

DÉCLARATION DE LIENS D'INTÉRÊT AVEC LA PRÉSENTATION

Intervenant : R . Boukhoulef , Blida

Je n'ai pas de lien d'intérêt à déclarer

DÉCLARATION DE LIENS D'INTÉRÊT AVEC LA PRÉSENTATION

Intervenant : Prénom Nom, Ville

Je déclare les liens d'intérêt suivants :



GRCI 2018

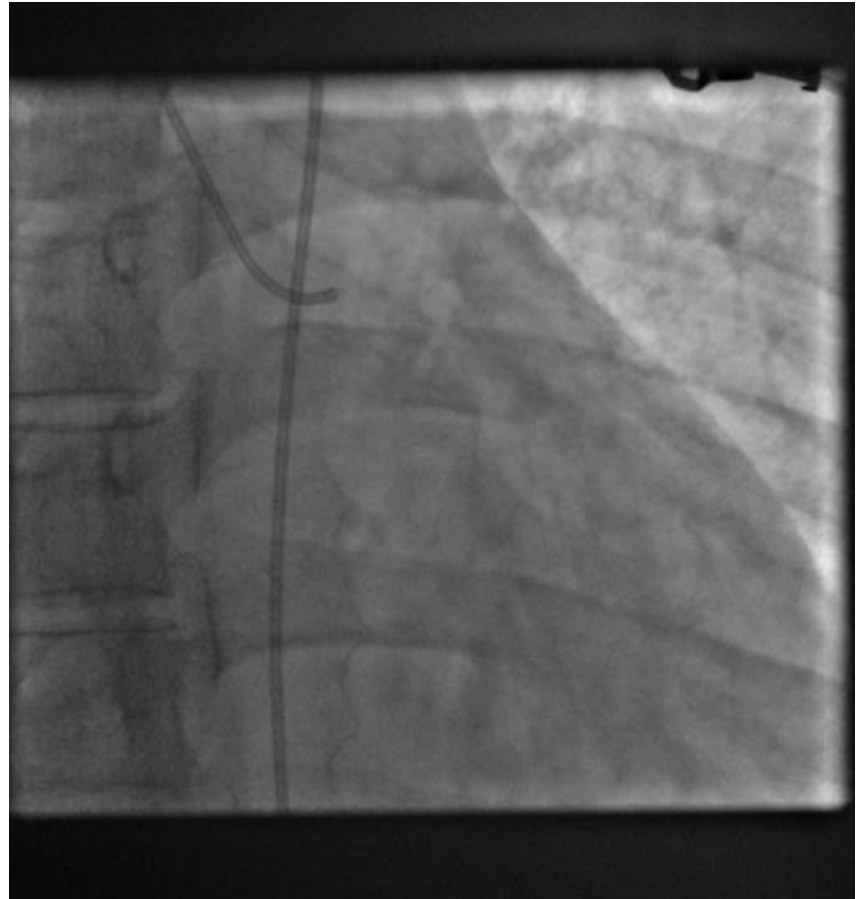
Reste-t-il encore une place pour CPIA ?

***R Boukhoulef
Blida***

- Jeune âgé de 28 ans
- TABAC ++
- STEMI Antérieur H 7 compliqué d'état de choc
- TA : 80/50 mm H g

- ECG : sus décalage en antérieur étendu

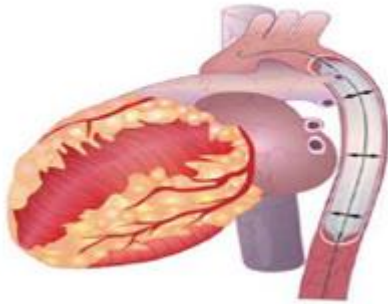
Coronarographie



assistance circulatoire !?

cur

CPIA



Tandemheart / ECLS



Impella

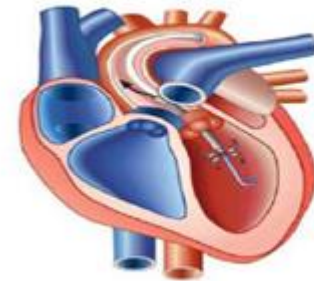
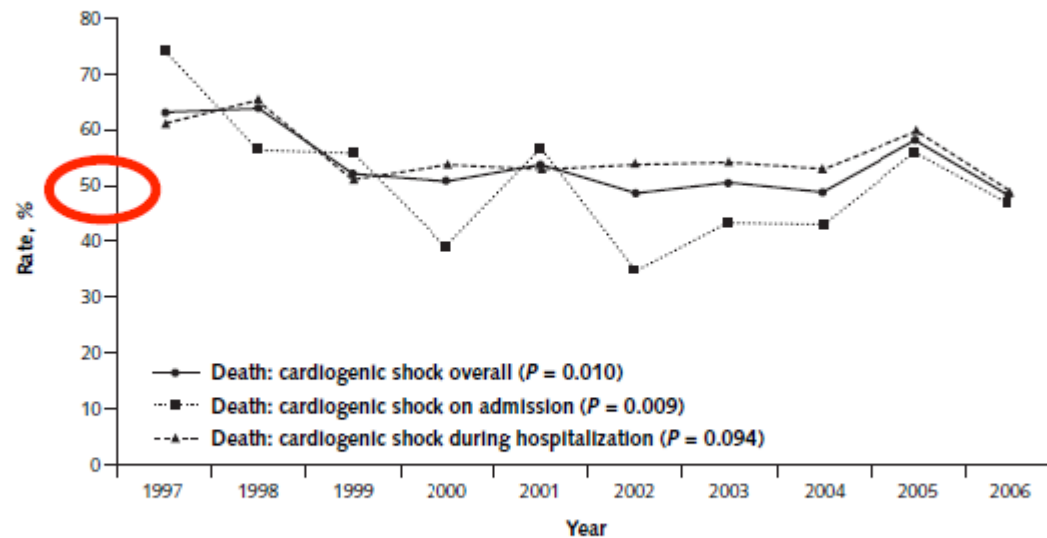


Figure 4. Temporal trends from 1997 to 2006 in rates of death in patients with overall cardiogenic shock, cardiogenic shock on admission, and cardiogenic shock developing during hospitalization.



