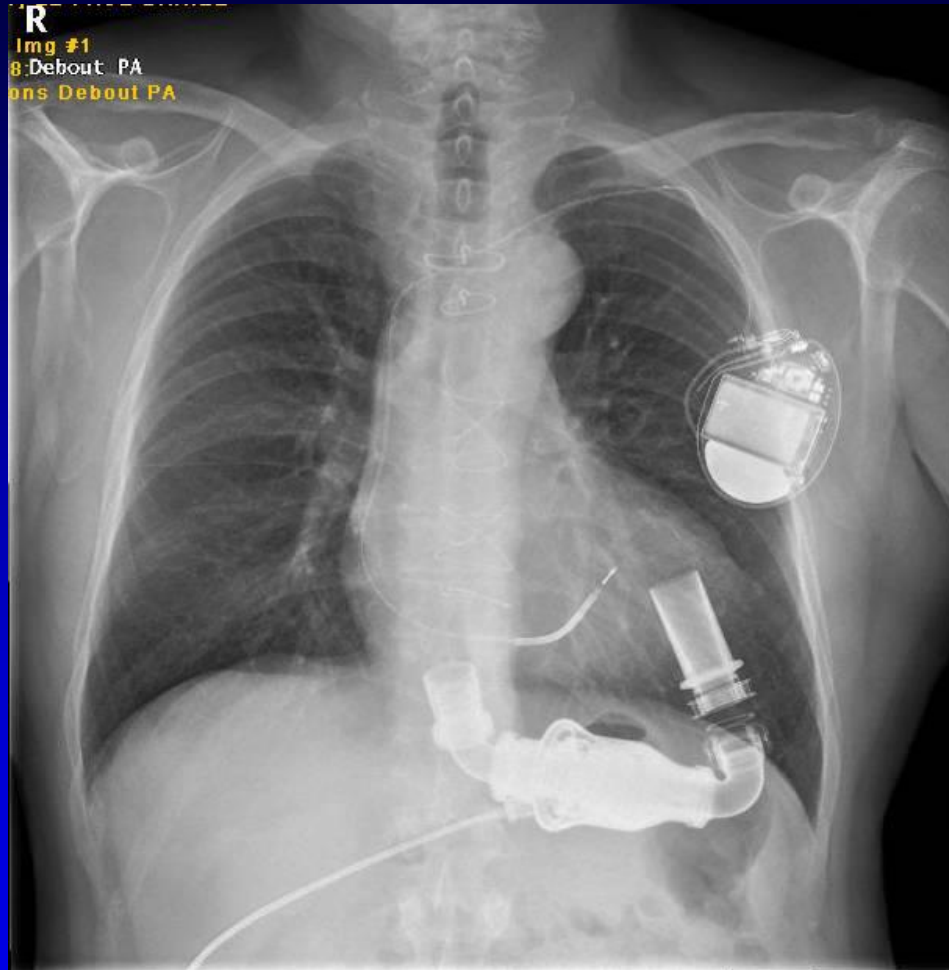


Assistance Circulatoire Mécanique



Erwan Flécher, CHU Pontchaillou, Rennes.

Assistances circulatoires de « courte durée »

Implantation rapide

En urgence

Rétablir une hémodynamique!

Utilisation temporaire: quelques jours...

Patients (graves) en réanimation



CPIAO

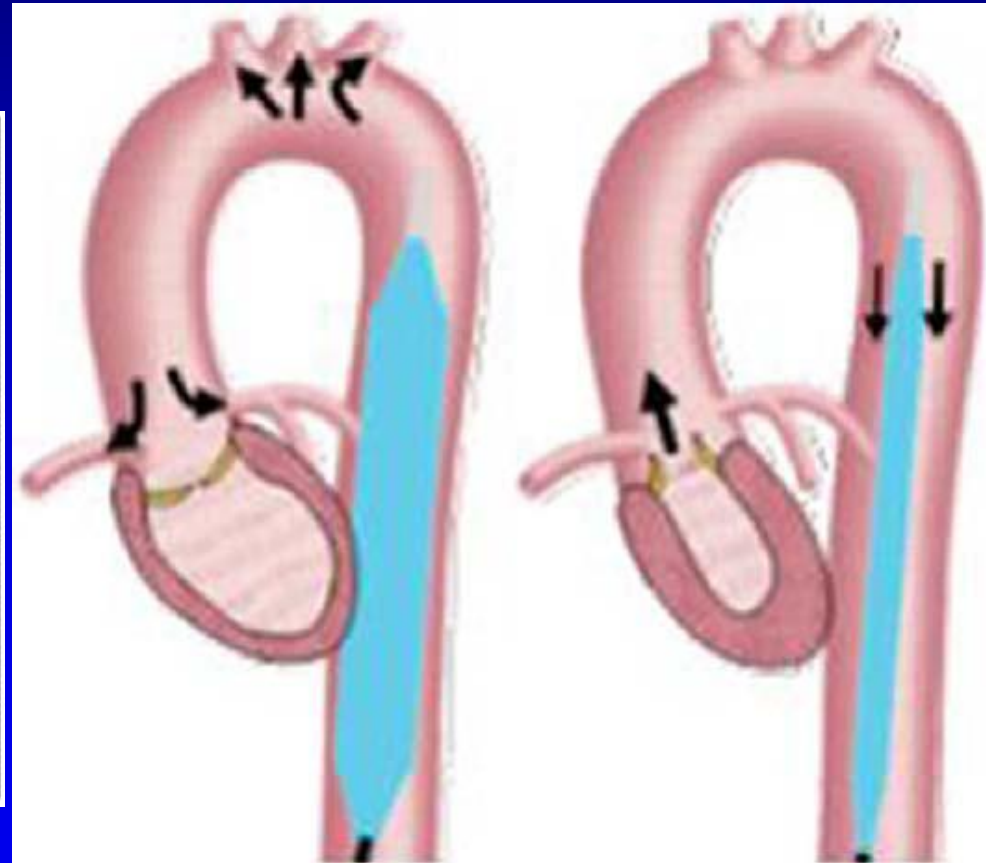
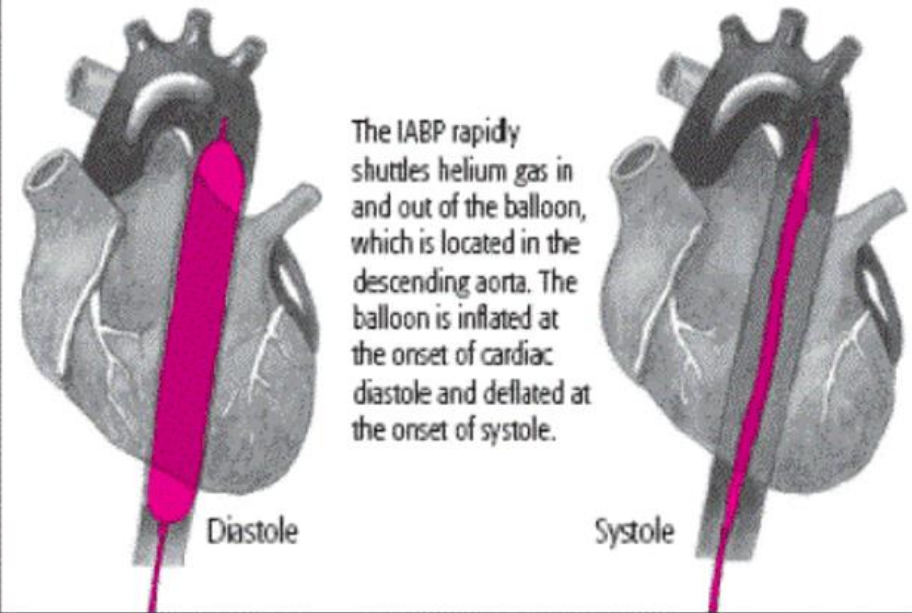
- 1^{ère} ligne d'ACM, choc ischémique+++
temporaire, percutané (Seldinger fémoral
rétrograde)
- Majoration du débit entre 0.5 et 1 L/mn
- Implantation aisée, rapide, au lit du malade
- Faible coût, disponible facilement
- Ballon gonflé à l'hélium et synchronisé à l'ECG
- Inflation en diastole
- Contre-indications: IA, AAA, pontages...

