Update in Hospital Medicine

Deepti Rao, MD
November 2, 2018
After this talk you should be able to

- Consider the High Value Care and Patient Safety concepts in ordering:
  - Telemetry
  - Daily Labs
  - Laxatives
  - Oxygen

- Understand if saline or lactated ringers is the preferred fluid for noncritically ill patients

- Understand the treatment of Inpatient Hypertension

- Consider the use of Naltrexone in the treatment of Alcohol Use Disorder
Where do I get my information from

- EvidenceAlerts--McMaster
- NEJM
- Journal Club
- Best Practice
- Colleagues—Tony Worsham, Mary Lacy, Sepher Khashei, Eva Angeli, Eileen Barrett, Dana Davis
Right Care in Hospital Medicine: Co-creation of Ten Opportunities in Overuse and Underuse for Improving Value in Hospital Medicine

Hyung J. Cho, MD, Charlie M. Wray, DO, Samantha Maione, RN, BSN, Fima Macharet, MD, Ankush Bansal, MD, Mary E. Lacy, MD, and Surafel Tseg, MD

Case

- Mr. Patient is a 46yo male with a history of alcohol use disorder who presents with pancreatitis. On exam he is meeting SIRS criteria with tachycardia to 120 and WBC of 15. His labs are consistent with alcohol related pancreatitis. He has an AKI with a creatinine of 2. You are admitting him to the hospital.
In your admitting orders will you order:

- Telemetry?
  - 1. True
  - 2. False
Right Care in Hospital Medicine: Co-creation of Ten Opportunities in Overuse and Underuse for Improving Value in Hospital Medicine

Hyung J. Cho, MD, Charlie M. Wray, DO, Samantha Maione, RN, BSN, Fima Macharet, MD, Ankush Bansal, MD, Mary E. Lacy, MD, and Surafel Tseg, MD


Don’t order telemetry monitoring in the absence of a specific clinical indication.
Society of Hospital Medicine – Adult Hospital Medicine

Released February 21, 2013
Don’t order continuous telemetry monitoring outside of the ICU without using a protocol that governs continuation.

Inappropriate use of telemetric monitoring is likely to increase cost of care and produce false positives potentially resulting in errors in patient management.
Costs of Cardiac Monitoring?

- Alarm Fatigue
- Tethering of patients—fall, delirium
- Noise
- Disruption of work flow/psychological overload
- Cost (equipment, tech time, nursing time, MD time, extra testing)
Costs of Cardiac Monitoring?

  • $110/patient/day $683/patient
  • $3,474/event that influenced management

• Unclear “cost” at UNM, but currently no direct charge to patients
# UNM Indications for Telemetry

## UNMH Telemetry Guidelines:

Based on AHA guidelines with some adjustments based on local practice, ICU orderset has automatic telemetry orders, as does alcohol withdrawal order set (where all patients monitored on CIWA are kept on telemetry).

<table>
<thead>
<tr>
<th>Timeframe</th>
<th>Condition</th>
<th>Monitor Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>24 hours</td>
<td>Chest pain (troponin negative)</td>
<td>Off monitor: (Y/N)</td>
</tr>
<tr>
<td></td>
<td>Post-ablation or device implantation</td>
<td>Off monitor: (Y/N)</td>
</tr>
<tr>
<td></td>
<td>Post-surgical (non-cardiac)</td>
<td>Off monitor: (Y/N)</td>
</tr>
<tr>
<td></td>
<td>Severe sepsis</td>
<td>Off monitor: (Y/N)</td>
</tr>
<tr>
<td></td>
<td>Syncope (low arrhythmia risk)</td>
<td>Off monitor: (Y/N)</td>
</tr>
<tr>
<td></td>
<td>Electrolyte monitoring (K &gt; 5.5 or &lt; 3, Mg &lt; 1)</td>
<td>Off monitor: (Y/N)</td>
</tr>
<tr>
<td></td>
<td>Other: (require text entry)</td>
<td>Off monitor: (Y/N)</td>
</tr>
<tr>
<td>48 hours</td>
<td>New onset or rapid atrial arrhythmia</td>
<td>Off monitor: (Y/N)</td>
</tr>
<tr>
<td></td>
<td>Acute heart failure or pulmonary edema</td>
<td>Off monitor: (Y/N)</td>
</tr>
<tr>
<td></td>
<td>ACS, non-STEMI</td>
<td>Off monitor: (Y/N)</td>
</tr>
<tr>
<td></td>
<td>Overdose of QTc prolonging drug or QTc &gt;500ms</td>
<td>Off monitor: (Y/N)</td>
</tr>
<tr>
<td>72 hours</td>
<td>Post-surgical (high-risk, including cardiac)</td>
<td>Off monitor: (Y/N)</td>
</tr>
<tr>
<td></td>
<td>STEMI</td>
<td>Off monitor: (Y/N)</td>
</tr>
<tr>
<td>Indefinite</td>
<td>Syncope (high arrhythmia risk)</td>
<td>Off monitor: (Y/N)</td>
</tr>
<tr>
<td></td>
<td>Life-vest</td>
<td>Off monitor: (Y/N)</td>
</tr>
<tr>
<td></td>
<td>Post-cardiac arrest</td>
<td>Off monitor: (Y/N)</td>
</tr>
<tr>
<td></td>
<td>2nd/3rd degree heart block</td>
<td>Off monitor: (Y/N)</td>
</tr>
<tr>
<td></td>
<td>Stroke</td>
<td>Off monitor: (Y/N)</td>
</tr>
<tr>
<td></td>
<td>Chest trauma</td>
<td>Off monitor: (Y/N)</td>
</tr>
<tr>
<td></td>
<td>Complex cardiac admission</td>
<td>Off monitor: (Y/N)</td>
</tr>
</tbody>
</table>
When a patient is admitted, this comes up.
We have a quality and safety view in our handoff sheet.
In your admitting orders will you order:

- Telemetry?
  - 1. True
  - 2. False
In summary

- Use a protocol that governs continuation if you are going to order telemetry outside of the ICU.
In your admitting orders will you order:

- 1. Saline?
- 2. Lactated Ringers?
- 3. Either will work
Balanced Crystalloids versus Saline in Noncritically Ill Adults

Wesley H. Self, M.D., M.P.H., Matthew W. Semler, M.D.,
Jonathan P. Wanderer, M.D., Li Wang, M.S., Daniel W. Byrne, M.S.,
Jean P. Collins, M.D., Corey M. Slovis, M.D., Christopher J. Lindsell, Ph.
Jesse M. Ehrenfeld, M.D., M.P.H., Edward D. Siew, M.D.,
Andrew D. Shaw, M.B., Gordon R. Bernard, M.D.,
and Todd W. Rice, M.D., for the SALT-ED Investigators*
Why is this interesting?

- “The chloride concentration of saline is higher than that of human plasma. Infusion of saline generally causes hyperchloremic metabolic acidosis and may increase renal inflammation and impair renal perfusion…may contribute to kidney injury and impair a patient’s ability to recover from severe illness.”

- Noncritically ill patients
Basics of design

- Single center study—Vanderbilt, Tennessee
- Each month ED crossed-over between LR (95%)/Plasm-Lyte A or saline
  - Intervention did not continue into hospitalization
    - CPOE notified clinicians about the trial and guided them through fluid orders
- 16 month
- Outcomes
  - Primary: Hosp free days (28-LOS)
    - Given a value of 0 if died in hospital
  - Secondary: Adverse Kidney events (discharge or 30 days whichever first), AKI, in-hosp death
Basics of data

• 13347 patients (similar, 70% admitted to medicine)
• Mean vol fluid admin 1600 cc (had to be over 500cc)
• Other than type of fluid all other care per treating md (pragmatic trial design)
<table>
<thead>
<tr>
<th>Outcome</th>
<th>Balanced Crystalloids (N=6708)</th>
<th>Saline (N=6639)</th>
<th>Adjusted Odds Ratio (95% CI)*</th>
<th>Adjusted P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Median hospital-free days to day 28 (IQR)</td>
<td>25 (22–26)</td>
<td>25 (22–26)</td>
<td>0.98 (0.92–1.04)</td>
<td>0.41</td>
</tr>
<tr>
<td>Major adverse kidney event within 30 days — no. (%)</td>
<td>315 (4.7)</td>
<td>370 (5.6)</td>
<td>0.82 (0.70–0.95)</td>
<td>0.01</td>
</tr>
<tr>
<td>Death — no. (%)</td>
<td>94 (1.4)</td>
<td>102 (1.5)</td>
<td>0.89</td>
<td></td>
</tr>
<tr>
<td>New renal-replacement therapy — no./total no. (%) †</td>
<td>18/6582 (0.3)</td>
<td>31/6530 (0.5)</td>
<td>0.56</td>
<td></td>
</tr>
<tr>
<td>Final serum creatinine ≥200% of baseline — no./total no. (%) †</td>
<td>253/6582 (3.8)</td>
<td>293/6530 (4.5)</td>
<td>0.84</td>
<td></td>
</tr>
<tr>
<td>Stage 2 or higher acute kidney injury — no./total no. (%) †</td>
<td>528/6582 (8.0)</td>
<td>560/6530 (8.6)</td>
<td>0.91 (0.80–1.03)</td>
<td>0.14</td>
</tr>
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<td>In-hospital death — no. (%)</td>
<td>95 (1.4)</td>
<td>105 (1.6)</td>
<td>0.88 (0.66–1.16)</td>
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Table 3. Clinical Outcomes According to Assigned Treatment Group in the Intention-to-Treat Analysis.

