

PROLONGED RESUSCITATION AND SHOCK IN STEMI

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DISCLOSURE STATEMENT OF FINANCIAL INTEREST

I, **SORIN BRENER MD**, DO NOT have a financial interest/arrangement or affiliation with one or more organizations that could be perceived as a real or apparent conflict of interest in the context of the subject of this presentation.

CLINICAL PRESENTATION

- 64 yo man presents with first episode of CP, lasting ~2 hours
- He suffers cardiac arrest in ED, while in triage area
- Initial rhythm is VT, followed by VF
- After ROSC, first EKG shows inferior STEMI
- Recurrent VF requires more defibrillation and CPR
- Transferred to cath lab with active CPR – Lucas device

PAST MEDICAL HISTORY

- ASD repair in 2012 - Amplatz device following TIA
- Smoking
- Paroxysmal AF – on rivaroxaban
 - Therapy stopped by patient 1 month before presentation because of hematuria

ANTITHROMBOTIC THERAPY

- Crushed ticagrelor was given via NG on arrival , together with crushed ASA
- IV Cangrelor was started as soon as sheath was placed
- IV Bivalirudin was used for antithrombin therapy

CORONARY ANGIOGRAPHY



CLINICAL COURSE

- After PCI, rhythm stabilized
- Extubated next day
- Peak CK-MB was 120; Tnl – 46
- EF 65% - no cardiac thrombi
- Discharged home on day 7 neurologically intact
 - ASA 81
 - Ticagrelor 90 BID
 - Lisinopril 5 QD
 - Toprol XL 50 QD
 - Atorvastatin 80 QD

CLINICAL PRESENTATION

- 39 yo man with HTN, HLD, prediabetes, corneal transplant
- Unwitnessed cardiac arrest
- In ED – VF and DCC 5 times
- CPR with Lucas device
- ROSC few times for few seconds
- V-A ECMO started in ED