CPIAO



Abb. 1

The ins and outs of the IABP

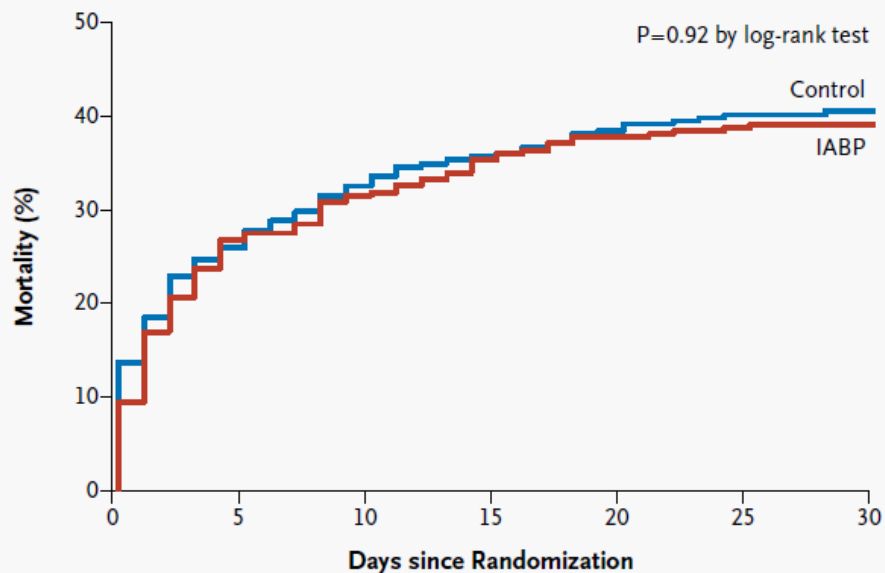


INDICATIONS

- Infarctus du myocarde avec état de choc cardiogénique
 - IDM antérieur étendu
 - IDM inférieur étendu au VD
 - Complication mécanique : CIV, IM
- Sevrage de CEC difficile
- Préventif : revascularisation coronaire interventionnelle ou chirurgicale à risque
- Arythmies ventriculaires réfractaires d'origine ischémique

ORIGINAL ARTICLE

Intraaortic Balloon Support for Myocardial Infarction with Cardiogenic Shock

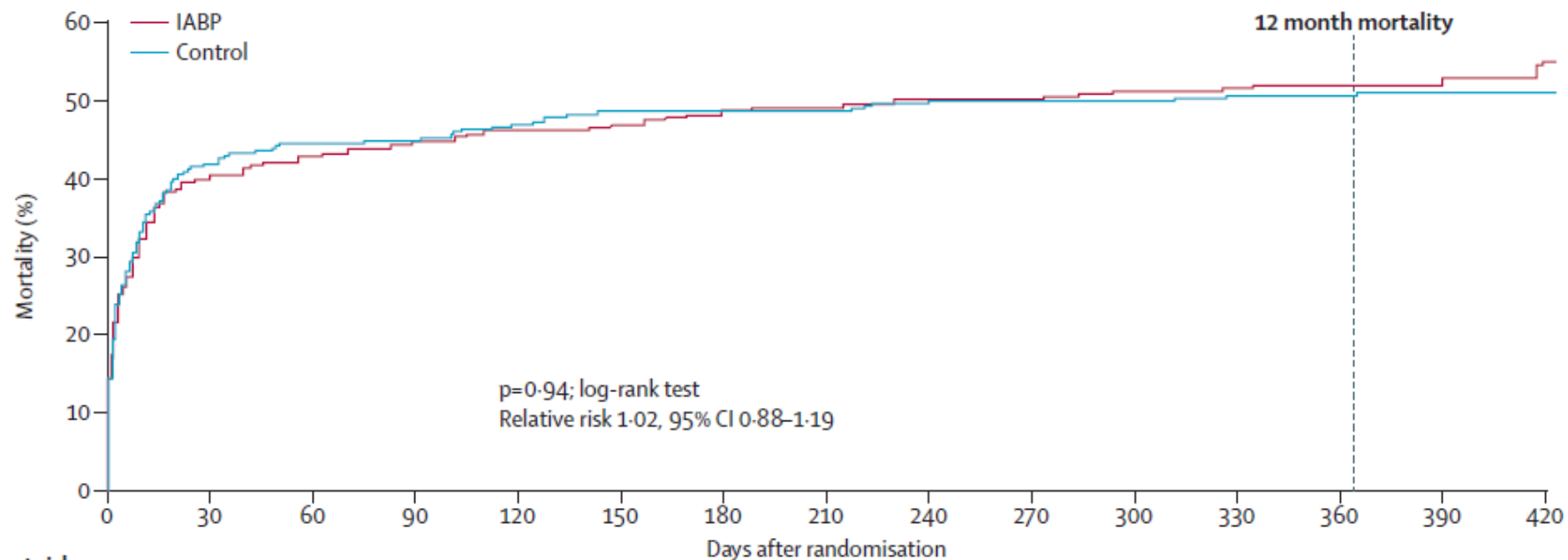


In conclusion, we conducted a randomized, controlled trial of intraaortic balloon pump support in patients with cardiogenic shock complicating myocardial infarction for whom early revascularization was planned. Use of intraaortic balloon counterpulsation, as compared with conventional therapy, did not reduce 30-day mortality.