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<tr>
<td>Death — no. (%)</td>
<td>9 (1.3)</td>
<td>10 (1.5)</td>
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But we don’t know what type or how much fluid they got in the hospital.
Balanced Crystalloids versus Saline in Critically Ill Adults

Matthew W. Semler, M.D., Wesley H. Self, M.D., M.P.H.,
Jonathan P. Wanderer, M.D., Jesse M. Ehrenfeld, M.D., M.P.H.,
Li Wang, M.S., Daniel W. Byrne, M.S., Joanna L. Stollings, Pharm.D.,
Avinash B. Kumar, M.D., Christopher G. Hughes, M.D.,
Antonio Hernandez, M.D., Oscar D. Guillamondegui, M.D., M.P.H.,
Addison K. May, M.D., Liza Weavind, M.B., B.Ch., Jonathan D. Casey, M.D.,
Edward D. Siew, M.D., Andrew D. Shaw, M.B., Gordon R. Bernard, M.D.,
and Todd W. Rice, M.D., for the SMART Investigators
and the Pragmatic Critical Care Research Group*
<table>
<thead>
<tr>
<th>Outcome</th>
<th>Balanced Crystalloids (N = 7942)</th>
<th>Saline (N = 7860)</th>
<th>Adjusted Odds Ratio (95% CI)††</th>
<th>P Value††</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Primary outcome</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Major adverse kidney event within 30 days — no. (%)‡</td>
<td>1139 (14.3)</td>
<td>1211 (15.4)</td>
<td>0.90 (0.82 to 0.99)</td>
<td>0.04</td>
</tr>
<tr>
<td><strong>Components of primary outcome</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>In-hospital death before 30 days — no. (%)</td>
<td>818 (10.3)</td>
<td>875 (11.1)</td>
<td>0.90 (0.80 to 1.01)</td>
<td>0.06</td>
</tr>
<tr>
<td>Receipt of new renal-replacement therapy — no./total no. (%)§</td>
<td>189/7558 (2.5)</td>
<td>220/7458 (2.9)</td>
<td>0.84 (0.68 to 1.02)</td>
<td>0.08</td>
</tr>
<tr>
<td>Among survivors</td>
<td>106/6787 (1.6)</td>
<td>117/6657 (1.8)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Final creatinine level ≥200% of baseline — no./total no. (%)§</td>
<td>487/7558 (6.4)</td>
<td>494/7458 (6.6)</td>
<td>0.96 (0.84 to 1.11)</td>
<td>0.60</td>
</tr>
<tr>
<td>Among survivors</td>
<td>259/6787 (3.8)</td>
<td>273/6657 (4.1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Among survivors without new renal-replacement therapy</td>
<td>215/6681 (3.2)</td>
<td>219/6540 (3.3)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Lactated Ringer’s Solution Reduces Systemic Inflammation Compared With Saline in Patients With Acute Pancreatitis

BECHIEN U. WU,* JAMES Q. HWANG,† TIMOTHY H. GARDNER,§ KATHRYN REPAS,* RYAN DELEE,§ SONG YU,* BENJAMIN SMITH,‖ PETER A. BANKS,* and DARWIN L. CONWELL*
Acidosis may lead to worsening of pancreatitis.

**Figure 3.** Impact of resuscitation strategy and fluid type on prevalence of SIRS at enrollment and 24 hours after randomization. GDR, goal-directed resuscitation; STD, standard resuscitation.
Acidosis may lead to worsening of pancreatitis.
In your admitting orders will you order:

- 1. Saline?
- 2. Lactated Ringers?
- 3. Either will work
In summary

- Use a protocol that governs continuation if you are going to order telemetry outside of the ICU.
- In noncritically ill patients LR vs. saline does not seem to matter
In your admitting orders will you order:

- Colace?
- 1. True
- 2. False
TITLE: Dioctyl Sulfosuccinate or Docusate (Calcium or Sodium) for the Prevention or Management of Constipation: A Review of the Clinical Effectiveness

DATE: 26 June 2014
A review of literature

Table 1: Selection Criteria

<table>
<thead>
<tr>
<th>Population</th>
<th>Adult patients with constipation and/or for whom prevention of constipation is desired (in hospital and/or long-term care settings)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intervention</td>
<td>Dioctyl sulfosuccinate or docusate (provided in either a calcium or sodium salt)</td>
</tr>
<tr>
<td>Comparator</td>
<td>• Placebo</td>
</tr>
<tr>
<td></td>
<td>• Other management methods</td>
</tr>
<tr>
<td>Outcomes</td>
<td>Measurable clinical changes in bowel function</td>
</tr>
<tr>
<td>Study Designs</td>
<td>Health technology assessments, systematic reviews, meta-analyses, randomized controlled trials, and non-randomized studies</td>
</tr>
</tbody>
</table>
Conclusions

• The available evidence suggests that **docusate is no more effective than placebo in the prevention or management of constipation.**

• The studies were limited by
  • inadequate sample sizes,
  • the use of additional bowel medications (rescue medications) which may have confounded the results
  • the potential lack of consistent data capture involving multiple health care providers.

• Furthermore, the study results are mostly generalizable to patients with opioid induced constipation.

