2019 Update in Hospital Medicine (Part 1)

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Please participate in audience response, Go To Crowd Compass Conference App → Schedule → Thursday → Updates
Disclosure of Financial Relationships

Daniel D. Dressler, MD, MSc, FACP, SFHM

Has disclosed relationships with entities producing, marketing, re-selling, or distributing health care goods or services consumed by, or used on, patients.

Associate Editor, *NEJM Journal Watch Hospital Medicine and NEJM Journal Watch General Medicine* (MMS)
Textbook Editor, *Principles and Practice of Hospital Medicine, 2nd Edition* (McGraw-Hill)
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No other financial conflicts of interest to report
Objectives

• Incorporate into clinical practice recently published literature evidence to provide optimal management for specific conditions in hospitalized patients

• Topics:
  – CCM: Cardiac Arrest Resuscitation, Shock management
  – Cardiology: Acute Decompensated Heart Failure
  – GI: Biliary disease, nutrition
Case

- As you’re walking into the hospital to start your shift, you hear a Code Blue called to the unit that you’re walking through.
- You walk into the room and find a nurse performing CPR on the patient.
What interventions can improve relevant outcomes for patients in cardiac arrest?

A. Provide epinephrine rather than vasopressin
B. Provide amiodarone rather than lidocaine for patients with shockable rhythms
C. Provide compressions during defibrillation to minimize hands off time
D. Starbucks’s Coffee IV (...wide open!)
Adrenaline and vasopressin for cardiac arrest

Background: Epinephrine has been used for cardiac arrest since 1960s

Question: In patients with cardiac arrest, what is the effect of epinephrine (adrenaline) and vasopressin on relevant survival outcomes?

Methods: Meta-analysis of 26 RCTs (n = 21,704), 16 OOH cardiac arrests, 8 IHCA, 2 pediatric. Quality of evidence reported via GRADE approach.

Interventions: Comparisons of standard dose epinephrine (SDE) to placebo, high-dose epinephrine (HDE) to SDE, vasopressin to SDE and vasopressin plus SDE to SDE.

Outcomes: ROSC, survival to hospital discharge, survival to hospital discharge with favorable neurologic outcome (CPC<3, or mRS<4).

Results: For comparison of HDE to SDE or comparison of Vasopressin to SDE or comparison of SDE + vasopressin to SDE, no difference in survival to discharge or survival to discharge with favorable neurologic outcomes.

Other results...

Epi v. placebo

Survival to Hospital Discharge
- 3.2% v. 2.3%
- NNT 101
  - P=0.006

Survival to Hospital Discharge with Favorable Neurologic Outcome
- 2.2% v. 1.9%
- NNT (258)
  - P=0.21

A Randomized Trial of Epinephrine in Out-of-Hospital Cardiac Arrest


<table>
<thead>
<tr>
<th>Outcome</th>
<th>Epinephrine</th>
<th>Placebo</th>
<th>Odds Ratio (95% CI)†</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Unadjusted</td>
<td>Adjusted</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Primary outcome</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Survival at 30 days — no./total no. (%)‡</td>
<td>130/4012 (3.2)</td>
<td>94/3995 (2.4)</td>
<td>1.39 (1.06–1.82)</td>
</tr>
<tr>
<td>Favorable neurologic outcome at hospital discharge — no./total no. (%)</td>
<td>87/4007 (2.2)</td>
<td>74/3994 (1.9)</td>
<td>1.18 (0.86–1.61)</td>
</tr>
</tbody>
</table>
### Conclusions:
Epinephrine likely is still preferred over vasopressin for cardiac arrest. Whether Epi actually improves the relevant outcome of survival with good neurologic outcomes remains to be seen.

### Caveats:
Most studies in **outpatient** cardiac arrest, where outcomes much worse (Survival to hospital discharge with favorable neurologic outcomes 2-5% OHCA vs. 15-20% in IHCA). Little data on comparisons of Epi vs. no Epi for outcome of survival to hospital discharge with favorable neurologic outcomes.

### Impact HM:
Continue to use Epi in IHCA, but unclear if it truly makes a difference for patient outcomes (...possibly more so for non-shockable rhythms).

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What about antiarrhythmic drugs?
Effectiveness of antiarrhythmic drugs for shockable cardiac arrest: A systematic review

Antiarrhythmics for shockable cardiac arrest

Background: 2015 ACC/AHA Guidelines recommend amiodarone for shockable cardiac arrest, and lidocaine recommended as ‘alternative’

Question: What is the effectiveness of various antiarrhythmic drugs in the management of shockable cardiac arrest in adults?

