Hospices Civils de Lyon

Votre santé, notre engagement

Quelle place pour l'assistance circulatoire de courte durée ?

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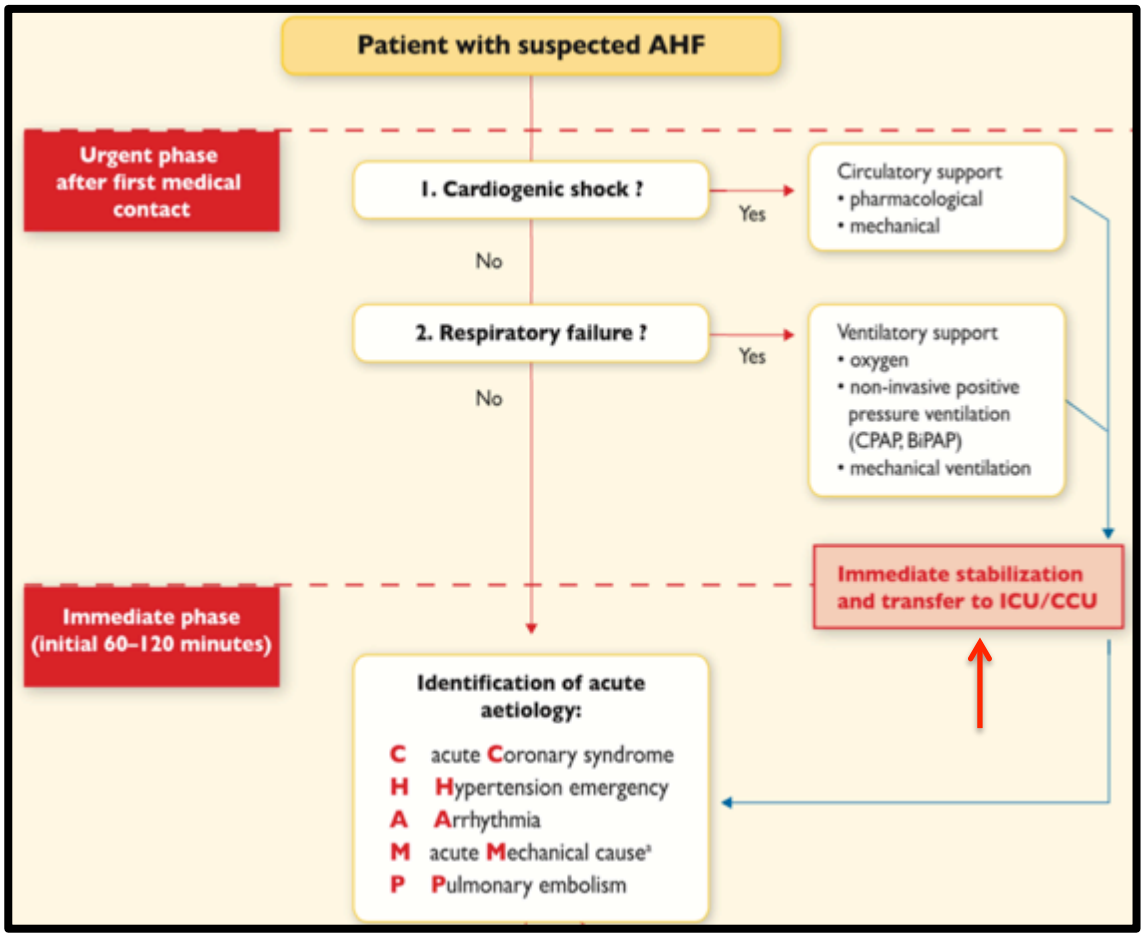
Liens d'Intérêts

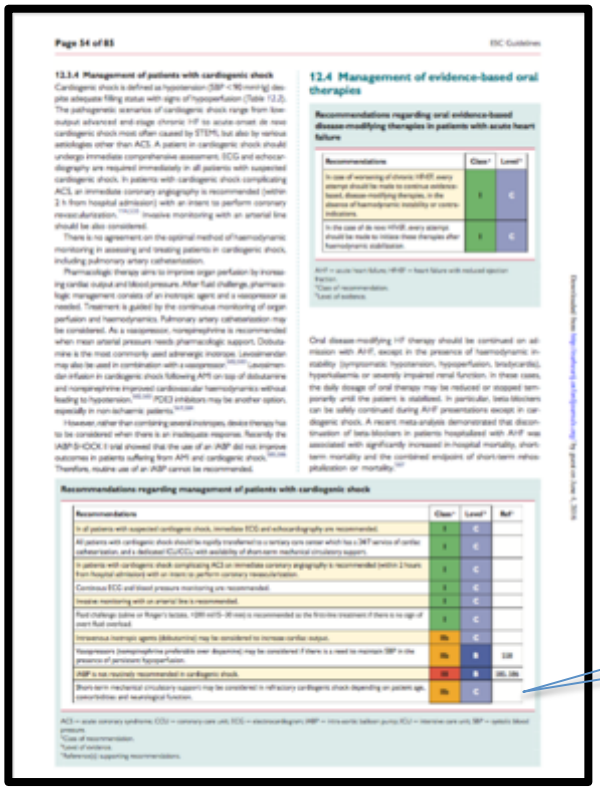
Aucun conflit d'intérêt en rapport avec cette présentation

EUROPEAN SOCIETY OF CARDIOLOGY®



Ponikowski et al.

Eur Heart J 2016;37:2129-200



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12.3.4 Management of patients with cardiogenic shock

Cardiogenic shock is defined as hypotension (SBP < 90 mmHg) despite adequate filling status with signs of hypoperfusion (Table 12.2). The pathogenetic scenarios of cardiogenic shock range from low-output advanced end-stage chronic HF to acute-onset de novo cardiogenic shock most often caused by STEMI, but also by various aetiologies other than ACS. A patient in cardiogenic shock should undergo immediate comprehensive assessment. ECG and echocardiography are required immediately in all patients with suspected cardiogenic shock. In patients with cardiogenic shock complicating ACS, an immediate coronary angiography is recommended (within 2 h from hospital admission) with an intent to perform coronary revascularization. [136,137,138] Invasive monitoring with an arterial line should be also considered.

