May 28 2015

Update In Hospital Medicine
10 recent articles and that might change your practice.

Rachel Lovins, MD
Disclosures

• None

• Expert Opinions: not mine
To Cut or Not to Cut
that is the question
2014 ACC/AHA Guideline on Perioperative Cardiovascular Evaluation and Management of Patients Undergoing Noncardiac Surgery

A Report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines

Developed in Collaboration With the American College of Surgeons, American Society of Anesthesiologists, American Society of Echocardiography, American Society of Nuclear Cardiology, Heart Rhythm Society, Society for Cardiovascular Angiography and Interventions, Society of Cardiovascular Anesthesiologists, and Society of Vascular Medicine

Endorsed by the Society of Hospital Medicine
Current 2015 CPG (Clinical practice guidelines) Update from 2009 Guidelines

- AHA and ACC joint publication
- Q 5 year revisions
- GWC- clinicians experts including: cardiologists, anesthesiologists, a surgeon, a hospitalist, and a patient representative.
Current 2015 CPG (Clinical practice guidelines) Update from 2009 Guidelines

- American College of Surgeons
- American Society of Anesthesiologists
- American Society of Echocardiography
- Society of Vascular Medicine
- Society of Hospital Medicine
Strength of Evidence: **NSH**
Almost all based on level of evidence **B or C**

**Level A**
- multiple populations, multiple RCT

**Level B**
- Limited populations
- One randomized trial OR non-randomized studies

**Level C**
- Very limited populations, only consensus opinion of experts, case studies or standard of care.
Some notable changes in perioperative guidelines

<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Low, intermediate and high risk</td>
<td>Risks are low (≤ 1%) or elevated</td>
</tr>
<tr>
<td>Surgery divided as emergent or not</td>
<td>Surgery: Routine, urgent or emergent</td>
</tr>
<tr>
<td>No specific risk indices</td>
<td>Uses risk indices</td>
</tr>
<tr>
<td>Anesthesia choice not included</td>
<td>Some specific anesthesia recommendations</td>
</tr>
<tr>
<td>β-blockers discussed without caveats</td>
<td>β-blocker caveats due to Poldermans</td>
</tr>
</tbody>
</table>
Size of Treatment Effect

Class I
• Benefit >>> Risk. Procedure/Treatment SHOULD be performed/administered

Class IIa
• Benefit >> Risk. Additional studies with focused objectives needed. It is REASONABLE to perform procedure/administer treatment

Class IIb
• Benefit ≥ risk. Additional studies with broad objectives needed; additional registry data would be helpful. Procedure/Treatment MAY BE CONSIDERED

Class III
• No Benefit or HARM.
Timing for Surgery

Need for Surgery:

Emergency
- life or limb is threatened if not in the operating room, no or minimal time for clinical evaluation, typically within < 6 hours

Urgent
- may be time for a limited clinical evaluation, typically between 6-12 hours.

Elective
- procedure can be delayed for up to one year.
Communication is Everything
<table>
<thead>
<tr>
<th>Points</th>
<th>Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0.4% risk</td>
</tr>
<tr>
<td>1</td>
<td>0.9% risk</td>
</tr>
<tr>
<td>2</td>
<td>6.6% risk</td>
</tr>
<tr>
<td>3 or more</td>
<td>11% risk</td>
</tr>
</tbody>
</table>
Surgical Risk Calculator

Are there other potential appropriate treatment options?  
- Other Surgical Options  
- Other Non-operative options  
- None

Please enter as much of the following information as you can to receive the best risk estimates. A rough estimate will still be generated if you cannot provide all of the information below.

- **Age Group**: Under 65 years
- **Sex**: Male
- **Functional status**: Independent
- **Emergency case**: No
- **ASA class**: I - Healthy patient
- **Steroid use for chronic condition**: No
- **Ascites within 30 days prior to surgery**: No
- **Systemic sepsis within 48 hours prior to surgery**: None
- **Diabetes**: None
- **Hypertension requiring medication**: None
- **Previous cardiac event**: No
- **Congestive heart failure in 30 days prior to surgery**: No
- **Dyspnea**: None
- **Current smoker within 1 year**: No
- **History of severe COPD**: No
- **Dialysis**: No
EMERGENCY?