Mortalité dramatique du choc cardiogénique même avec revascularisation

CPIA

- Assistance circulatoire de courte durée la plus simple
- Favorise essentiellement l'éjection du ventricule gauche

Une vieille histoire

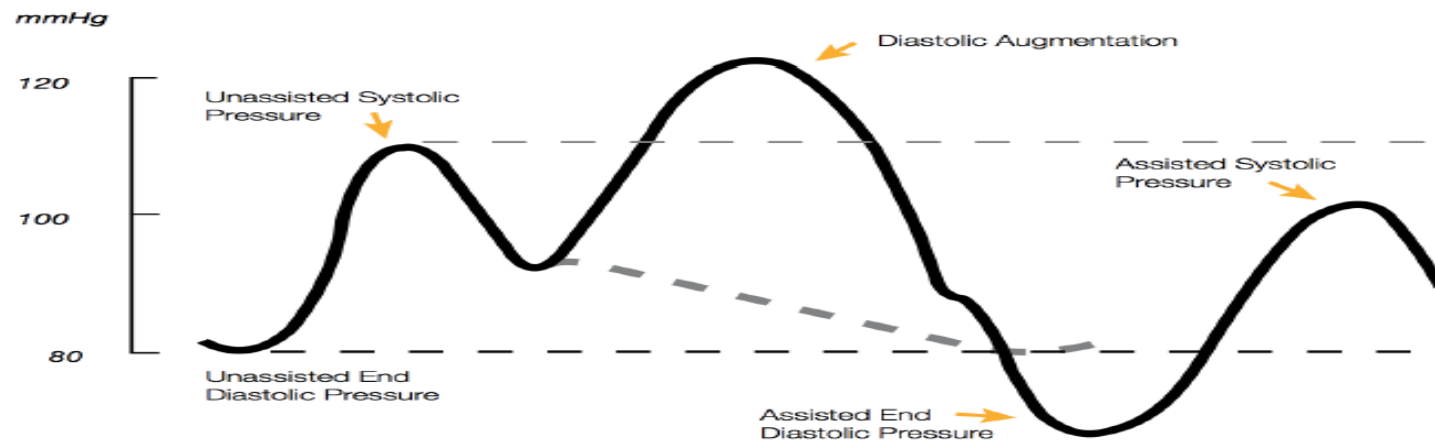
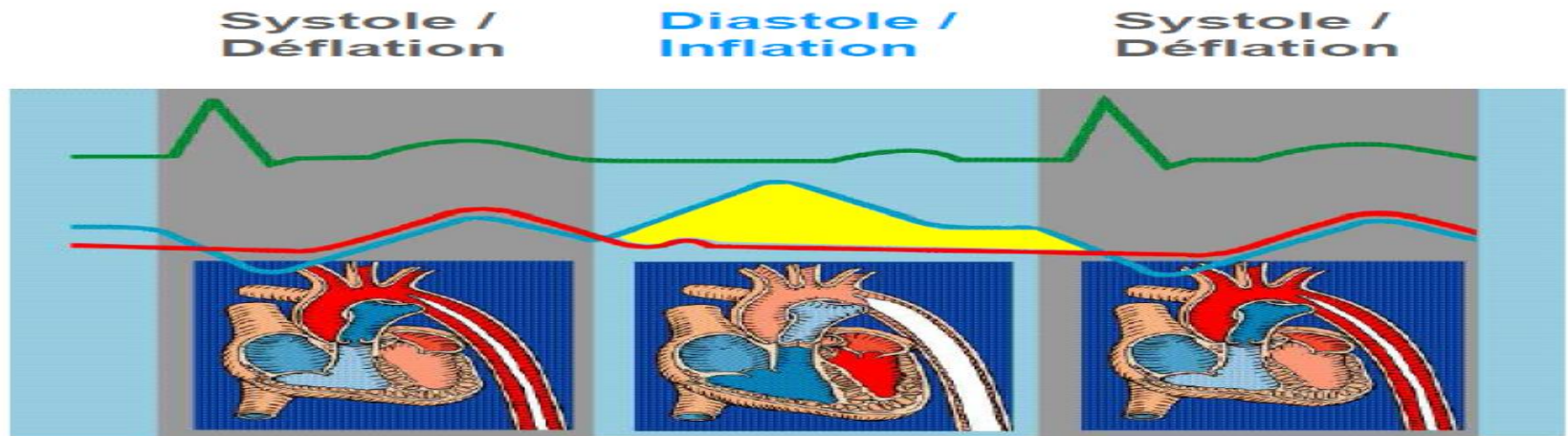
- 1961 : RH Clauss décrit la contre-pulsion mécanique chez l'animal (*J Thorac Cardiovasc Surg*)
- 1962 : SD Mouloupoulos réalise les premières expériences avec un ballonnet de CPIA (*Am Heart J*)
- **1968** : **A Kantrowitz** rapporte l'utilisation de CPIA chez 2 patients en **choc cardiogénique** (*JAMA*)



