

# GOAL DIRECTED RESUSCITATION FOR POST CARDIAC ARREST SYNDROME

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# DISCLOSURES

- None

# BACKGROUND

- Cardiac Arrest Incidence in the US

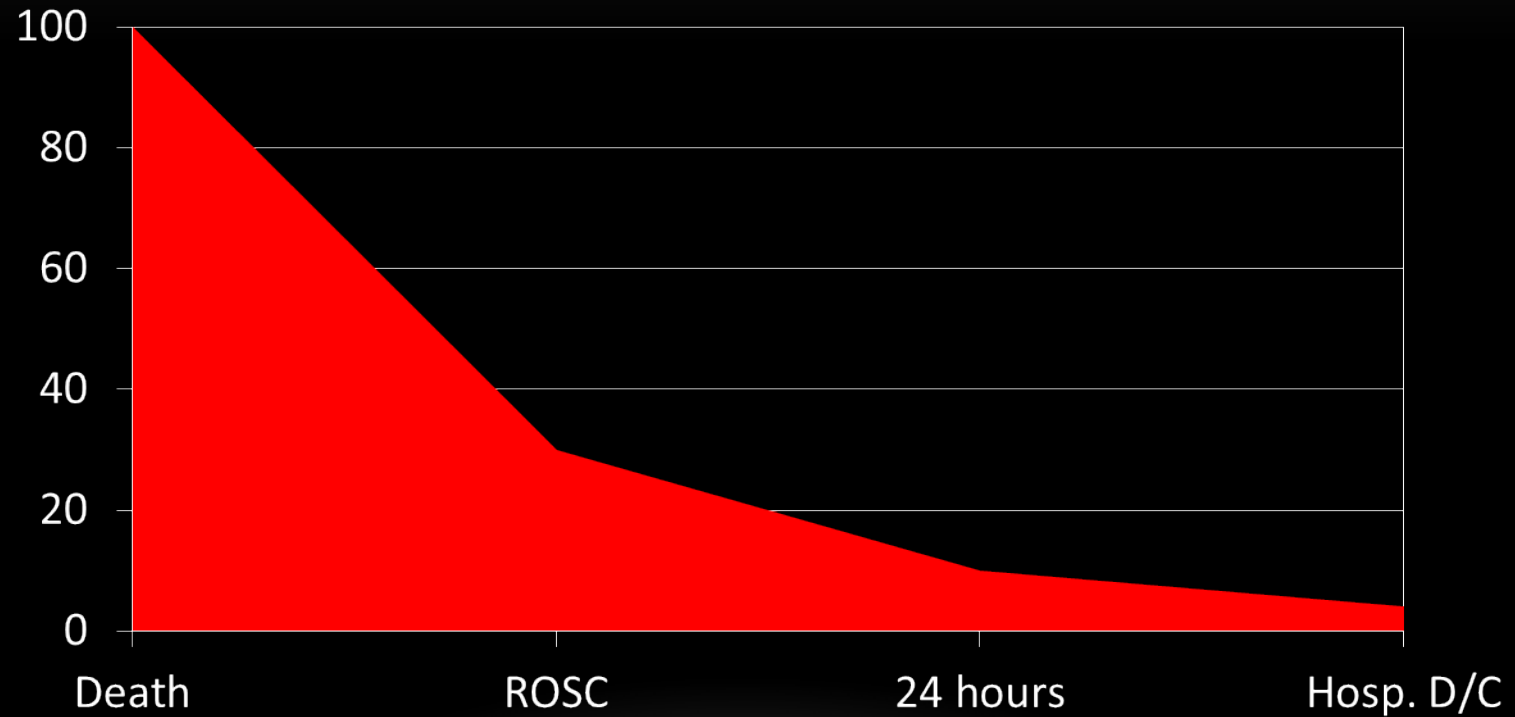
**Table 16-1. Incidence and Outcome of Out-of-Hospital Cardiac Arrest in the United States**

	Overall (95% CI)	Adults (95% CI)	Children (95% CI)
Incidence (per 100 000)			
EMS assessed	126.4 (124.0–128.8)	147.7 (144.8–150.7)	11.0 (9.6–12.4)
EMS treated	63.8 (62.1–65.4)	80.1 (77.9–82.2)	8.8 (7.6–10.1)
Bystander-witnessed shockable rhythm (including VT, VF, shockable by AED)	10.0 (9.4–10.6)	9.8 (9.0–10.6)	0.3 (0.1–0.5)
Survival to discharge, %			
EMS assessed	4.8 (4.4–5.2)	5.3 (4.9–5.7)	6.3 (3.3–9.3)
EMS treated	9.5 (8.8–10.2)	9.8 (9.0–10.6)	7.8 (4.2–11.5)
Bystander-witnessed shockable rhythm	28.4 (25.1–31.8)	28.4 (25.1–31.8)	57.1 (20.4–93.8)

CI indicates confidence interval; EMS, emergency medical services; VT, ventricular tachycardia; VF, ventricular fibrillation; and AED, automated external defibrillator.