There is no agreement on the optimal method of haemodynamic monitoring in assessing and treating patients in cardiogenic shock, including pulmonary artery catheterization.

Pharmacologic therapy aims to improve organ perfusion by increasing cardiac output and blood pressure. After fluid challenge, pharmacologic management consists of an inotropic agent and a vasopressor as needed. Treatment is guided by the continuous monitoring of organ perfusion and haemodynamics. Pulmonary artery catheterization may be considered. As a vasopressor, norepinephrine is recommended when mean arterial pressure needs pharmacologic support. Dobutamine is the most commonly used adrenergic inotrope. Levosimendan may also be used in combination with a vasopressor. [140,141] Levosimendan infusion in cardiogenic shock following AMI on top of dobutamine and norepinephrine improved cardiovascular haemodynamics without leading to hypotension. [140,142] PDE3 inhibitors may be another option, especially in non-ischaemic patients. [143,144]

However, rather than combining several inotropes, device therapy has to be considered when there is an inadequate response. Recently the IABP-SHOCK II trial showed that the use of an IABP did not improve outcomes in patients suffering from AMI and cardiogenic shock. [145,146] Therefore, routine use of an IABP cannot be recommended.

12.4 Management of evidence-based oral therapies

Recommendations regarding oral evidence-based disease-modifying therapies in patients with acute heart failure

Recommendations	Class*	Level*
In case of worsening of chronic HFrEF, every attempt should be made to continue evidence-based, disease-modifying therapies, in the absence of haemodynamic instability or contra-indications.	I	C
In the case of de novo HFrEF, every attempt should be made to initiate these therapies after haemodynamic stabilization.	I	C

AHF = acute heart failure; HFrEF = heart failure with reduced ejection fraction; *Class of recommendation; *Level of evidence.

Oral disease-modifying HF therapy should be continued on admission with AHF, except in the presence of haemodynamic instability (symptomatic hypotension, hypoperfusion, bradycardia), hyperkalaemia or severely impaired renal function. In these cases, the daily dosage of oral therapy may be reduced or stopped temporarily until the patient is stabilized. In particular, beta-blockers can be safely continued during AHF presentations except in cardiogenic shock. A recent meta-analysis demonstrated that discontinuation of beta-blockers in patients hospitalized with AHF was associated with significantly increased in-hospital mortality, short-term mortality and the combined endpoint of short-term rehospitalization or mortality. [147]

Recommendations regarding management of patients with cardiogenic shock

Recommendations	Class*	Level*	Ref*
In all patients with suspected cardiogenic shock, immediate ECG and echocardiography are recommended.	I	C	
All patients with cardiogenic shock should be rapidly transferred to a tertiary care center which has a 24/7 service of cardiac catheterization and a dedicated ICU/CCU with availability of short-term mechanical circulatory support.	I	C	
In patients with cardiogenic shock complicating ACS an immediate coronary angiography is recommended (within 2 hours from hospital admission) with an intent to perform coronary revascularization.	I	C	
Continuous ECG and blood pressure monitoring are recommended.	I	C	
Invasive monitoring with an arterial line is recommended.	I	C	
Fluid challenge (saline or Ringer's lactate, ~200 ml/3–30 min) is recommended as the first-line treatment if there is no sign of overt fluid overload.	I	C	
Intravenous inotropic agents (dobutamine) may be considered to increase cardiac output.	IIb	C	
Vasopressors (norepinephrine preferable over dopamine) may be considered if there is a need to maintain SBP in the presence of persistent hypoperfusion.	IIb	B	139
IABP is not routinely recommended in cardiogenic shock.	III	B	145, 146
Short-term mechanical circulatory support may be considered in refractory cardiogenic shock depending on patient age, comorbidities and neurological function.	IIb	C	

ACS = acute coronary syndrome; CCU = coronary care unit; ECG = electrocardiogram; IABP = intra-aortic balloon pump; ICU = intensive care unit; SBP = systolic blood pressure; *Class of recommendation; *Level of evidence; *Reference(s) supporting recommendations.

CHOC CARDIOGÉNIQUE RÉFRACTAIRE

Les ACM temporaires peuvent être considérées dans un contexte de choc cardiogénique réfractaire en fonction de l'âge, comorbidités et état neurologique du patient (*IIb, C*)

Ponikowski et al.

Eur Heart J 2016;37:2129-200

Intermacs

INDICATIONS
Classe INTERMACS

Profile	Description
1.	Critical cardiogenic shock
2.	Progressive decline on inotropic support
3.	Stable but inotrope dependent
4.	Resting symptoms home on oral therapy
5.	Exertion intolerant
6.	Exertion limited
7.	Advanced NYHA Class III symptoms