Intra-aortic balloon counterpulsation in acute myocardial infarction complicated by cardiogenic shock (IABP-SHOCK II): final 12 month results of a randomised, open-label trial

Interpretation In patients undergoing early revascularisation for myocardial infarction complicated by cardiogenic shock, IABP did not reduce 12 month all-cause mortality.

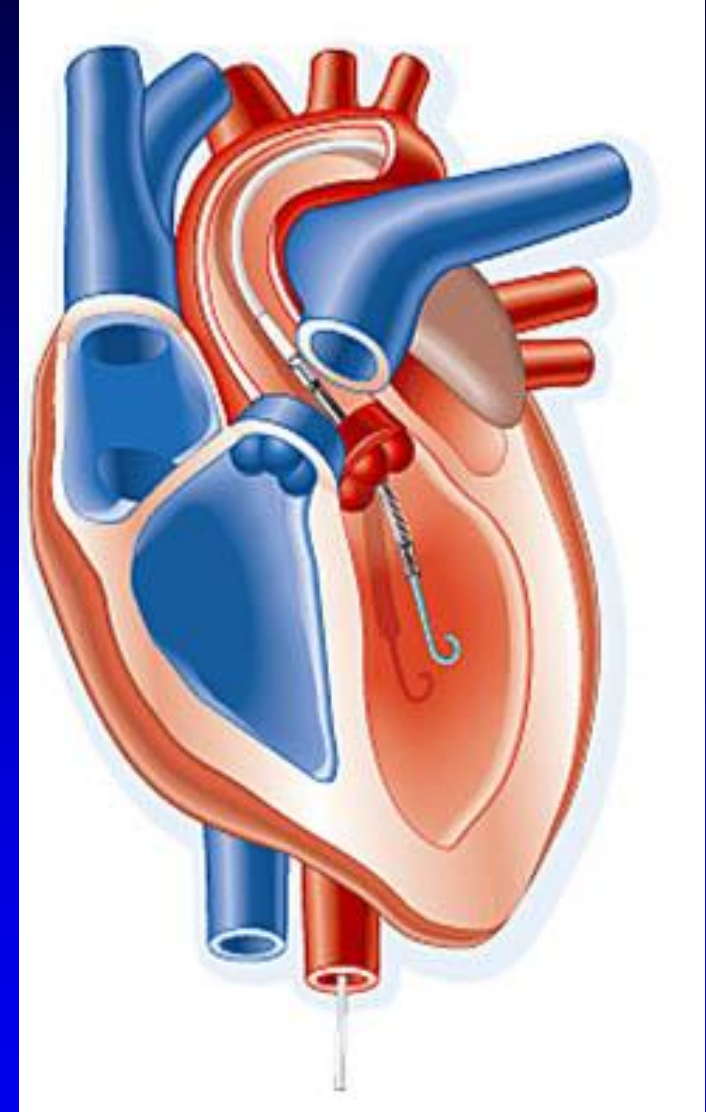
Lancet 2013; 382: 1638-45



Number at risk

IABP	301	181	171	165	161	159	154	152	149	147	146	144	136	45	21
Control	299	174	166	165	159	154	154	152	147	147	146	144	140	55	29

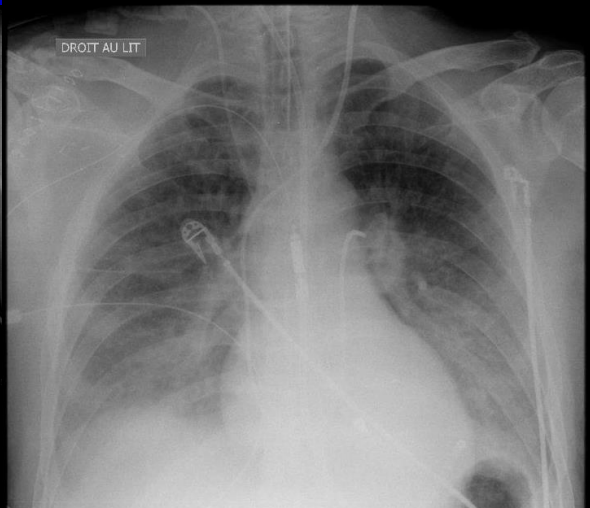
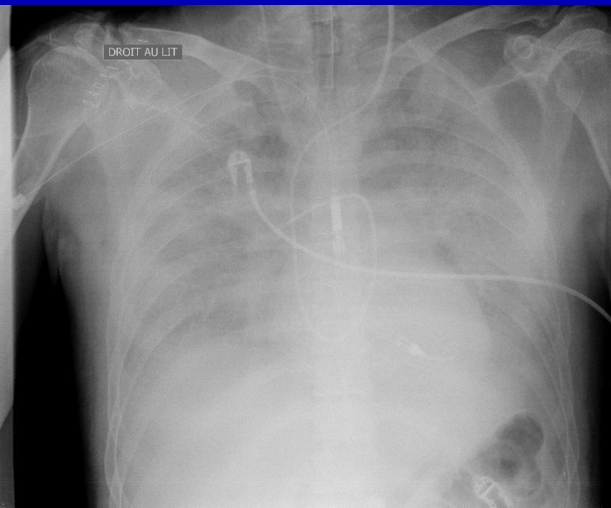
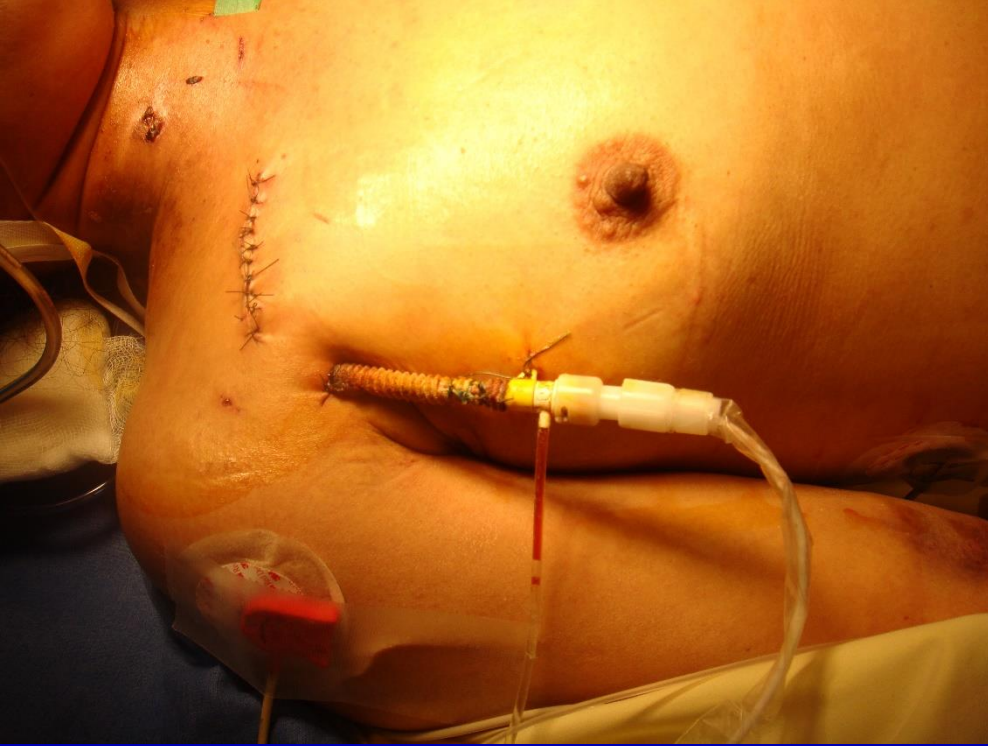
Percutaneous LVAD: IMPELLA



