Sizzling EM Part 2
AKA PIMP Session

Mike
&
BC

March 6, 2017
PIMP Session

Practice

Improving

Monthly

Papers
Goals (aka PIMP-jectives)

• Current literature - hot off the presses
• Focus on articles that are clinical
• Foster critical thinking
• Enhance your practice of EBM
What we will not do

- Discuss high level statistical concepts
- Teach you research methodology
- Serve as the “end all” for discussion on a topic
- Become a replacement for the clinical basics - listen up juniors!
- Don’t take my word for it - look it up
Friendly Reminder

WARNING

DO NOT TRY THIS AT HOME! DEATH OR INJURY COULD OCCUR. WE ARE TRAINED PROFESSIONALS.
Original Contribution

Direct Versus Video Laryngoscopy Using the C-MAC for Tracheal Intubation in the Emergency Department, a Randomized Controlled Trial

Brian E. Driver, MD, Matthew E. Prekker, MD, Johanna C. Moore, MD, Alexandra L. Schick, Robert F. Reardon, and James R. Miner, MD
In uncomplicated cases requiring emergent intubation, there was no difference in the 1st pass success rate whether video or direct laryngoscopy was used.
Background

- DL common
- trained >5 yrs ago
- VL common
- now popular
- 30% all intubations now
- 1% 10 yrs ago
What’s the Evidence?

- Video Laryngoscopy
- C-Mac or Glidescope
- improved 1st pass success
  - especially in difficult airway
  - but not randomized, so selection bias
- Some argue that DL is not 1st line
Study Question

Comparison of 1st pass success in emergent intubation in the ED using either DL vs VL?
Methods

• Prospective Randomized Trial
• Hennepin County
• Operators were senior residents
• Used C-Mac for DL and VL
• covered screen for DL
Procedures / Outcomes

• Primary outcome: 1st pass success
• Secondary outcomes:
  • time to intubation
  • aspiration
  • hospital LOS
Results

198

95 DL
86% 1st pass success

103 VL
92% 1st pass success
Results - Efficacy

- patients that failed DL
- 100% intubated by VL
- 2ndary outcomes
  - no difference seen
    - aspiration pneumonia
    - hospital LOS
    - time to intubation
Things to Consider

• Prospective Randomized study
• 57 patients eligible but NOT enrolled
  • could this potentially influence results
  • maybe, but unclear if in a + or - way
Take Home Points

• small increased 1st pass with VL vs DL
• although not statistically significant
• EP should get trained in both
• completely ok to use “old faithful” DL for 1st attempt
Platelet transfusion versus standard care after acute stroke due to spontaneous cerebral haemorrhage associated with antiplatelet therapy (PATCH): a randomised, open-label, phase 3 trial

PATCH is the first ever RCT to evaluate the utility of platelet transfusion in non-traumatic ICH not going to the OR and to their surprise they found that giving platelets increased the risk of both death and poor neurologic outcomes among patients on anti-platelet agents.
Hemorrhagic Stroke

• Makes up 10-20% of strokes
• But accounts for 50% of stroke deaths
• Worse outcomes than equivalent sized ischemic strokes
Making Matters Worse

- 1/4 people with non-traumatic ICH are taking anti-platelet therapy
- They have 27% increased odds of death
Platelet Transfusion

- Used prophylactically and therapeutically in many clinical settings
- Very few RCTs in patients with life-threatening bleeds - all small/poor quality
- Observational studies actually mixed results
Guidelines?

• Actually none supporting its use for patients with non-traumatic ICH

• **Different** in massive transfusion
  - 1:1:1 - dilution
  - Multiple guidelines - basically all suggest use for patients on anti-platelet agents
  - Maybe different b/c ongoing massive bleed
So Why Do We Do It?

Patient with a head bleed??
You didn’t give Platelets??
Study Question

• Does giving platelets reduce death or poor neurologic outcome in patients with acute non-traumatic ICH on anti-platelet therapy?
Methods

- Multi-center, randomized, open label trial at 41 hospitals in Europe
- Adults with non-traumatic ICH on anti-platelet therapy for at least 7 days
- Excluded:
  - Trauma: all SDH and EDH
  - GCS <8
  - Patients going immediately to OR
6 Year Study

No Patients Lost to Follow-up
Outcomes

• Death
• Disability
• Significant adverse event
• Fatal adverse event (expanding bleed/ herniation)

Pre-planned subgroup analyses of type of anti-platelet agent and volume of bleed
## Modified Rankin Scale (MRS)