Methods: Meta-analysis of 14 RCTs and 17 observational studies.

Interventions: RCT comparisons of Amiodarone to placebo (~2500 patients), Lidocaine to placebo (~2000 patients), and Amiodarone to Lidocaine (~2000 patients)

Outcomes: ROSC, survival to hospital discharge, survival to hospital discharge with favorable neurologic outcome

Amio vs. Placebo and Lidocaine vs. Placebo
Outcome: Survival to hospital discharge with good neurologic function at 30 days

<table>
<thead>
<tr>
<th>Study or Subgroup</th>
<th>Intervention</th>
<th>Placebo</th>
<th>Risk Ratio</th>
<th>Risk Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Events</td>
<td>Total</td>
<td>Events</td>
<td>Total</td>
</tr>
<tr>
<td>1.2.1 Amiodarone vs. Placebo (combined)</td>
<td>Kudenchuk, 1999</td>
<td>18</td>
<td>246</td>
<td>17</td>
</tr>
<tr>
<td></td>
<td>Kudenchuk, 2016</td>
<td>182</td>
<td>867</td>
<td>175</td>
</tr>
<tr>
<td></td>
<td>Subtotal (95% CI)</td>
<td>1213</td>
<td>1313</td>
<td>100.0%</td>
</tr>
<tr>
<td></td>
<td>Total events</td>
<td>200</td>
<td></td>
<td>192</td>
</tr>
<tr>
<td>Heterogeneity: Tau^2 = 0.00; Chi^2 = 0.00. df = 1 (P = 0.95); I^2 = 0%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Test for overall effect: Z = 1.35 (P = 0.18)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.2.5 Lidocaine vs. Placebo</td>
<td>Kudenchuk, 2016</td>
<td>172</td>
<td>984</td>
<td>175</td>
</tr>
<tr>
<td></td>
<td>Subtotal (95% CI)</td>
<td>984</td>
<td>1055</td>
<td>100.0%</td>
</tr>
<tr>
<td></td>
<td>Total events</td>
<td>172</td>
<td></td>
<td>175</td>
</tr>
<tr>
<td>Heterogeneity: Not applicable</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Test for overall effect: Z = 0.54 (P = 0.58)</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Test for subgroup differences: Chi^2 = 2.37, df = 4 (P = 0.67). I^2 = 0%</td>
<td></td>
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</tbody>
</table>

- Amio vs. placebo (~2500 patients):
  - 16.5% vs. 14.6%, (NNT 53), (p=0.18)

Amio vs. Lidocaine (head-to-head)
Outcome: Survival to hospital discharge with good neurologic function at 30 days

<table>
<thead>
<tr>
<th>Study or Subgroup</th>
<th>Intervention 1</th>
<th>Intervention 2</th>
<th>Risk Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Events Total</td>
<td>Events Total</td>
<td>M-H, Random, 95% CI</td>
</tr>
<tr>
<td>2.2.1 Amiodarone vs. Lidocaine</td>
<td>182 967</td>
<td>172 964</td>
<td>1.08 [0.89, 1.30]</td>
</tr>
<tr>
<td>Kudenchuk, 2016</td>
<td>182 967</td>
<td>172 964</td>
<td>1.08 [0.89, 1.30]</td>
</tr>
<tr>
<td>Subtotal (95% CI)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total events</td>
<td>182 967</td>
<td>172 964</td>
<td></td>
</tr>
</tbody>
</table>

Heterogeneity: Not applicable
Test for overall effect: Z = 0.77 (P = 0.44)

Antiarrhythmics for shockable cardiac arrest

Conclusions: For shockable cardiac arrest resuscitation, amiodarone and lidocaine likely provide analogous (uncertain) benefits for improving survival to hospital discharge with good neurologic outcomes.

Caveats: A 2017 Taiwan nationwide cohort study (~27,000 OOH arrest patients) showed improved survival to discharge in patients receiving either Amio (aOR 2.8) or Lido (aOR 2.5) [1-year survival Amio 8%, Lido 7%, neither 3%], but could have residual confounding. (Int J Cardiol. 2017 Jan 15;227:292-298.)

