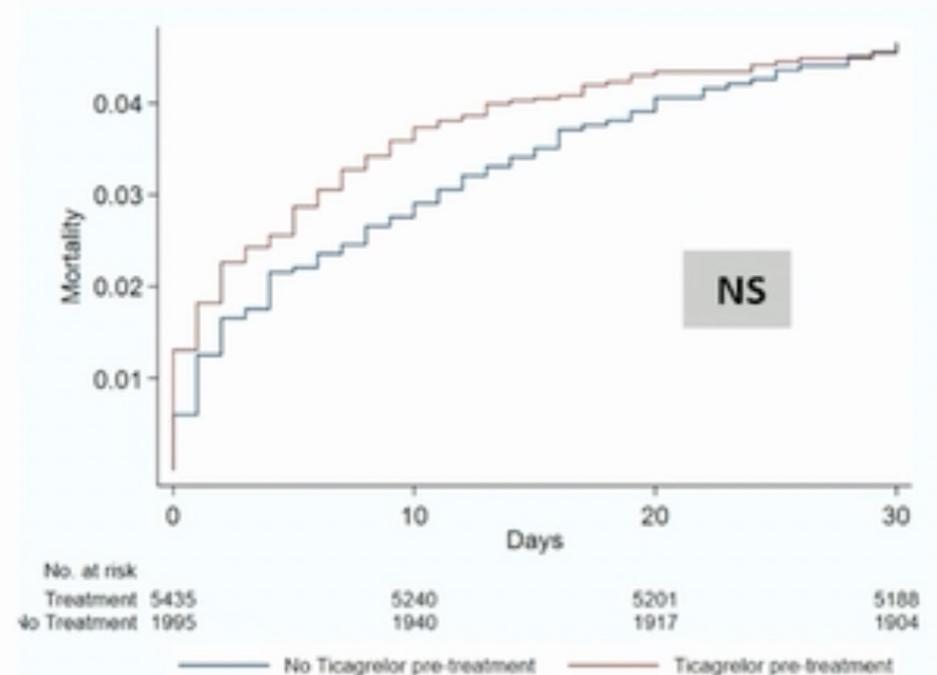
Koul et al Circ Cardiovasc Interv. 2018;11:e005528

Anti-P$_2$Y$_{12}$ intra-veineux en salle de cathéterisme
Cangrelor: Kengrexal®
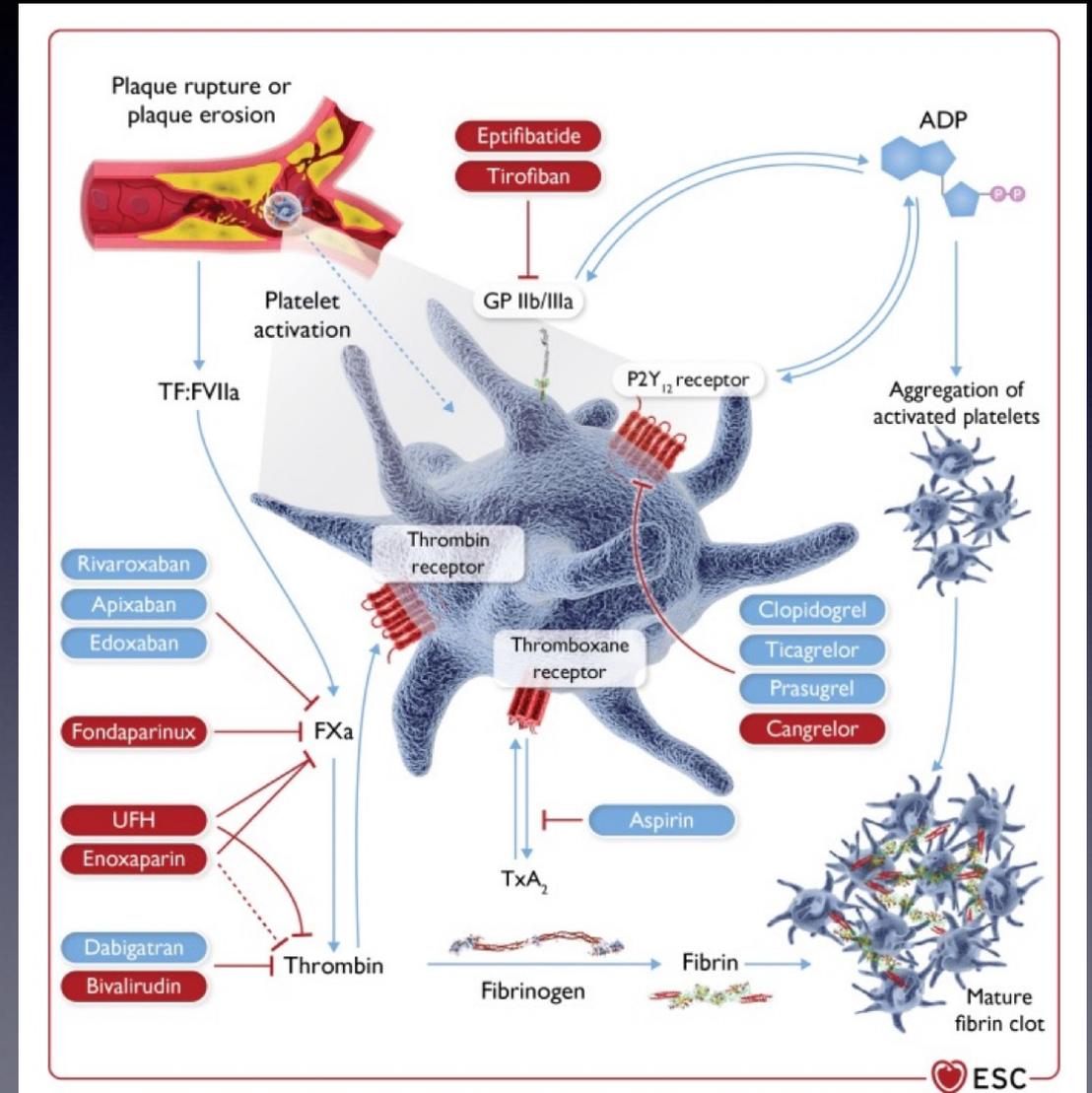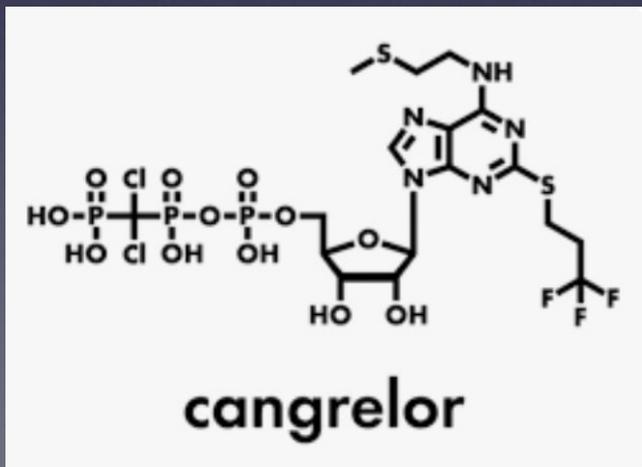
Cas clinique 2
Dose de charge inappropriée d'anti-P2Y12 retard à la chirurgie