<table>
<thead>
<tr>
<th>Score</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>No symptoms</td>
</tr>
<tr>
<td>1</td>
<td>No significant disability, despite symptoms; able to perform all usual duties and activities</td>
</tr>
<tr>
<td>2</td>
<td>Slight disability; unable to perform all previous activities but able to look after own affairs without assistance</td>
</tr>
<tr>
<td>3</td>
<td>Moderate disability; requires some help, but able to walk without assistance</td>
</tr>
<tr>
<td>4</td>
<td>Moderately severe disability; unable to walk without assistance and unable to attend to own bodily needs without assistance</td>
</tr>
<tr>
<td>5</td>
<td>Severe disability; bedridden, incontinent, and requires constant nursing care and attention</td>
</tr>
<tr>
<td>6</td>
<td>Death</td>
</tr>
</tbody>
</table>
## Disability

<table>
<thead>
<tr>
<th>Score</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>No symptoms</td>
</tr>
<tr>
<td>1</td>
<td>Minor symptoms</td>
</tr>
<tr>
<td>2</td>
<td>Some restrictions in lifestyle</td>
</tr>
<tr>
<td>3</td>
<td>Significant restrictions in lifestyle</td>
</tr>
<tr>
<td>4</td>
<td>Partly dependant</td>
</tr>
<tr>
<td>5</td>
<td>Fully dependant</td>
</tr>
<tr>
<td>6</td>
<td>Dead</td>
</tr>
</tbody>
</table>
## Results

<table>
<thead>
<tr>
<th></th>
<th>Platelet transfusion group (n=97)</th>
<th>Standard care group (n=93)</th>
<th>Odds ratio (95% CI)</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alive at 3 months (survival)</td>
<td>66 (68%)</td>
<td>72 (77%)</td>
<td>0.62 (0.33–1.19)</td>
<td>0.15</td>
</tr>
<tr>
<td>mRS score 4–6 at 3 months</td>
<td>70 (72%)</td>
<td>52 (56%)</td>
<td>2.04 (1.12–3.74)</td>
<td>0.0195</td>
</tr>
<tr>
<td>mRS score 3–6 at 3 months</td>
<td>86 (89%)</td>
<td>76 (82%)</td>
<td>1.75 (0.77–3.97)</td>
<td>0.18</td>
</tr>
<tr>
<td>Median ICH growth at 24 h (mL)*</td>
<td>2.01 (0.32–9.34)</td>
<td>1.16 (0.03–4.42)</td>
<td>--</td>
<td>0.81</td>
</tr>
</tbody>
</table>
## Results

<table>
<thead>
<tr>
<th></th>
<th>Platelet transfusion group (n=97)</th>
<th>Standard care group (n=93)</th>
<th>Odds ratio (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Any SAE</td>
<td>41 (42%)</td>
<td>27 (29%)</td>
<td>1.79 (0.98–3.27)</td>
</tr>
<tr>
<td>Any fatal SAE</td>
<td>24 (25%)</td>
<td>15 (16%)</td>
<td>1.71 (0.83–3.51)</td>
</tr>
<tr>
<td>SAE due to ICH</td>
<td>24 (25%)</td>
<td>13 (14%)</td>
<td>2.02 (0.96–4.27)</td>
</tr>
<tr>
<td>ICH enlargement</td>
<td>15 (15%)</td>
<td>13 (14%)</td>
<td>1.13 (0.50–2.52)</td>
</tr>
<tr>
<td>Brain oedema</td>
<td>5 (5%)</td>
<td>0</td>
<td>11.12 (0.61–204.97)</td>
</tr>
<tr>
<td>Brain herniation</td>
<td>2 (2%)</td>
<td>0</td>
<td>4.90 (0.23–103.33)</td>
</tr>
<tr>
<td>Intraventricular extension</td>
<td>6 (6%)</td>
<td>0</td>
<td>13.28 (0.74–239.24)</td>
</tr>
<tr>
<td>Hydrocephalus</td>
<td>3 (3%)</td>
<td>2 (2%)</td>
<td>1.45 (0.24–8.89)</td>
</tr>
<tr>
<td>SAE due to thromboembolism</td>
<td>4 (4%)</td>
<td>1 (1%)</td>
<td>3.96 (0.43–36.08)</td>
</tr>
</tbody>
</table>
What About the Subgroups?

