EPINEPHRINE IN OOHCA: THREAT OR MENACE?

TERENCE VALENZUELA MD-KEEP EPINEPHRINE
UNIVERSITY OF ARIZONA MEDICAL CENTER

RAYMOND FOWLER MD-LOSE EPINEPHRINE
UT SOUTHWESTERN MEDICAL CENTER
EACH YEAR ANOTHER ATTEMPT TO ENLIGHTEN AND ENTERTAIN

Dr. Valenzuela- Creative yet rigorous in thinking, grounded in the medical literature but not enslaved by it.

Dr. Fowler- A brute force intellect in command of an immense body of alternative facts

In previous debates, Dr. Fowler has not fared well...
"...epinephrine remains one of the most common ALS interventions, and likely increases the rate of ROSC after cardiac arrest, its effects on long-term outcomes is far less certain"

"epinephrine... may be reasonable in ... cardiac arrest However, the literature behind its use is controversial, based on initial studies in the 1960s... Epinephrine can improve ROSC but patients receiving epinephrine demonstrate decreased survival to discharge and [poorer] neurological outcome..."
Drug | Dose | Shocked | ROSC | Awake at 24 hrs | Coma or Death at 24 hrs
--- | --- | --- | --- | --- | ---
None | - | 3 (20%) | 1 (7%) | 0 (0%) | 15 (100%)
Epi | 1 mg | 7 (47%) | 7 (47%) | 3 (20%) | 12 (80%)

Redding JS JAMA 1968; 203: 93-98
Resuscitation from Ventricular Fibrillation
Conclusion: Further studies will be necessary to clarify the optimal combination of drugs to enhance the effectiveness of artificial ventilation of the lungs, external cardiac massage, and external electrical countershock in resuscitation from ventricular fibrillation.
Paradis JAMA
1990;263:1106-1113

% of Patients with ROSC

0% (n = 9)
0% (n = 16)
0% (n = 19)
36% (n = 14)
57% (n = 14)
80% (n = 5)
80% (n = 5)
50% (n = 2)
100% (n = 2)

Maximal Coronary Perfusion Pressure, mm Hg
Registry Study

417,188 cases of OOHCA 2005-2008

Propensity matched analysis

“Epinephrine associated with greater chance of ROSC before hospital arrival but a decreased chance of survival with good functional outcome at 30 days”

<table>
<thead>
<tr>
<th>Outcome</th>
<th>ROSC</th>
<th>1 month survival</th>
<th>Cerebral Performance Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adjusted for known variables influencing survival after OOHCA</td>
<td>2.36</td>
<td>0.46</td>
<td>0.31</td>
</tr>
</tbody>
</table>
Thus, properly evaluating this traditional therapy now seems necessary and timely and should consist of a rigorously conducted and adequately powered clinical trial comparing epinephrine with placebo during cardiac arrest. Such a trial has previously seemed unethical, and investigators who have attempted to perform this comparison have received unwarranted criticism in their communities. While awaiting results of such a definitive trial, physicians and other practitioners involved in cardiac resuscitation must consider carefully whether continued use of epinephrine is justified.
<table>
<thead>
<tr>
<th>Treatment Arm</th>
<th>Epinephrine</th>
<th>Placebo</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number enrolled</td>
<td>4007</td>
<td>3995</td>
</tr>
<tr>
<td>Survived to discharge</td>
<td>128 (3.2%)</td>
<td>91 (2.3%)</td>
</tr>
<tr>
<td>Good neuro function</td>
<td>87 (2.2%)</td>
<td>63 (1.9%)</td>
</tr>
<tr>
<td>Severe neuro impairment</td>
<td>39 (0.98%)</td>
<td>16 (0.40%)</td>
</tr>
</tbody>
</table>

Perkins GD. A Randomized Trial of Epinephrine on Out-of-Hospital Cardiac Arrest 2019 379; 8: 711-721
“We must ponder whether additional treatments after he returned to spontaneous circulation could improve functional recovery and whether drug use should differ on the basis of cardiac rhythm, and whether lower doses of epinephrine would be superior to higher doses among patients with out-of-hospital-cardiac-arrest”

I.e. Keep using epinephrine while we look for stuff that improves neurologic outcome.  **FURTHER STUDY IS NEEDED**
REASON NOT TO JOIN THE EPINEPHRINE HATERS

Every Epi Black-flag article sites the same reference:

Methods

”Cerebral cortical microcirculatory blood flow (MBF) was measured with orthogonal polarization spectral imaging.”

SERIOUSLY ? SHOW OF HANDS
<table>
<thead>
<tr>
<th>OUTCOME</th>
<th>CURRENT PROPORTION</th>
<th>CHANGE IN OUTCOME</th>
<th>PROJECTED OUTCOME</th>
</tr>
</thead>
<tbody>
<tr>
<td>ROSC ON ED ARRIVAL</td>
<td>27%</td>
<td>10%</td>
<td>37%</td>
</tr>
<tr>
<td>SURVIVAL TO HOSPITAL DISCHARGE</td>
<td>9%</td>
<td>3%</td>
<td>12%</td>
</tr>
<tr>
<td>GOOD NEURO FUNCTION AT DISCHARGE</td>
<td>6%</td>
<td>2%</td>
<td>8%</td>
</tr>
<tr>
<td>SURVIVAL TO HOSPITAL DISCHARGE (PERKINS)</td>
<td>3.2%</td>
<td>? %</td>
<td>? %</td>
</tr>
<tr>
<td>SEVERE NEURO IMPAIRMENT AT DISCHARGE (PERKINS)</td>
<td>0.98%</td>
<td>? %</td>
<td>? %</td>
</tr>
</tbody>
</table>
FUTURE NEUROPROTECTION DURING CPR

Active compression decompression CPR
Heads up CPR
Sodium Nitroprusside enhanced CPR
Post ischemic conditioning after CPR
Membrane stabilizers
Post ischemic conditioning with inhaled gases

Moore JC Current Opinion
Critical Care 2017; 23: 215-222