ACM TEMPORAIRE

- **Décès**
- **Sevrage**
- **Non Sevrable**

ACM DE LONGUE DURÉE

- **BTB**
- **SU**
- **Greffe**

J Heart Lung Transplant 2009;28:535-41

INDICATIONS
Classe INTERMACS

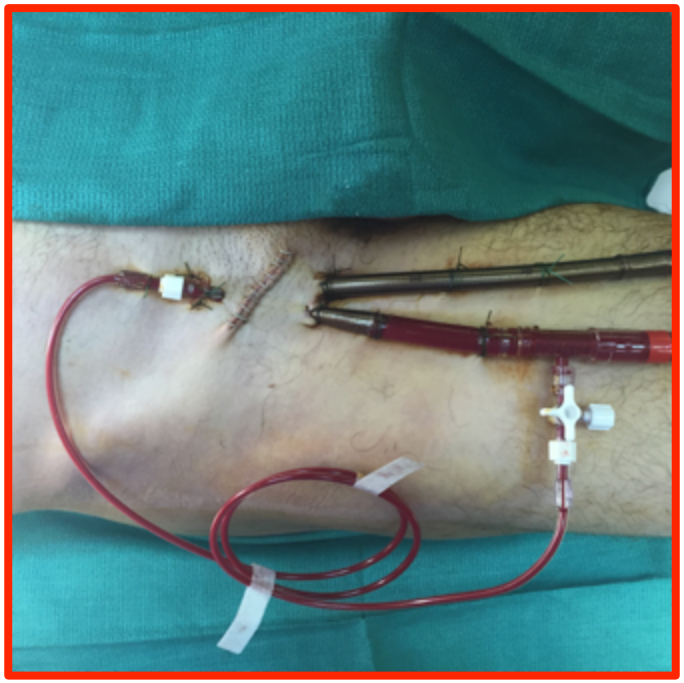
Seventh INTERMACS annual report: 15,000 patients and counting

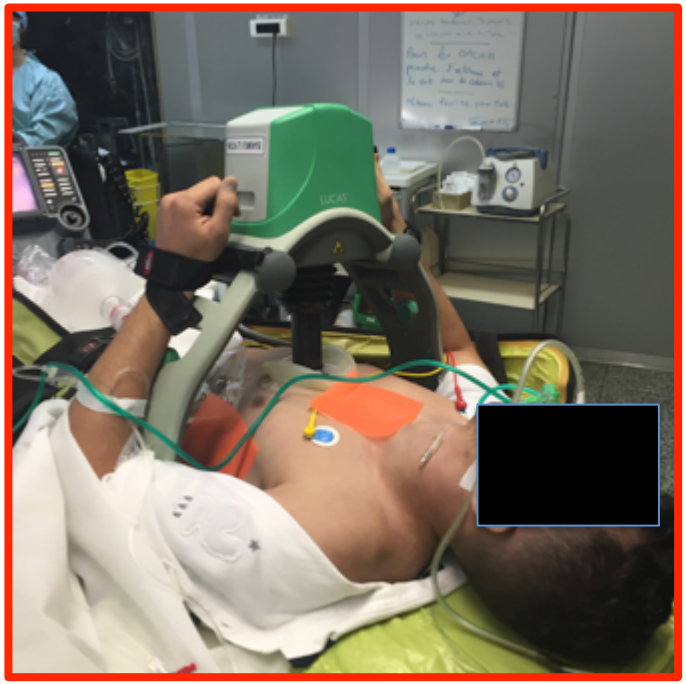
Implantation des ACM de longue durée selon la classe INTERMACS

	Classe 1	Classe 3
2006	40.8%	7.8%
	↓	↓
2012-2014	14.3%	29.6%

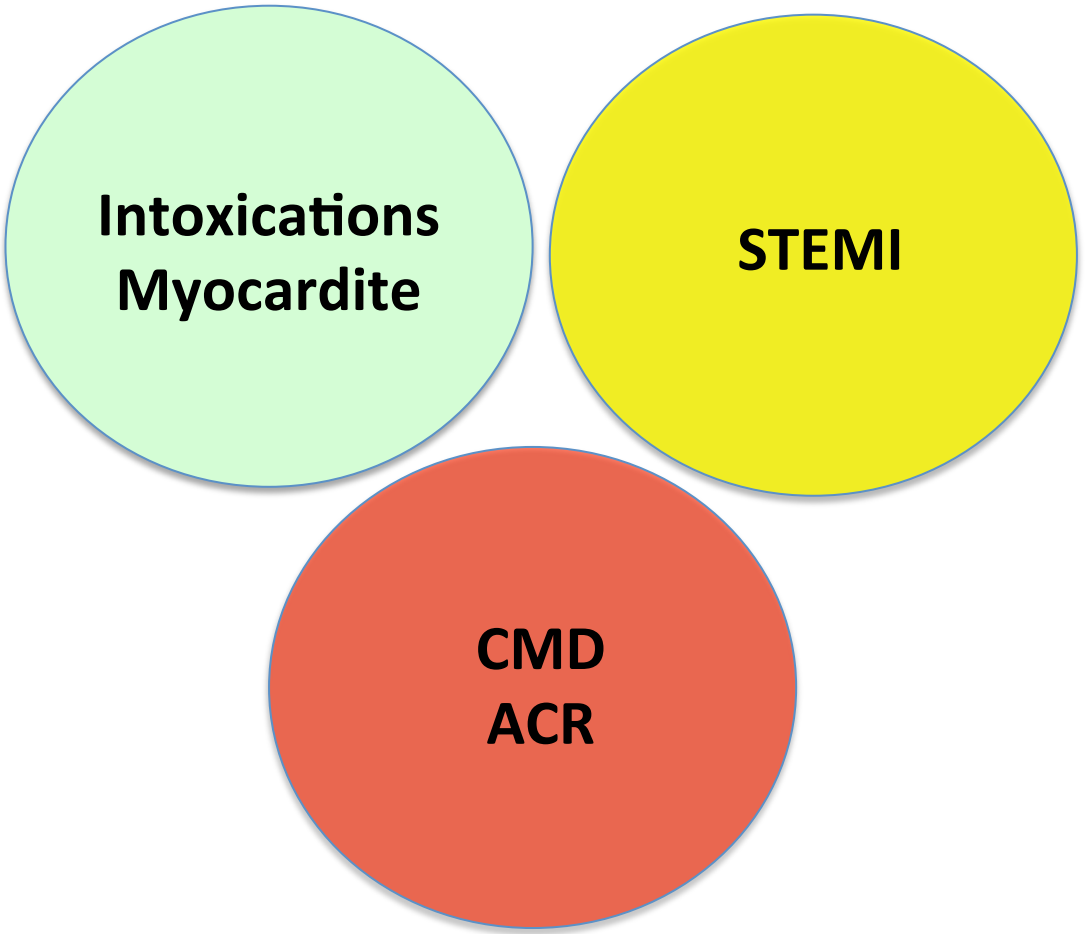
J Heart Lung Transplant 2015;34:1495-504