From: Optimal Treatment of Patients Surviving Out-of-Hospital Cardiac Arrest

J Am Coll Cardiol Interv. 2012;5(6):597-605. doi:10.1016/j.jcin.2012.01.017

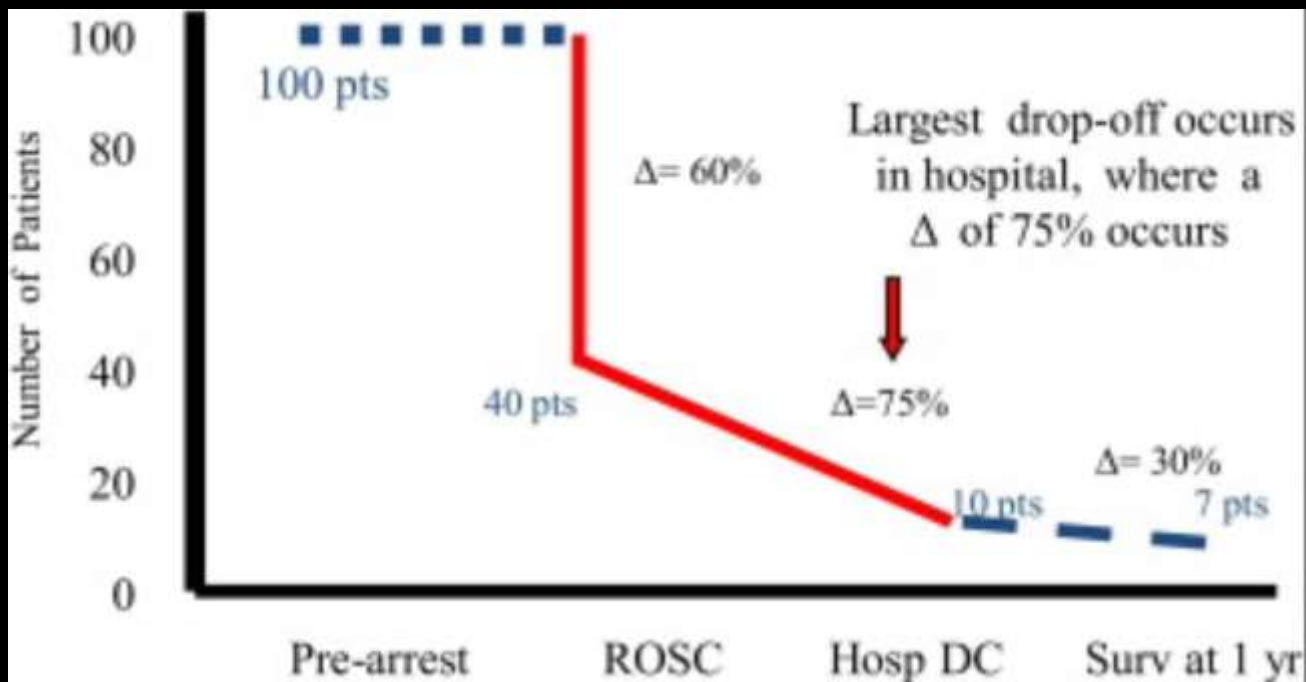


Figure Legend:

An Idealized Survival Curve After OHCA

The greatest drop-off in survival is not at the initial treatment in the field, but occurs in the hospital where 75% of those initially resuscitated die before hospital discharge (DC). Hosp = hospital; OHCA = out-of-hospital cardiac arrest; pts = patients; ROSC = return of spontaneous circulation; Surv = survival.

EKG

13-OCT-1976 (39 yr)
Male Caucasian
Room: 8
Loc: 49

Vent. rate 99 BPM
PR interval 167 ms
QRS duration 79 ms
QT/QTc 325/417 ms
P-R-T axes 32 14 68
BP 71/59

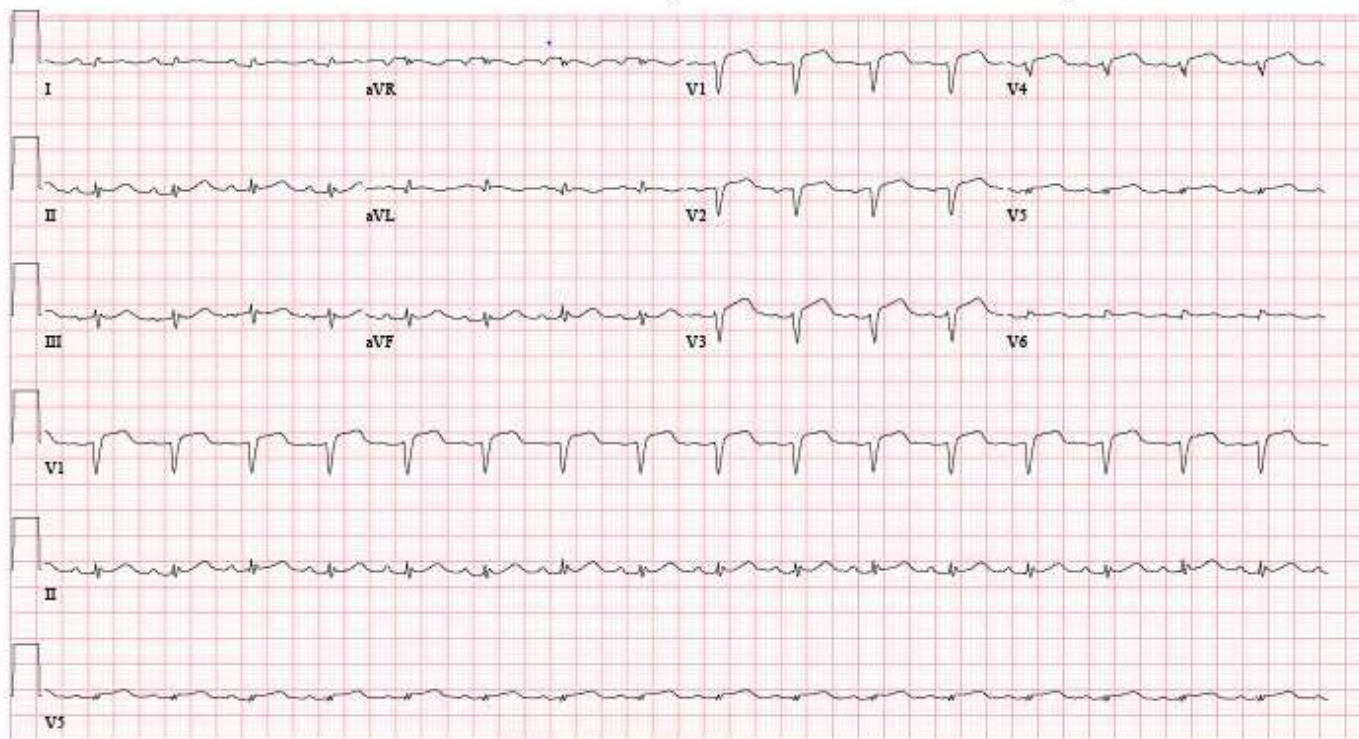
NORMAL SINUS RHYTHM
LOW VOLTAGE QRS
CANNOT RULE OUT ANTEROSEPTAL INFARCT, AGE UNDETERMINED
ABNORMAL ECG