Patient scheduled for surgery with known or risk factors for CAD* (Step 1)

Emergency: Yes → Clinical risk stratification and proceed to surgery
No → ACS† (Step 2)

Yes → Evaluate and treat according to GDMT†
No → Estimated peroperative risk of MACE
Stepwise Approach to Perioperative Cardiac Risk Assessment

Estimated perioperative risk of MACE based on combined clinical/surgical risk (Step 3)

- Low risk (<1%) (Step 4)
- Elevated risk (Step 5)

No further testing (Class III:NB)

- Proceed to surgery
If patient at low risk of perioperative MACE (<1%):
YOU DON’T NEED ANYMORE TESTING
Steps for Elevated Risk Patients

1. IACE classified risk

2. Moderate or greater (≥4 METs) functional capacity
   - Excellent (>10 METs)
   - Moderate/Good (≥4–10 METs)

3. No or unknown
   - Poor OR unknown functional capacity (<4 METs): Will further testing impact decision making OR perioperative care? (Step 6)
   - No: Proceed to surgery according to GDMT OR alternate strategies (noninvasive treatment, palliation) (Step 7)
   - Yes: Pharmacologic stress testing (Class IIa)

4. If normal: No further testing (Class IIb)
   - If abnormal: Coronary revascularization according to existing CPGs (Class I)

JACC
Dec 9, 2014
Class 1 (level of evidence C)

- Get ECHO if patients with clinically suspected MODERATE or greater valvular stenosis or regurge and-
  ○ no prior echo in the last year
  ○ or a significant change in clinical status since last eval (that’s it)
- get a pre-op valve repair or replacement only if patient already meets indications for repair or replacement

Class IIa - (level of evidence B and C)

- its reasonable to do elevated risk noncardiac surgery with appropriate monitoring on patients with asymptomatic:
  ○ severe aortic stenosis
  ○ severe MR
  ○ severe aortic regurge with normal LVEF
Is an ECG recommended?
Maybe

<table>
<thead>
<tr>
<th>Recommendations</th>
<th>COR</th>
<th>LOE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>The 12-lead ECG</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Preoperative resting 12-lead ECG is reasonable for patients with known coronary heart disease or other significant structural heart disease, except for low-risk surgery</td>
<td>IIA</td>
<td>B</td>
</tr>
<tr>
<td>Preoperative resting 12-lead ECG may be considered for asymptomatic patients, except for low-risk surgery</td>
<td>IIB</td>
<td>B</td>
</tr>
<tr>
<td>Routine preoperative resting 12-lead ECG is not useful for asymptomatic patients undergoing low-risk surgical procedures</td>
<td>III: No Benefit</td>
<td>B</td>
</tr>
<tr>
<td><strong>Assessment of LV function</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>It is reasonable for patients with dyspnea of unknown origin to undergo preoperative evaluation of LV function</td>
<td>IIA</td>
<td>C</td>
</tr>
<tr>
<td>It is reasonable for patients with HF with worsening dyspnea or other change in clinical status to undergo preoperative evaluation of LV function</td>
<td>IIB</td>
<td>C</td>
</tr>
<tr>
<td>Reassessment of LV function in clinically stable patients may be considered</td>
<td>IIB</td>
<td>C</td>
</tr>
<tr>
<td>Routine preoperative evaluation of LV function is not recommended</td>
<td>III: No Benefit</td>
<td>B</td>
</tr>
</tbody>
</table>

JACC
Dec 9, 2014
Patient With Coronary Stent

- Stent implantation ≤4-6 wk
  - No: Risk of surgical delay is greater than risk of DES thrombosis
    - Yes: Proceed to surgery after 180 d (Class IIb)
  - Yes: DES ≥30 d, but ≤365 d
    - No: Does surgery demand discontinuation P2Y₁₂ inhibitors?
      - No: Continue current DAPT regimen
      - Yes: Continue ASA and restart P2Y₁₂ ASAP (Class I)
  - Yes: Delay surgery until after optimal period (BMS: 30 d and DES: 365 d) (Class I)
- Elective surgery
  - Yes: Delay surgery until after optimal period (BMS: 30 d and DES: 365 d) (Class I)
  - No: Continue DAPT unless risk of bleeding is greater than risk of stent thrombosis (Class I)
Summary of Recommendations for Perioperative Therapy

Surgery and PCI timing

1. NC surgery should be delayed after PCI - if DES shoot for 365 days
   ● if DES surgery MAY be ok after 180d
2. DON’T do Elective non-cardiac surgery where you have to STOP DAPT for 30 days with BMS, 12 mo for DES
3. Don’t do elective NCS within 14 days of balloon angioplasty if you have to stop aspirin.