• More rigorous and larger RCTs are required to definitively ascertain the clinical effectiveness of docusate.
In your admitting orders will you order:

- Colace?
  - 1. True
  - 2. False
In summary

- Use a protocol that governs continuation if you are going to order telemetry outside of the ICU.
- In noncritically ill patients LR vs. saline does not seem to matter
- Use medicines other than colace for prevention or management of constipation in hospitalized patients
In your admitting orders will you order:

- AM Labs for the next 3 days—CBC, Chem 7?
- 1. True
- 2. False
Right Care in Hospital Medicine: Co-creation of Ten Opportunities in Overuse and Underuse for Improving Value in Hospital Medicine

Hyung J. Cho, MD, Charlie M. Wray, DO, Samantha Maione, RN, BSN, Fima Macharet, MD, Ankush Bansal, MD, Mary E. Lacy, MD, and Surafel Tseg, MD


Don’t order daily labs in the presence of clinical stability or in the absence of a specific clinical question.
Hospitalized patients frequently have considerable volumes of blood drawn (phlebotomy) for diagnostic testing during short periods of time. Phlebotomy is highly associated with changes in hemoglobin and hematocrit levels for patients and can contribute to anemia. This anemia, in turn, may have significant consequences, especially for patients with cardiorespiratory diseases. Additionally, reducing the frequency of daily unnecessary phlebotomy can result in significant cost savings for hospitals.
Labs at UNM

- 2012 ChargeMaster:
  - BMP $93
  - CBC $43

- So if we cut down just 1 CBC and 1 BMP per patient, x 24,239 discharges (Dec 2016 – Nov 2017) = $3.2 million
  - Medicine ~7000 dc/yr ($952,000)
In your admitting orders will you order:

- AM Labs for the next 3 days—CBC, Chem 7?
  - 1. True
  - 2. False
In summary

• Use a protocol that governs continuation if you are going to order telemetry outside of the ICU.
• In noncritically ill patients LR vs. saline does not seem to matter
• Use medicines other than colace for prevention or management of constipation in hospitalized patients
• Order only those labs you need to help you make decisions
In your admitting orders will you order:

- 1. Oxygen for room air sat <90%?
- 2. Oxygen for sat less than 96%?
- 3. Oxygen no matter what the sat
Mortality and morbidity in acutely ill adults treated with liberal versus conservative oxygen therapy (IOTA): a systematic review and meta-analysis

Derek K Chu,†, Lisa H-Y Kim,†, Paul J Young, Nima Zamiri, Saleh A Almenawer, Roman Jaeschke, Wojciech Szczeklik, Holger J Schünemann, John D Neary, Waleed Alhazzani

Lancet 2018
But isn’t oxygen harmless?

Potential negative effects of hyperoxia:
- Absorption atelectasis
- Acute lung injury
- Inflammatory cytokine production
- CNS toxicity
- Reduced cardiac output
- Cerebral and coronary vasoconstriction

Effects seen in RCT’s
- Respiratory failure
- Shock
- Recurrent MI
- Arrhythmia

Oxygen Therapy in Suspected Acute Myocardial Infarction

Robin Hofmann, M.D., Stefan K. James, M.D., Ph.D.,
Tomas Jernberg, M.D., Ph.D., Bertil Lindahl, M.D., Ph.D.,
David Erlinge, M.D., Ph.D., Nils Witt, M.D., Ph.D., Gabriel Arefalk, M.D.,
Mats Frick, M.D., Ph.D., Joakim Alfredsson, M.D., Ph.D.,
Lennart Nilsson, M.D., Ph.D., Annica Ravni-Fischer, M.D., Ph.D.,
Elmir Omerovic, M.D., Ph.D., Thomas Kellerth, M.D., David Sparv, B.Sc.,
Ulf Ekelund, M.D., Ph.D., Rickard Linder, M.D., Ph.D.,
Mattias Ekström, M.D., Ph.D., Jörg Lauermann, M.D., Urban Haaga, B.Sc.,
John Pernow, M.D., Ph.D., Ollie Östlund, Ph.D., Johan Herlitz, M.D., Ph.D.,
and Leif Svensson, M.D., Ph.D., for the DETO2X–SWEDEHEART Investigators.
Basics of design

- Systematic review of studies where oxygen was the intervention
- **Acutely ill**: any condition requiring non-elective hospital admission and the potential to be exposed to supplemental oxygen.
- No
  - pregnant,
  - studies limited to chronic respiratory/psychiatric disease
  - ECMO or HBO
- Outcomes
  - Mortality (in hospital, 30 days, at longest followup)
  - Morbidity (Disability, HAP, any hospital acquired infection, LOS)
Basics of data

- 25 RCT trial
- 16037 patients (15754 with mortality data), median age 64, 64%:36% men:women
  - Sepsis
  - Critical illness
  - Stroke
  - Trauma
  - MI
  - Surgery

- Oxygen
  - nasal prongs in four trials
  - facemask in 13 trials
  - Invasive mechanical ventilation in eight trials
Basics of data

- Liberal oxygen—median FiO2 of 0.52 (range 0.28–1.00) for a median duration of 8 h (range 1–144 h)
  - SpO2 94-96%
- Conservative supplementation—median FiO2 0.21, (range 0.21–0.50)
• 19/25 of the trials used room air or titrated to a low SpO2 in conservative group
  • These trials used to calculate mortality

Mean baseline SpO2 were similar in some of the studies so really patients were being hyperoxygenated
Funnel plot—low Publication risk

