Practice Changing Pearls from the Recent Medical Literature

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Our Time Together

• Review recently published medical literature that might impact your practice
• Provide the level of evidence supporting these studies
• Offer editorial comments
• This will be a rapid fire exercise

My criteria for article selection:

• The topic must interest me
• The article can quickly be synthesized into a 3-5 minute presentation
• The article has influenced my own practice
Our Time Together

- No disclosures
- No controversial topics
- No intellectual pontification

Levels of Evidence

- Level 1a: Meta-analysis of well-designed randomized control trials
- Level 1b: Well-designed randomized control trials
- Level 2a: Well-designed controlled study without randomization
- Level 2b: Well-designed quasi-experimental study
- Level 3: Well-designed non-experimental study (case studies)
- Level 4: Expert opinion or consensus statement

Therapeutic Hypothermia
True or False

Although TH improves neurologic outcomes in adult survivors of cardiac arrest, it currently has no role in the management of perinatal asphyxia.

Therapeutic Hypothermia Quiz

Effects of Hypothermia for Perinatal Asphyxia on Childhood Outcome

NEJM 2014

Therapeutic Hypothermia Background

• Immediate application of TH in adult survivors of cardiac arrest...
• Is easily implemented
• Improves neurologic outcomes
• Does not increase the incidence of vegetative states
Therapeutic Hypothermia

Background

• What about TH in infants with perinatal asphyxia?
• Will long-term neurologic outcomes benefit?
• Will this increase the devastating risk of life-long vegetative states?

Methods

• Randomized, controlled observational study
• Neonates of at least 36 weeks of gestation
• Moderate to severe anoxic encephalopathy
• Abnormal EEG

• #132 infants received usual care
• #145 infants received TH
• Initiated within 6 hours after birth
• Cooling blanket
• 32-34°C for 72 hours
Therapeutic Hypothermia

Methods

• Patients followed for 6-7 years
• Extensive neurocognitive evaluation
• Primary outcome: frequency of survival with an IQ score of =/>85

Therapeutic Hypothermia

Results

<table>
<thead>
<tr>
<th></th>
<th>TH</th>
<th>Usual Care</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mortality</td>
<td>29%</td>
<td>30%</td>
</tr>
<tr>
<td>Normal Neuro Outcome</td>
<td>45%</td>
<td>28%</td>
</tr>
<tr>
<td>RR 1.6 [95%CI 1.15 to 2.22]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CP</td>
<td>21%</td>
<td>36%</td>
</tr>
<tr>
<td>P=0.03</td>
<td></td>
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</tbody>
</table>

Therapeutic Hypothermia

Results

<table>
<thead>
<tr>
<th></th>
<th>TH</th>
<th>Usual Care</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mod/Severe Disability</td>
<td>22%</td>
<td>37%</td>
</tr>
<tr>
<td>P=0.03</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Normal Motor</td>
<td>78%</td>
<td>59%</td>
</tr>
<tr>
<td>P=0.01</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IQ =/&gt;85</td>
<td>52%</td>
<td>39%</td>
</tr>
<tr>
<td>RR 1.31</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P=0.04</td>
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</tbody>
</table>
Therapeutic Hypothermia

Conclusion

- Moderate TH after perinatal asphyxia improves neurocognitive outcomes in middle childhood
- TH does not increase the risk of long-term vegetative states
- Level of Evidence: 1b

Therapeutic Hypothermia

GLH Editorial Comments

- I strongly agree with the authors
- I am now immediately implementing TH in all infants who survive respiratory arrest and demonstrate evidence of hypoxic encephalopathy...not just perinatal infants
- I'm not wise enough to determine which infant might have complete recovery

Therapeutic Hypothermia

GLH Editorial Comments

- I do so without worrying that I'm increasing the likelihood of long-term vegetative survival
- I'm also providing a devastated family a bit of time to be with their critically ill child even if death is inevitable
- Please discuss this with your conscience
True or False

Although TH improves neurologic outcomes in adult survivors of cardiac arrest, it currently has no role in the management of perinatal asphyxia.