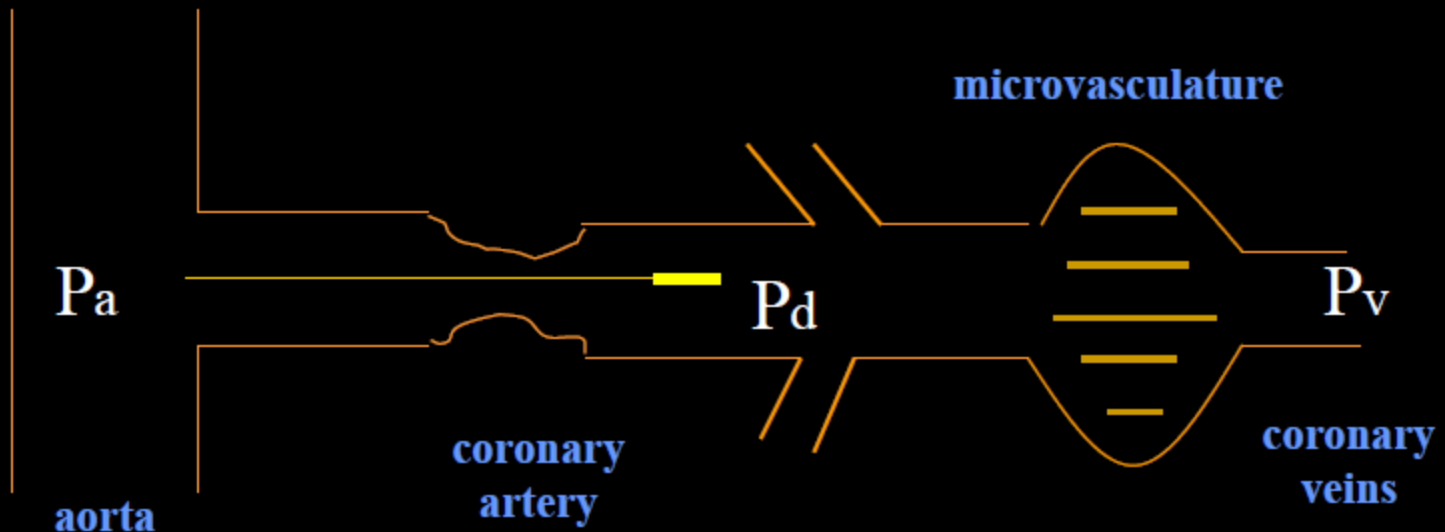
LES INDICATIONS ETAIENT

- Infarctus antérieur sans choc
- Angioplastie protégée
- Choc cardiogénique sur SCA
- Défaillance VG réfractaire sans SCA
- Pré-chirurgie cardiaque (pontages, IM, CIV)
- Sortie de chirurgie cardiaque
- Infarctus du VD
- Décharge ECMO

Mécanisme d'action de la CPIA



Determinants of Myocardial Blood Flow



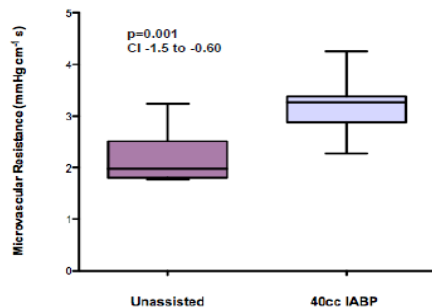
$$\text{Myocardial Flow} = \frac{\text{Perfusion Pressure } (P_d - P_v)}{\text{Microvascular Resistance}}$$

Coronary and Microvascular Physiology During Intra-Aortic Balloon Counterpulsation

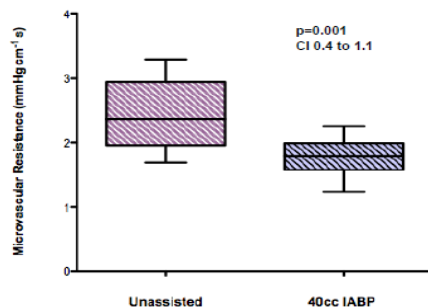
Kalpa De Silva, MBBS, PhD,* Matthew Lumley, MBBS, BSc,* Balrik Kailey, BSc,*
 Jordi Alastruey, PhD,† Antoine Guilcher, PhD,‡ Kaleab N. Asress, MA, BM, BCH,*
 Sven Plein, MD, PhD,†§ Michael Marber, PhD,* Simon Redwood, MBBS, MD,*
 Divaka Perera, MA, MD*

London, and Leeds, United Kingdom

Switched on Auto-regulation

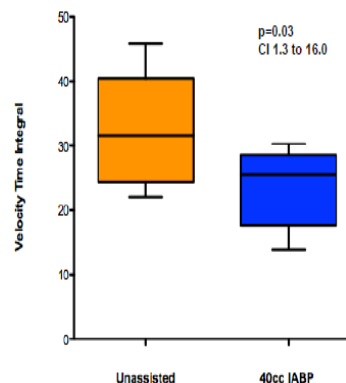


Switched off Auto-regulation

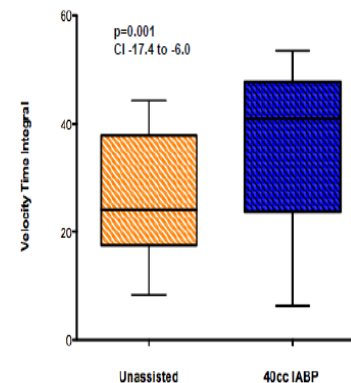


$$\text{Microvascular Resistance} = P_d/APV$$

Switched on Auto-regulation



Switched off Auto-regulation



January 8, 1968

Initial Clinical Experience With Intraaortic Balloon Pumping in Cardiogenic Shock

Adrian Kantrowitz, MD; Steinar Tjønneland, MD; Paul S. Freed, MS; [et al](#)

JAMA 1968;203(7):113-118 doi:10.1001/jama.1968.03140070041011

The New England Journal of Medicine

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VOLUME 341

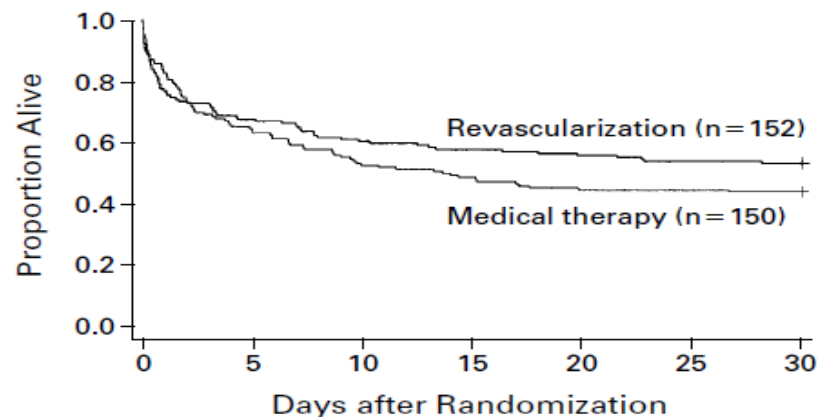
AUGUST 26, 1999

NUMBER 9



EARLY REVASCULARIZATION IN ACUTE MYOCARDIAL INFARCTION COMPLICATED BY CARDIOGENIC SHOCK

JUDITH S. HOCHMAN, M.D., LYNN A. SLEEPER, Sc.D., JOHN G. WEBB, M.D., TIMOTHY A. SANBORN, M.D., HARVEY D. WHITE, D.Sc., J. DAVID TALLEY, M.D., CHRISTOPHER E. BULLER, M.D., ALICE K. JACOBS, M.D., JAMES N. SLATER, M.D., JACQUES COL, M.D., SONJA M. MCKINLAY, Ph.D., AND THIERRY H. LEJEMTEL, M.D.,
FOR THE SHOCK INVESTIGATORS*



Les études clefs

Les études clefs

- La méta-analyse de 2009



European Heart Journal (2009) 30, 459–468
doi:10.1093/eurheartj/ehp602

CLINICAL RESEARCH
Coronary heart disease

A systematic review and meta-analysis of intra-aortic balloon pump therapy in ST-elevation myocardial infarction: should we change the guidelines?