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Technician:
Test ind:

Referred by: Iosif Gulzarov

Confirmed By: T SACCHI MD



CORONARY ANGIOGRAPHY

- After ECMO – directly to cath lab
- LAD is totally occluded at SP
- RCA has moderate disease
- LCX has mild disease
- 2 BMS in LAD with good reperfusion
- ASA, ticagrelor, heparin
- Dobutamine, Norepinephrine, Vasopressin

Se:1

Im: 20

Se:1

Im:20 (F29/50)

F.ROBERT

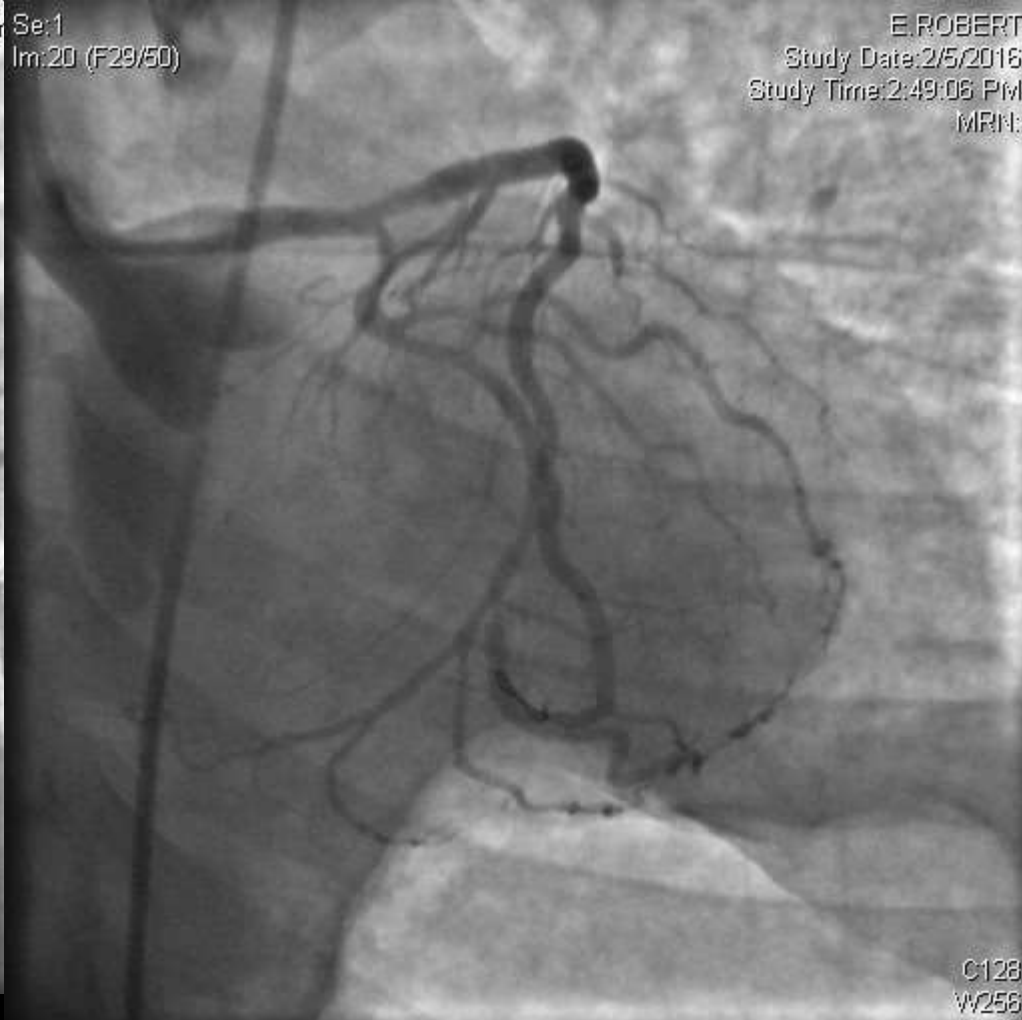
F.ROBERT

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Study Date:2/5/2016

Study Time:2:49:06 PM

MRN:



C128
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CLINICAL COURSE

- Return of LV ejection on day 2
- ECMO weaned and removed on day 4
- Extubated on day 5
 - Reintubated same evening
- Agitation and confusion
- Fever
- Extubated on day 10
- TTE on day 15 shows EF of 25-30%
- Discharged on day 17 to home with minimal neurological impairment

LUCAS CPR DEVICE

survival to discharge/30 days (average OR 0.89, 95% CI 0.77, 1.02) and survival with good neurological outcome (average OR 0.76, 95% CI 0.53, 1.11).

Resuscitation. 2015 Sep;94:91-7



From: Optimal Treatment of Patients Surviving Out-of-Hospital Cardiac Arrest

J Am Coll Cardiol Interv. 2012;5(6):597-605. doi:10.1016/j.jcin.2012.01.017

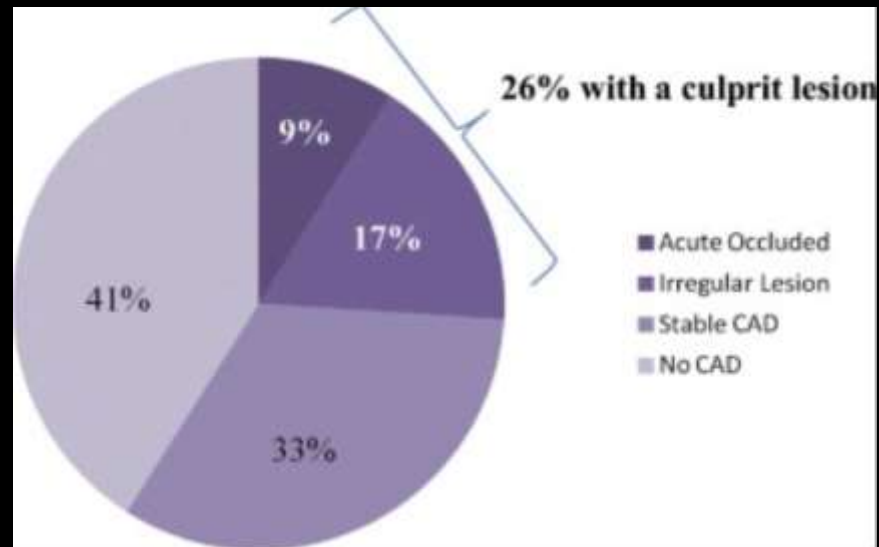


Figure Legend:

Coronary Angiography Results

Coronary angiographic results showing that 1 of every 4 resuscitated patients without ST-segment elevation has an acute culprit lesion found at early coronary angiography.