Therapeutic Hypothermia Quiz

Now for a delightful dose of Dr. Dachs’ off the cuff perspicacity and sagacity

Systematic review: 11 randomised trials
- 1505 neonates with intrapartum asphyxia

Results: Therapeutic hypothermia decreased:
- mortality (RR 0.75 (95% CI 0.64 to 0.88), NNT= 11
- neurodevelopmental disability in survivors
  RR 0.77 (95% CI 0.63 to 0.94), NNT= 8

Question: what is the correct method?
What is the correct temperature?
So where do we go with temperature?

1.B Targeted Temperature Management
   at 33°C versus 36°C after Cardiac Arrest
   The TTM Trial
   The NEW ENGLAND JOURNAL OF MEDICINE Dec 5, 2013

- Methods: 939 out-of-hospital arrest, ROSC randomized to:

- Results: 33°C 36°C
  - mortality 50% 48%
  - mRankin score 45% 44%

And for the skeptic...
maybe it’s not get cool,
but avoid getting hot!!!

Arch Intern Med, 2001

A last word on this topic....

- Methods: pre-hospital V fib arrests randomized to:

- Results: pre-hospital cooling (n=583) 2L of 4°C saline
  control (n=776)
  - Hospital D/C 62% 64%
  - Good Neuro outcome 57% 62%
Now for a delightful dose of Dr. Higgins' off the cuff perspicacity and sagacity

Near Death Awareness

AWARE
Awareness During Resuscitation: A Prospective Study

Resuscitation 2014
Near Death Awareness

Background

• Many survivors of cardiac arrest suffer from PTSD
• Anecdotal reports describe auditory and visual awareness of patients during the resuscitation
• Could these experiences contribute to PTSD?

Near Death Awareness

Methods

• Multicenter, prospective, observational study
• Intensive cognitive testing of survivors of cardiac arrest
• Examining the frequency and accuracy of visual and auditory experiences

Near Death Awareness

Results

• 2,060 cardiac arrest events
• 140 survivors who were evaluable and willing to undergo testing
• Nearly half (46%) reported memories of the resuscitation
Themes:
• Fear
• Animals/Plants
• Bright Lights
• Violence/Persecution
• Deja-Vu
• Family
• Near Death Experience

Near Death Awareness
Results

• Three patients recalled explicit details of their resuscitative event
• 1 patient left his body, rose to a corner of the room, and witnessed the entire event
• His specific recollections were verifiable

Near Death Awareness
Conclusions

• Many survivors of cardiac arrest retain memories, sometimes vivid and detailed, of their resuscitation.
• This may contribute to PTSD and other emotional conditions.

Level of Evidence: 2b
Near Death Awareness
GLH Editorial Comments

• I believe this because I have experienced a near death event myself.
• I have been aware of this occurring during resuscitations.
• This is why I demand professional behavior from every member of my resuscitative team.

Now for a delightful dose of Dr. Dachs’ off the cuff perspicacity and sagacity

How about we prevent V fib/V tach?
Azithromycin and Levofloxacin Use and Increased Risk of Cardiac Arrhythmia and Death

☐ Methods: retrospective cohort study of US veterans, 9/99 - 4/12
- Outpatient visits
- Average age: 56.8 yrs
- Antibiotic doses:
  - Amoxicillin = 979,380
  - Azithromycin = 594,792
  - Levofloxacin = 201,798
How about we prevent V fib/V tach?


Table 1. Weighted Hazard Ratio (Adjusted 95% CI) for Multiple Comparisons of All Causes of Death Among the 3 Antibiotic Groups.

