Why the Cath Lab for the Cardiac Arrest Patient?

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Review and presentation of current literature
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1. What are the rhythms and ECG indicators to go to cath lab?
2. What medications are given in cath lab and potential concerns?
3. Do you cool before or after cath and why?
4. What % of your patients go to cath and with what characteristics
Questions for Panel

5. Who do you NOT take to cath lab and why?

6. How often do you see Cardiogenic Shock and how do you treat it?

7. Any insights to culprit artery and “door to balloon” challenges

8. How often are you seeing Cardiomyopathy

Writing a White Paper to ACC
Dr. Paul McMullan, Ochsner
Why the Cath Lab for the Cardiac Arrest Patient?

Miracle on Ice
Nainesh C. Patel, MD, FACC
Co-Director MI Alert/ Hypothermia
Lehigh Valley Health Network

Disclosure of Financial Interest

- None
Cardiac Arrest Survival Rate

- Dismal--survival to admission 25%
- 1/3 deaths from neurologic damage
- 1/3 deaths from myocardial injury
- 1/3 deaths from multiorgan failure

Chain of Survival

- Early Access
- Early CPR
- Early Defibrillation
- Early Advanced Care
- Early Catheterization
Why isn’t angiography performed early?

- Reluctance
- Unknown neurologic prognosis
- It’s not a ST Elevation MI (STEMI)
- No ECG changes
- Not enough evidence
- In-hospital cardiac arrest
- Scorecard medicine: If I do PCI and patient does not survive, death counted against operator and hospital

Prognostication

<table>
<thead>
<tr>
<th>Absent corneal reflex at 24 hrs</th>
<th>Absent corneal reflex at 72 hrs</th>
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<tr>
<td>Absent pupillary reflex</td>
<td>Absent pupillary reflex at 72 hrs</td>
</tr>
<tr>
<td>Absent withdrawal response to pain at 24 hr</td>
<td>Absent withdrawal response at 72 hrs</td>
</tr>
<tr>
<td>No motor response at 24 hours</td>
<td>No motor response at 72 hrs</td>
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<td>No motor response at 72 hrs</td>
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- 435 Out-of-Hospital Cardiac Arrest patients without obvious extracardiac etiology...all underwent immediate cardiac cath
- 31% with STEMI..96% with obstructive lesion identified (74% successful PCI)
- 69% without STEMI..58% with obstructive lesion with only 26% successful PCI

Dumas et al., Circulation Interventions, June 2010
Immediate PCI in survivors of Cardiac Arrest

Dumas et al., Circulation Interventions, June 2010

PROCAT Study Limitations

- Experienced physician in ambulance--May help better identify cardiac causes
- Exceptional care--But no better than what we do everyday!
- Most treated with hypothermia (HOW MANY??????)
- 84 patients successfully resuscitated
- early angiography +/- PCI
- 71% had significant CAD
- 50% had total occlusion
- 11% had totally occluded artery without ECG changes or symptoms prior to arrest

17 Reports
Survival Postcardiac Arrest After Early PCI

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<th>Survival to discharge</th>
<th>Good neurological outcome</th>
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<td>556/930 = 60%</td>
<td>344/396 = 87%</td>
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Kern, Rahman, Cathe and Card Inter 75:616-624

Feasibility and Success of Early Coronary Angiography and PCI

Sunde et al. Resuscitation 2007;73;29-39
### PCI Combined with Therapeutic Hypothermia for STEMI After Resuscitation

<table>
<thead>
<tr>
<th>Author/year</th>
<th>n</th>
<th>Survival to hospital DC</th>
<th>Survivors with intact CNS</th>
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<tbody>
<tr>
<td>Hovdenes et al. 2007</td>
<td>50</td>
<td>41/50 (82%)</td>
<td>34/41 (83%)</td>
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<tr>
<td>Knafelj et al. 2007</td>
<td>40</td>
<td>30/40 (75%)</td>
<td>22/30 (73%)</td>
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<tr>
<td>Wolfrum et al. 2008</td>
<td>16</td>
<td>12/16 (75%)</td>
<td>11/12 (92%)</td>
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<tr>
<td>Peels et al. 2008</td>
<td>44</td>
<td>22/44 (50%)</td>
<td>NA</td>
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<tr>
<td><strong>Total</strong></td>
<td>150</td>
<td><strong>105/150 (70%)</strong></td>
<td><strong>67/83 (81%)</strong></td>
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### No delay in Door to Balloon time

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Sebastian Wolfrum, MD, Christian Pflau, Peter W. Redlie, MD, Henriet Schuneder, MD.
Cardiac Cath underutilized after in-hospital cardiac arrest

- 110 patients with *in-hospital* VF arrest survivors
- 30/110 (27%) cath performed within 1 day
- 17/30 (57%) had PCI
- 13/30 (43%) STEMI or new LBBB
- 17/30 had angiography in the absence of ECG data suggesting acute MI
- Patients who received cath were more likely to survive than those who did not 80% vs. 54%, p<.05

Merchant, RM, Abella BS. Resuscitation 2008, Dec 79(3) 398-403

ILCOR Consensus Statement 2008

*Circulation* 118;2452-2483

- In summary, patients resuscitated from cardiac arrest who have electrocardiographic criteria for *ST-elevation myocardial infarction* should undergo immediate coronary angiography, with subsequent PCI if indicated. Furthermore, given the high incidence of ACS in patients with out-of-hospital cardiac arrest and limitations of electrocardiography-based diagnosis, it is appropriate to *consider immediate coronary angiography* in all post–cardiac arrest patients in whom ACS is suspected.
Is there data to support cath in any patient with ST depression?


- 13,608 ACS Patients
- 1,198 with isolated anterior ST depression in V1-V4 (8.8%)
- 1 in 4 patients had an occluded artery (26.2%) with ECG to PCI=29.2 hrs
- Increased Mortality Risk

Why angiography should be performed early?

- Neurologic testing is unreliable within first 24-48 hours
- Growing evidence
- Chest pain and ECG were poor predictors of acute coronary occlusion
- Successful immediate coronary angioplasty was associated with improved hospital survival in pts with or without ST segment elevation.
Is there data to support immediate cath in patients with cardiac arrest?

- Randomized trials incredibly difficult to perform in cardiac arrest patients
- We know a certain percentage of these patients will have occluded/severely obstructed arteries
- Immediate PCI may provide benefit and improve mortality in some patients with cardiac arrest--we don’t want to deny care to those that may benefit

Questions?

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