Surgery and DAPT

1. Continue DAPT for first 4-6 weeks after BMS or DES unless risk of bleeding>benefit (?)*
2. If you have to stop DAPT, keep the ASA and restart P2Y inhibitor ASAP*
3. Management of antiplatelet therapy should be determined by consensus
4. If on asa without prior stenting, may be reasonable to stop aspirin prior to surgery
Summary of Recommendations for Perioperative Therapy

Beta-blockers
1. Continue BB if already on one
2. It may be reasonable to start a BB if patient with intermediate/high risk pre-op testing results
3. It may be reasonable to start a BB if patients with $\geq 3$ RCRI risk factors.
4. best to start 2-7 days before but little data about $> 30$ days before
5. Never start on day of surgery

Other cardiac meds
1. Continue statins if currently taking
2. Peri-op initiation is reasonable for vascular surgery
3. Peri-op statin initiation may be considered in pts with a clinical risk factor having elevated risk surgery
4. No clonidine or alpha2 agonist to prevent cardiac events!
5. ACE/ARB - if you stop them before surgery, restart ASAP afterwards
Summary of Recommendations

**Troponins** - check post op on if patient has signs of sx suggestive of ischemia or MI
- It MIGHT be good to check on post op on high risk patients without signs or sx
- Do not check them routinely in post op patients

**Post op Anemia** - Shoot for Hg of 8 or symptoms as a trigger for transfusion
Use and Outcomes Associated with Bridging During Anticoagulation Interruptions in Patients with Atrial Fibrillation:

Findings from the Outcomes Registry for Better Informed Treatment of Atrial Fibrillation (ORBIT-AF) Benjamin A. Steinberg et al

Circulation, 2015; 131:488-494
7372 US patients with afib on OAC, median f/u 2 years
-2803 interruption events in 2200 patients
-Bridging used in 24%
-Bridged patients more likely to have had prior CVA and mechanical valve replacements, but
-No difference in CHA2DS2-VASc scores
Orbit-AF

Outcomes Measured:
- MI, stroke or systemic embolism
- major bleeding
- cause-specific hospitalization
- death within 30 days
Results: Bridged patients had -
-MORE bleeding (P=0.0001)
-MORE MI, stroke, embolism, major bleed
-MORE hospitalization and death within 30 days (P=0.0001)
Conclusion?
Conclusion-
- Bridging used in ¼ of anticoagulation interruptions
- Bridging is associated with higher risk for bleeding and adverse events
- Data do not support use of routine bridging
- We need more information

What to do?
Wait for BRIDGE trial, randomized controlled, will be published soon
BLOOD
Bleeding Ulcers

Review: In high-risk ulcers, intermittent and continuous PPI therapy do not differ for recurrent bleeding

In patients with high-risk bleeding ulcers, what is the efficacy of intermittent proton-pump inhibitor (PPI) therapy compared with bolus plus continuous-infusion PPI therapy?

<table>
<thead>
<tr>
<th>Recurrent bleeding</th>
<th>Number of trials (n)</th>
<th>Intermittent PPI</th>
<th>Bolus + continuous PPI</th>
<th>RRR (95% CI)</th>
<th>ARD (upper 95% CI)†</th>
</tr>
</thead>
<tbody>
<tr>
<td>At 7 d</td>
<td>10 (1373)</td>
<td>6.9%</td>
<td>9.4%</td>
<td>26% (−6 to 48)</td>
<td>−2.64 (−0.28)</td>
</tr>
<tr>
<td>At 3 d</td>
<td>9 (1173)</td>
<td>8.1%</td>
<td>11%</td>
<td>23% (−10 to 46)</td>
<td>−2.36 (0.17)</td>
</tr>
<tr>
<td>At 30 d</td>
<td>13 (1733)</td>
<td>7.9%</td>
<td>8.7%</td>
<td>9% (−24 to 33)</td>
<td>−0.97 (1.49)</td>
</tr>
</tbody>
</table>
Conclusion?

In patients with high-risk bleeding ulcers, intermittent proton-pump inhibitor (PPI) therapy does not differ from bolus plus continuous-infusion PPI therapy for recurrent bleeding.
Agony
Pain
Misery
In suspected nephrolithiasis, US did not differ from CT for high-risk diagnoses but reduced radiation exposure.


In patients with suspected nephrolithiasis, what is the efficacy of initial diagnostic imaging with US compared with abdominal CT?