- Type of agent
- Country of enrollment
- Volume of bleed

Trend maintained across the board
Things to consider

• Smaller trial than some of the large stroke trials we are used to reading
• Most of the patients were on ASA (about 75%) but this is where we expect most benefit
• “On anti-platelet agents for 7 days” by self-report and not lab tests of platelet function
• Why did they find this??
  ✴ Little clots causing ischemia
  ✴ Proinflammatory effects
  ✴ Small fixed space to bleed into
Take Home Points

- Well done trial in a prominent journal
- Authors found the opposite of what they expected based when they started
- Mortality, disability and adverse events all worse in the platelet group
- “Platelet transfusion cannot be recommended for the treatment of acute intracerebral haemorrhage in people taking antiplatelet therapy (non-traumatic/not to OR) because platelet transfusion seemed to worsen outcome”
An Observational Study of 2,248 Patients Presenting With Headache, Suggestive of Subarachnoid Hemorrhage, Who Received Lumbar Punctures Following Normal Computed Tomography of the Head

David Sayer, MRCS*, Ben Bloom, FRCEM, Katalin Fernando, MD, Stuart Jones, FRCPTh, Sally Benton, FRCPTh, Shumontha Dev, FRCEM, Sathish Deverapalli, MBBS, and Tim Harris, FRCEM
LP to diagnose and exclude SAH has a low yield and is often uninterpretable.
Background

- HA are common
- SAH is rare
- Good news - CT scan’s within 6 hours, high diagnostic yield
- Bad News - Aneurysms are Bad
What’s the Evidence?

- CT 98% sens before 12hrs of HA
- LP early testing false negative
- xanthochromia vs spectrophotometry
Study Question

What is the rate of diagnosis of SAH by LP after negative CT?

…and the rate of aneurysmal SAH after positive LP?
Methods

- Retrospective Observational Study
- 6 ED’s in England
- HA + CT + LP
Procedures / Outcomes

• primary: Rate of SAH by LP after negative CT
• secondary: rate of aneurysmal SAH after a positive LP

• Outcomes:
  ✴ + LP by spectrophotometry
  ✴ Positive blood
  ✴ Negative blood
  ✴ Inconclusive
  ✴ Uninterpretable
Results

LP performed 2,248
- Uninterpretable 350 (15.6%)

Interpretable 1,898
- Positive 92 (4.8%)
  - Vascular abnormality 9 (0.45%)
- Inconclusive 299 (15.0%)
  - Vascular abnormality 0 (0%)
- Negative 1,507 (75.8%)
Results - Efficacy

• 79% were (-)
• 4.8% were (+)
• 15% were inconclusive
• 92 patients with + CSF
  • 8 aneurysms & 1 carotid fistula.
• Total yield of 0.4% of CSFs
Things to Consider

- Large sample, but retrospective
- Uninterpretable LP non negligible
- +LP was spectrophotometry
- Disease prevalence affects sensitivity
- Retrospective Observational study
Take Home Points

• +SAH in +LP is 0.4%
• Algorithms to account for onset of HA
• True positive LP rate probably 1%, so if high suspicion consider LP
Original Contribution

Performance of the 4-way range of motion test for radiographic injuries after blunt elbow trauma☆☆☆

David R. Vinson, MD a,b,c,*, Gregory S. Kann, MD, MSc a,d, Samuel D. Gaona, BS e, Edward A. Panacek, MD, MPH f

a The Permanente Medical Group, Oakland, CA
b Kaiser Permanente Division of Research, Oakland, CA
c Department of Emergency Medicine, Kaiser Permanente Sacramento Medical Center, Sacramento, CA
d Department of Emergency Medicine, Kaiser Permanente South Sacramento Medical Center, Sacramento, CA
e Department of Emergency Medicine, University of California Davis School of Medicine, Sacramento, CA
f Department of Emergency Medicine, University of South Alabama Medical Center, Mobile, AL
A normal 4-way range of motion test of the elbow, is 99% sensitive for elbow fracture and 100% sensitive for elbow fracture needing surgery.
Background

- Quick Paper
- Elbow injuries are quite common
- X-rays are negative 75% of the time
- Candidate decision rules (like Ottawa) have been discussed
4 way ROM

Full Supination

Flexion to > 90

Full Pronation

Extension to 180
Study Question

- Does normal 4 way ROM rule out elbow fracture (what is the sensitivity and specificity of the 4 way ROM test for the elbow)?
Methods

• Prospective validation study
• Conducted at Kaiser and UC Davis
• Broad inclusion criteria:
  ✴ any patient $\geq$ 5 that the attending thought needed an x-ray
  ✴ excluded patients with palsy, AMS, neurovascular injury
Methods

• MD explicitly documented ROM
• Standard 3-view x-ray ordered
• Outcome:
  • any radiographic evidence of fracture
Results