Mortality

$I^2$ 0%

NNH 71
### Neurological (stroke-traumatic brain injury)

<table>
<thead>
<tr>
<th>Setting</th>
<th>Liberal (n/N)</th>
<th>Conservative (n/N)</th>
<th>RR (95% CI)</th>
<th>% weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aliet al (2014)**</td>
<td>5/155</td>
<td>4/246</td>
<td>1.18 (0.93–2.43)</td>
<td>1.6</td>
</tr>
<tr>
<td>Roffet et al (2017)**</td>
<td>5/2168</td>
<td>45/2668</td>
<td>1.11 (0.75–1.66)</td>
<td>16.6</td>
</tr>
<tr>
<td>Ronning et al (1999)**</td>
<td>3/292</td>
<td>22/258</td>
<td>1.18 (0.74–1.89)</td>
<td>11.9</td>
</tr>
<tr>
<td>Singhal et al (2005)**</td>
<td>0/9</td>
<td>1/7</td>
<td>0.27 (0.01–5.70)</td>
<td>0.3</td>
</tr>
<tr>
<td>NCTO0414726</td>
<td>14/43</td>
<td>4/42</td>
<td>3.42 (1.22–9.54)</td>
<td>2.5</td>
</tr>
<tr>
<td>Sh et al (2017)**</td>
<td>0/9</td>
<td>(Excluded)</td>
<td></td>
<td>0</td>
</tr>
</tbody>
</table>

### Sepsis

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<th>% weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>NCTO2378545 (2015)</td>
<td>3/25</td>
<td>2/25</td>
<td>1.50 (0.27–8.22)</td>
<td>0.9</td>
</tr>
</tbody>
</table>

### Emergency surgery

<table>
<thead>
<tr>
<th>Setting</th>
<th>Liberal (n/N)</th>
<th>Conservative (n/N)</th>
<th>RR (95% CI)</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Butler et al (1987)**</td>
<td>1/7</td>
<td>0/22</td>
<td>3.83 (0.12–88.62)</td>
<td>0.3</td>
</tr>
<tr>
<td>Subietzna et al (2016)**</td>
<td>2/119</td>
<td>4/220</td>
<td>0.50 (0.09–2.70)</td>
<td>0.9</td>
</tr>
<tr>
<td>NCTO23687217</td>
<td>0/30</td>
<td>(Excluded)</td>
<td></td>
<td>0</td>
</tr>
</tbody>
</table>

### Critical care (mixed medical-surgical)

<table>
<thead>
<tr>
<th>Setting</th>
<th>Liberal (n/N)</th>
<th>Conservative (n/N)</th>
<th>RR (95% CI)</th>
<th>% weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Girardis et al (2016)**</td>
<td>80/243</td>
<td>58/235</td>
<td>1.33 (1.00–1.78)</td>
<td>32.1</td>
</tr>
<tr>
<td>Panwar et al (2016)**</td>
<td>12/51</td>
<td>13/53</td>
<td>0.96 (0.48–1.90)</td>
<td>5.6</td>
</tr>
</tbody>
</table>

### Cardiac (myocardial infarction-cardiac arrest)

<table>
<thead>
<tr>
<th>Setting</th>
<th>Liberal (n/N)</th>
<th>Conservative (n/N)</th>
<th>RR (95% CI)</th>
<th>% weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hofmann et al (2017)**</td>
<td>53/3311</td>
<td>44/3318</td>
<td>1.21 (0.81–1.80)</td>
<td>16.8</td>
</tr>
<tr>
<td>Khoshnood et al (2015)**</td>
<td>3/85</td>
<td>3/75</td>
<td>0.88 (0.48–1.84)</td>
<td>1.1</td>
</tr>
<tr>
<td>Kues et al (2006)**</td>
<td>4/4</td>
<td>4/4</td>
<td>1.0</td>
<td>4</td>
</tr>
<tr>
<td>Rawes et al (1976)**</td>
<td>9/05</td>
<td>9/05</td>
<td>2.71 (0.76–9.73)</td>
<td>1.6</td>
</tr>
<tr>
<td>Stub et al (2012)**</td>
<td>5/12</td>
<td>11/321</td>
<td>0.45 (0.16–12.9)</td>
<td>2.4</td>
</tr>
<tr>
<td>Ukholskina et al (2005)**</td>
<td>15/8</td>
<td>0/79</td>
<td>4.07 (1.78–98.10)</td>
<td>0.6</td>
</tr>
<tr>
<td>Young et al (2014)**</td>
<td>5/9</td>
<td>4/8</td>
<td>1.11 (0.45–2.75)</td>
<td>3.2</td>
</tr>
</tbody>
</table>

**P<0.05, **P<0.01

### In-hospital mortality

- **RR 1.21 p=0.02**

**NNH 71**

**Publication risk—low**

**I² 0%**
In hospital mortality
Other interesting findings

- No association:
  - FiO2 and mortality
  - ICU vs nonICU
  - Delivery method
  - Duration of exposure
  - Hypoxia at baseline
  - Disability, hospital acquired infection or LOS for medical patients