Impella

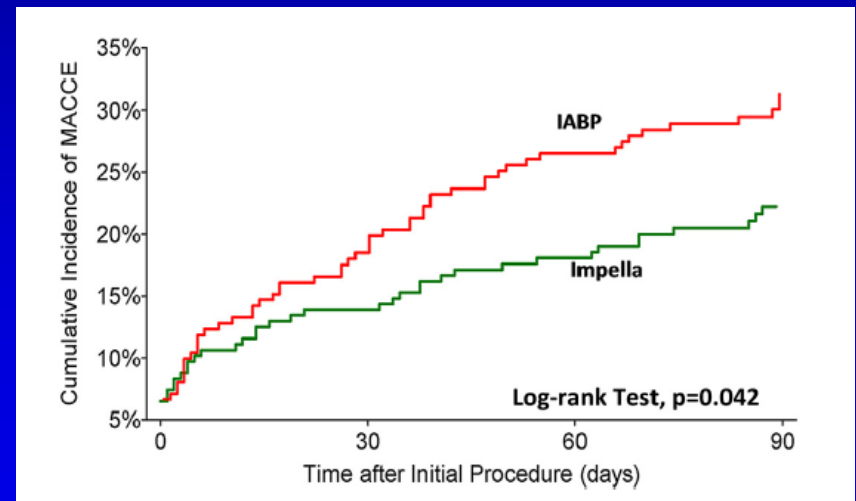
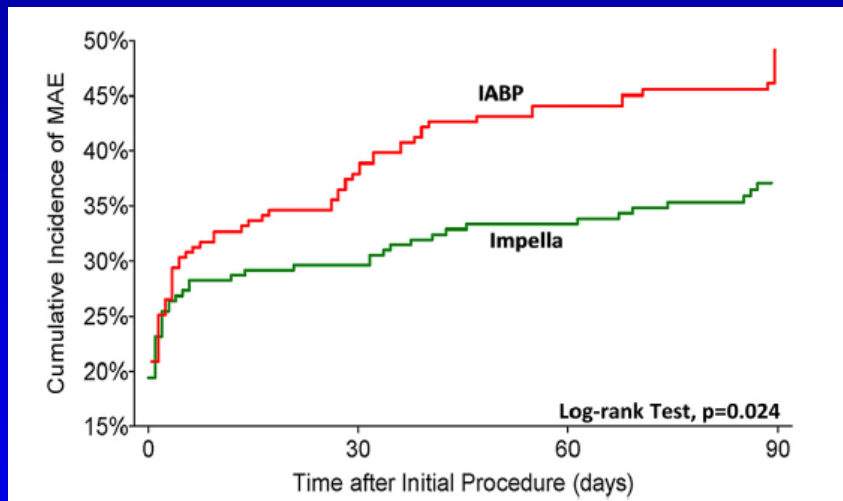
- Assistance monoventriculaire gauche
- Fonction VD conservée!
- 2,5L/mn, 3,5 L/mn (percutanées) ou 5L/mn (abord chirurgical)
- Assistance de courte durée (qqs jours à qqs semaines)
- Pompe axiale, flux continu
- Surcoût+++ , pas d'oxygénateur (ECMO)
- Logistique d'implantation: ampli, ETO...





Impact of Hemodynamic Support With Impella 2.5 Versus Intra-Aortic Balloon Pump on Prognostically Important Clinical Outcomes in Patients Undergoing High-Risk Percutaneous Coronary Intervention (from the PROTECT II Randomized Trial)

postprocedure. In conclusion, hemodynamic support with Impella compared with IABP during high-risk PCI in the PROTECT-II trial resulted in improved event-free survival at 3-month follow-up; this finding was further supported by multivariate analyses. © 2014 Elsevier Inc. All rights reserved. (Am J Cardiol 2014;113:222–228)



ECMO et ECLS



Introduction

- Extra Corporeal Membrane Oxygenation
- Système d'assistance circulatoire et respiratoire léger
- Indications cardiologiques: myocardites, intoxications médicamenteuses, choc cardiogénique post IDM, post cardiectomie...
- Indications respiratoires et pédiatriques (SDRA)