ECMO VA





ECMO VA
Indications



ECMO VA
Indications

Intoxications
Myocardite

- INTOXICATION MÉDICAMENTEUSE

taux de survie après ECMO VA: **65-85%**

Masson et al.	Resuscitation 2012;83(11):1413-7
Mohan et al.	Indian Heart J 2016;68(3):295-301

- MYOCARDITE

taux de survie après ECMO VA: **55-78%**

Hsu et al.	Eur J Cardiothorac Surg 2011;40(3):682-8
Diddle et al.	Crit Care Med 2015;43(5):1016-25

Les intoxications médicamenteuses et les myocardites sont les meilleurs indications pour la mise en place d'une ECMO VA en considération de leur ***POTENTIEL DE RÉCUPÉRATION ÉLEVÉ***

ECMO VA
Indications

STEMI

- INFARCTUS AIGU DU MYOCARDE

taux de survie après ECMO VA: **40-65%**

Tsao et al.	J Crit Care 2012;27(5):530.e1-11
Wu et al.	Resuscitation 2013;84(7):940-5
Muller et al.	Intensive Care Med 2016;42(3):370-8

Les résultats de l'ECMO VA pour le choc cardiogénique post-STEMI sont plus mitigés en raison d'une ***PHYSIOPATHOLOGIE PLUS COMPLEXE (ISCHÉMIE/ RÉPERFUSION)***

ECMO VA
Indications

CMD
ACR

*L'utilisation d'une ECMO VA dans le cadre d'une **DÉCOMPENSATION AIGUE D'UNE CARDIOMYOPATHIE CONNUE** doit rentrer dans une stratégie de **BTB/BTT** et comme **TRAITEMENT DE SAUVETAGE** pour les **ACR***

Tarzia et al.	J Thorac Cardiovasc Surg 2015;150(2):333-40
Wang et al.	Resuscitation 2014;85(9):1219-24
Pozzi et al.	Int J Cardiol 2016;204:70-6

ECMO VA
Indications

Thrombolyse

Embolectomie

Resuscitation 2013;84:1365-70
Perfusion 2015;30:611-6

Embolie Pulmonaire

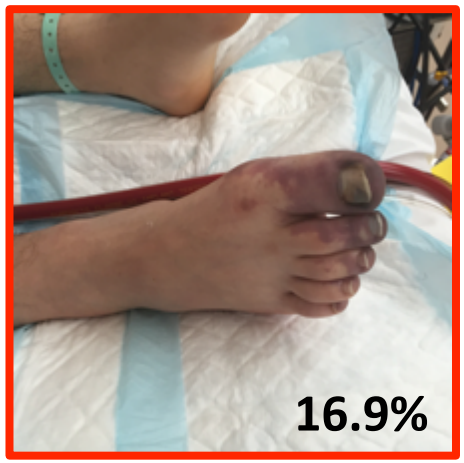
Choc Septique

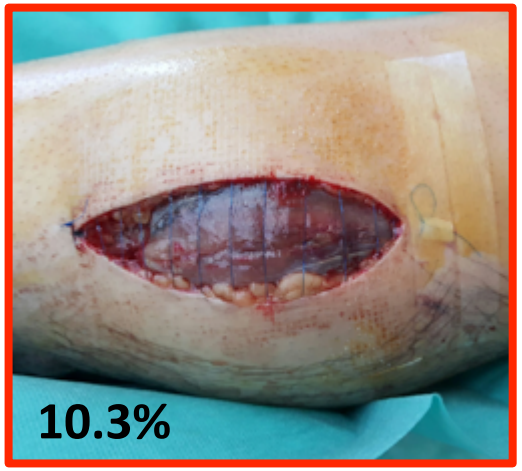
Crit Care Med 2013;41:1616-26
J Thorac Cardiovasc Surg 2013;146:1041-6
Eur J Cardiothorac Surg 2015;47:e68-74

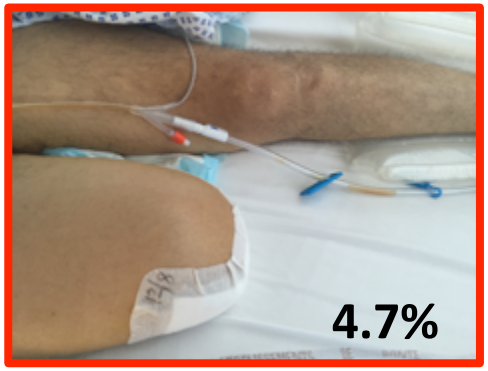
ECMO VA
Complications

A) ISCHÉMIE DU MEMBRE INFERIEUR

Complications of Extracorporeal Membrane Oxygenation for Treatment of Cardiogenic Shock and Cardiac Arrest: A Meta-Analysis of 1,866 Adult Patients