Impact HM: ACC/AHA and ERC 2018 Guidelines: Amiodarone or lidocaine may be considered for VF/pVT that is unresponsive to defibrillation. Particularly useful with witnessed arrest, for whom time to drug administration may be shorter. (Class IIb; Level of Evidence B-R)


AHA FOCUSED UPDATE

2018 American Heart Association Focused Update on Advanced Cardiovascular Life Support Use of Antiarrhythmic Drugs During and Immediately After Cardiac Arrest
Short Take: Hands-On Defibrillation with a Safety Barrier

- **Background:** Maximizing hands-on CPR time improves outcomes in cardiac arrest.
- **Question:** Can a thin draping sheet of polyethylene (3’ x 3’, thickness ~0.05mm) over CPR area provide caregivers adequate insulation to permit hands-on defibrillation during resuscitation?
- **Methods:** 23 patients receiving 27 elective shocks (for Afib/flutter) at 200J or higher (up to 360J). 20 lb of pressure applied by provider.
- **Results:** Mean currents were 0.67mA, with peak of 1.08mA, well below maximum acceptable standard peak of 5mA (set by IEC). No shocks were subjectively perceptible by caregivers.
- **Conclusions:** This type of drape appears to provide safety to clinicians. Uninterrupted chest compressions during shock delivery are achievable and possibly next advancement in CPR protocol.


IEC: International Electrotechnical Commission
What interventions can improve relevant outcomes for patients in cardiac arrest?

A. Provide epinephrine rather than vasopressin
B. Provide amiodarone rather than lidocaine for patients with shockable rhythms
C. Provide compressions during defibrillation to minimize hands off time
D. Starbuck’s Coffee IV (…wide open!)
After assisting with the code, you get called to admit a patient from the ED with HF exacerbation.

The patient already received a dose of IV Lasix, and still has some increased work of breathing.

Exam:
- VS BP 108/68  P 112  R 26  T 37.1  O2 Sat 87% on 2L, 92% on 4L
- Elevated JVP, +S3, displaced apical impulse
- Mild to mod increased WOB, rales to mid lung fields
- BLE 3+ edema
What hospital intervention(s) can improve in-hospital mortality or length of stay outcomes in the management of patients admitted for ADHF?

A. ACE-inhibitors
B. Aldosterone antagonists (e.g. spironolactone)
C. Sacubitril-valsartan (Entresto)
D. Non-invasive ventilation
E. Salted peanuts and beef jerky
F. No interventions improve mortality or LOS for ADHF
Non-invasive positive pressure ventilation (CPAP or bilevel NPPV) for cardiogenic pulmonary edema

DOI: 10.1002/14651858.CD005351.pub4.
Non-Invasive Ventilation (NIV) for Cardiogenic Pulmonary Edema

**Background:** For patients hospitalized with acute decompensated heart failure (ADHF) and pulmonary edema, U.S. 2013 guidelines (Circulation 2013; 128:e240) and 2017 updates (Circulation 2017; 136:e137) do not address noninvasive ventilation (NIV), whereas European 2016 guidelines (Eur Heart J 2016 37:2129) recommend its prompt consideration.

**Question:** In hospitalized ADHF, does NIV improve relevant outcomes?

**Methods:** Meta-analysis of 24 RCTs, unblinded, ~2600 patients presenting to an ED or inpatients with ADHF with pulmonary edema. Average f/u: 2 weeks.

**Interventions:** NIV (either CPAP or bilevel ventilation) + standard medical therapy (diuretics, nitrates, O2) or standard therapy alone.

**Outcomes:**
1°: hospital mortality
2°: endotracheal intubation, treatment intolerance, LOS, Acute MI, other adverse events

Non-Invasive Ventilation (NIV) for Cardiogenic Pulmonary Edema

<table>
<thead>
<tr>
<th>Outcomes</th>
<th>NIV</th>
<th>Control</th>
<th>RR</th>
<th>P Value</th>
<th>NNT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hospital Mortality</td>
<td>11%</td>
<td>18%</td>
<td>0.65</td>
<td>&lt;0.001</td>
<td>17</td>
</tr>
<tr>
<td>Endotracheal Intubation</td>
<td>8%</td>
<td>15%</td>
<td>0.49</td>
<td>&lt;0.001</td>
<td>13</td>
</tr>
<tr>
<td>Hospital LOS</td>
<td>Mean Difference: -0.3 days</td>
<td>0.51</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adverse Events*</td>
<td>3.8%</td>
<td>3.2%</td>
<td>1.04</td>
<td>0.81</td>
<td>-</td>
</tr>
</tbody>
</table>

No difference with CPAP vs. bilevel ventilation. Mask type did not affect outcomes.