- Consider not titrating oxygen higher than SaO2 94-96%
In your admitting orders will you order:

- 1. Oxygen for room air sat <90%?
- 2. Oxygen for sat less than 96%?
- 3. Oxygen no matter what the sat
In summary

- Use a protocol that governs continuation if you are going to order telemetry outside of the ICU.
- In noncritically ill patients LR vs. saline does not seem to matter
- Use medicines other than colace for prevention or management of constipation in hospitalized patients
- Order only those labs you need to help you make decisions
- Use oxygen conservatively (except perhaps in emergency surgical patients)
Right Care in Hospital Medicine: Co-creation of Ten Opportunities in Overuse and Underuse for Improving Value in Hospital Medicine

Hyung J. Cho, MD, Charlie M. Wray, DO, Samantha Maione, RN, BSN, Fima Macharet, MD, Ankush Bansal, MD, Mary E. Lacy, MD, and Surafel Tseg, MD
Underuse (Do’s)
• Implement programs designed to promote sleep in the inpatient setting.
• Provide verbal or written communication to the patient’s primary care provider prior to discharge.
• Provide personalized instructions (including education) to patients on discharge.
• Check orthostatic vital signs on patients with syncope prior to considering testing beyond an electrocardiogram.
• Use structured verbal and written communication for shift and service handoffs between providers.

Overuse (Don’ts)
• Don’t order daily labs in the presence of clinical stability or in the absence of a specific clinical question.
• Don’t order telemetry monitoring in the absence of a specific clinical indication.
• Don’t routinely order laboratory and imaging tests prior to evaluating and examining the patient.
• Don’t order urine electrolytes in acute kidney injury in the absence of oliguria or hepatic disease, and don’t order renal ultrasound without an evidence-based risk stratification framework.
• Don’t order computed tomography of the head to evaluate inpatient delirium in the absence of neurologic findings.
Mr. Patient is transferred to the medical unit. The RN calls with bp 190/110. He does not have hx of htn or chest pain/sob/focal neuro deficits/vision changes.

- You tell the RN:
  - A. “I will order hydralazine 10mg iv q4hr prn sbp>180/dbp>110.”
  - B. “I will order nifedipine 10mg po q4hr prn sbp>180/dbp>110.”
  - C. “I will order nifedipine 10mg po times one since his sbp>180/dbp>110.”
  - D. “Let’s wait and see what his bp does.”
End-Organ Damage Characterizes Hypertensive Emergencies

Hypertensive encephalopathy
- Stroke

Brain

Cardiovascular System
- Unstable angina
- Acute heart failure
- Acute myocardial infarction
- Acute aortic dissection
- Dissecting aortic aneurysm

Retina
- Hemorrhages
- Exudates
- Papilledema

Kidney
- Hematuria
- Proteinuria
- Decreasing renal function


Hypertensive emergency
Characteristics and Outcomes of Patients Presenting With Hypertensive Urgency in the Office Setting

Krishna K. Patel, MD; Laura Young, MD; Erik H. Howell, MD; Bo Hu, PhD; Gregory Rutecki, MD; George Thomas, MD; Michael B. Rothberg, MD, MPH

Jama Int Med 2016
Basics of Design

- Retrospective cohort study with propensity matching
  - Cleveland Clinic Health system 2008-2013
  - Bp >180/110

- Main outcomes:
  - Major Adverse Cardiovascular Events-MACE (ACS, CVA/TIA)
  - Uncontrolled htn (followed for 6 months)
  - Hospital admission (1 month)
• Almost 60K office visits met criteria for htn urgency of 2.2 million total
  • Median age 63
  • 58% Women
  • 76% White
  • Mean BMI 31
  • Mean bp 182/96

• When they did their propensity matching
  • 852 pt send home vs 426 sent to hospital (TOTAL OUT OF 60K!)
Data

- Characteristic differences between patients sent to hospital vs not
  - Age (58 vs 63)
  - African American
  - Mean sbp (198 vs 182)
  - Mean dbp (107 vs 96)
  - Preexisting dx htn (96% vs 72%)
  - CKD (16% vs 10%)
  - Acei/arb (34% vs 41%)
  - Clonidine (13% vs 6%)
Results