Source: Resuscitation Outcomes Consortium Investigators, unpublished data, June 20, 2012.

# POST CARDIAC ARREST SYNDROME



# PROBLEM

- Reported Mortality rates for patients after cardiac arrest range between 60-85% and have not changed significantly over the past 50 years despite significant improvements in many other disease processes.
- Why?
  - A unique and complex combination of pathophysiological processes resulting from Cardiac Arrest
    - Post-cardiac arrest brain injury
    - Post-cardiac arrest myocardial dysfunction
    - Systemic ischemia/reperfusion response
    - Unresolved pathological process that caused the cardiac arrest

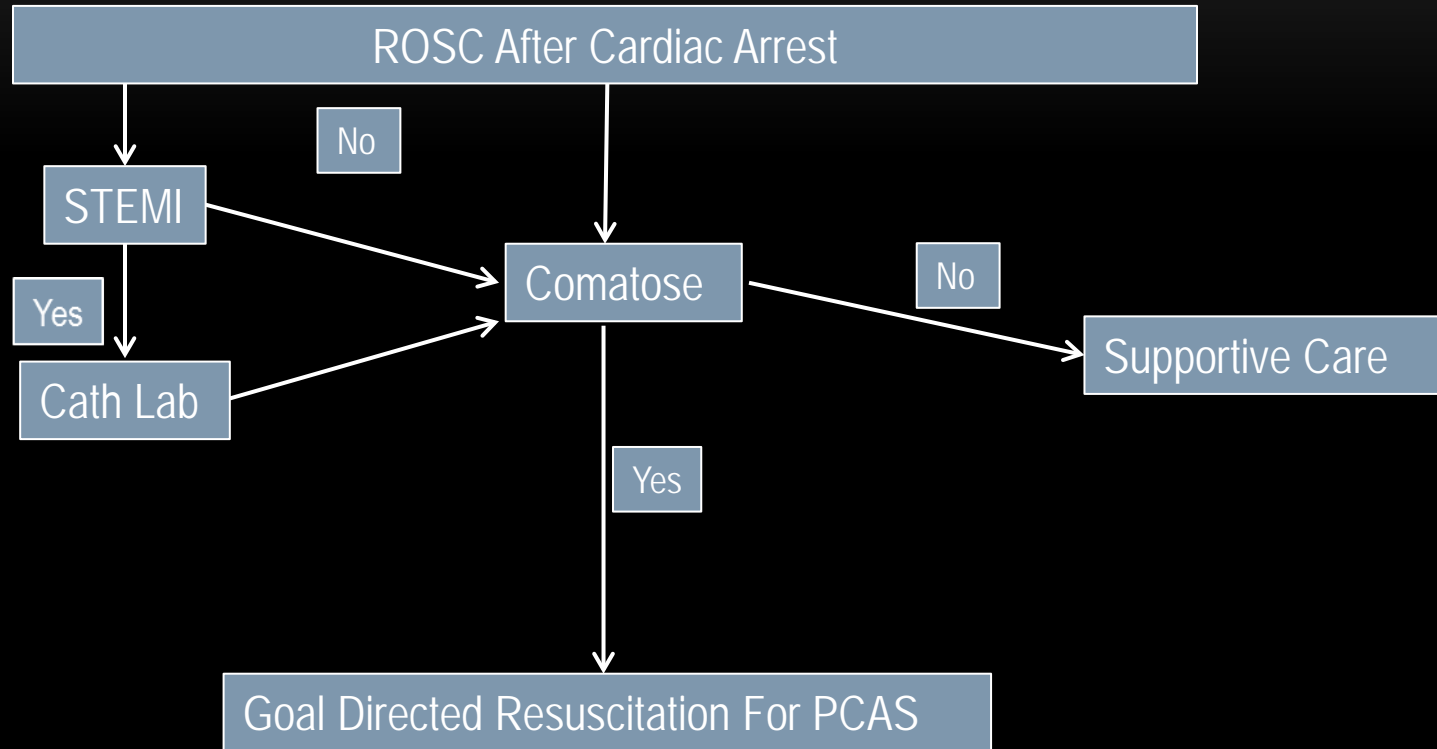
# PROBLEM

- Comprehensive post-arrest care is needed
    - No formal, descriptive guidelines
      - Needs to be multi-disciplinary
    - No quality control
  - Major barriers to comprehensive care
    - Multi-disciplinary treatment teams are involved with individual priorities resulting in significant variation in treatment and outcomes
  - A growing body of knowledge that individual components of the post-cardiac arrest syndrome are treatable, i.e. Therapeutic hypothermia
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# POSSIBLE SOLUTION