Low heterogeneity of outcomes across studies

Adverse clinical outcomes = skin damage, mask discomfort, GI s/e, sinusitis, PTX, hypotension, arrhythmia, cardiac arrest, aspiration, CVA, Sz

*Acute MI: no difference in 2 groups (inconsistent acute MI definitions across studies)

Non-Invasive Ventilation (NIV) for Cardiogenic Pulmonary Edema

**Conclusions:** NIV remains the sole intervention with randomized trial-level evidence for improved mortality outcomes in patients with acute HF exacerbations. Also with reduced endotracheal intubation.

**Impact HM:** Practical considerations (such as availability of intensive care unit beds or NIV devices) could limit NIV use at some institutions. Hospitalists should strongly consider NIV for patients with acute HF exacerbations with pulmonary edema.

What hospital intervention(s) can improve in-hospital mortality or length of stay outcomes in the management of patients admitted for ADHF?

A. ACE-inhibitors
B. Aldosterone antagonists (e.g. spironolactone)
C. Sacubitril-valsartan (Entresto)
D. Non-invasive ventilation
E. Salted peanuts and beef jerky
F. No interventions improve mortality or LOS for ADHF
Case continued…

- Out patient was placed on CPAP while being diuresed
- Other home HF meds (ACE-I, spironolactone, β-blocker) were continued
- Potassium level after diuretic returns at 3.8. Initial K level was 3.9 on admission.
- Your nurse is requesting to replete the K, and your medical student asks you…what is the most appropriate K level for this type of patient in the hospital?
- You respond…
What potassium levels are associated with the best outcomes in patients hospitalized with heart failure?

A. Maintain K ≥ 4.5 mEq/L
B. Maintain K ≥ 4.0 mEq/L
C. Maintain K between 4.0 and 4.5 mEq/L
D. Maintain K between 3.5 and 3.9 mEq/L
E. Maintain K between 3.5 and 4.5 mEq/L
F. Pass me a banana
Examining the “Repletion Reflex”: The Association between Serum Potassium and Outcomes in Hospitalized Patients with Heart Failure

doi: 10.12788/jhm.3270
[Epup ahead of print]
Short Take: K Levels in HF Hospitalization

- Background: Hospitalists get called incessantly to replete K, even with normal levels between 3.5 to 4.0mEq/L, and especially in cardiac patients.
- Question: What K levels are best for patients hospitalized with heart failure?
- Methods: Retrospective cohort ~5000 normokalemic patients (admission potassium level 3.5 to 5.0 mEq/L) hospitalized for at least 3 days at 56 US hospitals for acute decompensated heart failure.
  - Adjustment for demographic factors, medical comorbidities and illness severity
  - Comparison of patients with avg hospital serum K in the low-normal range (<4.0 mEq/L) vs. mid-range normal levels (4.0-4.5 mEq/L) vs. high-normal levels (>4.5 mEq/L).

Short Take: K Levels in HF Hospitalization

- **Results:** Repletion more frequent in patients with low-normal K than those with mid-range K or high-normal K (72% vs. 41% vs. 27% respectively).

- **Results:** Patients with high-normal K had longer LOS (0.6 days, p=0.009) and trend towards higher mortality and higher ICU admissions (OR 1.5 and 1.8, p=0.07)

- **Conclusions:** Possible debunking of dogma that hospitalized patients with HF must maintain K $\geq 4.0$ mEq/L. RNs and MDs expend unnecessary time, resources correcting inpatient K.

What potassium levels are associated with the best outcomes in patients hospitalized with heart failure?

A. Maintain K ≥ 4.5 mEq/L
B. Maintain K ≥ 4.0 mEq/L
C. Maintain K between 4.0 and 4.5 mEq/L
D. Maintain K between 3.5 and 3.9 mEq/L
E. Maintain K between 3.5 and 4.5 mEq/L
F. Pass me a banana
Case concluded

- Patient’s HF improved dramatically within 36 hours while on CPAP and receiving diuresis.
- Potassium level drifted down and patient received repletion for K 3.4, and levels did not rise above 4.5 during hospital stay.
- Discharged home after 4 day hospital stay.
Crossing the Coffee Chasm...
Case

- You get called about another admission, this time a 48 year old ED patient who needs to go to the ICU.
- Patient was altered in the ED and was intubated for ‘airway protection’ after emesis. There was some question of substance use. Possible small RLL infiltrate on CXR.
- He was mildly hypotensive with a lactate level of 4.4 in the ED
- Admitted for respiratory failure and sepsis
What type of ICU care might improve our patient’s outcomes?