- **Patient de 69 ans, HTA, dyslipemie**

- **25/09: appel du SAMU pour DT intense EVA 9-10/10**

- **ECG: sus-ST en AVR**

- **SAMU: précharge Kardegic et Ticagrelor**

- **Hospitalisation en USIC**

  - **Anémie à 8 g en rapport avec un ulcère gastro-duodenal: → IPP**

  - **Coronaropathie tritronculaire: IVA, marginale, IVP: indication de pontage**

  - **RAo GM 58, Sao 0,8 cm2**

- **RVAO+pontage programmé en oct 2023: chirurgie retardée d'une semaine**

Gestion pré-opératoire des antiP2Y12
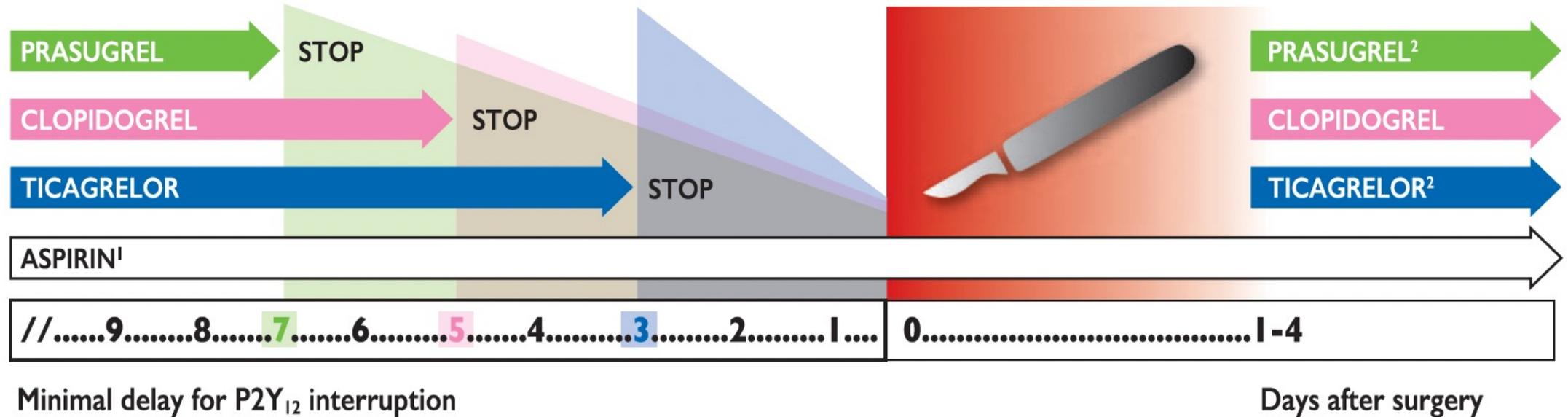
CAS PARTICULIER: ARRET CARDIAQUE

The ACS spectrum

Clinical presentation	Oligo/ asymptomatic	Increasing chest pain/symptoms	Persistent chest pain/symptoms	Cardiogenic shock/ acute heart failure	Cardiac arrest

ECG findings	Normal	ST segment depression		ST segment elevation	Malignant arrhythmia

Working diagnosis	NSTE-ACS			STEMI	

hs-cTn levels					

Final diagnosis					

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ESC

Score IDM dans l'ACR récupéré
177 patients
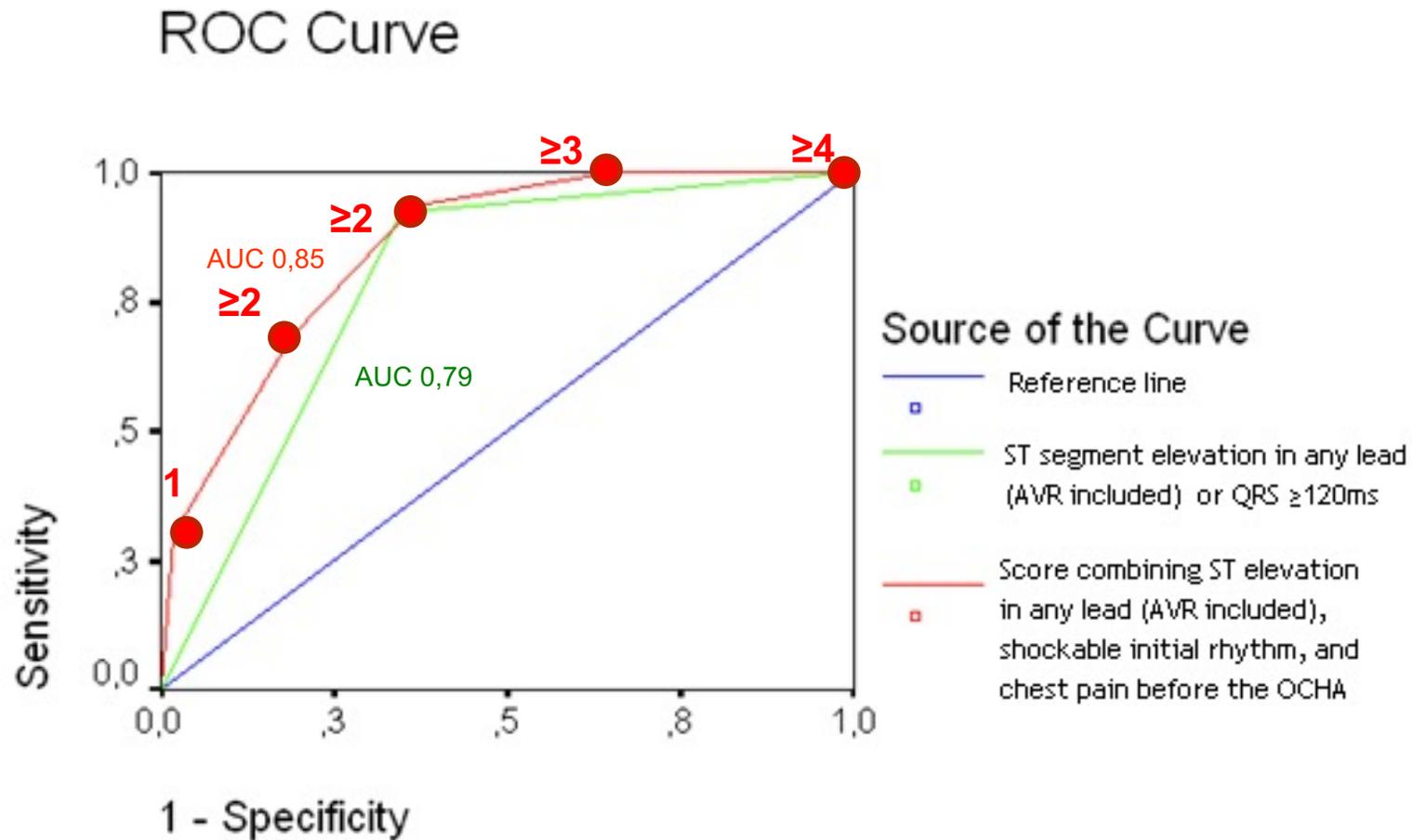
- Angio if AMI score >2