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J Am Coll Cardiol Interv. 2012;5(6):597-605. doi:10.1016/j.jcin.2012.01.017

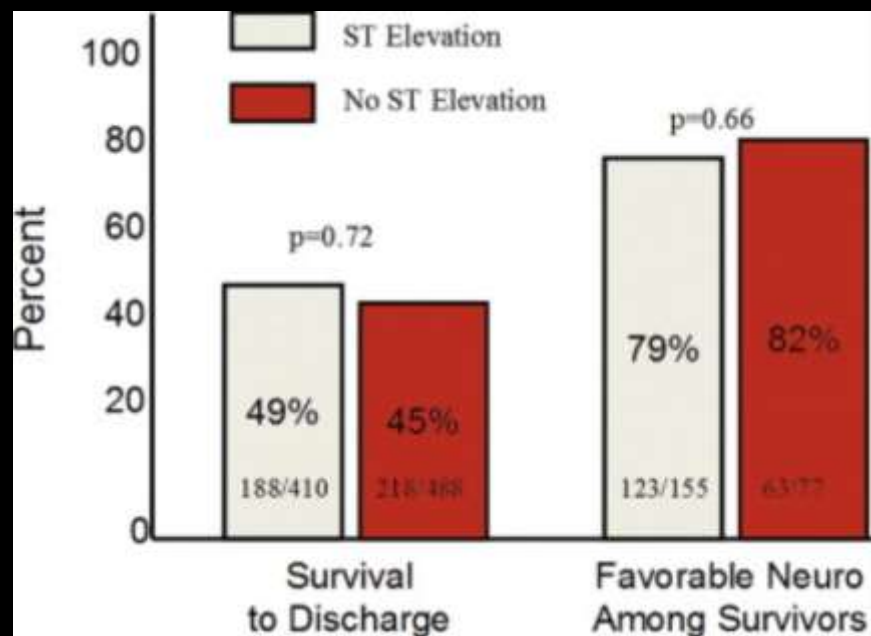


Figure Legend:

Differences in Survival

No differences in survival-to-discharge or favorable neurological function among survivors were seen between those with or without ST-segment elevation on their post-resuscitation electrocardiograms.

ESC GUIDELINES 2012

LV assist devices may be considered for circulatory support in patients in refractory shock.