Krischan D. Sjauw, Annemarie E. Engström, Marije M. Vis, René J. van der Schaaf, Jan Baan Jr, Karel T. Koch, Robbert J. de Winter, Jan J. Piek, Jan G.P. Tijssen, and José P.S. Henriques*

Table 2 Design of cohort studies of intra-aortic balloon pump in STEMI complicated by cardiogenic shock

| Study | Control for confounders | A priori addressed confounders | Measurement of exposure to IABP therapy | Number of patients lost to FUP | Inclusion in cohort without knowledge of outcome |
|---|---|--|---|--------------------------------|---|
| Moulopoulos <i>et al.</i> ²² | — | None | + | 0 | — (group allocation biased by knowledge of contra-indication for IABP in control group) |
| Stomel <i>et al.</i> ²³ | — | CS definition, STEMI definition | + | 0 | + |
| Kovacs <i>et al.</i> ²⁴ | — | CS definition, STEMI definition | + | 0 | + |
| Bengtsson <i>et al.</i> ²⁵ | — | CS definition | + | 0 | + |
| Waksman <i>et al.</i> ²⁶ | — | CS definition, STEMI definition | + | 0 | + |
| GUSTO-I ²⁷ | — (subgroup analysis from randomized trial) | CS definition | + | 5 | ± (IABP after day 1 considered as no IABP) |
| NRMI-2 ²⁸ | ± | CS definition, STEMI definition, demographics, hospital presentation factors, hospital course parameters | + | 0 | + |
| SHOCK registry ²⁹ | ± | CS definition, only CS due to LV failure, timing of IABP therapy | + | 0 | + |
| AMC CS cohort ^{20,21} | ± | CS definition, STEMI definition, demographics, hospital presentation factors, hospital course parameters | + | 0 | + |

+ denotes that the issue is properly addressed; ± denotes that the issue could be a cause of bias; — denotes that bias due to the issue is likely.

Use of intraaortic balloon counterpulsation in patients presenting with cardiogenic shock: observations from the GUSTO-I Study. Global Utilization of Streptokinase and TPA for Occluded Coronary Arteries.

Anderson RD¹, Ohman EM, Holmes DR Jr, Col I, Stebbins AL, Bates ER, Stomel RJ, Granger CB, Topol EJ, Califf RM.

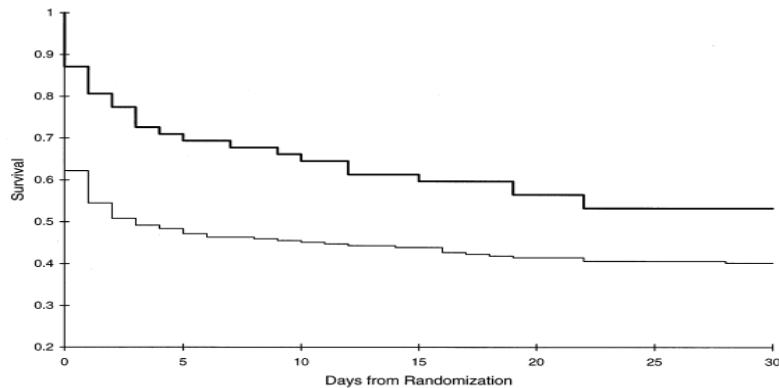


Figure 2. Thirty-day Kaplan-Meier survival curves for the early IABP (bold line) and no-IABP groups (light line).

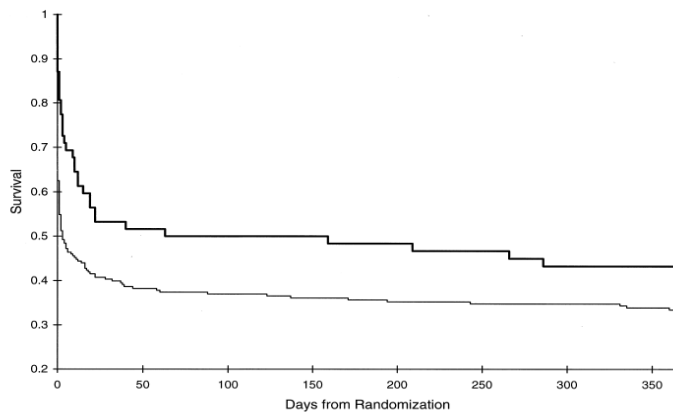


Figure 1. One-year Kaplan-Meier survival curves for the early IABP (bold line) and no-IABP groups (light line). The 1-year mortality rate was 57% in the early IABP group versus 67% in the no-IABP group ($p = 0.04$).

Conclusions. IABP appears to be underutilized in patients presenting with cardiogenic shock, both within and outside the United States. Early IABP institution is associated with an increased risk of bleeding and adverse events but a trend toward lower 30-day and 1-year all-cause mortality.

(J Am Coll Cardiol 1997;30:708-15)

©1997 by the American College of Cardiology

Am Heart J. 2001 Jun;141(6):933-9.

The use of intra-aortic balloon counterpulsation in patients with cardiogenic shock complicating acute myocardial infarction: data from the National Registry of Myocardial Infarction 2.

Barron HV¹, Every NR, Parsons LS, Angeja B, Goldberg RJ, Gore JM, Chou TM; Investigators in the National Registry of Myocardial Infarction 2.

