

The 44th Annual International Congress of the
**EGYPTIAN SOCIETY OF
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 CardioEgyt2017

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Cardiogenic shock in the setting of primary PCI

Dr. Mohamed Aly Abdelhafez, M.D.
Lecturer of Cardiology
Assiut University
 2017

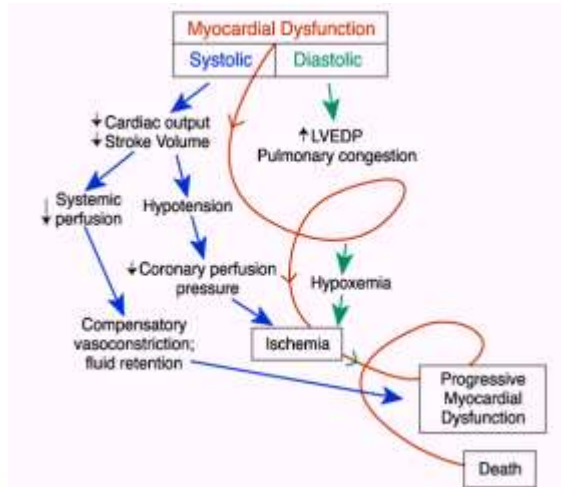
- ❖ Cardiogenic shock is a state of end-organ hypoperfusion due to cardiac failure.
- ❖ It occurs in 5% to 8% of patients hospitalized with STEMI.

Table 1: The Diagnostic Criteria of Cardiogenic Shock

Cardiogenic Shock
Hypotension:
Systolic blood pressure <90 mmHg for >30 min, or
Vasopressors required to achieve a blood pressure ≥90 mmHg
Elevated Left Ventricular Filling Pressures:
Pulmonary congestion, or
Adequate or elevated filling pressures (wedge pressure >20 mmHg)
Signs of impaired organ perfusion (at least one of the following):
Altered mental status
Cold, clammy skin
Oliguria
Increased serum lactate levels

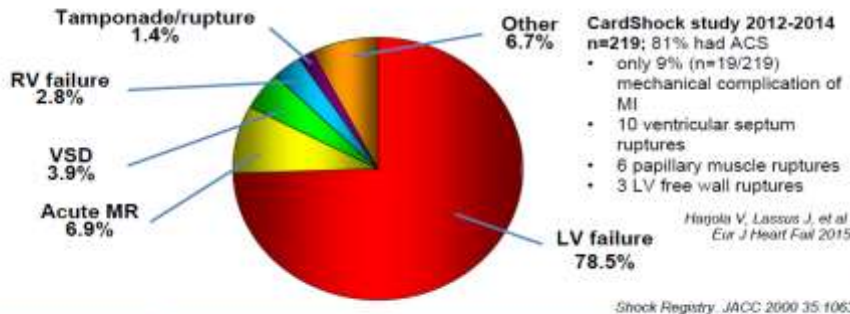


Schematic



What is the most important etiology?

Etiological factors after AMI:
data from SHOCK trial (n=232) and registry (n= 1190)



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Cardiogenic Shock

- In AMI, cardiogenic shock most often results from **extensive infarction** → pump failure
 - At least **40%** of the LV myocardial mass must be lost to cause pump failure
- RV infarction, ruptures and arrhythmias (tachy and brady)
- Non-infarct causes: LVOT obstruction, PE, aortic dissection with acute AR or tamponade, apical ballooning



Profound LV failure

- Risk factors
 - Elderly (age > 70)
 - Diabetes
 - Anterior infarction
 - Prior MI
 - 3 vessel (58%), left main disease (29%)
 - **Early use of beta blockers in large infarcts**



Is shock immediately lethal?



Figure 7. Cumulative mortality from the time of onset of shock. Half the group are dead within 10.2 hr (thin dashed line). Overall mortality is 86 percent.

Hasdai et al. JACC 2000;36:687



What to do ?

Treatment of cardiogenic shock (Killip class IV)

Recommendations	Class	Level
Oxygen/mechanical respiratory support is indicated according to blood gasses.	I	C
Urgent echocardiography/Doppler must be performed to detect mechanical complications, assess systolic function and loading conditions.	I	C
High-risk patients must be transferred early to tertiary centres.	I	C
Emergency revascularization with either PCI or CABG in suitable patients must be considered.	I	B
Fibrinolysis should be considered if revascularization is unavailable.	IIa	C
Intra-aortic balloon pumping may be considered.	IIb	B
LV assist devices may be considered for circulatory support in patients in refractory shock.	IIb	C
Haemodynamic assessment with balloon floating catheter may be considered.	IIb	B
Inotropic/vasopressor agents should be considered:		
• Dopamine:	IIa	C
• Dobutamine:	IIa	C
• Norepinephrine (preferred over dopamine when blood pressure is low).	IIb	B



Which one to choose?

