Apophenia, Numeracy & Medical Decisions:

Burton W. Lee, MD
Visiting Professor of Medicine
Division of Pulmonary, Allergy & Critical Care
UPMC & University of Pittsburgh School of Medicine
Apophenia

The Three Nonbeneficial Trials

The Two Beneficial Trials

Odds Ratio (±SE) for Survival

Diana Duyser of Hollywood, Florida

Weird news on NBCNEWS.com

‘Virgin Mary grilled cheese’

28,000

Figure 3. Forest Plot for Predefined Subgroup Analysis According to Type of Shock.
A total of 1044 patients were in septic shock (542 in the dopamine group and 502 in the norepinephrine group), 280 were in cardiogenic shock (115 in the dopamine group and 145 in the norepinephrine group), and 263 were in hypovolemic shock (138 in the dopamine group and 125 in the norepinephrine group). The P value for interaction was 0.87.
Numeracy


<table>
<thead>
<tr>
<th></th>
<th>Correct</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interpret the Meaning of the 95% CI</td>
<td>12%</td>
</tr>
<tr>
<td>Interpret a Kaplan Meier Curve</td>
<td>10%</td>
</tr>
</tbody>
</table>
A Week in the ICU - Patient of Midazolam

Dexmedetomidine vs Midazolam or Propofol Sedation During Prolonged Mechanical Ventilation: Two Randomized Controlled Trials

Conclusions Among ICU patients receiving prolonged mechanical ventilation, medetomidine was not inferior to midazolam and propofol in maintaining light sedation. Dexmedetomidine reduced duration of mechanical ventilation compared with midazolam and improved patient’s ability to communicate pain with midazolam and propofol. More adverse effects were associated with midazolam.

No. of patients at risk
- Dexmedetomidine
  - No. of patients at risk
  - Duration of mechanical ventilation

- Midazolam
  - No. of patients at risk
  - Duration of mechanical ventilation

*P* = .03

*P* = .24
Interpret the Meaning of the 95% CI
Interpret a Kaplan Meier Curve

Meta-Analysis of Ac Respiratory Distress Low Tidal Volumes

68.3% of observations within ±1 sd of mean
95.5% of observations within ±2 sd of mean
99.7% of observations within ±3 sd of mean

Odds ratio ± 95% CI (beat adjusted*)
Odds ratio ± 95% CI (univariable)
Odds ratio ± SEM (Eichacker et al.)

The Three Nonbeneficial Trials
The Two Beneficial Trials

Odds Ratio (±SE) for Survival

Harm
No Effect
Benefit

0.50 0.75 1.00 1.33 2.00

0.50 0.75 1.00 1.33 2.00

0.50 0.75 1.00 1.33 2.00
GAMBLE A

You agree to a gamble where you roll a 20-sided dice:

If you roll a 20, you lose; otherwise you win.
Table 3. Data on Outcomes in All 1186 Patients and on Cerebral Performance in 115 Patients at Hospital Discharge.*

<table>
<thead>
<tr>
<th>Variable</th>
<th>Vasopressin Group (N=589)</th>
<th>Epinephrine Group (N=597)</th>
<th>P Value</th>
<th>Odds Ratio (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>All patients</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spontaneous circulation restored with study drugs</td>
<td>145/589 (24.6)</td>
<td>167/597 (28.0)</td>
<td>0.19</td>
<td>1.2 (0.9–1.5)</td>
</tr>
<tr>
<td>Hospital admission</td>
<td>214/589 (36.3)</td>
<td>186/597 (31.2)</td>
<td>0.06</td>
<td>0.8 (0.6–1.0)</td>
</tr>
<tr>
<td>Hospital discharge</td>
<td>57/578 (9.9)</td>
<td>58/588 (9.9)</td>
<td>0.99</td>
<td>1.0 (0.7–1.5)</td>
</tr>
<tr>
<td>Ventricular fibrillation</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spontaneous circulation restored with study drugs</td>
<td>82/223 (36.8)</td>
<td>106/249 (42.6)</td>
<td>0.20</td>
<td>1.3 (0.9–1.8)</td>
</tr>
<tr>
<td>Hospital admission</td>
<td>103/223 (46.2)</td>
<td>107/249 (43.0)</td>
<td>0.48</td>
<td>0.9 (0.6–1.3)</td>
</tr>
<tr>
<td>Hospital discharge</td>
<td>38/233 (17.8)</td>
<td>47/245 (19.2)</td>
<td>0.30</td>
<td>1.1 (0.7–1.8)</td>
</tr>
</tbody>
</table>