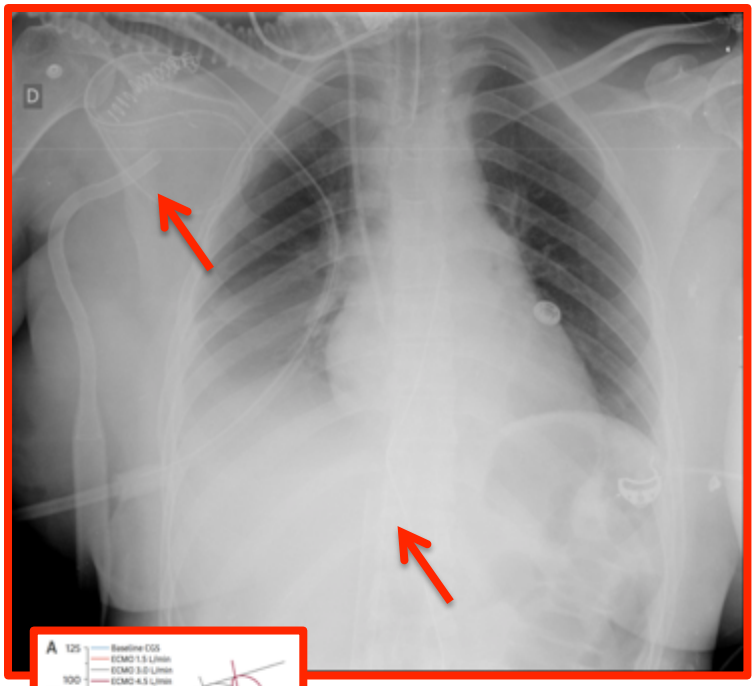


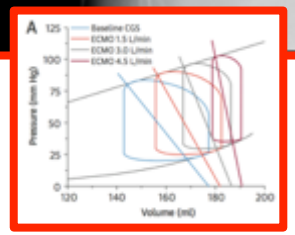


Ann Thorac Surg 2014;97:610-6

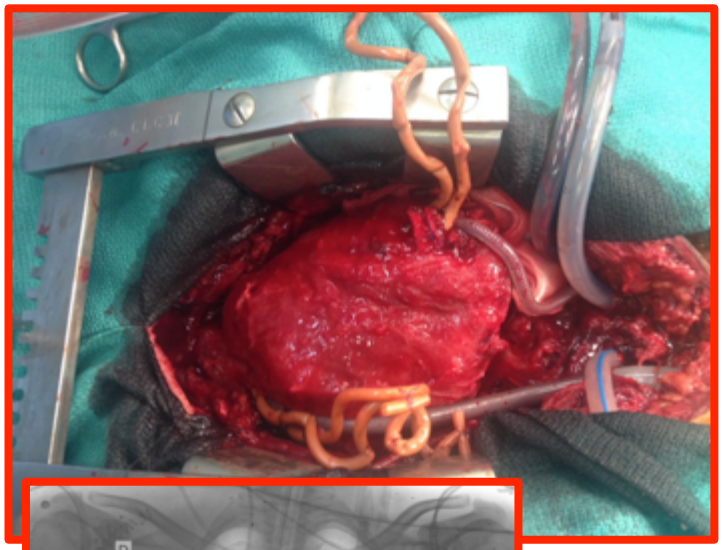
ECMO VA
Complications

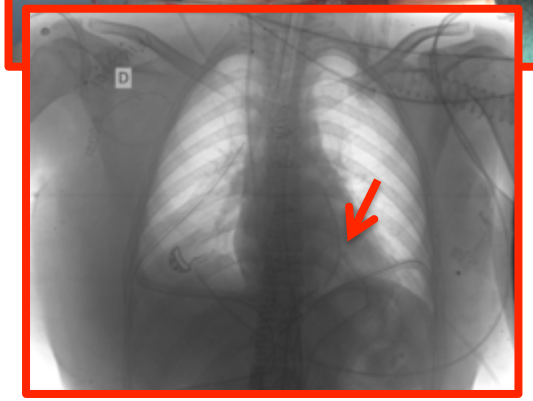
B) OAP



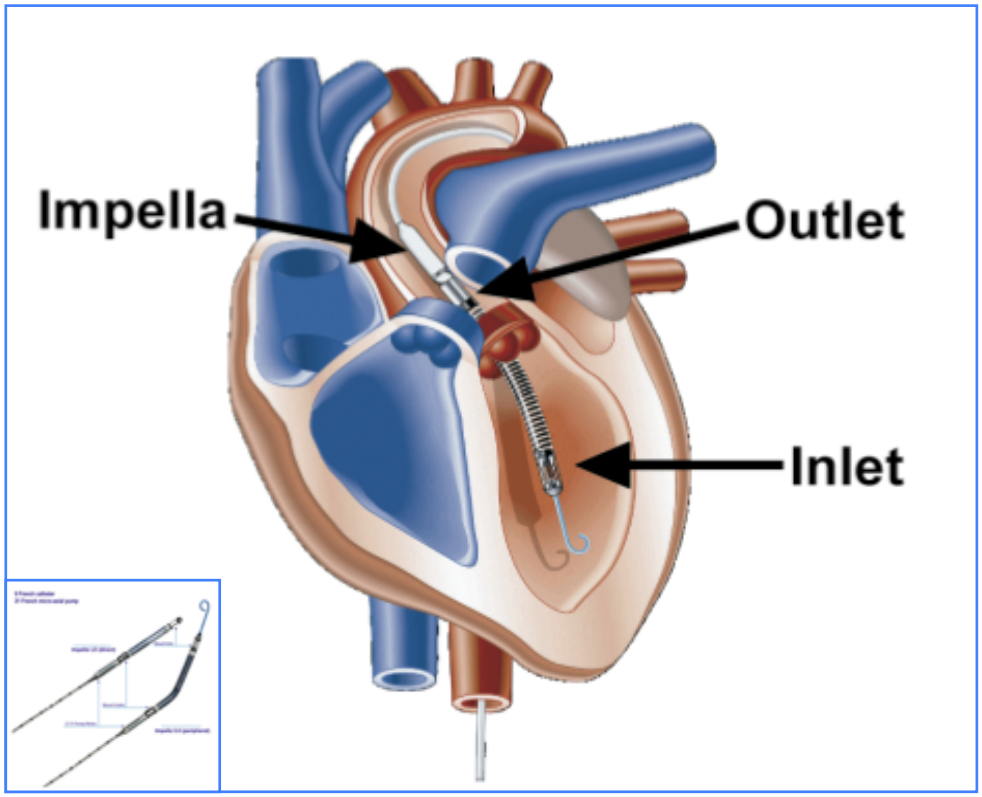


J Am Coll Cardiol 2015;66:2663-74





IMPELLA



Pompe micro-axiale

Transvalvulaire aortique

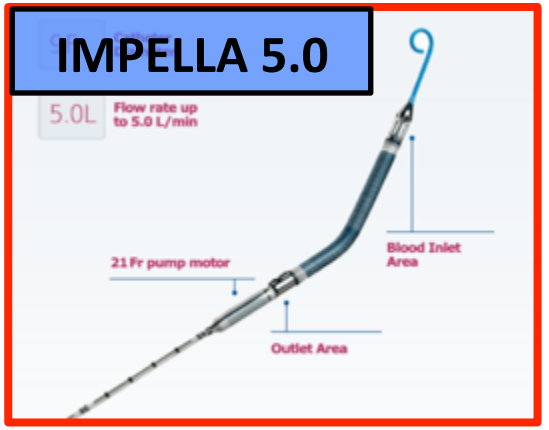
Support hémodynamique

Décharge du VG