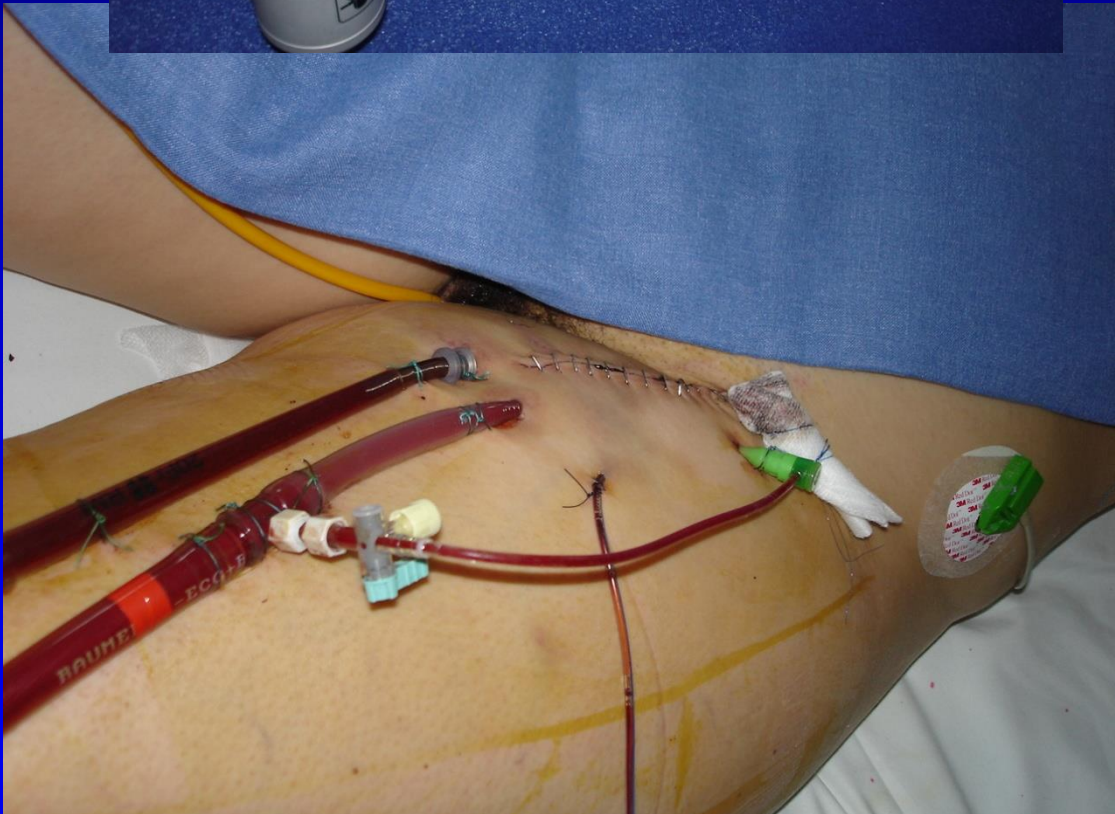
Indications Circulatoires

- Pronostic vital engagé « rapidement »
- Index Cardiaque $< 2 \text{ L/mn/m}^2$
- PA syst $< 90 \text{ mmHg}$
- Acidose lactique malgré support inotrope maximal
- CPIAO avec choc persistant
- Arrythmie réfractaire ou ACR

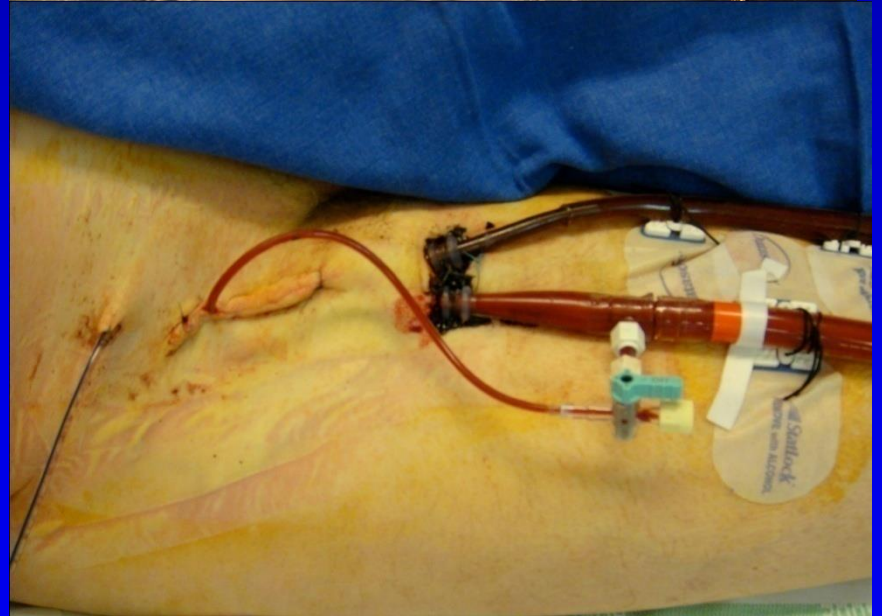
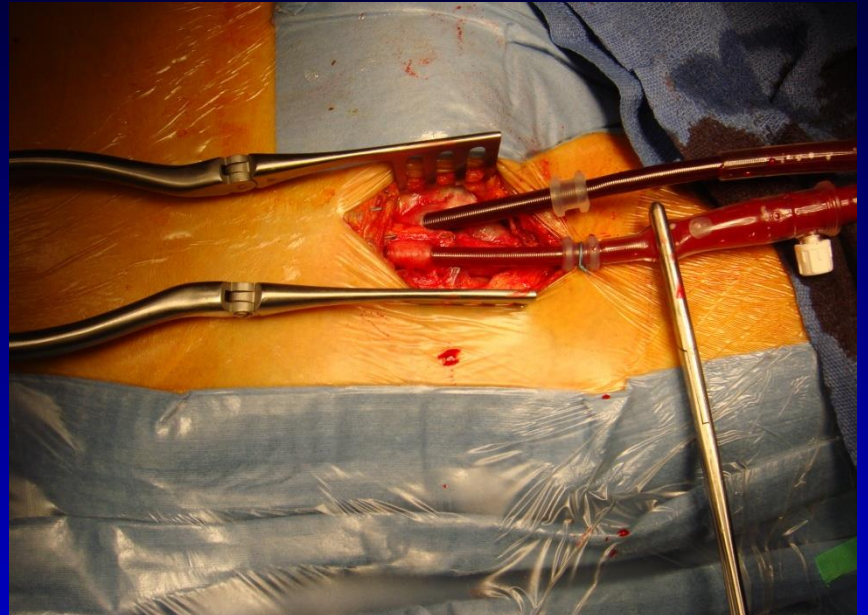
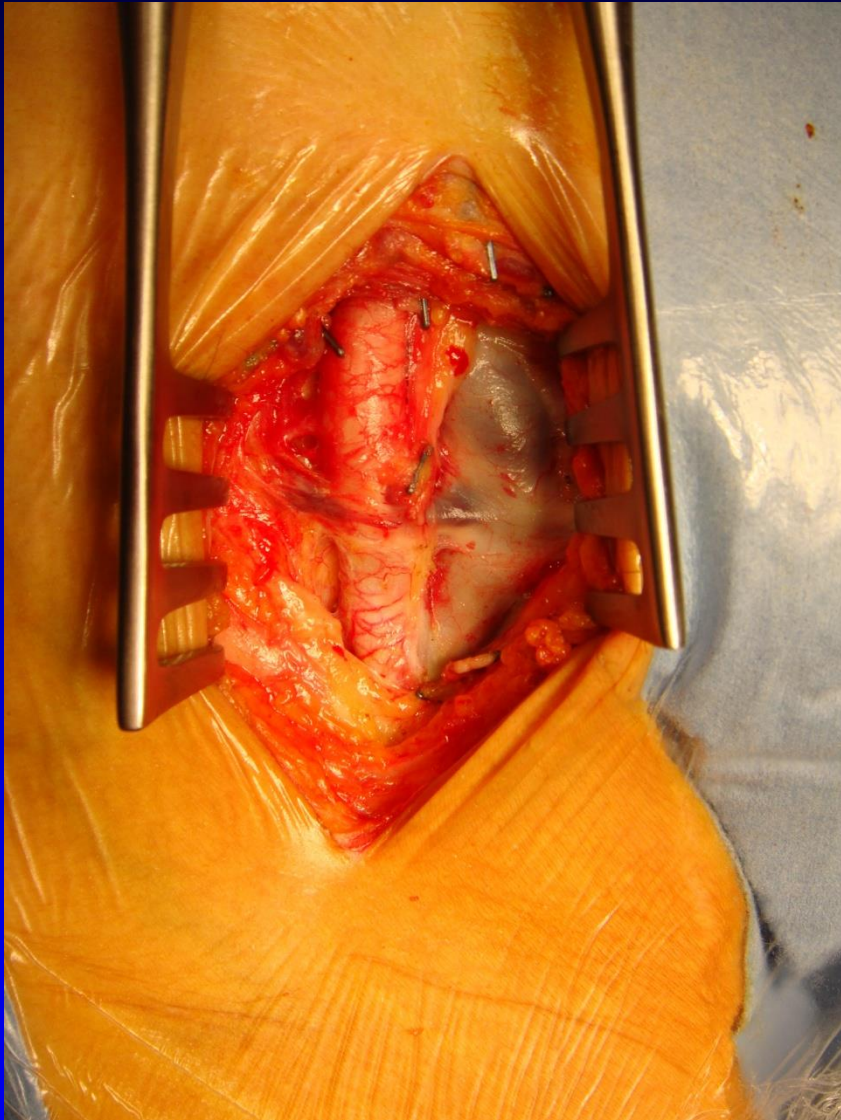
Objectifs