<table>
<thead>
<tr>
<th>Antibiotic</th>
<th>Days 1 to 5</th>
<th>Days 6 to 10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Azithromycin</td>
<td>1.68 (1.05-2.60)</td>
<td>1.14 (0.81-1.62)</td>
</tr>
<tr>
<td>Levofloxacin</td>
<td>2.40 (1.70-3.64)</td>
<td>1.68 (1.35-2.47)</td>
</tr>
</tbody>
</table>

Results:

- Potential drawback: non-randomized
- The authors attempted to control for confounding with propensity scores.
- Is consistent with previous study

Azithromycin and Levofloxacin-associated cardiac arrest

Level of Evidence: 2a

RJD Editorial Comments

Azithromycin and the Risk of Cardiovascular Death

Wayne A. Ray, Ph.D., Katherine T. Mump, M.D., Ethel Hall, B.S., Patrick C. McInerney, Ph.D., and C. Michael Step, M.B., D.O.

NEJM, May 17, 2012
We need to wean ourselves from these 2 drugs....


Now for a delightful dose of Dr. Higgins' off the cuff perspicacity and sagacity

Hands-On Defibrillation
Hands-On Defib Quiz

True or False

Continuing active hands-on CPR during patient defibrillation is safe and minimizes compression pauses

Electrical Exposure Risk Associated with Hands-On Defibrillation

Resuscitation 2014

Hands-On Defib Background

• High-quality, minimally-interrupted chest compressions during CPR efforts are essential for optimal patient outcome

• Recently, hands-on defib (e.g. no interruption of compressions during the defibrillation discharge) has been advocated

• This may be cool, but is it really safe?
• Fresh cadaver study

• Multiple iterations of defibrillation were studied (e.g., pad location, defib energies, body habitus)

• The amount of electrical energy exposure to rescuers was measured

Hands-On Defib
Methods

Hands-On Defib
Results

• Energy levels of greater than 1J have the potential for inducing ventricular fibrillation

• In this study, rescuer delivered energy levels varied between 1J and 8J
**Hands-On Defib**

**Conclusions**

- Given current resuscitative equipment and procedures, hands-on defibrillation places the rescuer at potential risk.
- Since CPR can be continued up to the very moment of defibrillation and restarted immediately after, HOD cannot be supported.
- **Level of Evidence: 2b**

**Hands-On Defib**

**GLH Editorial Comments**

- I agree with the authors.
- As expected, some of my more risk-taking colleagues are doing this and brag about it later.
- I’m not.
- Focus on only pausing for the 3-4 seconds required to deliver the discharge.

**Hands-On Defib**

**Quiz**

**True or False**

Continuing active hands-on CPR during patient defibrillation is safe and minimizes compression pauses.
aVR/STEMI

ST-segment elevation in lead aVR:
• Is associated with acute right coronary artery occlusion
• Is associated with acute left main coronary artery occlusion
• Is a normal variant of no clinical significance

The Importance of Lead aVR Interpretation by Emergency Physicians

American Journal of Emergency Medicine 2014
aVR/STEMI
Background

• Lead aVR is often under-appreciated

• The Forgotten Lead
• The Ignored Lead
• The Neglected Lead

• It has a role in diagnosing TCA toxicity

• How about ACS?

aVR/STEMI
Methods/Results

• ST-elevation in lead aVR is associated with acute left main coronary artery and left anterior descending coronary artery occlusion.

• This may be the only lead suggesting a STEMI in the appropriate clinical context.

The Case Described in the Article
The Case Described in the Article

Another Case of Acute Left Main CA Occlusion

aVR/STEMI
Conclusions

- Always examine lead aVR for ST-segment elevation in patients being evaluated for possible ACS
- It may be the only lead with STE
- It predicts acute LMCA/LADCA occlusion
- Level of Evidence: 4
I've incorporated this recommendation into my practice.

Be prepared to educate your consulting cardiologist “just in time” about the importance of this finding.

Don't back down. Be your patient's advocate.

Now for a delightful dose of Dr. Dachs’ off the cuff perspicacity and sagacity

What would you do?

36 y/o male (+) 20min episode of chest pain. Occurred at rest. No risk factors. No meds.

FHx: father (+) CABG at age 59. Runs 12 miles a week without difficulty. EKG: normal. Troponin x2 negative.

- Obtain exercise stress +/- nuclear
- Obtain a cardiac CT
- Obtain a cardiac calcium score
- Start ASA and arrange Cardiology F/U
- Reassure the patient it's not cardiac
Background: Overwhelmingly most CP in ED in **not** ACS.