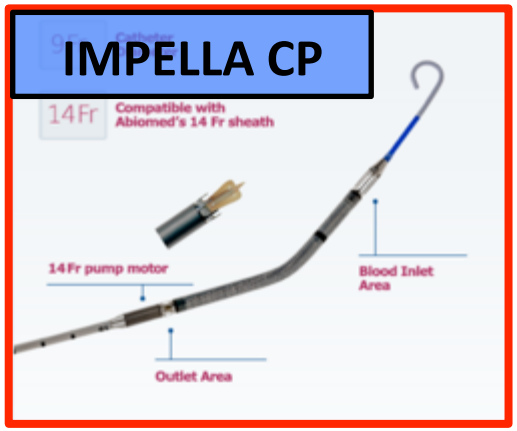
ABIOMED
Recovering hearts. Saving lives.

IMPELLA

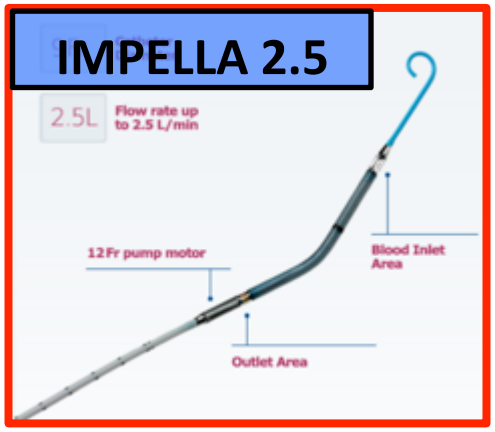
IMPELLA 5.0



IMPELLA CP

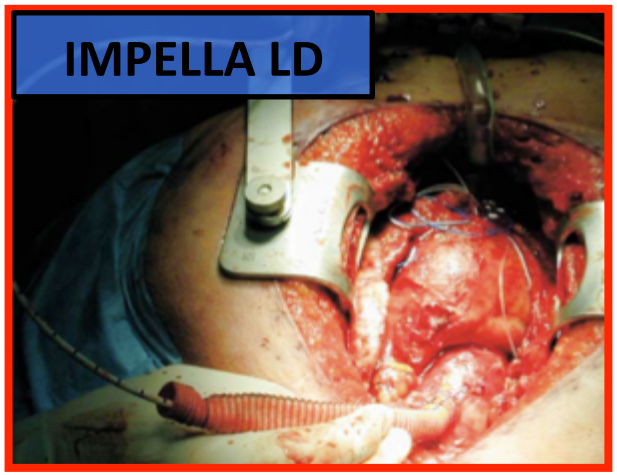


IMPELLA 2.5



ABIOMED
Recovering hearts. Saving lives.

IMPELLA 5.0

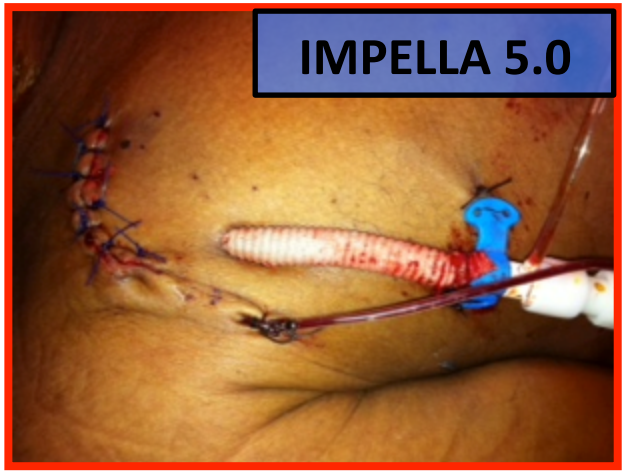


Intrathoracique

Aorte ascendante

Périphérique

Artère fémorale ou sous-clavière droite



ABIOMED
Recovering hearts. Saving lives.