Coronary occlusion if:

- ST elevation including AVR: 2 points
- Shockable rhythm: 1 point
- Chest pain before ACR: 1point

Arrêt cardiaque extra-hospitalier
2 situations

Arrêt cardiaque récupéré

- **ECG STEMI**
  - Occlusion coronaire
  - Bénéfice d'une coronarographie et angioplastie immédiate
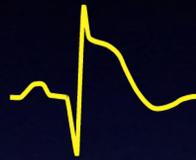
- **ECG: absence de STEMI**
  - Hospitalisation en réanimation
  - Coronarographie différée à 48h

Arrêt cardiaque non récupéré

- **Discussion ECMO en urgence**
  - Si rythme initial choquable

  (fibrillation ventriculaire réfractaire)

- **Arrêt des soins**
  - Asystole
  - Dissociation électromécanique

Advanced reperfusion strategies for patients with out-of-hospital cardiac arrest and refractory ventricular fibrillation (ARREST): a phase 2, single centre, open-label, randomised controlled trial

Demetris Yannopoulos, Jason Bartos, Ganesh Raveendran, Emily Walser, John Connett, Thomas A Murray, Gary Collins, Lin Zhang, Rajat Kalra, Marinos Kosmopoulos, Ranjit John, Andrew Shaffer, R J Frascone, Keith Wesley, Marc Conterato, Michelle Biros, Jakub Tolar, Tom P Aufderheide

Summary

Background Among patients with out-of-hospital cardiac arrest (OHCA) and ventricular fibrillation, more than half present with refractory ventricular fibrillation unresponsive to initial standard advanced cardiac life support (ACLS) treatment. We did the first randomised clinical trial in the USA of extracorporeal membrane oxygenation (ECMO)-facilitated resuscitation versus standard ACLS treatment in patients with OHCA and refractory ventricular fibrillation.

Methods For this phase 2, single centre, open-label, adaptive, safety and efficacy randomised clinical trial, we included adults aged 18–75 years presenting to the University of Minnesota Medical Center (MN, USA) with OHCA and refractory ventricular fibrillation, no return of spontaneous circulation after three shocks, automated cardiopulmonary resuscitation with a Lund University Cardiac Arrest System, and estimated transfer time shorter than 30 min. Patients were randomly assigned to early ECMO-facilitated resuscitation or standard ACLS treatment on hospital arrival by use of a secure schedule generated with permuted blocks of randomly varying block sizes. Allocation concealment was achieved by use of a randomisation schedule that required scratching off an opaque layer to reveal assignment. The primary outcome was survival to hospital discharge. Secondary outcomes were safety, survival, and functional assessment at hospital discharge and at 3 months and 6 months after discharge. All analyses were done on an intention-to-treat basis. The study qualified for exception from informed consent (21 Code of Federal Regulations 50.24). The ARREST trial is registered with ClinicalTrials.gov, NCT03880565.