Rates of MACE low

<table>
<thead>
<tr>
<th>Outcome</th>
<th>No. (%) of Patients</th>
<th>Referred to Hospital (n = 426)&lt;sup&gt;a&lt;/sup&gt;</th>
<th>Sent Home (n = 58 109)</th>
<th>P Value&lt;sup&gt;b&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>MACE&lt;sup&gt;c&lt;/sup&gt;</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7 d</td>
<td>2 (0.5)</td>
<td>61 (0.1)</td>
<td></td>
<td>.02</td>
</tr>
<tr>
<td>8-30 d</td>
<td>2 (0.5)</td>
<td>119 (0.2)</td>
<td></td>
<td>.23</td>
</tr>
<tr>
<td>1-6 mo</td>
<td>4 (0.9)</td>
<td>492 (0.8)</td>
<td></td>
<td>.83</td>
</tr>
<tr>
<td>Uncontrolled hypertension</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 mo&lt;sup&gt;d&lt;/sup&gt;</td>
<td>349 (81.9)</td>
<td>49 320 (84.9)</td>
<td></td>
<td>.09</td>
</tr>
<tr>
<td>6 mo&lt;sup&gt;e&lt;/sup&gt;</td>
<td>213 (66.6)</td>
<td>24 819 (60.2)</td>
<td></td>
<td>.02</td>
</tr>
<tr>
<td>All-cause hospital admission</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7 d</td>
<td>35 (8.2)</td>
<td>2311 (4.0)</td>
<td></td>
<td>&lt;.001</td>
</tr>
<tr>
<td>8-30 d</td>
<td>48 (11.3)</td>
<td>3897 (6.7)</td>
<td></td>
<td>&lt;.001</td>
</tr>
</tbody>
</table>
### Table 3. Outcomes of Asymptomatic Patients in Propensity Matched Comparison

<table>
<thead>
<tr>
<th>Outcome</th>
<th>No. (%) of Patients</th>
<th>P Value&lt;sup&gt;c&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>MACE&lt;sup&gt;a&lt;/sup&gt;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7 d</td>
<td>2 (0.5)</td>
<td>0</td>
</tr>
<tr>
<td>8-30 d</td>
<td>2 (0.5)</td>
<td>0</td>
</tr>
<tr>
<td>1-6 mo</td>
<td>4 (0.9)</td>
<td>8 (0.9)</td>
</tr>
<tr>
<td>Uncontrolled hypertension</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 mo&lt;sup&gt;b&lt;/sup&gt;</td>
<td>349 (81.9)</td>
<td>735 (86.3)</td>
</tr>
<tr>
<td>6 mo&lt;sup&gt;b&lt;/sup&gt;</td>
<td>213 (66.6)</td>
<td>393 (64.6)</td>
</tr>
<tr>
<td>All-cause hospital admission</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7 d</td>
<td>35 (8.2)</td>
<td>40 (4.7)</td>
</tr>
<tr>
<td>8-30 d</td>
<td>48 (11.3)</td>
<td>59 (6.9)</td>
</tr>
</tbody>
</table>
Well why did this help you?

- Because if a patient is asymptomatic, it would seem their chances of running into problems are low
A period of rest may be all that’s needed

Hypertensive urgencies in the emergency department: evaluating blood pressure response to rest and to antihypertensive drugs with different profiles.

- 549 patients with bp >180/110
- First tx rest for 30 minutes:
  - 32% declined into acceptable range and stayed
- If did not respond to rest then received oral tx
  - 54% responded and had acceptable bp in 2 hours
- No severe htn related major or minor events
What about using iv meds?

How should Asymptomatic hypertension be managed in the hospital?

Adverse events:
- Hypotension
- Syncope
- Chest pain
- Holding next dose of antihypertensive
- Increased LOS
What about using iv meds?

How should asymptomatic hypertension be managed in the hospital?

Adverse events:
- Hypotension
- Syncope
- Chest pain
- Holding next dose of antihypertensive
- Increased LOS
• Make sure it is not hypertensive emergency.
• Identify and treat any precipitating causes
• Identify if the patient known hypertension which is being under treated or is untreated
• Consider starting treatment
• Make sure the patient has follow-up.
How should Asymptomatic hypertension be managed in the hospital?

The Hospitalist April 2018

- Hypertensive emergency
- Address these factors
- Consider restarting
- Repeat bp after rest period
- Home meds held?
- Other contributing factors (pain? Anxiety? Withdraw?)
- Symptoms? End organ damage?
How should Asymptomatic hypertension be managed in the hospital?

The Hospitalist April 2018

- If still elevated:
  - Typically no treatment needed
  - If high risk (CAD, CHF, CVA) and urgent treatment desired:
    - Captopril 6.25-12.5 mg
    - Carvedilol 6.25-12.5 mg
    - Clonidine .1-.2 mg
    - Furosemide 40 mg (if volume up)

- Note: recommend against nifedipine
Should all patients presenting with hypertensive urgency be admitted?

No.

Is there a subset of patients with hypertensive urgency who should be admitted?

Propose that in patients with hypertensive urgency who have a high risk for cardiovascular disease or complications (long standing diabetes, known left ventricular systolic dysfunction, aortic or cerebral aneurysms) we first assist with management following the UpToDate recommendations. If an acceptable BP is not obtained within 3 to 4 hours consider placing in IM observation.

Propose that IM assist with ensuring appropriate outpatient follow-up.

What goals do we have for patients with hypertensive urgency?

Ensuring that there is no evidence of end organ damage

Ensuring appropriate outpatient follow-up (what time frame is acceptable)

Provide recommendations for appropriate antihypertensive therapy pending outpatient follow-up.
UpToDate
Management of Asymptomatic Severe Hypertension in Adults

- **When blood pressure should be lowered over a period of hours** (Patients judged to be at high risk for imminent cardiovascular events – those with known aortic or intracranial aneurysms).
  - Provide the patient a quiet room and see if their BP comes down
  - Consider initiating antihypertensive therapy if the patient’s BP does not respond to rest.
  - Use oral clonidine or captopril and then observe over a few hours to assess if the patient’s BP drops by 20 to 30 mmHg.
  - Ensure that the patient has f/u within a few days.