IMPELLA 5.0

INDICATIONS CHIRURGICALES

S. postcardiotomie

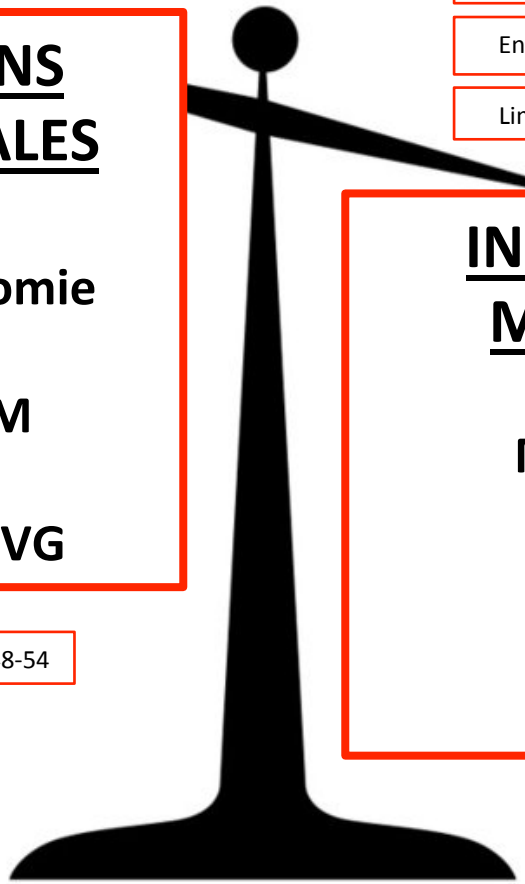
CIV post-IdM

Décharge du VG

Griffith et al. - J Thorac Cardiovasc Surg 2013;145:548-54

La Torre et al. - Tex Heart Inst J 2011;38:42-9

Gaudard et al. - Crit Care 2015;19:363



INDICATIONS MEDICALES

Myocardite

STEMI

CMD

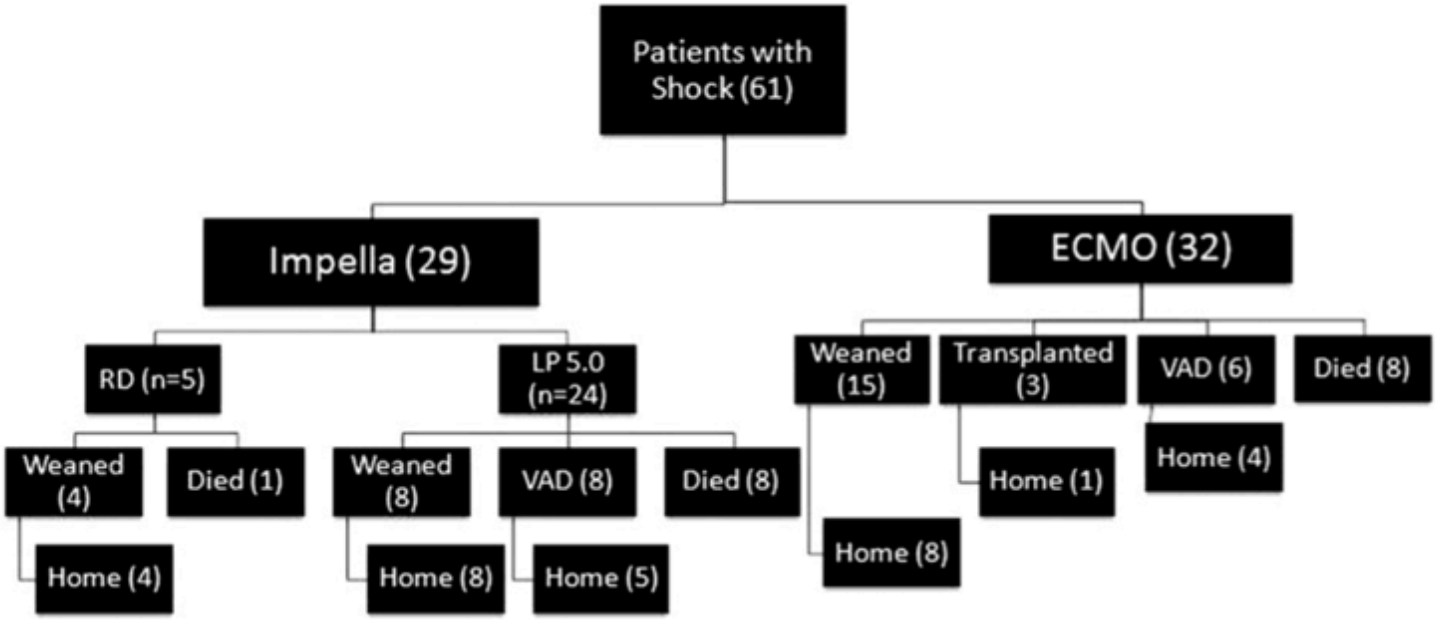
Garatti et al. - Artif Organs 2006;30:523-8

Engström et al. – Crit Care Med 2011;39:2072-9

Lima et al. – Am J Cardiol 2016;117:1622-8

IMPELLA 5.0

Comparative outcomes in cardiogenic shock patients managed with Impella microaxial pump or extracorporeal life support



Survie 30J = 56%

↓ transfusions, ↓ TE artériels

Lamarche et al.

Survie 30J = 62%

J Thorac Cardiovasc Surg 2011;142:60-5

IMPELLA 5.0

AVANTAGES

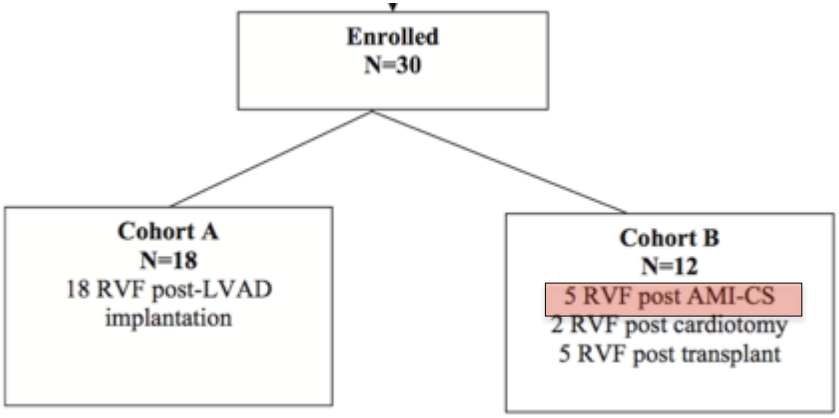
- Artère sous-clavière
- ↓ Infections
- Mobilisation précoce
- Décharge du VG