- 251 people enrolled - 111 kids, 140 adults
- 39% had elbow fracture
- Specificity of Ottawa ankle rule is only 30%
- Lone miss was a 7 year old with non-displaced supracondylar fracture after slip and fall
Things to consider

• This is not the first study to suggest normal range of motion of the elbow rules out elbow fracture even if tender

• Is the largest and has other advantages including that there were a large number of pediatric patients

• Using ‘fat pad’ sign as ‘radiographic evidence of fracture may be too conservative’

• Confidence limits for sensitivity go down to 94%
Take Home Points

• Body of evidence is fairly strong that a normal 4 way ROM rules out elbow fracture

• Still there are concerns about the lower edge of the confidence limits

• Avoid the x-ray

• If the mechanism or symptoms are very concerning or the child is at a very young age, get the film
Ketamine as Rescue Treatment for Difficult-to-Sedate Severe Acute Behavioral Disturbance in the Emergency Department

Geoffrey Kennedy Isbister, MD, FACEM; Leonie A. Calver, PhD; Michael A. Downes, MBBS, FACEM; Colin B. Page, MBBS

Ketamine appeared effective and did not cause obvious harm in agitated patients and is a potential option for patients who have failed previous attempts at sedation.
Background

- agitation is common
- sedation is on a continuum
  - verbal→rx→restraints
- time/resource consuming
  - especially “re-dosing”
What’s the Evidence?

- Previous study
  - 8% not sedated after 1-2 doses of droperidol
  - 3% after 3 doses
Study Question

Is ketamine a safe and effective rescue option when droperidol has failed to tranquilize violent, delirious patients?
Methods

- Subgroup analysis from Droperidol or midazolam (DORM II) study
- Prospective observational study
- 2 hospitals
Procedures / Outcomes

- two 10mg doses of droperidol
- still agitated then ketamine (4-6 mg/kg)
- primary:
  - number of patients who failed to achieve sedation within 2 hours of ketamine
  - or required further sedation within 1 hour of ketamine
Results

1200

49 (4%) Ketamine

90% met endpoints

1152 no ketamine
Results - Efficacy

• Median dose Ketamine 300mg
• Median time to sedation 20min
Things to Consider

- Study designed to look at droperidol & BZD
- Ketamine only subgroup analysis
- Protocol was NOT followed to a T
- Ketamine dose often lowered
- Very small sample size
Take Home Points

- ketamine seemed to work as rescue
- droperidol worked 96% of the time
- ketamine appeared safe
- need newer study featuring ketamine
Resuscitative endovascular balloon occlusion of the aorta might be dangerous in patients with severe torso trauma: A propensity score analysis

Junichi Inoue, MD, Atsushi Shiraishi, MD, PhD, Ayako Yoshiyuki, MD, Koichi Haruta, MD, Hiroki Matsui, MPH, and Yasuhiro Otomo, MD, PhD, Tokyo, Japan
In this matched study of severely injured trauma patients, Resuscitative Endovascular Ballon Occlusion of the Aorta (REBOA) was associated with a higher mortality.
Background

• Resuscitative Endovascular Balloon Occlusion of the Aorta
• Described in the 1950’s
• Popularized recently in the US
• Used commonly in Japan since 1990’s
• Something ED docs could learn to do
• Essentially an aortic cross clamp for severe hemorrhagic shock due to penetrating or blunt torso trauma
  ✴ Intra-abdominal, Pelvic or Chest
What’s the evidence

- Case series and anecdotes
- NO RCT’s
- Limited observational studies are REBOA +/-
Placement - Zone 3

- For Intra-abdominal and Pelvic Hemorrhage
Placement- Zone I

- For Chest Trauma as an alternative to ED Thoracotomy
REBOA Algorithm

- Favors ED Thoracotomy for Chest Trauma
- Favos REBOA for pelvic trauma
- Intra-abdominal in the middle
Study Question

Is REBOA associated with improved mortality?
Methods

- Multi-site observational, retrospective Japanese trauma registry study
- 2004-2014, 234 trauma centers (95%)
- Inclusion: Sick trauma patients $\geq 16$ years old who were not DOA to the ED
- Divided the cohort:
  - Group 1 - Underwent REBOA
  - Matched Group - Did not get REBOA
- Primary outcome - in hospital mortality
- Secondary outcome - TimeDoor to surgery time
Methods

- Used propensity scores to match the groups:
  - Construct a statistical model with the outcome being the chance of getting REBOA as a function of everything observable about the patients (age, gender, injury type, vitals)
  - Estimate each person’s chance of REBOA in the data
  - Match people who did and did not REBOA based on the predicted chance that they would
  - Observe whether the cohort with REBOA had better survival than the matched cohort that did not
Results