IIb

C

ECMO CONSOLE





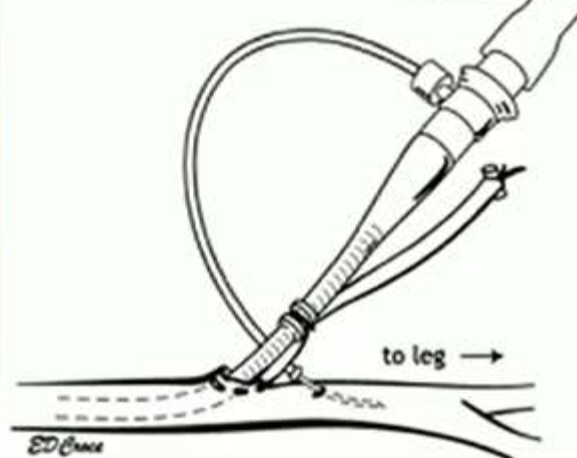
Peripheral cannulation



femoral
artery
cannulation
site



from ECMO



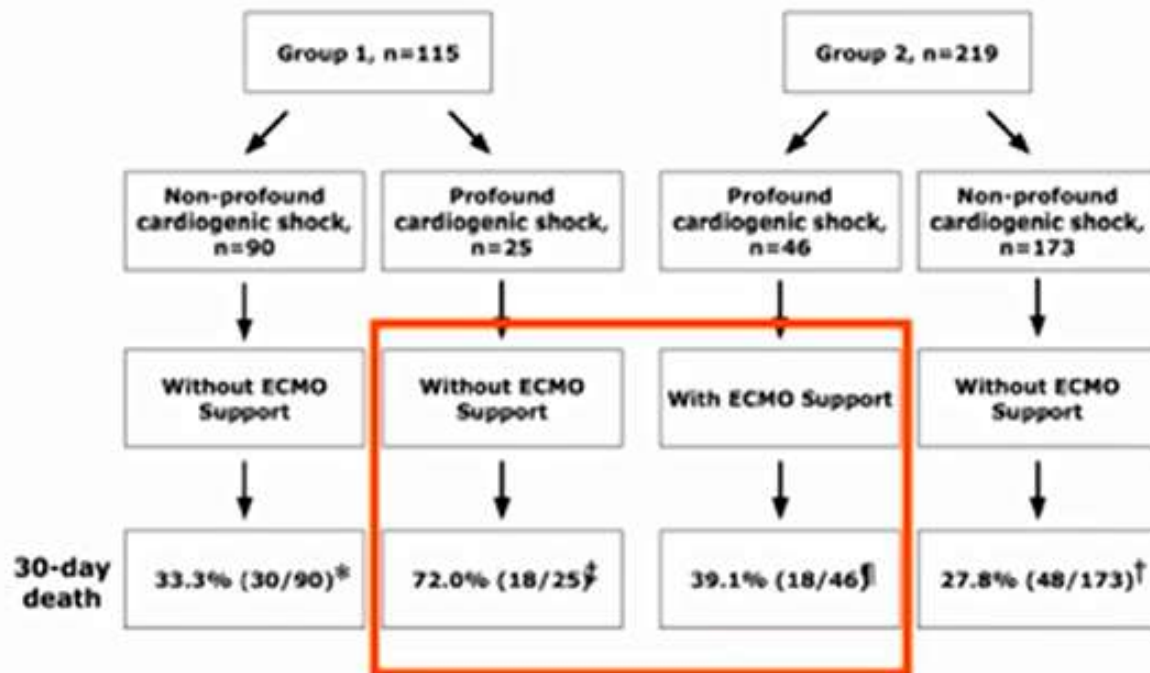
ED Case



Early extracorporeal membrane oxygenator-assisted primary percutaneous coronary intervention improved 30-day clinical outcomes in patients with ST-segment elevation myocardial infarction complicated with profound cardiogenic shock

Juinn-Jyr Sheu, MD, Tzu-Hsien Tsai, MD, Fan-Yen Lee, MD, Hsu-Yi Fang, MD,
Cheuk-Kwan Sun, MD, PhD, Sheng-Lan, PhD, Cheng-Hsu Yang, MD, Shyh-Ming Chen, MD,
Chi-Ling Kang, MD, Yuan-Kai Hsieh, MD, Chen-Jen Chen, MD, Chung-Jen Wu, MD, Han-Kai Yip, MD

Crit Care Med 2010; 38:1810-1817.





Cardiopulmonary resuscitation with assisted extracorporeal life-support versus conventional cardiopulmonary resuscitation in adults with in-hospital cardiac arrest: an observational study and propensity analysis

Yih-Sheng Chen¹, Jen-Chieh Lin¹, Wei-Hsueh Wang^{1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20,21,22,23,24,25,26,27,28,29,30,31,32,33,34,35,36,37,38,39,40,41,42,43,44,45,46,47,48,49,50,51,52,53,54,55,56,57,58,59,60,61,62,63,64,65,66,67,68,69,70,71,72,73,74,75,76,77,78,79,80,81,82,83,84,85,86,87,88,89,90,91,92,93,94,95,96,97,98,99,100}, Shih-Chuan Wang^{1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20,21,22,23,24,25,26,27,28,29,30,31,32,33,34,35,36,37,38,39,40,41,42,43,44,45,46,47,48,49,50,51,52,53,54,55,56,57,58,59,60,61,62,63,64,65,66,67,68,69,70,71,72,73,74,75,76,77,78,79,80,81,82,83,84,85,86,87,88,89,90,91,92,93,94,95,96,97,98,99,100}