- En attente de RECUPERATION
- En attente de GREFFE (SU1)
- En pont avec une autre assistance (LVAD)

« ECMO: bridge to decision, you just buy more time! »



Implantation



ECMO: Bridge to decision

**EVOLUTION
UNDER ECMO**

```
graph TD; A[EVOLUTION UNDER ECMO] --> B[DEATH]; A --> C[BRIDGE TO TRANSPLANT]; A --> D[BRIDGE TO BRIDGE]; A --> E[RECOVERY];
```

DEATH

**BRIDGE TO
TRANSPLANT**

**BRIDGE TO
BRIDGE**

RECOVERY

Problématiques pour l'infectiologue

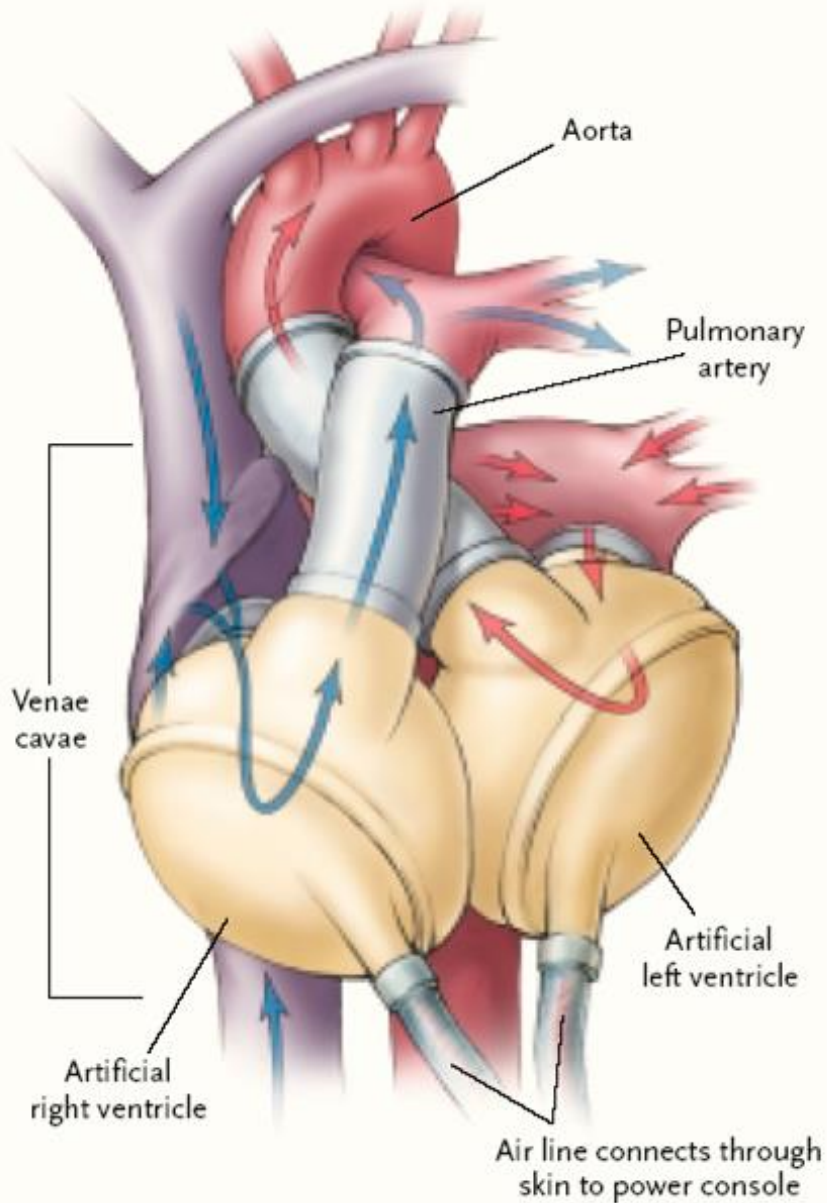
- Gestion de l'infection et du sepsis en réanimation chez un patient sous ACM temporaire:
 - en attente de greffe?
 - En attente d'ACM de longue durée?
 - Sans avoir suffisamment de récupération myocardique pour retirer la pompe?

Assistances circulatoires de « longue durée »

- Deux questions essentielles:
- Support Uni ou Bi ventriculaire?
- Quel objectif: récupération, greffe ou implantation permanente?