23 180 patients en CC
après IDM

réduction de la
mortalité chez les
patients traités par
thrombolyse + CPIA

[53] Gu J, Hu W, Xiao H, Feng X, Chen Y, Zhang D:

Intra-aortic balloon pump improves clinical prognosis and attenuates C-reactive protein level in acute STEMI complicated by cardiogenic shock. *Cardiology* 2010;117(1):75–80.

Critère de jugement
Mortalité à 6 mois et à
un an

Taux de troponine
CRP
FEVG

Am J Cardiol. 2013 Dec 1;112(11):1709-13. doi: 10.1016/j.amjcard.2013.07.035. Epub 2013 Sep 13.

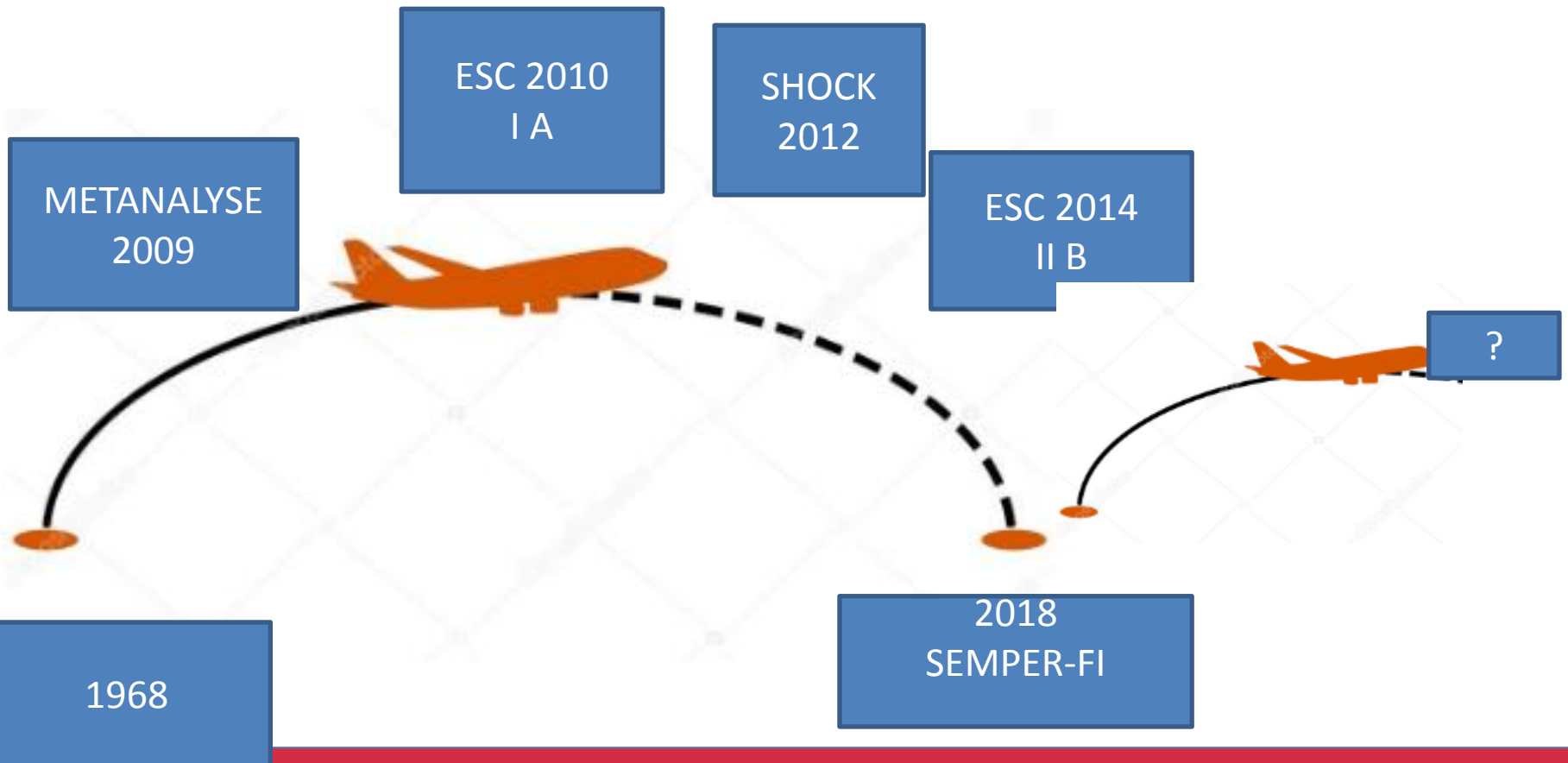
Utility of intra-aortic balloon pump support for ventricular septal rupture and acute mitral regurgitation complicating acute myocardial infarction.

Kettner J¹, Sramko M, Holek M, Pirk J, Kautzner J.

The
American Journal
of
Cardiology

CPIA a réduit la mortalité à 30 jours chez les patients en état de choc (61%)

Mais des études récentes.....



Depuis

GRCI 2015
France

Je n'utilise plus la CPIA en phase aiguë d'infarctus....

ASSISTANCE CARDIAQUE
La CPBIA a-t-elle encore sa place ?