Emergency PCI is indicated for patients with cardiogenic shock due to STEMI or NSTEMI-ACS if coronary anatomy is amenable.	I	B
Emergency CABG is recommended for patients with cardiogenic shock if the coronary anatomy is not amenable to PCI.	I	B
Emergency surgery for mechanical complications of acute myocardial infarction is indicated in case of haemodynamic instability.	I	C



When ?

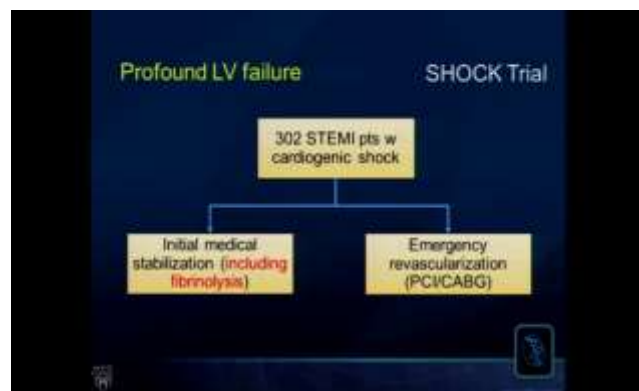
Primary PCI is indicated for patients with severe acute heart failure or cardiogenic shock due to STEMI independent from time delay of symptom onset.	I	B
Emergency angiography with the intent of revascularization is indicated in cardiogenic shock or acute severe heart failure after fibrinolysis.	I	B



Is there is any supporting data?



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Profound LV failure

- SHOCK Trial
 - No mortality benefit seen in all patients at 30 days
 - Patients < 75 years benefit from early revascularization at 30 days and 1 year, older did not
 - Mortality benefit seen overall with revascularization at 6 mo, 1 year and 6 years




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Profound LV failure

- Current recommendations
 - Early revascularization using PCI or CABG for patients <75 yrs who develop cardiogenic shock within 36 hours of MI
 - Class I, LOE A
 - It may be reasonable to perform early revascularization for selected patients > 75yrs with MI complicated with cardiogenic shock
 - Class IIa, LOE B

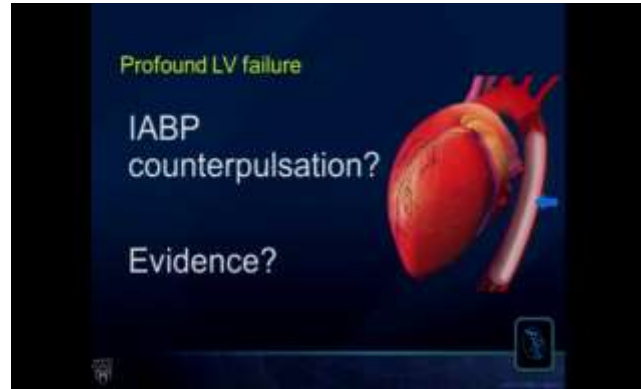
JACC 2013;61(4):e78-e140




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What about circulatory support?








- 600 pts with **non-rupture** cardiogenic shock
- No mortality benefit at 30 days or 1 year in patients with IABP



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2013 ACC/AHA/SCAI STEMI Guidelines STEMI and Cardiogenic Shock

 I IIa IIb III	Intra-aortic balloon pump counterpulsation can be useful in cardiogenic shock after STEMI when pharmacological therapy does not quickly stabilize hemodynamic status <i>no survival benefit with PPCI</i>
 I IIa IIb II	LV assist devices may be considered for treatment of refractory cardiogenic shock

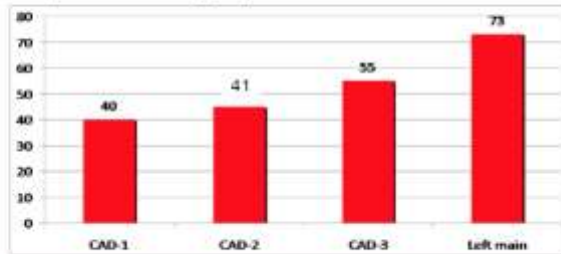

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Does the number of diseased vessels matters?