Lancet 2008; 372: 554-61

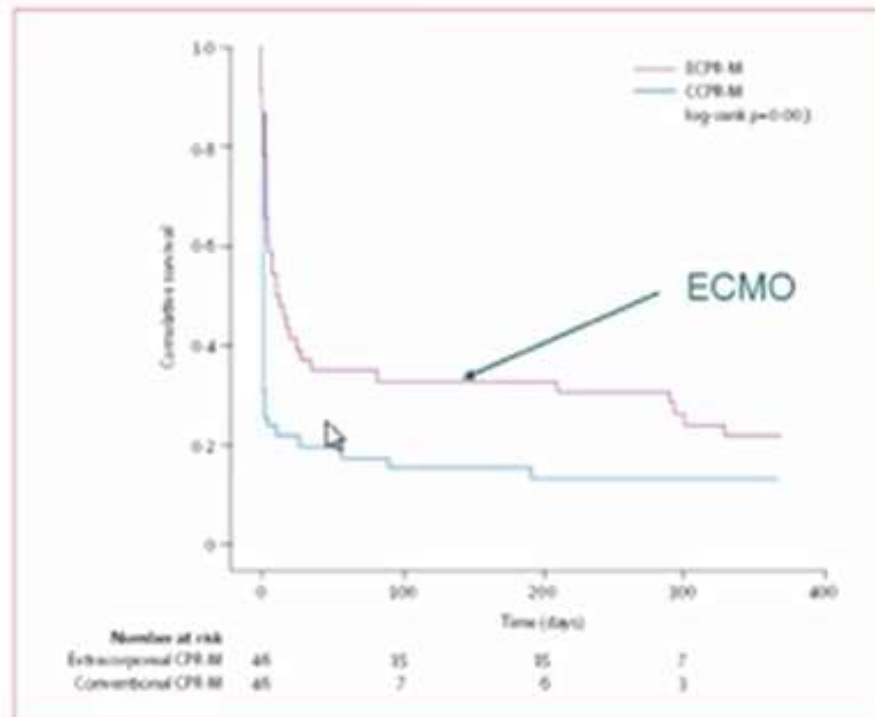


Figure 3: Kaplan-Meier plot of the survival curves in the extracorporeal CPR-M and conventional CPR-M groups for 1 year



Cardiopulmonary resuscitation with assisted extracorporeal life-support versus conventional cardiopulmonary resuscitation in adults with in-hospital cardiac arrest: an observational study and propensity analysis

Hui Sheng Chen¹, Jia Wu Liu², Yu Yu Yu³, Wen Zhi Yu⁴, Shouping Wu⁵, Yan Hong Wang⁶, Xian Wang⁷, Xue Han Wang⁸, Han Han Yu⁹, Qian Han Wang¹⁰, Li Chen Chen¹¹, Yu Yu Yu¹², Shouping Wu¹³, Yan Hong Wang¹⁴, Xian Wang¹⁵, Xue Han Wang¹⁶, Han Han Yu¹⁷, Qian Han Wang¹⁸