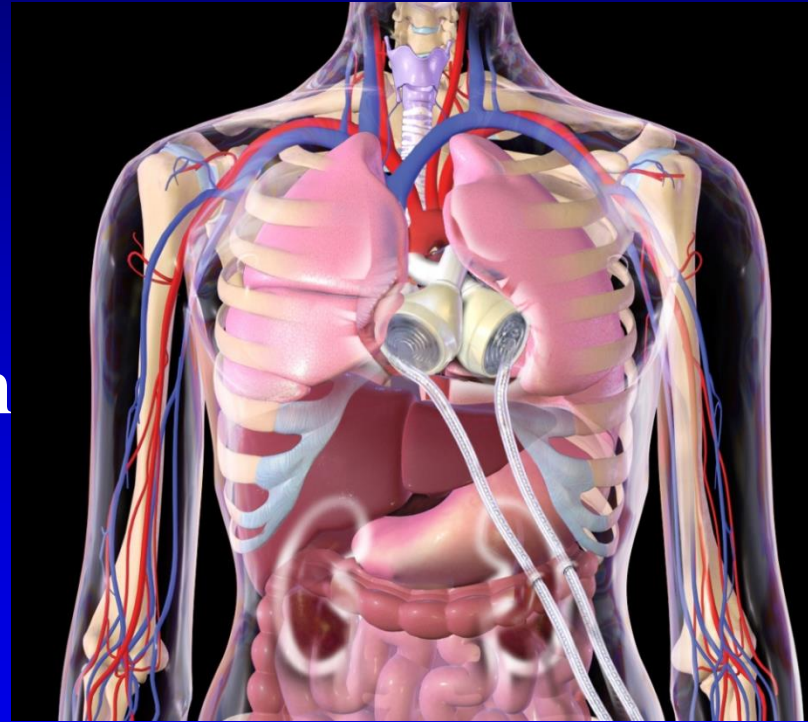
ACM Biventriculaire

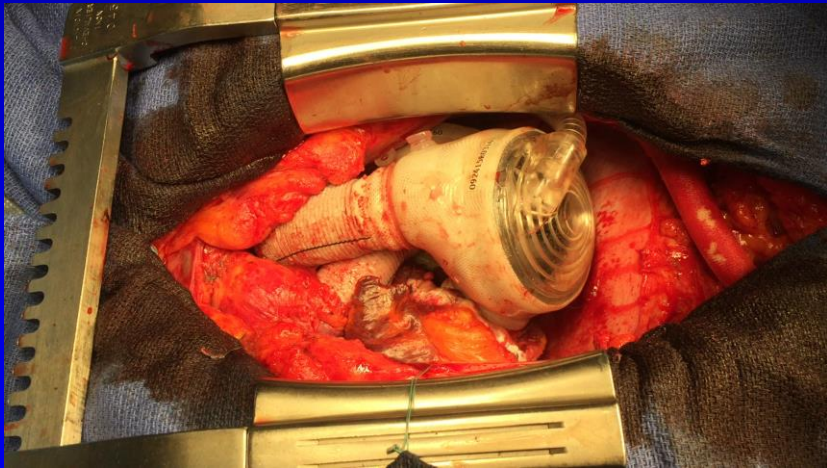
CardioWest TAH



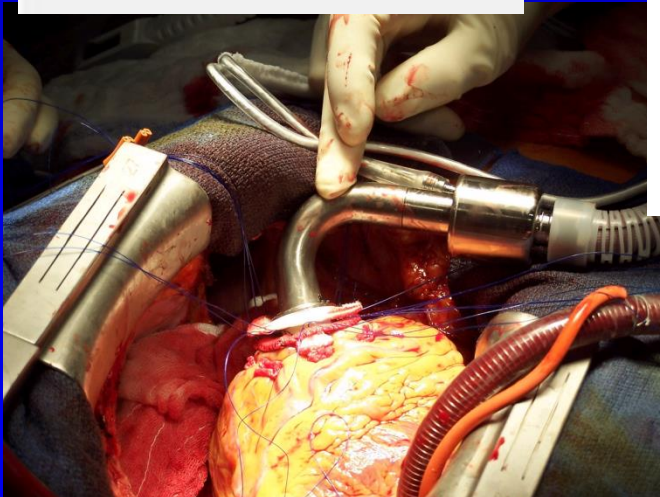
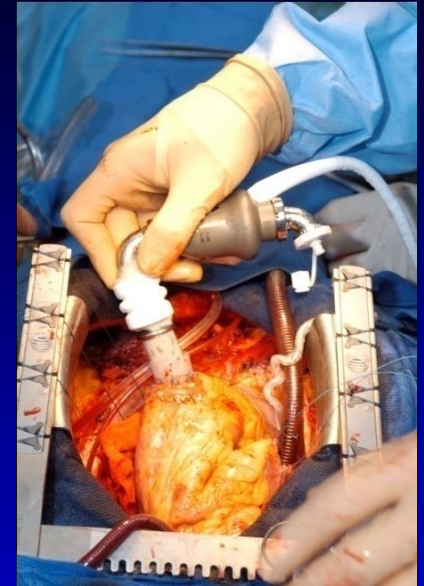
CardioWest

- En attente de greffe uniquement
- Assistance biventriculaire, pneumatique, pulsatile
- 160g, volume: 400 ml
- Volume d'éjection maximal: ml, débit cardiaque > 9 L/mn
- Console portable en Europe
- Coût 80,000 €





LVAD 3^{ème} Génération: Electromagnétiques



Pompes ventriculaires axiales/centrifuges

- ❑ Cœurs artificiels partiels de troisième génération
- ❑ Flux continu, mécanisme électromagnétique
- ❑ Encombrement réduit, implantables
- ❑ Silencieuses, sans valves
- ❑ Autorisent une implantation permanente
- ❑ Assistance gauche uniquement