- Mean age 54
- 70% Male
- Mean SBP on ED arrival = 80 mmHg
- GCS 11
Results

- Door to primary surgery time with REBOA was 97 minutes
- Multiple subgroup analyses (lower BP, higher volume REBOA sites, different injury patterns)

★ ALL FAVORED ‘NO REBOA’ GROUP

**TABLE 2. Comparisons of Study Outcomes in Propensity Score-Matched Subjects With REBOA and Those Without REBOA**

<table>
<thead>
<tr>
<th>Outcome</th>
<th>With REBOA</th>
<th>Without REBOA</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Primary outcome</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>In-hospital mortality, %</td>
<td>61.8 (57.9–65.7)</td>
<td>45.3 (41.3–49.3)</td>
<td>16.5 (10.9 to 22.0)</td>
</tr>
<tr>
<td><strong>Secondary outcomes</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ED mortality, %</td>
<td>17.1 (14.1–20.1)</td>
<td>9.7 (7.3–12.1)</td>
<td>7.3 (3.5 to 11.2)</td>
</tr>
<tr>
<td>Door-to-blood transfusion time, min</td>
<td>50 (44–57)</td>
<td>64 (58–71)</td>
<td>–14 (–23 to –5)</td>
</tr>
<tr>
<td>Door-to-primary surgery time, min</td>
<td>97 (90–104)</td>
<td>110 (102–119)</td>
<td>–14 (–25 to –3)</td>
</tr>
</tbody>
</table>

All categorical variables are described as frequencies and 95% confidence intervals, and all numeric variables are described as medians and bootstrapped 95% confidence intervals. Mortality was estimated via linear regression analysis, and time variables were estimated via bootstrapping.

ED, emergency department.
Things to consider

- Retrospective, observational design
- Matching design, though better than many other matching techniques is still prone to bias from unobserved differences between groups (propensity score matching can only adjust for observed differences)
- They did use a more robust technique (instrumental variable) and found same results
- Long door-to-surgery time (97min) may have accounted for poor performance of REBOA
- The authors were really surprised by this result
Take Home Points

• Largest study on this topic by far
• Best available evidence does not show REBOA is associated with better outcomes (in fact opposite)
• More research necessary
• I wouldn’t go out and take a REBOA certification course as yet
Clinical paper

A text message alert system for trained volunteers improves out-of-hospital cardiac arrest survival

Ruud W.M. Pijls, Patty J. Nelemans, Braim M. Rahel, Anton P.M. Gorgels
Pilot study: receiving a text message alert for suspected arrest <1km (0.62 miles) found significant increases in hospital discharge and other outcomes of interest when a TM volunteer responded.
Background

- OHCA is bad
- Early CPR-defibrillation is good
- EMS might take some time
- Mobile Tech used for various health issues
What’s the Evidence?

- OHCA survival <10%
- Survival increased by early EMS activation and time at the scene
- Survival increased by early CPR-defibrillator use
Study Question

Does a Text Message alert system for trained volunteers in the community reduce response times and improves survival after OHCA?
Methods

- Single Dutch province
- Trained responders to text message response system
- AED’s placed in residential area
- 9000 volunteers
Procedures / Outcomes

• subjects in two cohorts
• OHCA w/ TM volunteers
• OHCA w/o TM volunteers
Results

833 (presumed) cardiac arrest

422 TM-alert system activated

131 0 responders

291 ≥ 1 responder(s)

411 TM-alert system not activated
Results - Efficacy

- Result unpredictable
- Sometimes no-one in area responding to TM
- >1 person responded (69%)
- More likely to be in a shockable rhythm w/ TM responder
- ?due to early BLS
- Survival to hospital discharge when a TM volunteer showed up 27.1% vs. 16% in the control
- ROSC on arrival to the ED: 41.7% TM vs. 32.3% controls
Things to Consider

- pilot study in a small European province
- 69% time responders at scene
- who were the responders?
  - how were they trained
  - longitudinal
Take Home Points

- TM volunteer responders arrived 69% of the time
- TM responders increased ROSC and out of hospital discharge
- Innovative solution using technology
ORIGINAL CONTRIBUTION

Comparative Trends and Downstream Outcomes of Coronary Computed Tomography Angiography and Cardiac Stress Testing in Emergency Department Patients With Chest Pain: An Administrative Claims Analysis