Sabrina SAAFI
Jean Luc KHOZIAN
CHU La TIMONE, Marseille

GRCI 2016

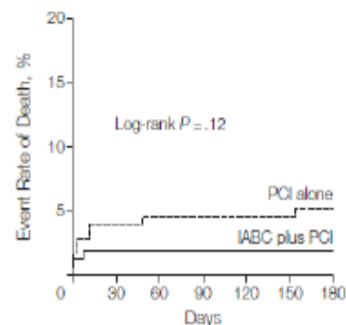


CRISP

Table 3. Cardiac Magnetic Resonance Imaging (MRI) Findings

| | Total (N = 337) | IABC Plus PCI (n = 161) | PCI Alone (n = 176) | P Value |
|--|------------------|-------------------------|---------------------|---------|
| Time from symptom onset to MRI, median (IQR), d | 4.0 (3.0-5.0) | 4.0 (3.0-5.0) | 4.0 (3.0-4.0) | .20 |
| Primary End Point | | | | |
| Infarct size, % of left ventricular mass | | | | |
| Per-protocol analysis, No. (%) | | | | |
| Mean (95% CI) | 275 (81.6) | 133 (82.6) | 142 (80.7) | |
| Mean (95% CI) | 39.8 (37.4-42.1) | 42.1 (38.7-45.6) | 37.5 (34.3-40.8) | .06 |
| Median (IQR) | 38.8 (26.0-52.2) | 42.8 (27.2-54.7) | 36.2 (25.9-49.4) | |
| Multiple imputation analysis | | | | |
| Mean (95% CI) | 39.7 (37.3-42.1) | 42.1 (38.6-45.6) | 37.6 (34.3-40.9) | .07 |
| Median (IQR) | 39.0 (26.0-52.3) | 42.5 (27.1-55.9) | 36.4 (24.9-49.9) | |
| <u>Proximal left anterior descending and TIMI flow score of 0 or 1</u> | | | | |
| Per-protocol analysis, No. (%) | | | | |
| Mean (95% CI) | 192 (57.0) | 80 (57.8) | 90 (56.3) | |
| Mean (95% CI) | 44.4 (41.7-47.1) | 46.7 (42.8-50.6) | 42.3 (38.6-45.9) | .11 |
| Median (IQR) | 42.1 (30.3-54.7) | 45.1 (32.7-60.8) | 38.6 (29.6-51.6) | |
| Multiple imputation analysis | | | | |
| Mean (95% CI) | 44.4 (41.7-47.1) | 46.8 (42.9-50.8) | 42.1 (38.4-45.7) | .08 |
| Median (IQR) | 42.5 (30.3-55.9) | 45.3 (32.3-61.6) | 39.2 (29.5-51.9) | |

Figure 2. Event Rate of Death From 0 to 180 Days



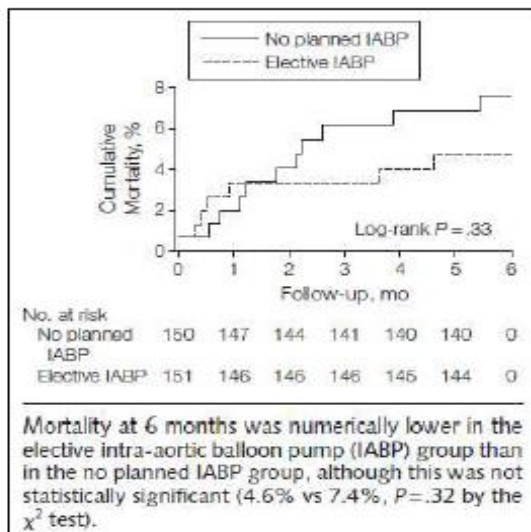
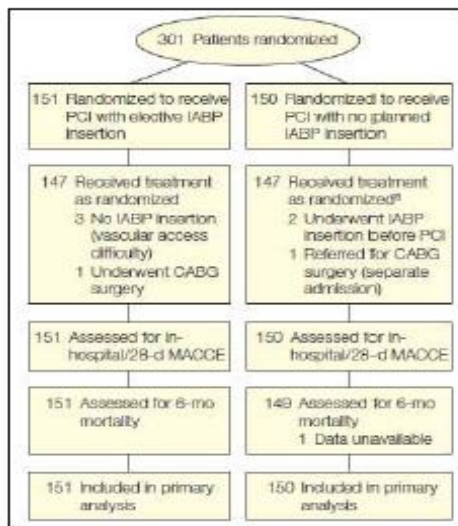
- Désobstruer l'artère reste la priorité....
- Mettre un ballon si choc???

Les études BCIS-1

Elective Intra-aortic Balloon Counterpulsation During High-Risk Percutaneous Coronary Intervention