A. Frequent lactic acid levels to guide fluid management for shock
B. Frequent capillary refill time checks to guide fluid management for shock
C. Flexible ICU visitation policies for patient’s family members
D. New Orleans-style beignets and coffee for all ICU patients (...via NG tube if necessary)
E. None of the above interventions improve patient outcomes
Effect of a Resuscitation Strategy Targeting Peripheral Perfusion Status vs Serum Lactate Levels on 28-Day Mortality Among Patients with Septic Shock

The ANDROMEDA-SHOCK Randomized Clinical Trial

Capillary Refill vs. Lactate to Guide Resuscitation in Septic Shock

Background: Surviving Sepsis guidelines endorse lactate clearance to guide resuscitation in sepsis (weak recommendation with low-quality evidence [NEJM JW Emerg Med Jun 2018 and Intensive Care Med 2018; 44:925]). CMS sepsis reporting (i.e., SEP-1) requires measuring lactate and repeating assessment if lactate is >2 mmol/L.

Question: Is capillary refill a better marker than lactate to assess adequate resuscitation of patients with septic shock?

Methods: RCT, unblinded, 424 patients, 28 hospitals in 5 South American countries. 8-hour resuscitation strategies based on serial measurements of either capillary refill time (CRT) or lactate levels.

Interventions: Resuscitation guided by either capillary refill (by 10-second blanching, with <3 seconds considered normal cap-refill) every 30-minutes OR lactate levels every 2 hours.

Fluid challenges (500cc crystalloid) q30’ until limited by CVP. Protocols for use of vasopressors and ionotropes.

Perfusion Goals: Normalize CRT (<3 seconds) OR normalize lactate (<2.0) or decrease by 20% every 2 hours.

Outcomes: 1°: 28-day mortality, organ dysfunction (SOFA at 72°), LOS, amt of IVF resuscitation.

Capillary Refill vs. Lactate to Guide Resuscitation in Septic Shock

<table>
<thead>
<tr>
<th>Outcomes</th>
<th>Capillary Refill</th>
<th>Lactate</th>
<th>aHR</th>
<th>P Value</th>
<th>NNT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mortality, 28-day</td>
<td>35%</td>
<td>43%</td>
<td>0.75</td>
<td>0.06</td>
<td>(12)</td>
</tr>
<tr>
<td>Mean SOFA score at 72 hrs</td>
<td>5.6</td>
<td>6.6</td>
<td>-</td>
<td>0.045</td>
<td>-</td>
</tr>
<tr>
<td>Fluid resuscitation 1st 8-hrs</td>
<td>2.36L</td>
<td>2.77L</td>
<td>-</td>
<td>0.01</td>
<td>-</td>
</tr>
</tbody>
</table>

No significant differences in mechanical ventilation-free days, renal replacement-free days, ICU LOS between groups. Less IVF resuscitation in cap-refill group.

Conclusions: Capillary refill guidance for septic shock resuscitation may improve short-term mortality, especially for less-ill patients (SOFA<10), but more studies are necessary for this process to be adopted more broadly.

Impact HM: Debate about using lactate clearance as a standardized part of sepsis care, including sepsis bundles that mandate lactate measurement, which might drive overtreatment of some patients.

Short Take: Flexible vs. Restrictive Visiting Policies in ICUs: Meta-Analysis

• Question: Does more flexible visiting hours for family members improve outcomes (compared with restrictive visiting) for ICU patients?
• Methods: Systematic review and meta-analysis of 16 studies
• Results: Compared with restrictive visit policies (≤6 hrs) flexible visit policies (>6 hrs) significantly reduced patient delirium (OR 0.39) and anxiety, without affecting mortality, ICU stay.
  – Improved family member satisfaction (9 studies) but higher staff burnout (single study)
• Limitations: Only 2 RCTs, most before-after studies
• Conclusions/Impact HM: Flexible visit policies in ICUs likely benefit patients and family members, but implementation needs to carefully mitigate staff concerns or challenges

What type of ICU care might improve our patient’s outcomes?

A. Frequent lactic acid levels to guide fluid management for shock
B. Frequent capillary refill time checks to guide fluid management for shock
C. Flexible ICU visitation policies for patient’s family members
D. New Orleans-style beignets and coffee for all ICU patients (…via NG tube if necessary)
E. None of the above interventions improve patient outcomes
Case continued...