Jacob R. Morris, BS, M. Fernanda Bellolio, MD, MS, Lindsey R. Sangaralingham, MPH, Stephanie R. Schilz, BA, Nilay D. Shah, PhD, Deepi G. Goyal, MD, Malcolm R. Bell, MD, Stephen L. Kopecky, MD, Waqas I. Gilani, MBBS, and Erik P. Hess, MD, MSc
Review of administrative claims showing:

1) A large increase in the number of CCTA’s performed in the evaluation of chest pain over the past several years

2) CCTA use is associated with an increase in additional testing and procedures but no change in AMI
Background

• >8 million ED visits for chest pain annually
• 10-20% will be diagnosed with ACS
• 1-2% of ACS will be missed
• Newer Troponin assays help identify AMI more rapidly
• How to diagnose ACS remains problematic
Strategies for Dx ACS

- Treadmill Exercise Stress Test
- Not sensitive (nor specific)
- Patient must be able to run
- Cardiology hours
Strategies for Dx ACS

- Stress Echo
- More sensitive & specific
- Patient must be able to run (can use chemicals)
Strategies for Dx ACS

- Myocardial Perfusion
- Still more sensitive & specific
- Patient must be able to run (can use chemicals)
- Nuclear Medicine hours
Strategies for Dx ACS
CCTA

- Cardiac Computed Tomography Angiography
- Safe, Faster than Nuclear Medicine Tests
- Greater Detection of CAD - Shows Anatomy, Not Function

CT Angiography for Safe Discharge of Patients with Possible Acute Coronary Syndromes

Harold I. Litt, M.D., Ph.D., Constantine Gatsonis, Ph.D., Brad Snyder, M.S., Harjit Singh, M.D., Chadwick D. Miller, M.D., Daniel W. Enríkín, M.D., James M. Learning, M.D., Laurence J. Gavin, M.D., Charissa B. Pacella, M.D., and Judd E. Hollander, M.D.
Study Question

What are the temporal trends in the use of CCTA?

Compared with other cardiac risk stratification strategies, is CCTA associated with more or less subsequent testing, interventions and / or incidence of AMI?
Methods

- Retrospective review of a massive claims database between 2006-2013
- Privately insured (and Medicare Advantage)
- Billing codes for ED visits type of cardiac testing
- Followed patients for 30 days
- Propensity Score Matching to account for selection bias
Outcomes of Interest

• Trend in cardiac risk stratification modalities over time

• Odds of:
  ✴ PCI
  ✴ CABG
  ✴ Repeat Cardiac Testing
  ✴ Repeat ED Visit
  ✴ Repeat Admission
  ✴ AMI at 30 days (not death)
Results

- 2 million ED visits for Chest Pain
- 22% had some form of risk stratification testing
- Nuclear Medicine > Stress Echo > Treadmill > CCTA
- During the study period CCTA increased from:
  - 0.8% of the total in 2006 to 4.5% in 2013
- All other risk stratification strategies decreased
## Results

- Get higher odds of PCI and CABG
- Higher odds of repeat testing and hospitalization
- No decrease in the rate of AMI at 30 days