Influence of the extent of CAD on mortality after PCI in the Shock trial

1-year mortality (%)



Webb JG et al, JACC 2003

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Have you have to operate on all affected arteries?

2013 ACC/AHA/SCAI PCI Guidelines
Management of Patients with STEMI

PCI should not be performed in a noninfarct artery at the time of primary PCI in patients without hemodynamic compromise

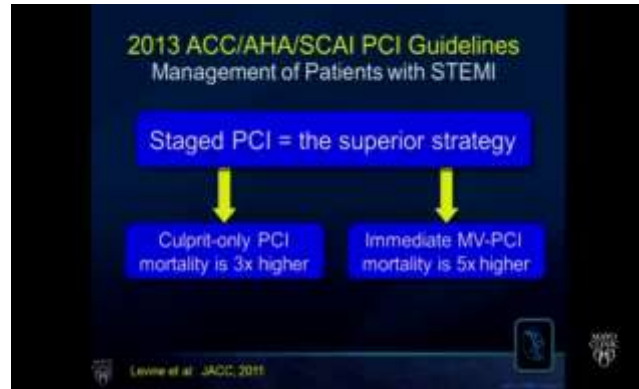
I IIa IIb III



Levine et al, JACC, 2013

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Why ?



When to operate on non-culprit artery?

Recommendations	Class ^a	Level ^b
Strategy		
Primary PCI should be limited to the culprit vessel with the exception of cardiogenic shock and persistent ischaemia after PCI of the supposed culprit lesion.	IIa	B
Staged revascularization of non-culprit lesions should be considered in STEMI patients with multivessel disease in case of symptoms or ischaemia within days to weeks after primary PCI.	IIa	B

On the other side

The Complete Versus Lesion-Only Primary PCI Trial (CvLPRIT)

- 296 STEMI patients with multivessel disease randomized to infarct-related artery only PCI or complete revascularization during index admission.
- The primary endpoint was the composite of total mortality, recurrent MI, heart failure and ischaemia-driven revascularisation at 12 months.

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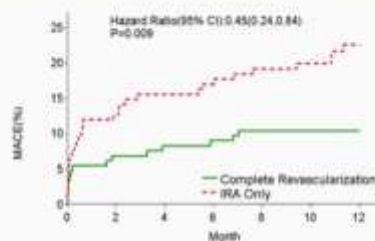
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CvLPRIT: Primary Endpoint (MACE) at 12 Months



Number at risk:

Month	0	2	4	8	10	12
Complete	150	131	129	128	125	73
IRA Only	148	122	118	116	111	68

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CvLPRIT: Individual Endpoints at 12 Months

Variable	IRA only (N=146)	Complete Revascularisation (N=150)	HR (95% CI)	P value
Time to First Event				
MACE N(%)	31 (21.2)	15 (10.0)	0.45 (0.24, 0.84)	0.009
Components N(%)				
All-cause mortality	6 (4.1)	2 (1.3)	0.32 (0.06, 1.60)	0.14
Recurrent MI	4 (2.7)	2 (1.3)	0.48 (0.09, 2.62)	0.39
Heart failure	9 (6.2)	4 (2.7)	0.43 (0.13, 1.39)	0.14
Repeat Revascularisation	12 (8.2)	7 (4.7)	0.55 (0.22, 1.39)	0.2

COMPLETE: ~4000 STEMI patients with multivessel disease randomised to full staged revascularization or optimal medical treatment.

Am Gerchick, UK, #023

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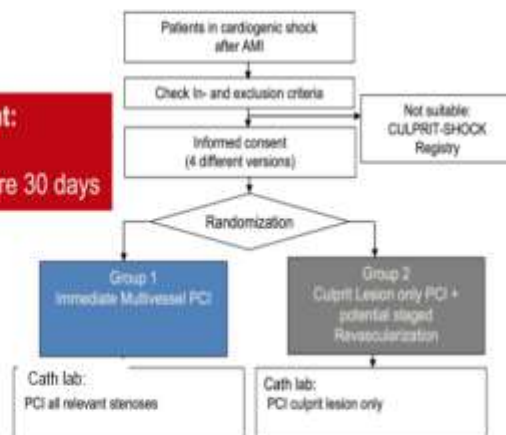
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Multivessel PCI in Cardiogenic Shock: CULPRIT-SHOCK Trial

Planned Sample
Size: 706
patients with CS

Study hypothesis:
culprit only PCI
plus staged is
superior to
immediate
multivessel PCI

**Primary Endpoint:
Mortality and/or
Severe renal failure 30 days**



Thiele H et al. Am Heart J 2016;172:160-9

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Which technique to use?