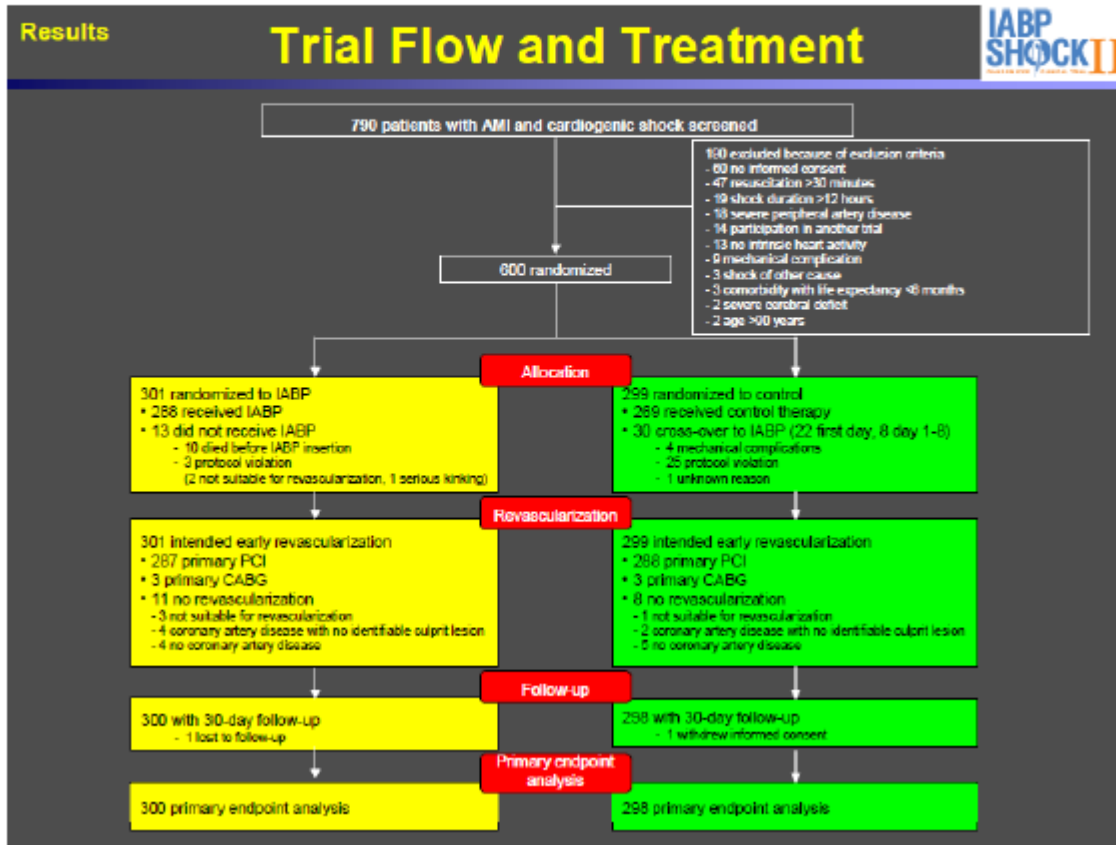
A Randomized Controlled Trial

JAMA. 2010;304(8):867-874



Shock II

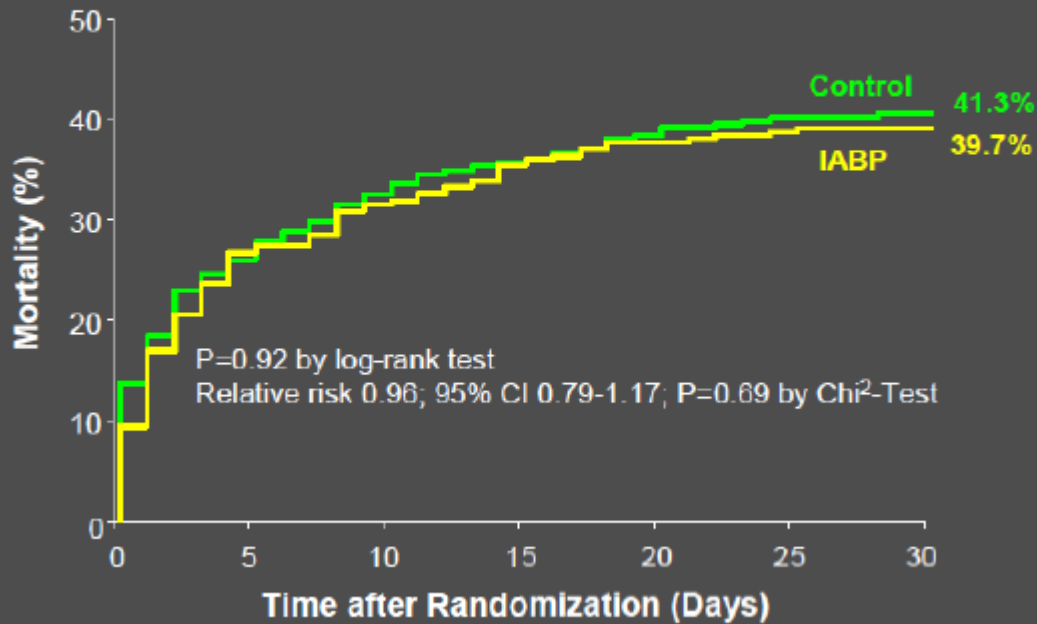
at



Results

Primary Study Endpoint (30-Day Mortality)

IABP
SHOCK II



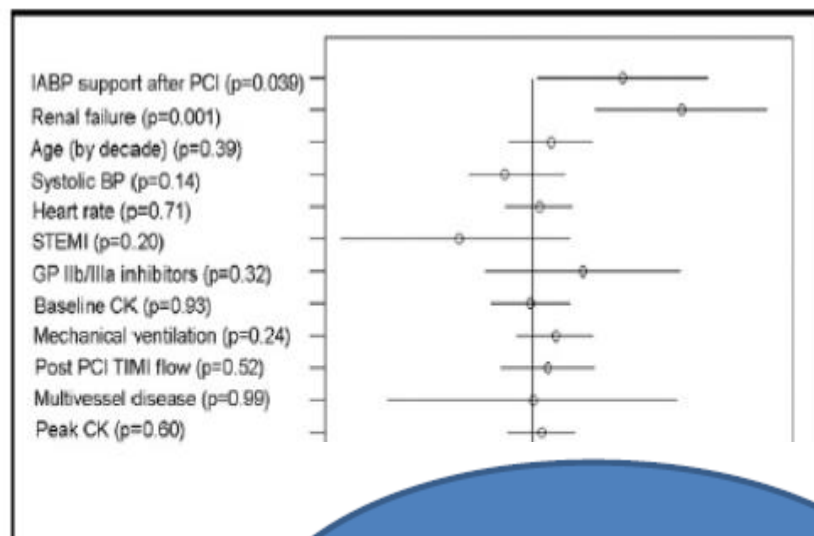
SHOCK II critiquable ?

Table 2. Pitfalls in the evaluation of IABP-SHOCK-II

- (1) Clinically relevant information withheld
 - (a) Time between onset of symptoms and revascularization
 - (b) Patients' hemodynamic status before reperfusion and before IABP insertion
 - (c) Outcome of patients who crossed over to IABP insertion
 - (d) Timing of IABP implementation
 - (e) Duration of IABP support
- (2) Extremely short delay between symptom onset and balloon insertion in Germany
- (3) Postischemic mechanical complications were an exclusion criterion
- (4) Large cross-over volumes from control to IABP or other mechanical support

...determined per protocol
...post procedural

...myocardial Infarction with



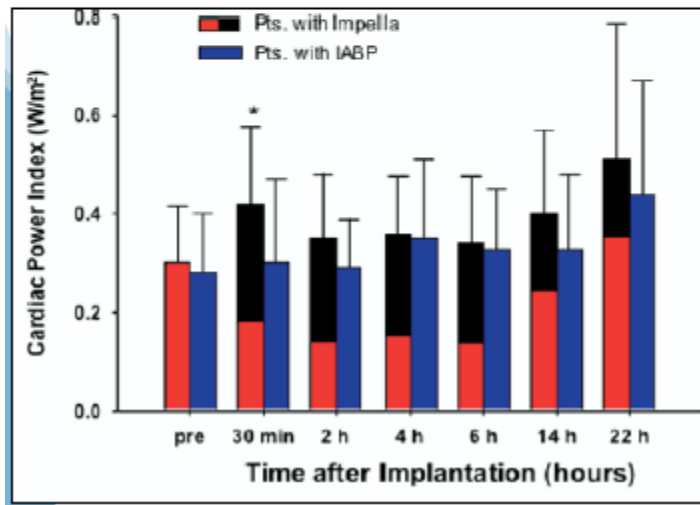
10 patients (3,3%) du groupe BCPIA sont morts avant...