<table>
<thead>
<tr>
<th>Propensity Model 1, CCTA vs. MPS</th>
<th>Propensity Model 2, CCTA vs. SE</th>
<th>Propensity Model 3, CCTA vs. TMET</th>
</tr>
</thead>
<tbody>
<tr>
<td>OR</td>
<td>95% CI</td>
<td>p-value</td>
</tr>
<tr>
<td>PCI</td>
<td>1.25 (1.06 - 1.51)</td>
<td>0.02</td>
</tr>
<tr>
<td>CABG</td>
<td>1.47 (1.03 - 2.13)</td>
<td>0.04</td>
</tr>
<tr>
<td>Healthcare utilization</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Repeat ED visit</td>
<td>0.95 (0.85 - 1.07)</td>
<td>0.43</td>
</tr>
<tr>
<td>Hospitalization</td>
<td>1.10 (0.99 - 1.22)</td>
<td>0.07</td>
</tr>
<tr>
<td>Repeat cardiac testing</td>
<td>1.68 (1.48 - 1.90)</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>CCTA</td>
<td>1.80 (1.21 - 2.70)</td>
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<tr>
<td>MPS</td>
<td>2.85 (2.36 - 3.47)</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>SE</td>
<td>6.17 (4.02 - 9.96)</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>TMET</td>
<td>1.57 (1.37 - 1.80)</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>30-day clinical outcome</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AMI</td>
<td>1.00 (0.47 - 2.12)</td>
<td>1.00</td>
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<table>
<thead>
<tr>
<th>Propensity Model 2, CCTA vs. MPS</th>
<th>Propensity Model 2, CCTA vs. SE</th>
<th>Propensity Model 3, CCTA vs. TMET</th>
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<tbody>
<tr>
<td>OR</td>
<td>95% CI</td>
<td>p-value</td>
</tr>
<tr>
<td>PCI</td>
<td>1.49 (1.22 - 1.81)</td>
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<tr>
<td>CABG</td>
<td>1.36 (0.96 - 1.95)</td>
<td>0.09</td>
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<tr>
<td>Healthcare utilization</td>
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<tr>
<td>Repeat ED visit</td>
<td>1.20 (1.06 - 1.38)</td>
<td>0.00</td>
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<tr>
<td>Hospitalization</td>
<td>1.59 (1.42 - 1.78)</td>
<td>&lt;0.0001</td>
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<tr>
<td>Repeat cardiac testing</td>
<td>3.16 (2.72 - 3.68)</td>
<td>&lt;0.0001</td>
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<tr>
<td>CCTA</td>
<td>2.07 (1.38 - 3.10)</td>
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<tr>
<td>MPS</td>
<td>4.84 (3.85 - 6.16)</td>
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<tr>
<td>SE</td>
<td>1.53 (1.17 - 2.01)</td>
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<tr>
<td>TMET</td>
<td>3.35 (2.83 - 3.98)</td>
<td>&lt;0.0001</td>
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<tr>
<td>30-day clinical outcome</td>
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<tr>
<td>AMI</td>
<td>1.00 (0.47 - 2.12)</td>
<td>1.00</td>
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<table>
<thead>
<tr>
<th>Propensity Model 3, CCTA vs. TMET</th>
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<tbody>
<tr>
<td>OR</td>
<td>95% CI</td>
</tr>
<tr>
<td>PCI</td>
<td>1.27 (1.06 - 1.53)</td>
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<tr>
<td>CABG</td>
<td>1.31 (0.93 - 1.87)</td>
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<td>Healthcare utilization</td>
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<tr>
<td>Repeat ED visit</td>
<td>1.09 (0.97 - 1.24)</td>
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<tr>
<td>Hospitalization</td>
<td>1.26 (1.13 - 1.40)</td>
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<tr>
<td>Repeat cardiac testing</td>
<td>1.32 (1.17 - 1.48)</td>
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<tr>
<td>CCTA</td>
<td>1.32 (1.17 - 1.48)</td>
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<tr>
<td>MPS</td>
<td>3.60 (2.21 - 6.16)</td>
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<tr>
<td>SE</td>
<td>1.25 (1.08 - 1.45)</td>
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<tr>
<td>TMET</td>
<td>2.11 (1.57 - 2.86)</td>
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<td>30-day clinical outcome</td>
<td></td>
</tr>
<tr>
<td>AMI</td>
<td>1.22 (1.07 - 1.38)</td>
</tr>
</tbody>
</table>
Things to Consider

• 78% of people received NO risk stratification
• Studies based on administrative claims are far from perfect
  ✴ Missing Data (smoking?)
  ✴ Selection Bias
• No info on uninsured or Medicaid patients
• Maybe it is a good thing that all those PCIs/ CABGs were performed!
  ✴ Unable to look at mortality
  ✴ Unable to look at symptoms
Take Home Points

• CCTA use is dramatically increasing
  ✴ probably because it is easy / available

• CCTA use is associated with more downstream procedures and testing (and almost certainly more dx of CAD)

• However, CCTA use is NOT associated with a decreased AMI incidence at 30

• Newer, more sensitive technologies often find more disease (over diagnosis) but patient level outcome improvements should be the standard before adoption
Intraosseous access in the obese patient: assessing the need for extended needle length

Thompson Kehrl, MD a,*, Brent A. Becker, MD a, Dell E. Simmons, MD b, Erin K. Broderick, MD c, Robert A. Jones, DO d
In this convenience sample of obese (BMI >30) patients the authors use landmarks and ultrasound measurements to predict that if you cannot feel the tibial tuberosity or plan to do a humeral IO line, use the long (yellow) needle.
Background

- Although not common..
- Sequelae can be bad
- Fairly time consuming to treat
What’s the Evidence?