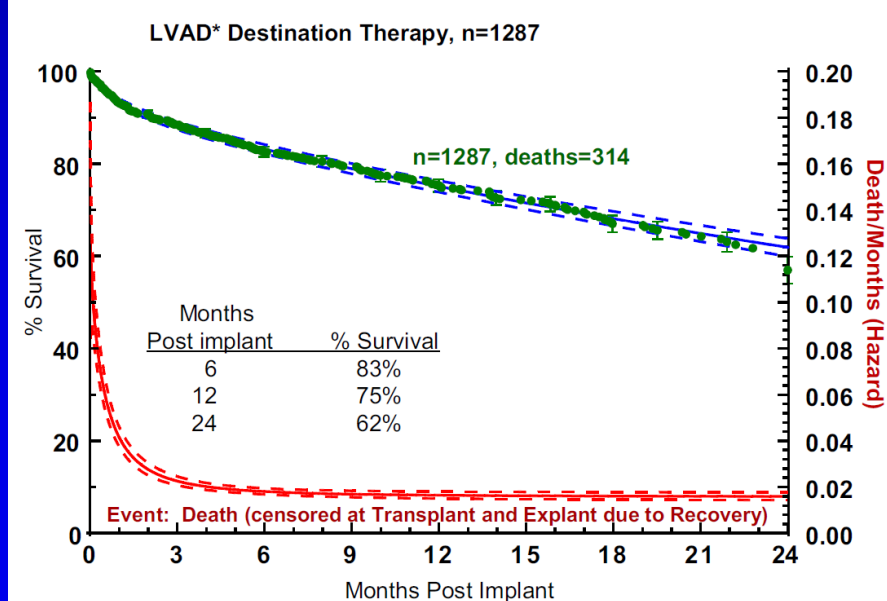
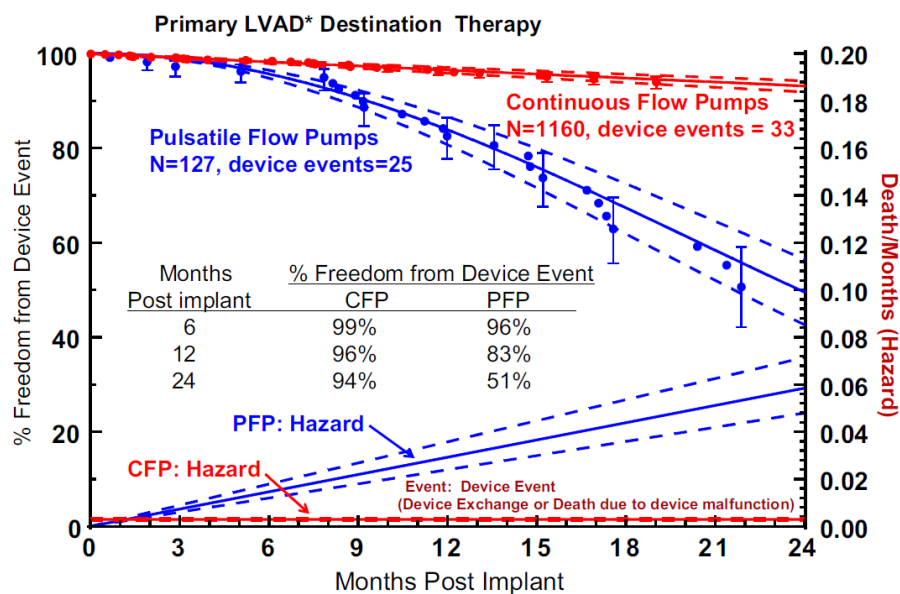


Survie sous LVAD

Long-term mechanical circulatory support (destination therapy): On track to compete with heart transplantation?

Among patients with a continuous flow LVAD who were not in cardiogenic shock, a particularly favorable survival was associated with no cancer, patients not in cardiogenic shock, and blood urea nitrogen less than 50 mg/dL, resulting in 1- and 2-year survivals of 88% and 80%.

Conclusions: (1) Evolution from pulsatile to continuous flow technology has dramatically improved 1- and 2-year survivals; (2) DT is not appropriate for patients with rapid hemodynamic deterioration or severe right ventricular failure; (3) important subsets of patients with continuous flow DT now enjoy survival that is competitive with heart transplantation out to about 2 years. (J Thorac Cardiovasc Surg 2012;144:584-603)



Relative roles of heart transplantation and long-term mechanical circulatory support in contemporary management of advanced heart failure – a critical appraisal 10 years after REMATCH

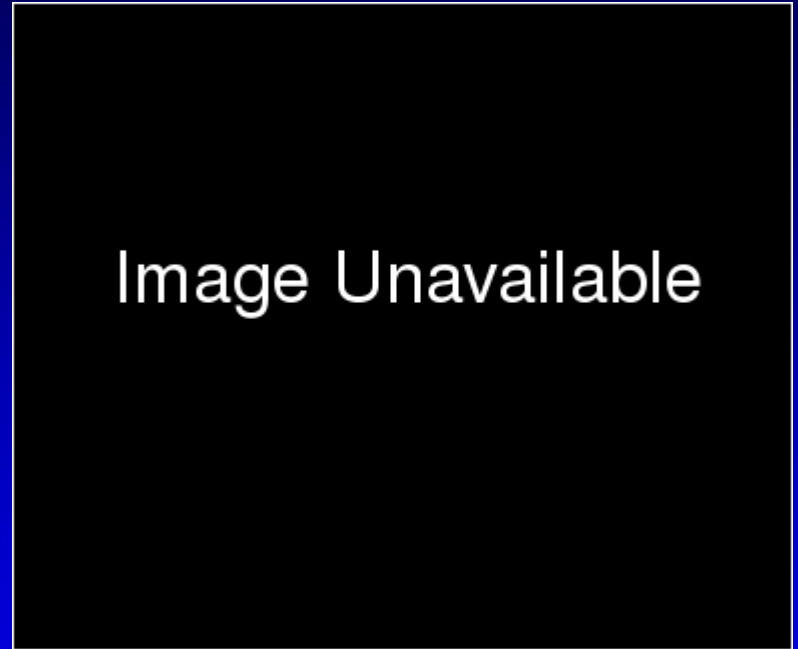
Eur J Cardiothorac Surg 2011;40:781-782

The second generation HeartMate II LVAD improved the survival and quality of life even more [10,11]. Currently, the 1-year survival in HeartMate II LVAD patients is around 85% and therefore reaching similar intermediate-term outcomes as HTx. Although HTx has maintained its highly visible role as established therapy for selected AdHF patients, it remains notably limited by donor organ availability. In contrast, MCS therapy is achieving similar outcomes as HTx but is available in potentially unlimited numbers. The professional paradigm could be summarized as: 'While HTx is maintaining its mature lifesaving and quality-of life enhancing role for selected AdHF patients, MCS therapy is rivaling the outcome of HTx, at least over midterm ranges and has the advantage to be available in unlimited numbers. Therefore, direct compar-

Mais dans la vraie vie...



Greffe Cardiaque
Il y a 20 ans



Assistance cardiaque
Il y a 20 ans

RÉSULTATS PROMETTEURS MAIS....



Problématiques pour l'infectiologue

- Gestion de matériel vital infecté au long cours, en attente de greffe
- Attention à l'immunosuppression à la transplantation
- Pour les DT: augmenter la survie avec prise en compte du confort et de la qualité de vie...

Merci de votre attention