- Our patient seemed to improve rapidly, with good perfusion via capillary refill (...lactate also reduced to <2.0). He was extubated within 24 hours, BP normalized, O2 sat 97% RA, procalcitonin level <0.25, and antibiotics were stopped.
- UDS was positive for multiple recreational drugs.
- You write transfer orders to the floor, but nursing staff tell you there are no open beds.
- You decide to...
Do you want to...

A. Wait for the floor bed to open, even if takes another day
B. Discharge directly home from the ICU
C. Check with a local fortune teller...they always know the right course of action...
Question: Do outcomes differ among ICU patients discharged directly home compared with patients transferred to floor then discharged home?

Methods: Retrospective cohort, >6700 adults admitted to 9 Canadian hospitals’ ICUs. Comparison of those discharged directly home (14%) to those discharged alive from the hospital. Propensity score matching (based on pt characteristics, ICU therapies, and

Results: Discharge home directly from ICU were more likely to have:
- Diagnosis of overdose, withdrawal, seizure or metabolic coma (32% vs. 10%)
- Lower severity of illness on adm (APACHE II 15 vs. 18)
- <48 hrs mechanical ventilation (42% vs. 34%)

Results: Propensity-matched cohort had similar 30-day readmission rates (~10%), ED revisits (~25%); and 1-year mortality

Conclusion/Impact HM: Discharge home directly from ICU is common, and in select patients appears safe, without increased mortality or healthcare utilization

Do you want to...

A. Wait for the floor bed to open, even if takes another day
B. Discharge directly home from the ICU
C. Check with a local fortune teller...they always know the right course of action...
Case concluded...

- Our patient was discharged home from the ICU
- Sought drug rehab counseling
- Did well without return to ED or hospital
Case Presentation

- 77 year old M with COPD presents from assisted living to the ER with subjective fever, RUQ abdominal pain that started a few weeks ago, but is much worse in last few days.
- VS BP 136/86, HR 108, R 20, T 38.4.
- RUQ tenderness. +Murphy’s sign. WBC 12.8 (14% band). UA negative. Imaging shown.
- ER physician calls you for admission after starting antibiotics. He says he spoke with the surgeon who is recommending a cholecystostomy tube by IR because of the patient’s comorbidities.
What intervention(s) will improve this patient’s outcomes?

A. Individualized nutrition support, as this can reduce adverse events and mortality in medical floor patients

B. Re-contact the surgeon to discuss cholecystectomy acutely rather than cholecystostomy

C. Both A and B

D. Neither A or B
Laparoscopic cholecystectomy versus percutaneous catheter drainage for acute cholecystitis in high risk patients (CHOCOLATE): multicenter randomised clinical trial

Laparoscopic cholecystectomy versus percutaneous catheter drainage for high-risk acute cholecystitis

<table>
<thead>
<tr>
<th>Background:</th>
<th>In high-risk patients, management of acute cholecystitis is controversial, with possible morbidity and mortality with cholecystectomy management. Catheter drainage has been increasingly used in attempts to mitigate those risks.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Question:</td>
<td>In patients with acute calculous cholecystitis and high surgical risk, how does laparoscopic cholecystectomy compare with percutaneous catheter drainage for morbidity and mortality?</td>
</tr>
<tr>
<td>Methods:</td>
<td>Nationwide RCT in 11 Netherlands hospitals, 142 patients (mean age 73 y, APACHE II ≥ 7 [and &lt; 15], symptoms &lt; 7 days), blinding of outcome adjudicators and pt safety monitoring board, 1-year f/u. ITT analysis. 94% f/u. Excluded: decompensated cirrhosis, ICU admission at dx</td>
</tr>
<tr>
<td>Interventions:</td>
<td>Laparoscopic cholecystectomy or percutaneous catheter drainage within 24 hours of presentation</td>
</tr>
<tr>
<td>Outcomes:</td>
<td>1º: 1-year mortality, major complications (infxn or cardiac/pulm at 1 month, need for reintervention at 1 year, or recurrent biliary dz at 1 year</td>
</tr>
</tbody>
</table>

Laparoscopic cholecystectomy versus percutaneous catheter drainage for acute cholecystitis in high risk patients (CHOCOLATE)