- Bundled Care incorporating treatment goals for each aspect of the post cardiac arrest syndrome

# POST CARDIAC ARREST SYNDROME MANAGEMENT





# GOAL DIRECTED RESUSCITATION FOR PCAS

Post Cardiac Arrest Neurologic Injury

- Therapeutic Hypothermia with Sedation and Paralysis
  - Goal Temperature 33° within 4 hrs of ROSC
    - {Any method that is available for practice area}
- Wean FiO<sub>2</sub> to maintain SaO<sub>2</sub> of 92%(PO<sub>2</sub> goal 60-90)
  - {Avoid Hypoxia}
- Maintain PCO<sub>2</sub> 40-45
  - {Avoid Hypocapnea(PCO<sub>2</sub> <30) or Hypercapnea(PCO<sub>2</sub> >50)}
  - {Brain over Lung for the first 24 hours}
- Continuous EEG monitoring to evaluate for seizures
  - {Keppra/Depakote Agents of choice for treatment}
- MAP > 70
- Avoid Early Prognostication, wait at least 72 hours

Post Cardiac Arrest Myocardial Dysfunction/  
Ischemia-Reperfusion Injury

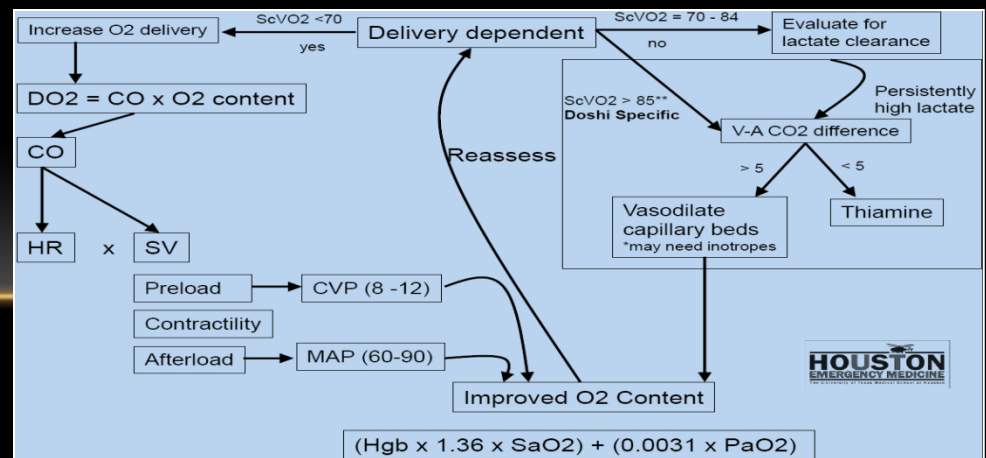
Persistent Precipitating Pathology

- Consider PCI even w/o STEMI
- Consider Massive PE
- Consider other treatable causes