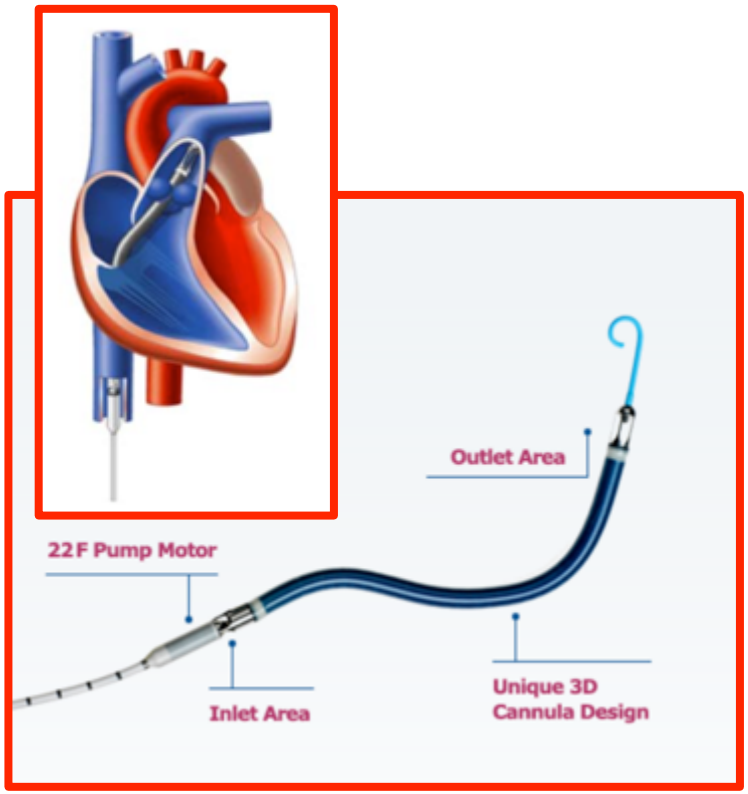
INCONVÉNIENTS

- Plus chère
- Plus compliqué (scopie)
- Procédure plus longue
- Support monoventriculaire
- Pas de support respiratoire

IMPELLA RP

Benefits of a novel percutaneous ventricular assist device for right heart failure: The prospective RECOVER RIGHT study of the Impella RP device





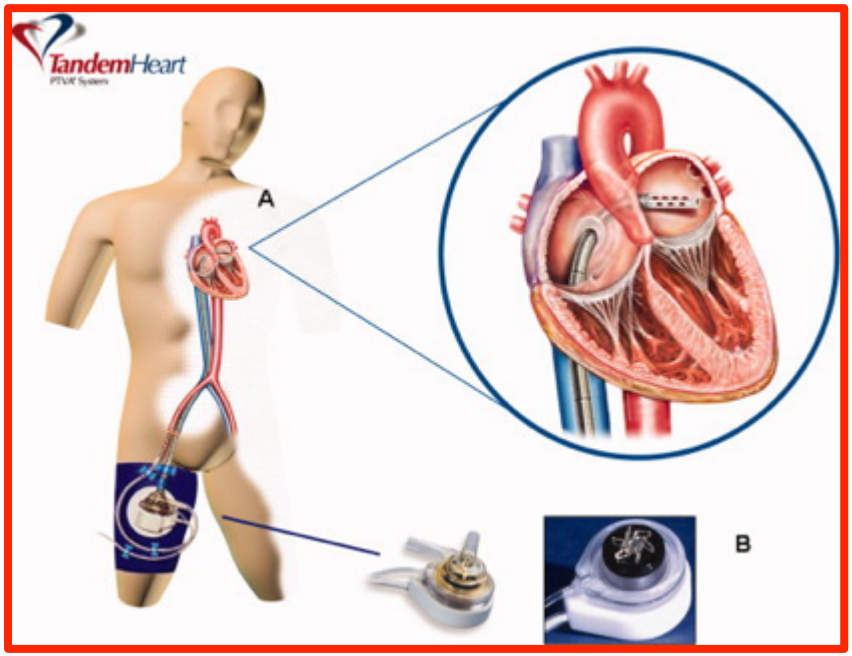
Event	Cohort A (n = 18) % (No.)	Cohort B (n = 12) % (No.)	p-value
Alive at			
30 Days	83.3 (15)	58.3 (7)	0.129
Discharge	77.8 (14)	58.3 (7)	0.255
30 days/discharge/next therapy	83.3 (15)	58.3 (7)	0.129
180 days	77.8 (14)	58.3 (7)	0.255

Anderson et al.

J Heart Lung Transplant 2015;34:1549-60

TANDEMHEART

BYPASS PARTIEL DU VG

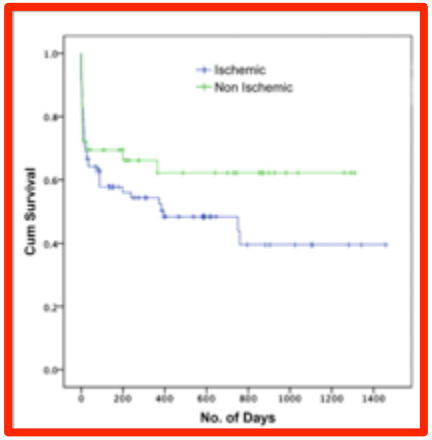


The Percutaneous Ventricular Assist Device in Severe Refractory Cardiogenic Shock

117 pts.

80 CMI (68.4%)	37 CMD (31.6%)

Survie 6m = 54.7%



Kar et al.

J Am Coll Cardiol 2011;57:688-96

CONCLUSION

Les assistances de courte durée représentent une stratégie thérapeutique efficace pour le choc cardiogénique réfractaire

L'ECMO VA périphérique garde sa place privilégiée en raison du support biventriculaire et de sa simplicité

L'Impella 5.0 peut être utilisé avec de bons résultats mais le support monoventriculaire en limite l'application clinique

La prise en charge de ces patients nécessite un approche multidisciplinaire entre cardiologues, réanimateurs et chirurgiens