So what do most hospitals do in this case scenario?

Methods: 224 hospital survey, 2010
- 549,078 ED pts with CP, age >35

Who got either...
- Nuclear stress test
- Stress echocardiography
- Cardiac PET scan
- Cardiac MRA
- Cardiac CT +/- calcium score

**And how much downstream resource use resulted?**

Results:
- Range of imaging performed: 0.2-55.7%
- 118,602 tests imaging tests performed
  - 80.4% myocardial perfusion test
  - 16.6% stress echo
  - 1.2% CTCA
Chest pain and non-invasive cardiac imaging

Results:

- The hospitals that did more tests....
  - Had more inpatient hospitalizations
  - Did more cardiac catheterizations
  - Did more revascularization (stent or CABG)

Results:

- The Outcome.....
  - There was no difference in 30 day AMI (0.3%) between high and low utilizers

Discussion:

- One test, will often beget another test
- We have to turn around the paradigm of “finding a needle in haystack”.
- Tests taken “just in case” will more often lead to false-positive results and interventions and needless complications and cost
The problem of “incidentalomas”


- Methods: 459 healthy adults, age 60-69
  - Kaiser Permanente, using 4 and 16 row CT

- Results: Yikes!!!
  - 307 incidental findings in 190 pts (41%)!!!
  - Follow up was indicated in 25% !!!

What would you do?

36 y/o male (+) 20min episode of chest pain.
Occurred at rest. No risk factors. No meds.

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Now for a delightful dose of Dr. Higgins’ off the cuff perspicacity and sagacity
Point-of-Care US to Diagnose CHF

True or False

During lung sonography, the absence of B-lines in a patient with a low pretest probability of CHF essentially rules out the diagnosis.

Point-of-Care Ultrasonography for The Diagnosis of Acute Cardiogenic Pulmonary Edema in Patients Presenting with Acute Dyspnea: A Systematic Review and Meta-analysis

Academic Emergency Medicine 2014
Diagnosing CHF in a patient presenting with acute dyspnea is traditionally based on:

- Physical exam
- Chest X-ray
- BNP
- EKG

Background

Point-of-Care lung ultrasonography can be helpful in sorting out dyspnea.

In CHF/PE, abundant B-lines will be present.

Cardiac squeeze can also be determined.
• Systematic review and meta-analysis
• 1075 patients
• Acute dyspnea with clinical suspicion of CHF
• Lung US searching for B-lines
US/CHF
Results

• Sensitivity 94% [95% CI 81% to 98%]
No B-lines = No CHF

• Specificity 92% [95% CI 84% to 96%]
B-lines = CHF

• Positive LR 12

• Negative LR 0.06

"I think this patient has CHF.
My pretest probability is 75%.
He has B-lines diffusely.
With a positive LR of 12,
my post-test probability
is about 98%.
Time for nitrates, CPAP and furosemide."

"I don't think this patient has CHF.
My pretest probability is 25%.
I can't find any B-lines.
With a negative LR of 0.06,
my post-test probability
is less than 2%.
I need to look for another cause
of his dyspnea."
I have no idea if this patient has CHF. My pretest probability is 50%.
I can't find any B-lines.
With a negative LR of 0.06, my post-test probability is less than 5%.
I need to look for another cause of his dyspnea.

I think this patient has CHF. My pretest probability is 75%.
I can't find any B-lines.
With a negative LR of 0.06, my post-test probability is less than 5%.
I need to look for another cause of his dyspnea.
I don’t think this patient has CHF. My pretest probability is 25%. He has B-lines diffusely. With a positive LR of 12, my post-test probability is about 85%. I’ll keep looking, but I think it’s time for nitrates, CPAP and furosemide.

When your pretest probability that the patient has CHF/PE is moderate to high, the presence of B-lines clinches the diagnosis.