<table>
<thead>
<tr>
<th>Outcomes</th>
<th>Event rates</th>
<th>RRR (95% CI)</th>
<th>NNT (CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Cholecystectomy</td>
<td>Drainage</td>
<td></td>
</tr>
<tr>
<td>Mortality at 1 y</td>
<td>3.0%</td>
<td>8.8%</td>
<td>66% (−64 to 93)</td>
</tr>
<tr>
<td>Major complications‡</td>
<td>12%</td>
<td>65%</td>
<td>81% (63 to 90)</td>
</tr>
<tr>
<td>Need for reintervention at 1 y</td>
<td>12%</td>
<td>66%</td>
<td>82% (64 to 91)</td>
</tr>
<tr>
<td>Recurrent biliary disease at 1 y</td>
<td>4.5%</td>
<td>53%</td>
<td>91% (73 to 97)</td>
</tr>
<tr>
<td>Median Hospital LOS (days)</td>
<td>5</td>
<td>9</td>
<td>p&lt;0.001</td>
</tr>
</tbody>
</table>
Laparoscopic cholecystectomy versus percutaneous catheter drainage for high-risk acute cholecystitis

Conclusions: Patients with calculous cholecystitis and high surgical risk, laparoscopic cholecystectomy reduces major complications and hospital LOS compared with percutaneous catheter drainage.

Impact HM: Hospitalists should query surgical colleagues and utilize this RCT literature to encourage surgical intervention in these patients with higher surgical risk.

Case continued…

- Our patient received a laparoscopic cholecystectomy, did well and was discharged 4 days later.
- 2 years later, he presented to the ED with 3 weeks of cough and nausea. SOB x 4 days.
- Initially cough was non-productive, but became productive over last 4-5 days.
- He’s has poor po intake over last 3 weeks, and has lost 12 lbs over that time. BMI 20.
- Admitted for COPD exacerbation
Individualised nutritional support in medical inpatients at nutritional risk: a randomised clinical trial

Individualized Nutritional Support in Medical Floor Patients

Background: 2 recent ICU studies a) enteral vs. parenteral nutrition in shock RCT—NUTRIREA-2 (Lancet 2017); and b) Energy-dense vs. routine enteral nutrition in critically ill (NEJM 2018) showed no benefit.

Question: Can structured nutrition screening and individualized nutrition intervention impact clinical outcomes?

Methods: RCT, unblinded, 8 Swedish hospitals over 4 years, screened all non-ICU medical patients (all able to take oral) for malnutrition, >2000 patients with increased risk malnutrition. ITT analysis.

Exclusions: Surgical patients, patients with terminal conditions, and patients with known need for nutrition support (e.g. post-gastric bypass, stem cell transplantation, acute liver failure, cystic fibrosis, anorexia nervosa).

Interventions: Nutritional support—with individualized protein and calorie goals and micronutrient supplementation—or standard hospital food. >75% of nutritional support patients achieved caloric and protein goals.

Outcomes: 1º: Adverse clinical outcomes = ICU admission, hospital readmission, hospital-acquired infection, major cardiovascular event, acute renal failure, gastrointestinal complication or functional decline.

Nutrition Risk Screening Tool

- Risk score > 2
## Individualized Nutritional Support in Medical Floor Patients

<table>
<thead>
<tr>
<th>Outcomes</th>
<th>Nutritional Support</th>
<th>Control</th>
<th>HR</th>
<th>P Value</th>
<th>NNT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adverse Clinical Outcomes within 30 days</td>
<td>23%</td>
<td>27%</td>
<td>0.81</td>
<td>0.02</td>
<td>25</td>
</tr>
<tr>
<td>Mortality within 30 days</td>
<td>7%</td>
<td>10%</td>
<td>0.32</td>
<td>&lt;0.001</td>
<td>38</td>
</tr>
</tbody>
</table>

Adverse clinical outcomes = ICU admission, hospital readmission, hospital-acquired infection, major cardiovascular event, acute renal failure, gastrointestinal complication or functional decline

Side-effects similar in 2 groups, and few intervention patients required enteral or parenteral nutrition (~1% each).

Individualized Nutritional Support in Medical Floor Patients

Conclusions: Systematic screening of medical inpatients for nutritional risk and designing—by registered dieticians—a structured and individualized nutrition support plan for high-risk patients improves mortality.

Impact HM: For institutions, the devil will be in the details of implementation of a process and intervention that can mimic that of this study design. However, it seems worth the work for improved patient outcomes.

For individual clinicians, it makes sense to screen inpatients and apply a structured nutrition intervention, with protein and calorie goals, for patients with expected >3 day LOS

What intervention(s) will improve this patient’s outcomes?