Technique		
Stenting is recommended (over balloon angioplasty) for primary PCI.	I	A
New-generation DES are recommended over BMS in primary PCI.	I	A
Radial access should be preferred over femoral access if performed by an experienced radial operator.	IIa	A
Thrombus aspiration may be considered in selected patients	IIb	A



Drug-Eluting Stents vs. Bare-Metal Stents in Acute Myocardial Infarction Complicated by Cardiogenic Shock - A Substudy of the IABP-SHOCK II-Trial

Jakob Ledwoch, M.D. [†], Georg Fuernau, M.D. [†], Steffen Desch, M.D. [†], Ingo Eitel, M.D. [†], Christian Jung, M.D., Ph.D. [‡], Susanne de Waha, M.D. [†], Janine Pösch, M.D. [†], Steffen Schneider, Ph.D. [§], Gerhard Schuler, M.D. ^{||}, Karl Weirder, M.D. [¶], Uwe Zeymer, M.D. ^{§§}, Holger Thiele, M.D. [†]

[†]Medical Clinic II, Department of Cardiology, Angiology, Intensive Care Medicine, University Heart Center Lübeck, Lübeck, Germany; [‡]German Center for Cardiovascular Research (DZHK), Partner Site Hamburg/Kiel/Lübeck, Lübeck, Germany; [§]Division of Cardiology, Pulmonology and Vascular Medicine, University Hospital Düsseldorf, Heinrich-Heine-University Düsseldorf, Düsseldorf, Germany; ^{§§}Institut für Herzerkrankung, Ludwigshafen, Germany; [¶] Clinic for Internal Medicine/Cardiology, University of Leipzig - Heart Center, Leipzig, Germany; ^{||} Clinic for Internal Medicine II, University-Hospital Halle (Saale), Martin-Luther-University Halle-Wittenberg, Halle (Saale), Germany; ^{¶¶}Medical Clinic B, Klinikum Ludwigshafen, Ludwigshafen, Germany

Conclusions

Despite the frequent use of DES nowadays, a substantial number of patients were treated by BMS in AMI complicated by CS. After adjustment for risk factors the one-year outcome of patients treated by DES compared to BMS was similar.




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Temporal Trends and Outcomes of Patients Undergoing Percutaneous Coronary Interventions for Cardiogenic Shock in the Setting of Acute Myocardial Infarction

A Report From the CathPCI Registry


Siddharth A. Wayangankar, MD, MPH,¹ Sripal Bangalore, MD, MHA,¹ Lisa A. McCoy, MS,² Hani Jneid, MD,³ Faisal Latif, MD,⁴ Wassef Karrowi, MD,⁵ Konstantinos Charitakis, MD,⁶ Dmitry N. Feldman, MD,⁷ Habib A. Dakik, MD,¹ Laura Mauri, MD,¹ Eric D. Peterson, MD, MPH,⁸ John Messenger, MD,¹ Mathew Roe, MD,⁹ Debabrata Mukherjee, MD,¹ Andrew Klein, MD¹





OBJECTIVES The purpose of this study was to examine the temporal trends in demographics, clinical characteristics, management strategies, and in-hospital outcomes in patients with acute myocardial infarction complicated by cardiogenic shock (CS-AMI) who underwent percutaneous coronary intervention (PCI) from the Cath-PCI Registry (2005 to 2013).

CONCLUSIONS Our study shows that despite the evolution of medical technology and use of contemporary therapeutic measures, in-hospital mortality in CS-AMI patients who are managed invasively continues to rise. Additional research and targeted efforts are indicated to improve outcomes in this high-risk cohort. (J Am Coll Cardiol Intv 2016;9:341-51) © 2016 by the American College of Cardiology Foundation.



Take home message

- Cardiogenic shock occurs in 5% to 8% of patients hospitalized with STEMI.
- Early revascularization improves survival substantially.
- Most importantly, hospital survivors have an excellent chance for long-term survival with good quality of life.



Thank you