Place CVC for CVP/ScVO2 monitoring

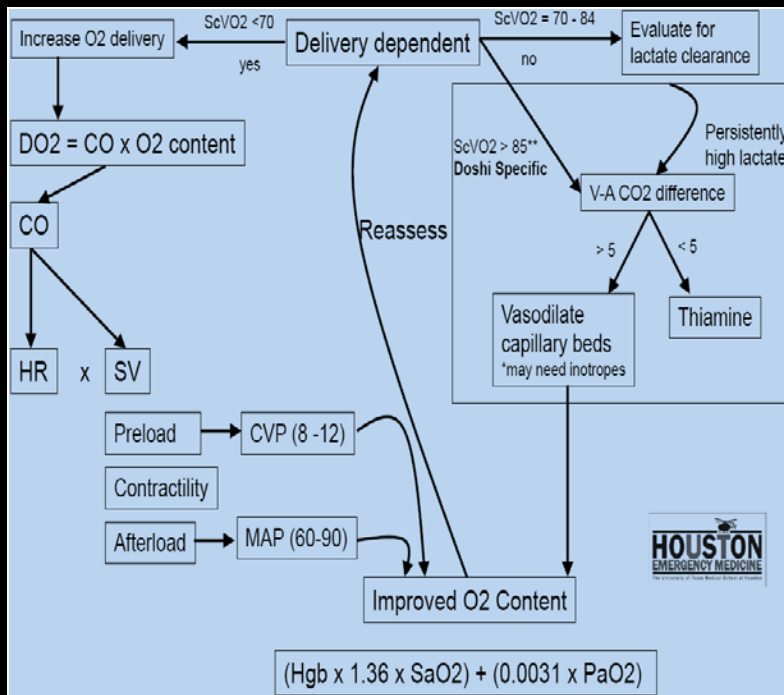
Other Supportive Measures

- DVT/GI prophylaxis
- Glycemic control
- Consider Adrenal insufficiency

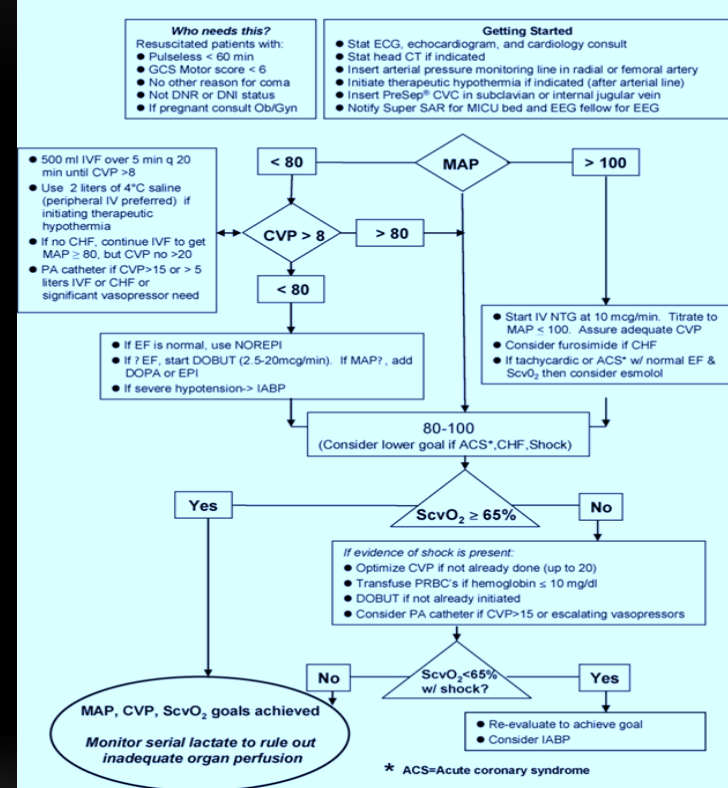


# GOAL DIRECTED RESUSCITATION FOR PCAS

## Post Cardiac Arrest Myocardial Dysfunction/ Ischemia-Reperfusion Injury



## Post-Cardiac Arrest Early Goal Directed Therapy



Gaieski, Resuscitation 2009

# PROPOSED TRIAL DESIGN

- Prospective Randomized trial
  - Patient to be Randomized to intervention arm(Follow the predesigned goal directed algorithm) versus control arm(typical standard of care for the institution)
  - Both arms will have documentation of all the interventions completed
- Inclusion Criteria
  - Age > 18 yrs, i.e. Adults
  - Comatose survivor after out-of hospital arrest, as defined by GCS Motor score of  $\leq 5$ .
- Exclusion Criteria
  - Terminal disease with life expectancy < 6 months
  - Previous advance directives stating no aggressive care
  - Pre-morbid poor functional status, i.e. bed bound, advanced dementia, etc



# PROPOSED TRIAL DESIGN

- Consent Process
  - Study does not involve any specific experimental intervention, and all the care falls within the realm of standard of care, so could be a waiver of consent
  - However, because of randomization, would consider obtaining consent for data collection and utilization. So would recommend EFIC process
- Follow up plan
  - All patients followed for the first 24 hours of hospitalization with documentation of all interventions, and then daily till discharge, with assessment of neurologic status with Pittsburgh CPC score and mRS at discharge. Follow up at 6 months for repeat assessment of neurologic status with same measures.
- Endpoints and outcomes
  - Primary: 1)Favorable Neurologic Outcome at 6 months, 2)Survival to discharge and at 6 months.

# WHY DO THIS TRIAL?

- Current epidemiology → 400,000 arrests/year → 30% ROSC(120,000 patients) → 10% survival to discharge(40,000 patients) → Survival with good neurologic outcomes < 5%(<20,000 patients)
- Even small improvements in outcomes result in significant number of lives saved, i.e. improvement of survival from 10% → 15% = 20000 lives saved annually for just out of hospital cardiac arrest
- If survival with favorable Neurologic outcomes improve, that not only means increased number of lives saved but a greater impact of cost of health care for the survivors.
- Relatively Easy trial to conduct, especially with the infra-structure and experience that NETT has in conducting successful Clinical trials.

QUESTIONS?

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Thank you