Low pretest probability + absence of B-lines excludes the diagnosis

Level of Evidence: 1a

Another study that underscores the value of bedside ultrasonography

Lung scanning techniques can be quickly mastered

And other findings might surprise: e.g. pneumothorax, pericardial tamponade, large pleural effusion
True or False

During lung sonography, the absence of B-lines in a patient with a low pretest probability of CHF essentially rules out the diagnosis.

Now for a delightful dose of Dr. Dachs’ off the cuff perspicacity and sagacity

Would you transfuse this patient? Its Saturday afternoon...

- Post-op hip replacement in NH rehab since 10/17, NH doc sends to ED
Would you transfuse this patient? Its Saturday afternoon...

- 40 y/o female, feels weak, DOE
  - Has received previous transfusions

Methods: 3 randomized double-blind trials, 2364 pts (adult CC, ped CC, GI bleeding)

Results: Hgb<7g vs. Hgb 7-10g
- Mortality RR 0.80 (CI 0.65-0.98) NNT =33
- Rebleeding RR 0.64 (CI 0.45-0.90) NNT =17
- Bacterial Inf RR 0.86 (CI 0.73-1.00) NNT =33
- ACS RR 0.44 (CI 0.22-0.89) NNT =50
- Pulm edema RR 0.48 (CI 0.33-0.72) NNT =33

Impact of More Restrictive Blood Transfusion Strategies on Clinical Outcomes: A Meta-analysis and Systematic Review

Methods: multicenter trial, ICU pts with septic shock, Hgb <9, randomized to:

Results: Hgb <7 Hgb <9
- Mortality no difference
  - Ave # transfusions 1 4

Lower versus Higher Hemoglobin Threshold for Transfusion in Septic Shock

TRISS trial group, Published ahead of print,
Restrictive Transfusion strategy
RJD Editorial Comments

- These numbers (NNT) are striking

- It is time to change our practice, we can no longer justify giving blood products with Hgb > 7

  Level of Evidence: 1a

Now for a delightful dose of Dr. Higgins' off the cuff perspicacity and sagacity

Cardioversion of Paroxysmal Atrial Fibrillation
True or False

The risk of a thromboembolic complication after successful cardioversion of paroxysmal atrial fibrillation of less than 48 hours duration is essentially zero.

For persistent AF...

- Elective cardioversion is an option
- 3+ weeks of anticoagulation
- Stroke risk with conversion is <1%
For paroxysmal AF...

Elective cardioversion is effective

Duration not longer than 48 hours

What is the stroke risk?

Is sooner better?

PAF

Background

Retrospective review

Patients presenting to an ED within 48 hours of PAF onset

Successful cardioversion

Primary outcome: stroke or systemic embolism

PAF

Methods

5116 cardioversions

Mean age 61 years

32% female

48% had >1 risk factor for stroke

PAF

Results
PAF Results

<table>
<thead>
<tr>
<th>Duration</th>
<th>Thromboembolic Complication Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;12 hours</td>
<td>0.3% [95% CI 0.1 to 0.6]</td>
</tr>
<tr>
<td>12 to 24 hours</td>
<td>1.1% [95% CI 0.7 to 1.6]</td>
</tr>
<tr>
<td>24 to 48 hours</td>
<td>1.1% [95% CI 0.4 to 1.8]</td>
</tr>
</tbody>
</table>

OR 12-24hrs vs. <12hrs = 4
OR 24-48 hrs vs. <12hrs = 3.3

PAF Conclusion

- A delay of PAF cardioversion of longer than 12 hours increases the risk of thromboembolic complications
- Level of Evidence: 2b

PAF GLH Editorial Comments

- This study has influenced my practice
- I take time to discuss stroke risk of cardioversion with candidates
- I expedite the process to minimize the PAF duration (my personal record is 42 minutes from patient presentation to discharge)
True or False

The risk of a thromboembolic complication after successful cardioversion of paroxysmal atrial fibrillation of less than 48 hours duration is essentially zero.

Now for a delightful dose of Dr. Dachs’ off the cuff perspicacity and sagacity

WHEW!!!!

Thanks for Your Kind Attention