- game changer in EM and pre-hospital care
- easy, quick
- assist in getting access quickly
- Sites:
  - proximal tibia
  - distal tibia (med malleolus)
  - proximal humerus
  - iliac crest
In this convenience sample of obese (BMI >30) patients the authors use landmarks and ultrasound measurements to predict that if you cannot feel the tibial tuberosity or plan to do a humeral IO line, use the long (yellow) needle.

impaction?
Methods

• Prospective observational convenience sample
• measured BMI, ability to palpate tibial tuberosity, and soft tissue depth (U/S)
Procedures / Outcomes

- logistic regression used
- assessing effect of BMI on soft tissue depth
- primary objective: soft tissue depth
- secondary objective: tibial tuberosity palpated —> “palpable or not palpable”
Results

- 75 patients enrolled
- Mean BMI 47.2
- able to palpate TT in 70/75
Results - Efficacy

Need for IO Access in Critically Ill Obese Adult

- Palpable Tibial Tuberosity
  - Yes
    - Standard 25 mm IO Placement in Lower Extremity Possible
  - No
    - 45 mm Needle Available
      - Yes
        - Attempt Placement in Preferred Insertion Site
      - No
        - Seek Other Means of Vascular Access
Things to Consider

- small convenience sample
- only 5 patients in which TT was not palpable
- did not insert IO device
Take Home Points

• Blue needle (25mm) is likely to work on MOST patients
• BUT…
  • if you cannot palpate TT then Yellow needle (45 mm)
• Yellow needle for all Prox humerus insertions
• IO device can get you out of a pinch
A Randomized Controlled Noninferiority Trial of Single Dose of Oral Dexamethasone Versus 5 Days of Oral Prednisone in Acute Adult Asthma

Matthew W. Rehrer, MD\textsuperscript{a}, Bella Liu, MD\textsuperscript{b}, Marcella Rodriguez, BS\textsuperscript{b}, Joseph Lam, PharmD\textsuperscript{b}, Harrison J. Alter, MD, MS\textsuperscript{b}
In this RCT of patients with moderate to severe asthma exacerbations single dose dexamethasone was slightly less effective than 5 days of prednisone, but the absolute difference in bounce-back rates was only around 2%
Background

- Asthma accounts for > 2 million ED visits
- NHLBI recommends systemic corticosteroids if:
  - Moderate to severe exacerbation
  - Mild exacerbation with incomplete response to beta agonists
- Usually this is a 5-7 burst of oral prednisone without a taper
Dexamethasone: a better choice?

- IM, IV and oral Dexamethasone have similar bioavailability
- Dexamethasone is active x 72 hours
- Previous studies of adults with asthma exacerbation have shown 2 dose regimen of dexamethasone is effective
- Since non adherence with the 5 day burst is predictive of a bad outcome, maybe a drug that is easier to take will help
Study Question

How does single dose dexamethasone administered in the ED compare with 5 days prednisone burst for moderate to severe asthma exacerbations?
Methods

• Single site RCT (Highland Hospital)
• Adults age 18-55 with moderate to severe asthma eligible for inclusion who were discharged
• Multiple exclusions including:
  ✴ No COPD
  ✴ No Bipap

Single Dose Dex administered in the ED VS. 5 days of prednisone (1st day in ED)
Outcomes

• Assessed by phone at 14 days
• Primary -
  ✴️ Bounceback rates to the ED
• Secondary -
  ✴️ Hospitalization
  ✴️ Asthma symptoms (wheezing etc…)
  ✴️ Steroid symptoms (difficulty sleeping etc…)

Results

- 465 patients randomized
- About 20% lost to follow

<table>
<thead>
<tr>
<th></th>
<th>Dexamethasone Group</th>
<th>Prednisone Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>ED visit</td>
<td>12.5%</td>
<td>9.8%</td>
</tr>
<tr>
<td>Hospitalization</td>
<td>3.4%</td>
<td>2.9%</td>
</tr>
<tr>
<td># Home albuterol tx (mean)</td>
<td>2.78</td>
<td>2.86</td>
</tr>
<tr>
<td>Residual SOB</td>
<td>29.5%</td>
<td>32.5%</td>
</tr>
<tr>
<td>Any adverse reaction</td>
<td>24.3%</td>
<td>28.6%</td>
</tr>
</tbody>
</table>
Things to consider

• Importance of non-adherence is minimized by:
  ✴ RCT design in general
  ✴ giving the patients the study meds
  ✴ excluding patients without a cell phone

• Non-inferiority studies often fail for lack of power (very sensitive to assumptions about baseline prevalence rates)

• Other studies have seen equivalence with single dose dex and prednisone in pediatric asthma
Take Home Points

• Limited single site study

• Tends to confirm the general trend in steroid prescribing - that less is equal

• May be slight advantage to multi-dose steroids over single dose dexamethasone but this needs to be balanced against the risk of non adherence and the side effect

• Insist on second dose of dexamethasone if particularly severe