13% d'insertion avant l'ATL seulement !!!

17,4% des patients du groupe contrôle ont finalement eu un BCPIA ou une ECMO

⊖ ISAR-SHOCK

- 25 patient RCT Impella vs IABP
- ↑ Index Cardiaque
- ↑ PAM (by 10mmHg) vs IABP
- Complications = IABP
- FEVG = NS



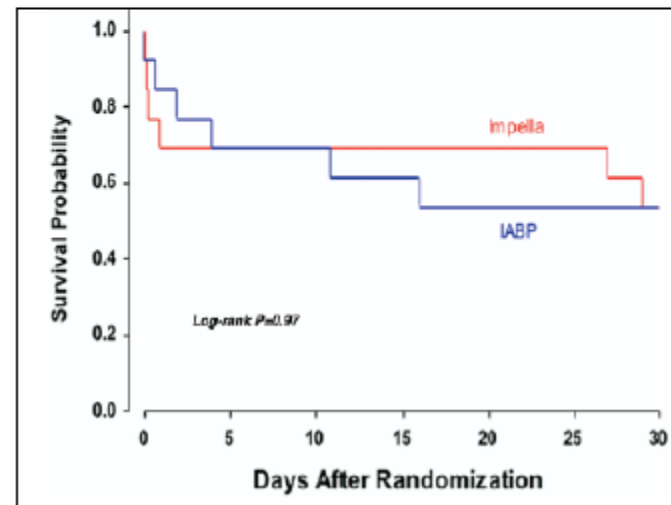
Journal of the American College of Cardiology
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Published by Elsevier Inc.

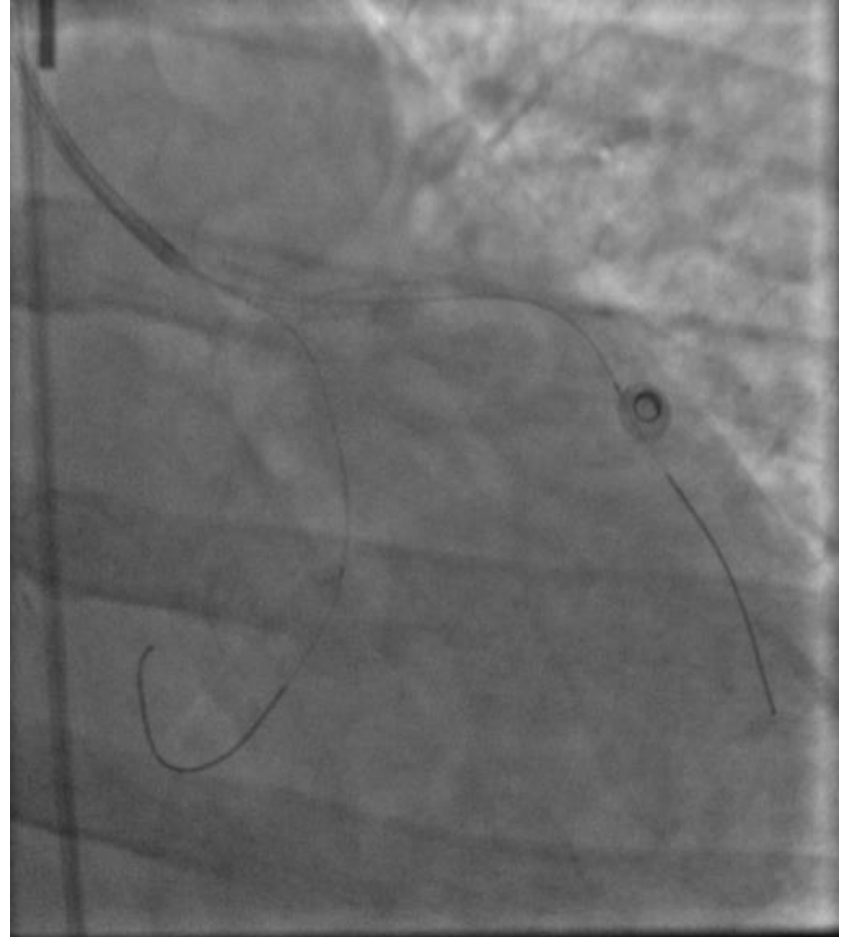
Vol 42, No 14
JACC: Shock
April 14, 2009

WORKS IN PROGRESS

A Randomized Clinical Trial to Evaluate the Safety and Efficacy of a Percutaneous Left Ventricular Assist Device Versus Intra-Aortic Balloon Pumping for Treatment of Cardiogenic Shock Caused by Myocardial Infarction

Melchor Seyfarth, MD,† Dirk Sibbing, MD,* Iris Bauer, MS,* Georg Fröhlich, MD,† Lorenz Bott-Fügel, MD,† Robert Byrne, MB, MRCPI,* Josef Dirschinger, MD,† Adnan Kastrup, MD,* Albert Schömig, MD*†
Munich, Germany





- Sevrage de CPIA deux jours après
- FEVG à la sortie 35 %

Survival improvement in Extensive Myocardial infarction with *P*ersistent ischemia *F*ollowing *I*ntra-aortic balloon pump implantation

L.X. van Nunen MD PhD
Catharina Hospital
EuroPCR Paris, May 24th, 2018



• Inclusion criteria

- Age 18-80 years old
- Large acute ST-segment elevation myocardial infarction
 - Summed ST-deviation (\sum ST-D) \geq 15mm
- Persistent ischemia after primary PCI
 - Insufficient ST-segment resolution <50%

• Exclusion criteria

- Chest pain onset <2 hrs or >8 hrs before arrival in the cath lab
- Clinical characteristics prohibitive for use of IABP (severe aortic regurgitation / aortic abnormalities)
- Inability to provide informed consent
- Cardiogenic shock requiring immediate mechanical support

100 patients
Large acute MI with
persistent ischemia

Randomization
IABP / no IABP
50 : 50

6 months follow-up
Mortality
Mechanical support
Heart failure

MERCI