Findings Between Aug 8, 2019, and June 14, 2020, 36 patients were assessed for inclusion. After exclusion of six patients, 30 were randomly assigned to standard ACLS treatment (n=15) or to early ECMO-facilitated resuscitation (n=15). One patient in the ECMO-facilitated resuscitation group withdrew from the study before discharge. The mean age was 59 years (range 36–73), and 25 (83%) of 30 patients were men. Survival to hospital discharge was observed in one (7%) of 15 patients (95% credible interval 1·6–30·2) in the standard ACLS treatment group versus six (43%) of 14 patients (21·3–67·7) in the early ECMO-facilitated resuscitation group (risk difference 36·2%, 3·7–59·2; posterior probability of ECMO superiority 0·9861). The study was terminated at the first preplanned interim analysis by the National Heart, Lung, and Blood Institute after unanimous recommendation from the Data Safety Monitoring Board after enrolling 30 patients because the posterior probability of ECMO superiority exceeded the prespecified monitoring boundary. Cumulative 6-month survival was significantly better in the early ECMO group than in the standard ACLS group. No unanticipated serious adverse events were observed.
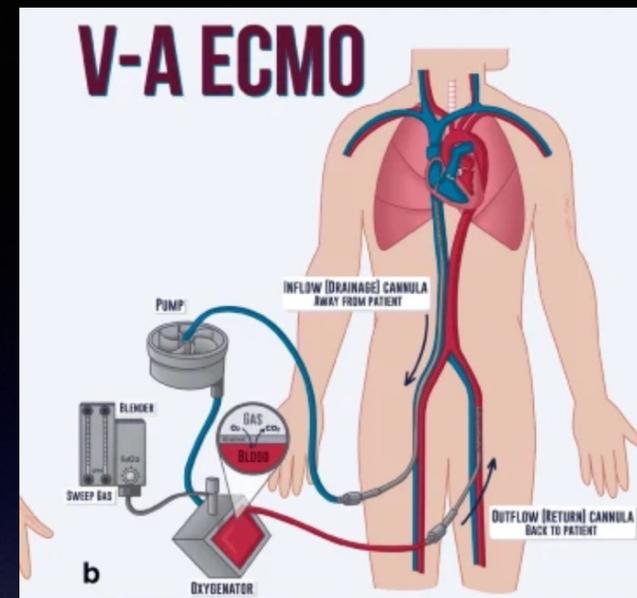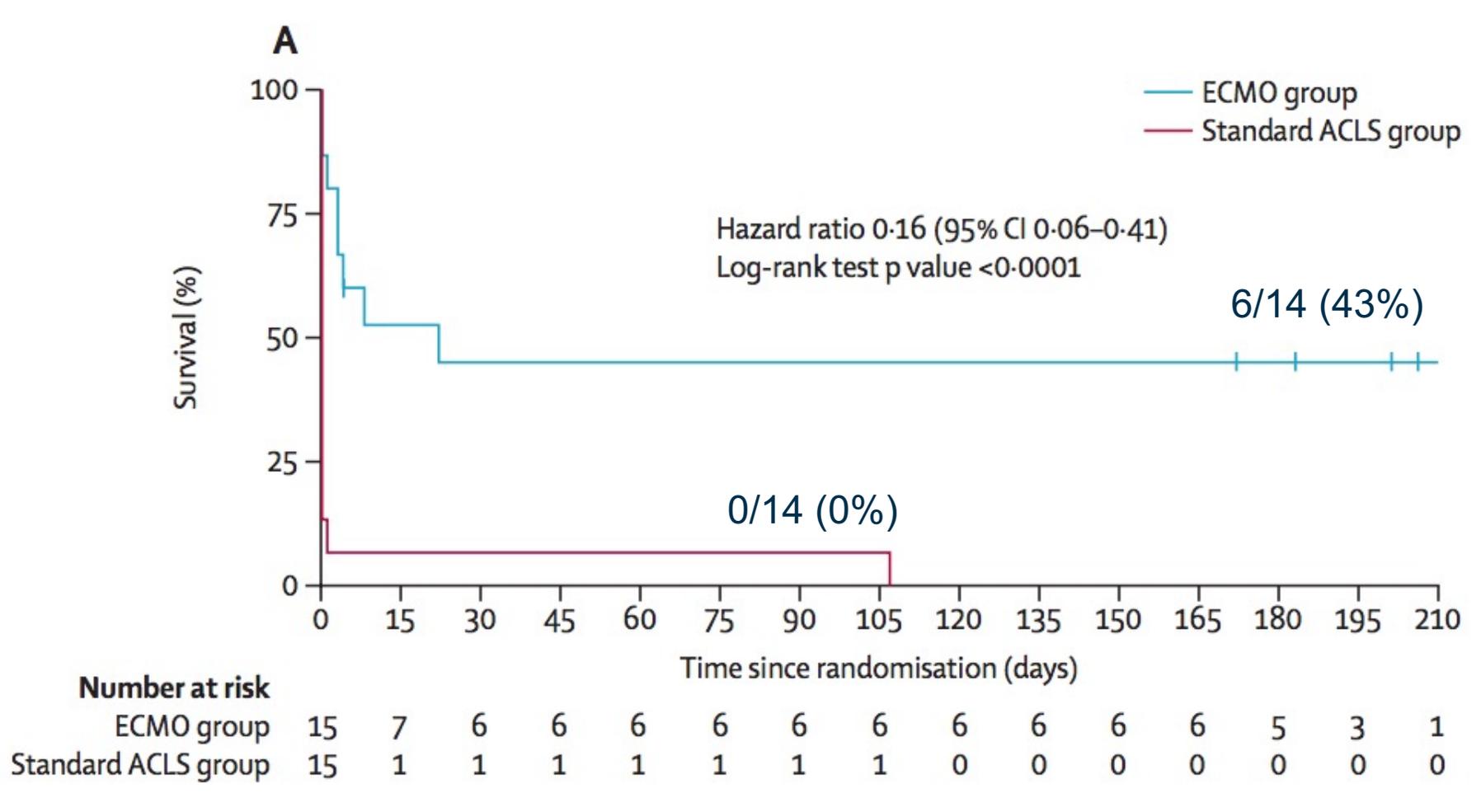
Planche à masser LUCAS ®

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	ECMO-facilitated resuscitation (n=15)		Standard ACLS treatment (n=15)		Risk difference or p value
	Number of patients with data	Patients	Number of patients with data	Patients	
Prehospital characteristics					
Primary VF cardiac arrest	15	15 (100%)	15	15 (100%)	..
Public location of cardiac arrest	15	8 (53%)	15	8 (53%)	..
Bystander witnessed	15	11 (73·3%)	15	13 (86·7%)	..
Bystander CPR	15	13 (86·7%)	15	12 (80·0%)	..
Time from 911 call to EMS arrival (min)	15	6 (2·3)	15	7 (2·5)	..
Endotracheal intubation	15	5 (33·3%)	15	4 (26·6%)	..
Epinephrine doses (1 mg)	15	3·3 (2·3)	15	4·4 (4·8)	..
Amiodarone dose (mg)	15	322 (165)	15	375 (78)	..
Number of shocks by EMS	15	5 (2·5)	15	6 (3)	..
Time from cardiac arrest to first shock (min)	15	8·5 (2)	15	7 (2·5)	..
Intermittent ROSC before ED arrival	15	5 (33·3%)	15	4 (26·6%)	..
Arriving with ROSC at the ED	15	0	15	0	..
Achieving ROSC in the ED	15	0	15	2 (13·4%)	..
EMS scene time (min)	15	22·5 (6)	15	23 (11)	..
Transport time (min)	15	19 (7)	15	20 (10)	..
Presenting arterial blood gases					
Initial lactate, mmol/L	15	11·5 (4·5)	15	10·7 (3·1)	..
Initial pH	15	6·9 (0·9)	15	7·0 (0·11)	..
Initial arterial oxygen, mm Hg	15	86 (18)	15	77 (26)	..
Initial serum bicarbonate, mg/dL	15	19·2 (6·5)	15	20·8 (5·0)	..
Initial end tidal CO_2, mm Hg	15	33 (15·2)	15	28 (17·7)	..