CONCLUSIONS

The effects of vasopressin were similar to those of epinephrine in the management of ventricular fibrillation and pulseless electrical activity, but vasopressin was superior to epinephrine in patients with asystole.

Asystole

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<th>Vasopressin Group (N=589)</th>
<th>Epinephrine Group (N=597)</th>
<th>P Value</th>
<th>Odds Ratio (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spontaneous circulation restored with study drugs</td>
<td>42/262 (16.0)</td>
<td>44/266 (16.5)</td>
<td>0.87</td>
<td>1.0 (0.7–1.6)</td>
</tr>
<tr>
<td>Hospital admission</td>
<td>76/262 (29.0)</td>
<td>54/266 (20.3)</td>
<td>0.02</td>
<td>0.6 (0.4–0.9)</td>
</tr>
<tr>
<td>Hospital discharge</td>
<td>12/257 (4.7)</td>
<td>4/262 (1.5)</td>
<td>0.04</td>
<td>0.3 (0.1–1.0)</td>
</tr>
</tbody>
</table>
OBJECTIVE To evaluate how often subgroup claims reported in the abstracts of RCTs are actually supported by statistical evidence ($P < .05$ from an interaction test) and corroborated by subsequent RCTs and meta-analyses.

CONCLUSIONS AND RELEVANCE A minority of subgroup claims made in the abstracts of RCTs are supported by their own data (i.e., a significant interaction effect). For those that have statistical support ($P < .05$ from an interaction test), most fail to meet other best practices for subgroup tests, including prespecification, stratified randomization, and adjustment for multiple testing. Attempts to corroborate statistically significant subgroup differences are rare; when done, the initially observed subgroup differences are not reproduced.
CONCLUSIONS

The effects of vasopressin were similar to those of epinephrine in the management of ventricular fibrillation and pulseless electrical activity, but vasopressin was superior to epinephrine in patients with asystole.

Not Prespecified Outcome
Not Stratified @ Randomization
Not Corrected for Multiple Testing
No Test for Interaction
Is this likely to be true?

CONCLUSIONS

As compared with epinephrine alone, the combination of vasopressin and epinephrine during advanced cardiac life support for out-of-hospital cardiac arrest does not improve outcome. (ClinicalTrials.gov number, NCT00127907.)
GAMBLE B

You agree to a gamble where you roll a 20-sided dice:

If you roll a 20, you lose; otherwise you win.
You agree to base the decision on **ONE** roll.
PRE-REGISTER 20 as the outcome.
2015 Cochrane Review - 20 Oseltamivir Trials (2 Published)

We have used data from 46 trials (20 oseltamivir and 26 zanamivir studies) in this review. We identified problems in the design of many of the studies that we included, which affects our confidence in their results. We found that both drugs shorten the duration of symptoms of influenza-like illness (unconfirmed influenza or 'the flu') by less than a day. Oseltamivir did not affect the number of hospitalisations, based on the data from all the people enrolled in treatment trials of oseltamivir. Zanamivir trials did not record this outcome. The effects on pneumonia and other complications of influenza, such as bronchitis, middle ear infection (otitis media) and sinusitis, were unreliably reported, as shown by the case report form in the trial documents. Some forms showed limitations in the diagnostic criteria for pneumonia. Regulatory comments noted problems with missing follow-up diary cards from participants. In children with asthma there was no clear effect on the time to first alleviation of symptoms.

Carl Heneghan, Professor of Evidence-Based Medicine at the University of Oxford: "I think the whole £500m has not benefited human health in any way and we may have harmed people."