- **When the pressure should be lowered over a period of days.**
  - Consider restarting or increasing the patient’s primary medication or adding a diuretic if the patient is not taking one.
  - In patients with previously untreated hypertension consider starting a calcium channel blocker (not nifedipine), or a combination antihypertensive.
Mr. Patient is transferred to the medical unit. The RN calls with bp 190/110. He does not have hx of htn and is asymptomatic.

- You tell the RN:
  - A. “I will order hydralazine 10mg iv q4hr prn sbp>180/dbp>110.”
  - B. “I will order nifedipine 10mg po q4hr prn sbp>180/ dbp>110.”
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In summary

- Use a protocol that governs continuation if you are going to order telemetry outside of the ICU.
- In noncritically ill patients LR vs. saline does not seem to matter
- Use medicines other than colace for prevention or management of constipation in hospitalized patients
- Order only those labs you need to help you make decisions
- Use oxygen conservatively (except perhaps in emergency surgical patients)
- Treat asymptomatic hypertension in the hospital only if the patient is at high risk of complications and then only with oral medications
Mr. Patient wants to quit using alcohol. You talk with him about medication for alcohol use disorder and he is interested.

- Which of the following is a false statement about using Naltrexone for ETOH cravings?
  - 1. It modulates the dopamine-mediated rewarding effects of ETOH
  - 2. The dosage approved by the FDA is 50mg/day
  - 3. It decreases risk of relapse to any drinking
  - 4. It reduces return to binge drinking
  - 5. It has to be started in the outpatient setting
JAMA | Review

Diagnosis and Pharmacotherapy of Alcohol Use Disorder
A Review

Henry R. Kranzler, MD; Michael Soyka, MD

April 2018
Basics of design

- Review of the literature
### Table 2. Non-Food and Drug Administration-Approved Medications for Treating Alcohol Use Disorder

<table>
<thead>
<tr>
<th>Medication</th>
<th>Naltrexone</th>
<th>Baclofen</th>
<th>Gabapentin</th>
<th>Topiramate</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Indication(s)</strong></td>
<td>United States: Complete or partial reversal of opioid drug effects European Union: Help reduce alcohol consumption in adults with alcohol dependence who consume &gt;60 g (≈4 drinks) per day (men) or &gt;40 g (≈3 drinks/day) (women).</td>
<td>Aversion of signs and symptoms of spasticity resulting from multiple sclerosis</td>
<td>Management of postherpetic neuralgia in adults and adjunctive therapy in the treatment of partial seizures in patients age 3 and older.</td>
<td>Monotherapy for partial onset or primary generalized tonic-clonic seizures, adjunctive therapy for partial onset seizures or primary generalized tonic-clonic seizures and seizures associated with Lennox-Gastaut syndrome; migraine prophylaxis; weight loss and chronic weight management (in combination with phenytoin)</td>
</tr>
<tr>
<td><strong>Dosage</strong></td>
<td>Approved dosage for AUD (in the European Union): 18 mg/d (as needed) Dosage in clinical trials for AUD: 5-80 mg/d in 1 dose or 2 divided doses</td>
<td>Dosage in clinical trials for AUD: 30-180 mg/d in up to 4 divided doses</td>
<td>Dosage in clinical trials for AUD: 600-1800 mg/d in 3 divided doses</td>
<td>Dosage in clinical trials for AUD: 75-300 mg/d in 2 divided doses</td>
</tr>
<tr>
<td><strong>Effect size(s)</strong></td>
<td>In a meta-analysis of 5 RCTs (N = 2567), naltrexone treatment was associated with a reduction in binge drinking of</td>
<td>In a meta-analysis of 13 RCTs (N = 1492), baclofen was associated with a significantly greater time to first binge to</td>
<td>Of 3 peer-reviewed, placebo-controlled RCTs (total N = 231), the largest (N = 150) showed that gabapentin resulted</td>
<td>In a meta-analysis of 7 RCTs (N = 1125), there were small-to-medium effects of topiramate on abstinence days</td>
</tr>
</tbody>
</table>
Mr. Patient wants to quit using alcohol. You talk with him about medication for alcohol use disorder and he is interested.

Which of the following is a false statement about using Naltrexone for ETOH cravings?

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- 5. **It has to be started in the outpatient setting**
In summary

- Use a protocol that governs continuation if you are going to order telemetry outside of the ICU.
- In noncritically ill patients LR vs. saline does not seem to matter
- Use medicines other than colace for prevention or management of constipation in hospitalized patients
- Order only those labs you need to help you make decisions
- Use oxygen conservatively (except perhaps in emergency surgical patients)
- Treat asymptomatic hypertension in the hospital only if the patient is at high risk of complications and then only with oral medications
- Consider starting naltrexone in the hospital and discharging with a prescription for patients admitted with alcohol related problems