(Table 2 continues on next page)

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|	ECMO-facilitated resuscitation (n=15)		Standard ACLS treatment (n=15)		Risk difference or p value
	Number of patients with data	Patients	Number of patients with data	Patients	
(Continued from previous page)					
ED times for standard ACLS					
Time from 911 call to randomisation (min)	15	48·5 (21)	15	51·8 (13)	0·61
ACLS duration after ED arrival (min)	15	NA	15	28·5 (17)	NA
Time of CPR duration from 911 call to death (min)	15	NA	13	81 (20)	NA
Time of CPR duration from 911 call to ROSC (min)	15	NA	2	83 (8·5)	NA
CCL treatment times					
Time from 911 call to VA-ECMO initiation, min	12	59 (28)	2	NA	NA
Time from randomisation to VA-ECMO initiation, min	12	12 (6)	2	NA	NA
Time from CCL arrival to VA-ECMO initiation, min	12	7 (4)	2	NA	NA
CCL access and treatment					

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Cas clinique

Cas clinique, patient de 72 ans

- ACR non récupéré sur la voie publique devant témoin
- MCE: pas de reprise d'un rythme propre
- Arrivée du SAMU après 15 minutes rythme de FV réfractaire
- Relai par planche à masser
- CEE x 5
- 7 mg d'adrénaline, 450 mg de cordarone, 100 mg Xylocaine
- Appel du SAMU à 18:00
- Arrivée au cathlab à 18:55
- Ponction artérielle fémorale droite échoguidée
- Gazométrie pH < 6.75, lactates à 23 mmol/l, PaO_2 60 mmHg, $PaCO_2$ à 65 mmHg.
- Gazométrie qualifiante (PaO_2 > 50 mmHg)
- Décision collégiale d'application du protocole ARREST-2
- ECMO puis angioplastie

- **Ponction veineuse fémorale droite et ponction fémorale superficielle droite échoguidées**
- **Sonde JR4 pour échange de guide Superstiff, dilatateurs**
- **Montée des canules**
- **Equipe pluridiscplinaire: cardiologue et chirurgien cardiaque**
- **Reperfusion du MID**
- **ECMO opérationnelle à 19:18 (+78min), maintien de la planche à masser**
- **Récupération d'un rythme propre efficace à 19:25 au premier CEE sous ECMO**
- **Coronarographie**