Lancet 2008; 372: 554-61

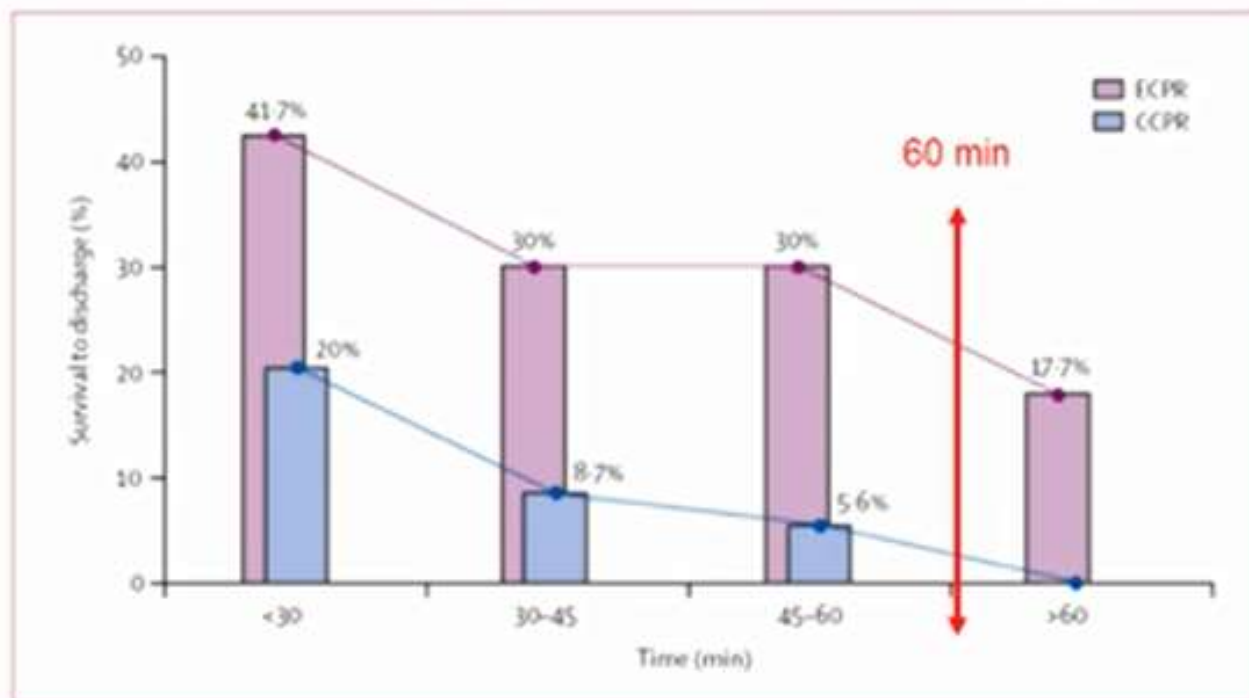
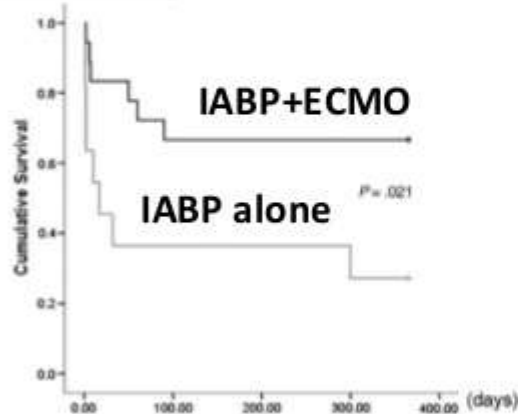


Figure 1: Relation between CPR duration and the survival rate to discharge
ECPR=extracorporeal CPR. CCPR=conventional CPR.

THE AUSTRALIAN EXPERIENCE

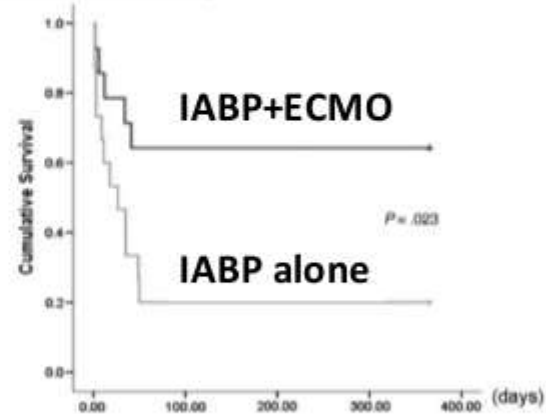
ECMO in Cardiogenic Shock

STEMI



	Wean	Discharge	1 month	2 months	6 months	12 months
IABP (11)	6 (54.55%)	5 (45.45%)	5 (45.45%)	5 (45.45%)	5 (45.45%)	3 (27.27%)
IABP+ECMO (18)	16 (88.89%)	13 (72.22%)	13 (72.22%)	13 (72.22%)	12 (66.67%)	12 (66.67%)

N-STEMI



	Wean	Discharge	1 month	2 months	6 months	12 months
IABP (18)	5 (33.33%)	3 (20.00%)	3 (20.00%)	3 (20.00%)	3 (20.00%)	3 (20.00%)
IABP+ECMO (14)	11 (78.57%)	9 (64.29%)	9 (64.29%)	9 (64.29%)	9 (64.29%)	9 (64.29%)

FINAL THOUGHTS

- Aggressive and effective CPR
 - Consider mechanical devices
- Early coronary angiography, particularly when STE present of post ROSC EKG
 - Class I LOE B
- Hypothermia in out-of hospital witnessed cardiac arrest with ROSC
 - Class I LOE B
- Early use of LV assist devices such as ECMO, Impella, Tandem Heart

Most importantly – DON'T GIVE UP!