A. Individualized nutrition support, as this can reduce adverse events and mortality in medical or surgical floor patients

B. Re-contact the surgeon to discuss cholecystectomy acutely rather than cholecystostomy

C. Both A and B

D. Neither A or B
Final case...

- You’re discussing with your patient who enjoys high-risk sports about using a parachute during skydiving.
- He asks you if there’s any “strong evidence” that a parachute can actually prevent bad outcomes when jumping from an aircraft.
- You counsel him...
Your counseling of a patient asking for “strong evidence” that parachutes can prevent bad outcomes when jumping from an aircraft?

A. “Don’t be an idiot, wear a parachute.”
B. “Would anyone in their right mind conduct a randomized controlled trial on this question?”
C. “If you want to try a jump without parachute, you might be a good candidate for this year’s Darwin Awards.”
D. “Can I post the video on YouTube?”
Parachute use to prevent death and major trauma when jumping from aircraft: randomized controlled trial

Robert W Yeh,1 Linda R Valsdottir,1 Michael W Yeh,2 Changyu Shen,1 Daniel B Kramer,1 Jordan B Strom,1 Eric A Secemsky,1 Joanne L Healy,1 Robert M Domeier,3 Dhruv S Kazi,1 Brahmanjee K Nallamothu4 On behalf of the PARACHUTE Investigators

• Participation in Randomized trials Compromised by widely Held beliefs about lack of Treatment Equipoise (PARACHUTE) trial
• OBJECTIVE
  – To determine if using a parachute prevents death or major traumatic injury when jumping from an aircraft.
• DESIGN: Randomized controlled trial
• SETTING
  – Private or commercial aircraft between September 2017 and August 2018.
Participations
- 92 aircraft passengers aged 18 and over were screened for participation.
- 23 agreed to be enrolled and were randomized.

Intervention
- Jumping from an aircraft (airplane or helicopter) with a parachute versus an empty backpack (unblinded).

Main outcome measures
- Composite of death or major traumatic injury upon impact with the ground measured immediately after landing.

Parachute use to prevent death and major trauma when jumping from aircraft: randomized controlled trial

Robert W Yeh,¹ Linda R Valsdottir,¹ Michael W Yeh,² Changyu Shen,¹ Daniel B Kramer,¹ Jordan B Strom,¹ Eric A Secemsky,¹ Joanne L Healy,¹ Robert M Domeier,³ Dhruv S Kazi,¹ Brahmajee K Nallamothu⁴ On behalf of the PARACHUTE Investigators

• RESULTS
  – Parachute use did not significantly reduce death or major injury (0% for parachute v 0% for control; P>0.9).
  – Compared with individuals screened but not enrolled, participants included in the study were on aircraft at significantly lower altitude (mean of 0.6 m for participants v mean of 9146 m for nonparticipants; P<0.001) and lower velocity (mean of 0 km/h v mean of 800 km/h; P<0.001).

• CONCLUSIONS
  – Parachute use did not reduce death or major traumatic injury when jumping from aircraft in the first randomized evaluation of this intervention.
  – However, the trial was only able to enroll participants on small stationary aircraft on the ground, suggesting cautious extrapolation to high altitude jumps.

Impact HM: When beliefs regarding the effectiveness of an intervention exist in the community, randomized trials might selectively enroll individuals with a lower perceived likelihood of benefit, thus diminishing the applicability of the results to clinical practice.
Take Home Points

• **Cardiopulmonary Resuscitation**
  – Epi or vasopressin for cardiac arrest (...but Epi likely the only one available on code carts, and give it early for non-shockable arrest rhythms)
  – Amio or Lidocaine for shockable cardiac arrest
  – Hands-on defibrillation may be in our future

• **Acute Heart Failure**
  – NIV reduces mortality and intubation
  – K repletion probably is being overdone for patients with normal K levels
Take Home Points

• **Septic Shock**
  – Capillary refill-guided resuscitation may be superior (or at least equivalent) to lactate-guided resuscitation esp for less-ill pts (SOFA<10)

• **Discharge from ICU**
  – Discharge home directly from ICU appears safe, without increased mortality or healthcare utilization
Take Home Points

• **Cholecystitis**
  - Calculous cholecystitis with high surgical risk benefit from laparoscopic cholecystectomy rather than percutaneous catheter drainage

• **Inpatient Nutrition**
  - Screen medical floor patients for nutritional risk and provide a nutrition support plan for high-risk patients
2019 Update in Hospital Medicine (Part 1)

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Questions?

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