Cannule ECMO

Contre perfusion
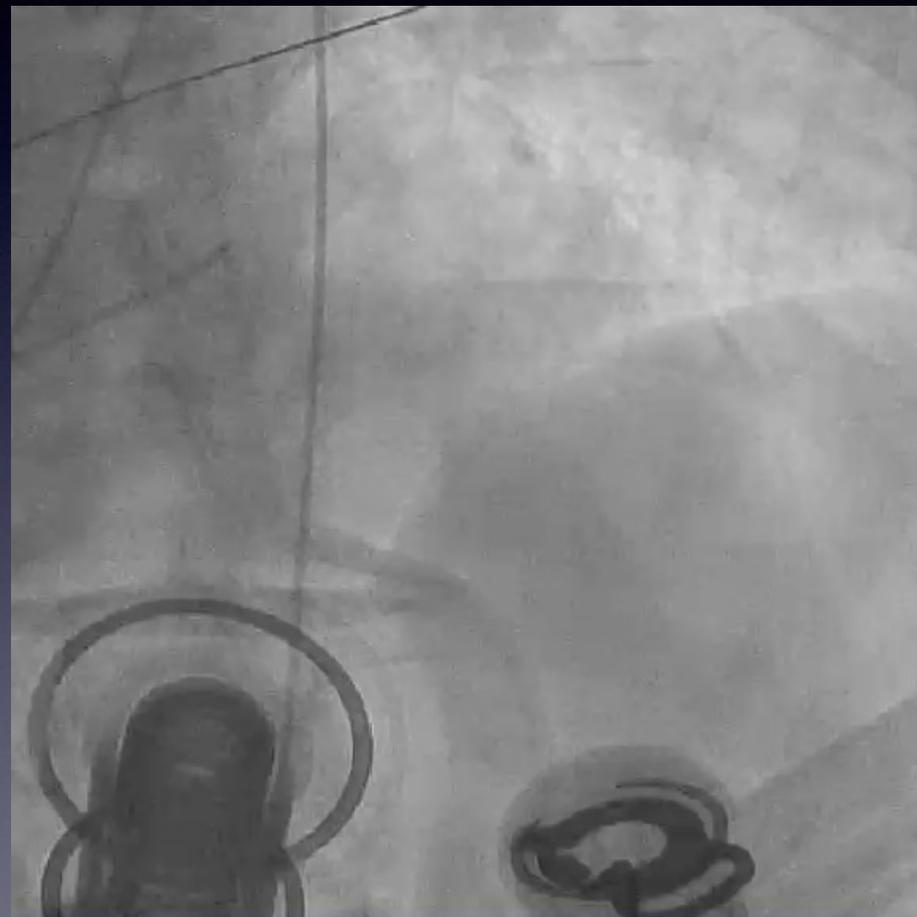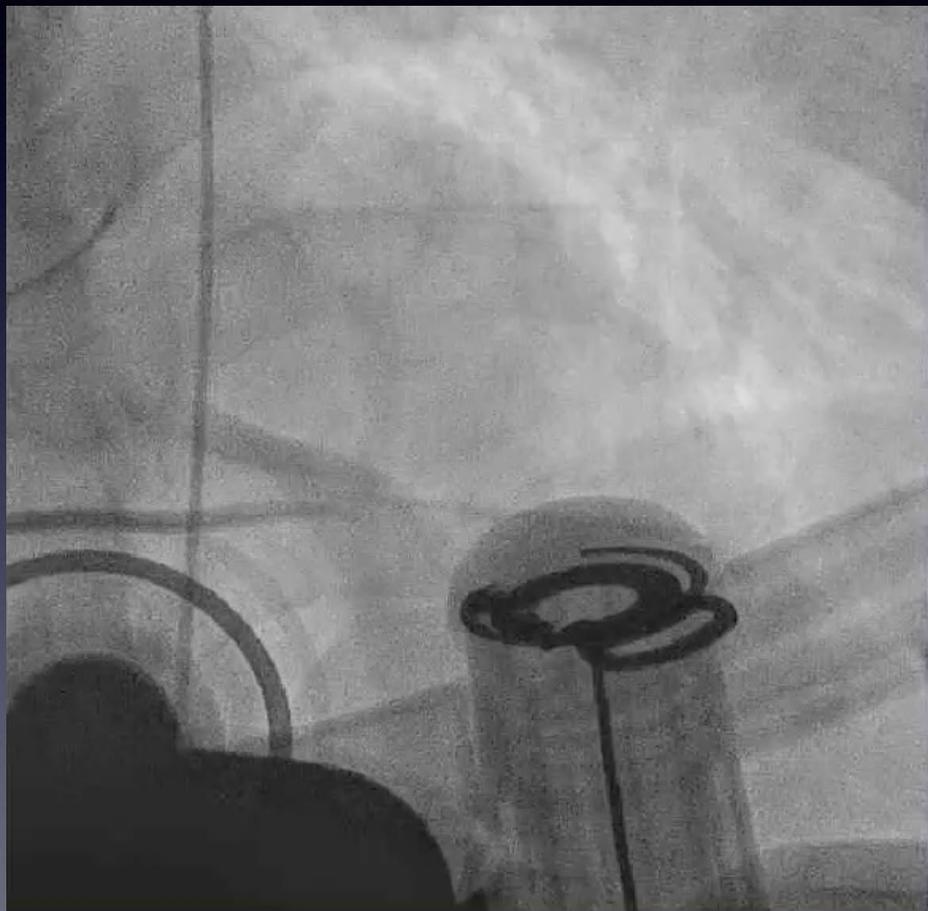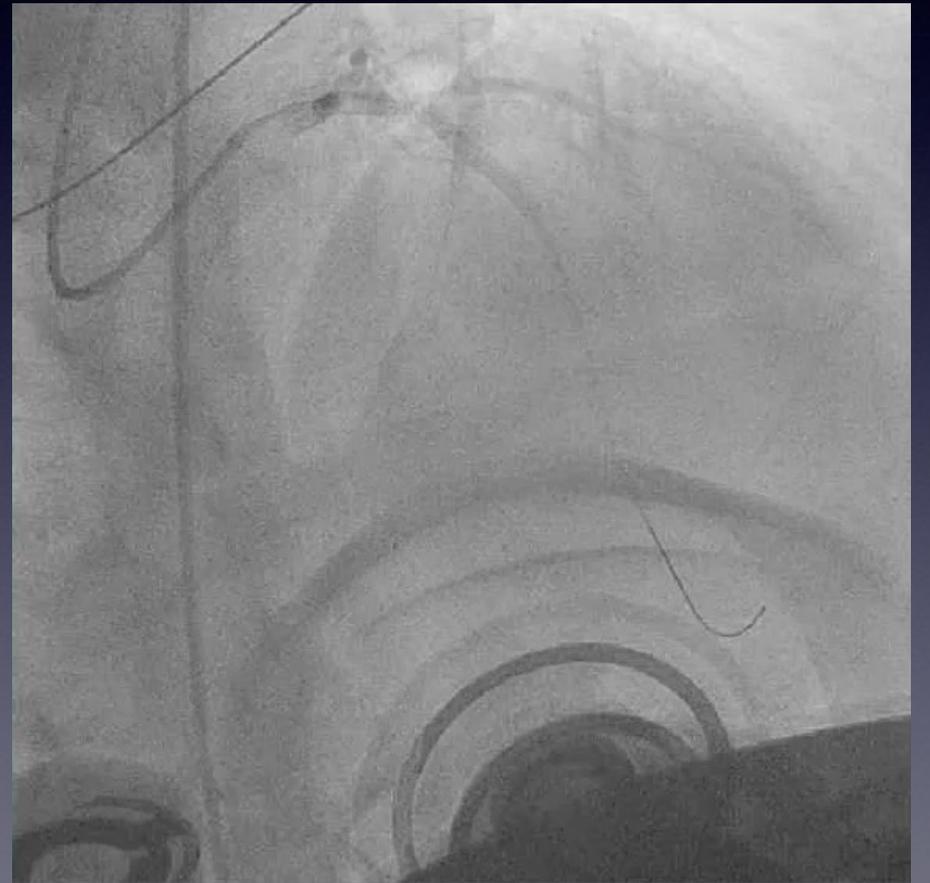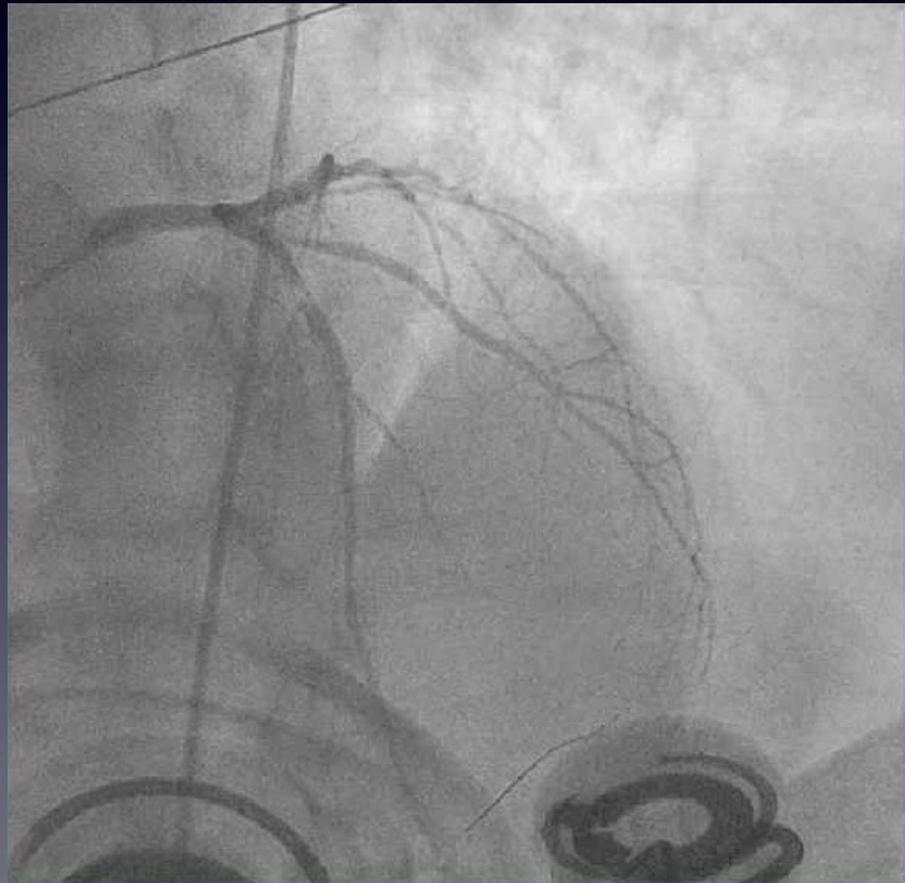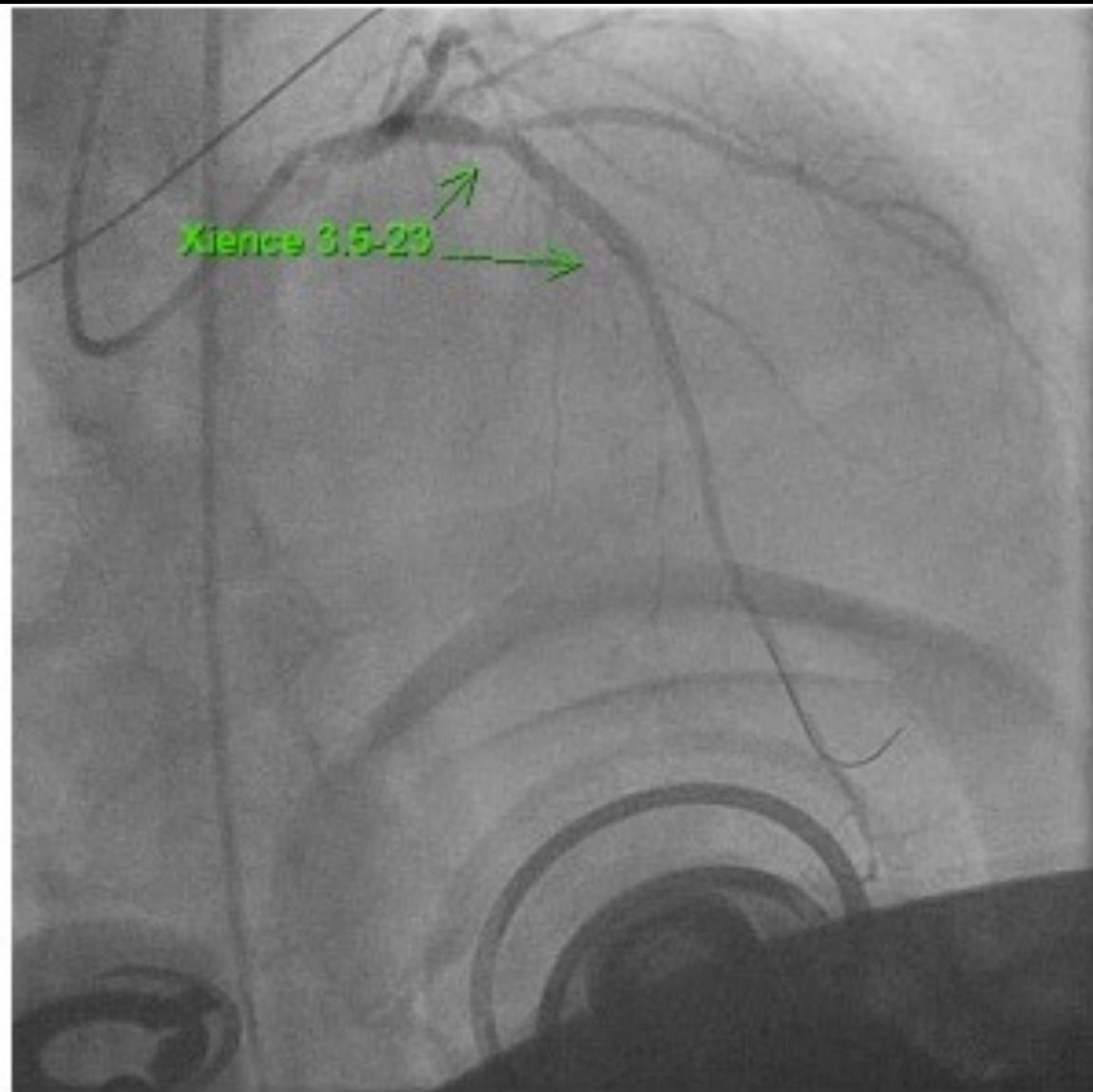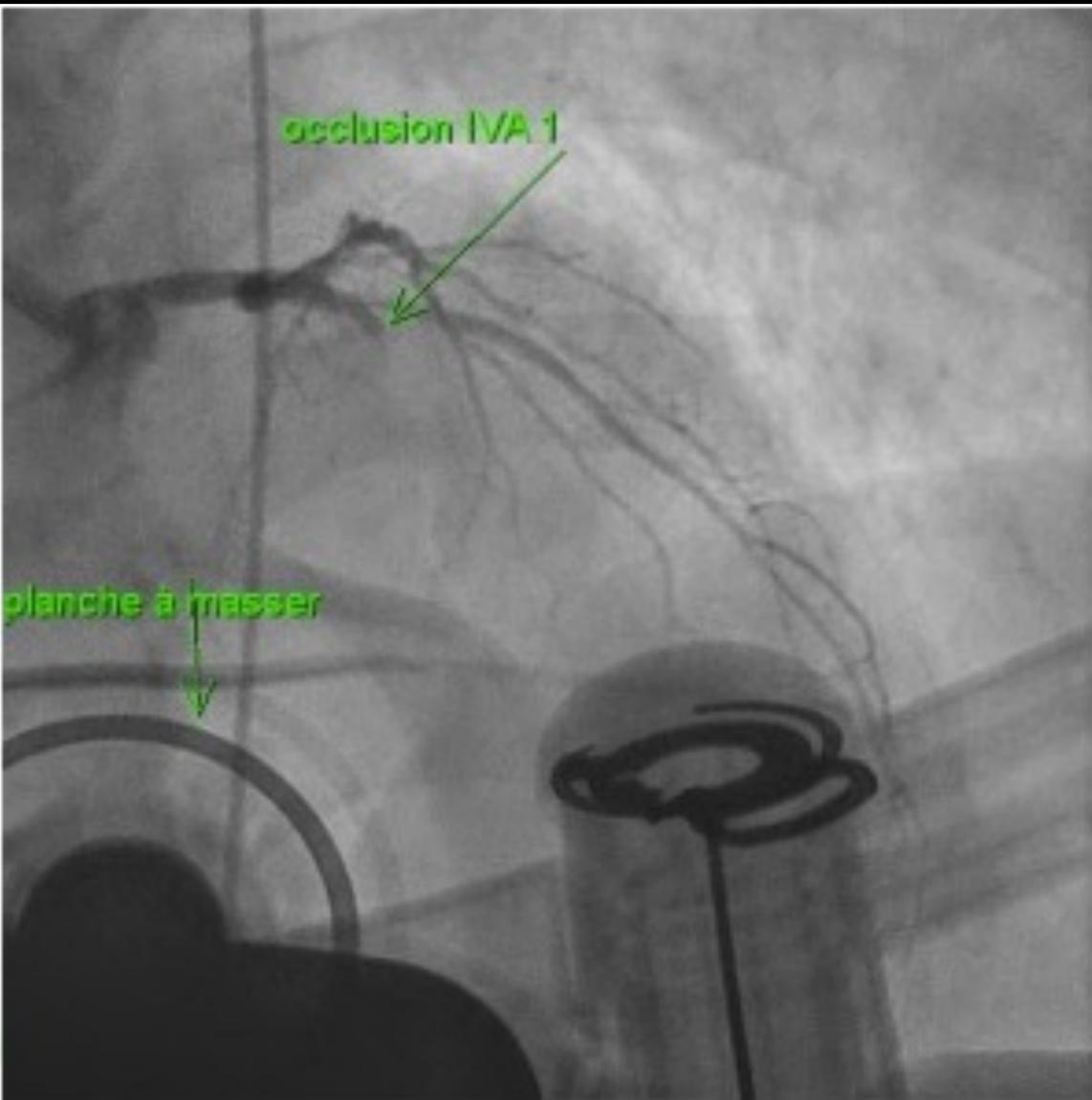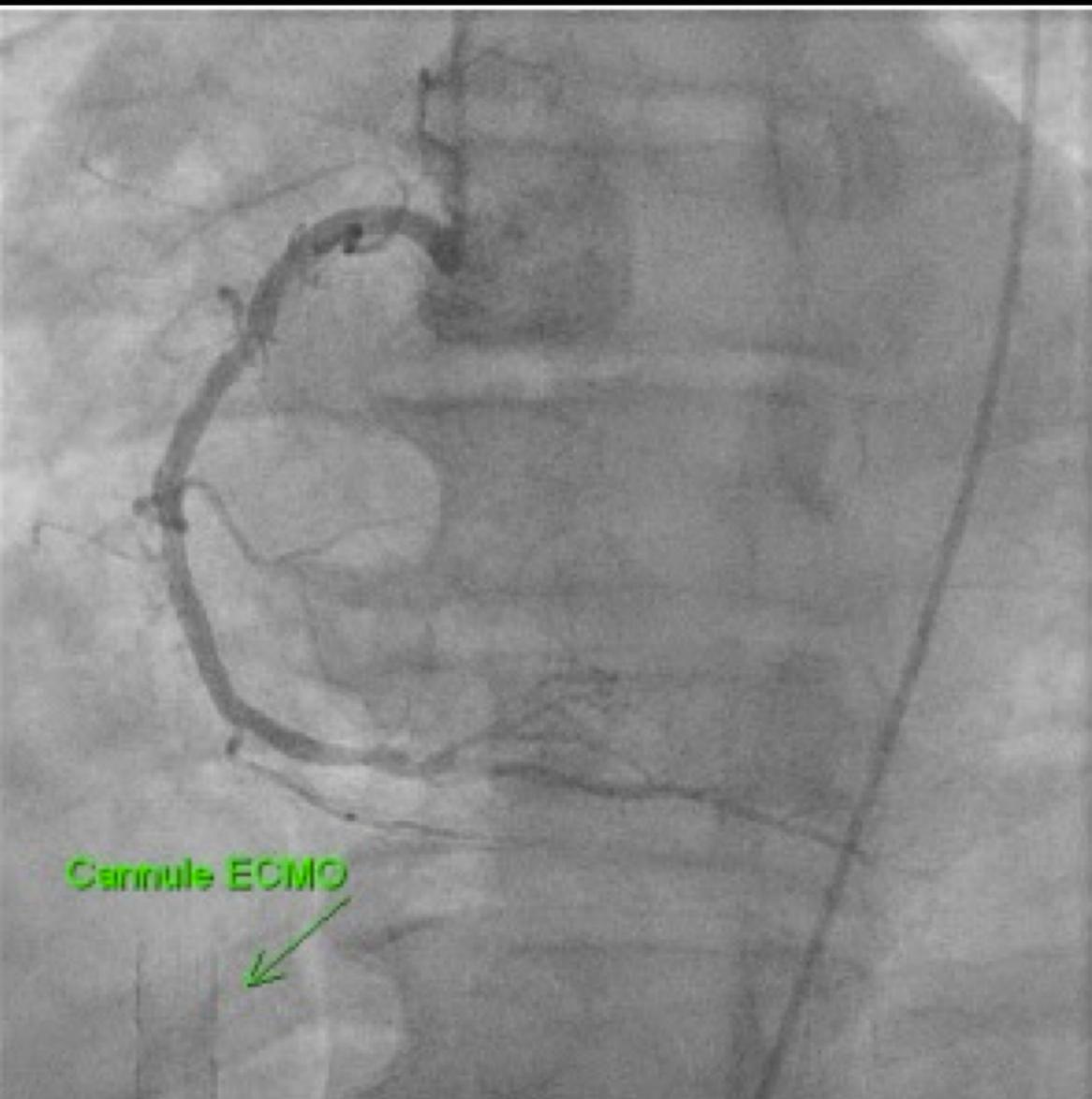
Evolution favorable

- **Extubation H48**
  - **Contact neurologique OK**
- **Ablation de l'ECMO à J5**
- **AVC hémorragique après ablation de l'ECMO**
  - **Hémiparésie lentement régressive**
- **Diarrhées: ischémie colique grade 2 traitée médicalement**
- **Insuffisance rénale aiguë → hémodiafiltration pdt 11 jours**
- **Sortie à J+30**
- **Rééducation pdt 3 mois**
- **Retour à domicile**
  - **Marche**
  - **Autonome à domicile**
  - **Quelques troubles des fonctions supérieures**
  - **Rankin 2**
- **Suivi à 1 an**
  - **Stable, autonome**

Conclusion

- **Diagnostic difficile dans 20 %; formes pièges +++**

- **Pierre angulaire en ville: décision d'hospitalisation**

- **Prise en charge extrêmement codifiée**

  - **Course contre la montre**

  - **Risque d'arrêt cardiaque**

- **Clinique, interrogatoire +++**

- **ECG**

- **Troponine en cas de clinique atypique**

  - **Récupérer le résultat rapidement**

  - **Interpréter le résultat en fonction du délai de la douleur**

    - **Elévation 3 heures après la douleur**

- **merci**