- Blinded, RCT in 15 academic ERs in the US
- 2776 patients 18 to 76 years of age

**Primary outcomes** - high-risk diagnoses with complications possibly related to missed or delayed diagnoses; cumulative radiation exposure from imaging at 6 months.

**Secondary outcomes** - serious adverse events and pain.
<table>
<thead>
<tr>
<th>Outcomes</th>
<th>Event rates</th>
<th>At 30 d</th>
<th>At 6 mo</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>High-risk diagnosis with complications§</strong></td>
<td>Point of care US</td>
<td>0.7%</td>
<td>0.3%</td>
</tr>
<tr>
<td></td>
<td>Radiology US</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Abdominal CT</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Serious adverse events</strong></td>
<td></td>
<td>12.4%</td>
<td>10.8%</td>
</tr>
<tr>
<td></td>
<td>Millisieverts</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Radiation exposure</strong></td>
<td></td>
<td>10.1</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>9.3</td>
</tr>
</tbody>
</table>
Conclusion

In patients with suspected nephrolithiasis, ultrasonography, at the point of care or by a radiologist, did not differ for high-risk diagnoses with complications but reduced radiation exposure compared with abdominal computed tomography.
Treatment of COPD exacerbation
Review: ≤ 7 and > 7 days of systemic corticosteroids do not differ for efficacy in COPD exacerbations


**Question**

In patients with acute exacerbations of chronic obstructive pulmonary disease (COPD), is short-duration therapy with systemic corticosteroids (SCSs) as effective as longer-duration therapy?
<table>
<thead>
<tr>
<th>Outcomes</th>
<th># of trials (n)</th>
<th>Short</th>
<th>Longer</th>
<th>RRR (95% CI)</th>
<th>NNT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treatment failure</td>
<td>4 (457)</td>
<td>6.3%</td>
<td>8.3%</td>
<td>26% (−42 to 62)</td>
<td>Not significant</td>
</tr>
<tr>
<td>Death</td>
<td>2 (336)</td>
<td>6.7%</td>
<td>7.7%</td>
<td>8% (−95 to 57)</td>
<td>Not significant</td>
</tr>
<tr>
<td>Hyperglycemia</td>
<td>2 (345)</td>
<td>44%</td>
<td>44%</td>
<td>1% (−25 to 21)</td>
<td>Not significant</td>
</tr>
<tr>
<td>Hypertension</td>
<td>1 (311)</td>
<td>9.6%</td>
<td>15%</td>
<td>35% (−19 to 65)</td>
<td>Not significant</td>
</tr>
<tr>
<td>Relapse</td>
<td>4 (478)</td>
<td>31%</td>
<td>30%</td>
<td>3% (−21 to 34)</td>
<td>Not significant</td>
</tr>
</tbody>
</table>
CONCLUSION

Review conclusion:
In patients with acute exacerbations of chronic obstructive pulmonary disease, short- and longer-duration therapies with systemic corticosteroids did not differ for treatment failure or death.
Finding Afib in stroke
ECG monitoring with implanted monitors increased AF detection more than usual follow-up after cryptogenic stroke

Companion Article(s):

● Ambulatory ECG monitoring for 30 d increased AF detection more than 24 h of ECG monitoring after cryptogenic stroke

ECG monitoring with implanted monitors increased AF detection more than usual follow-up after cryptogenic stroke

Question

In patients with cryptogenic stroke, how does long-term EKG monitoring with implanted cardiac monitors compare with usual follow-up for detecting a-fib?

-RCT, unblinded, 6 months F/U, USA Canada and Europe
-441 patients > 40 yrs old with cryptogenic stroke in the last 90 days.
A-fib in cryptogenic stroke

**Intervention**

ICMs that automatically detect and record AF, inserted within 10 days of randomization ($n = 221$), or usual care ($n = 220$).

**Outcomes**

Detection of AF at 6 months. Secondary outcomes - use of oral anticoagulants.
## ECG in cryptogenic stroke

<table>
<thead>
<tr>
<th>OUTCOME</th>
<th>event rate</th>
<th>at 6 mo</th>
<th>NNT</th>
</tr>
</thead>
<tbody>
<tr>
<td>ICM</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Usual Care</td>
<td>8.9</td>
<td>1.4</td>
<td>14</td>
</tr>
</tbody>
</table>

Detection of Afib

Patients prescribed OAT?
10% vs 4.6%, $P = 0.04$
ECG in cryptogenic stroke

Article Conclusion:
In patients with cryptogenic stroke, long-term electrocardiographic monitoring with implanted cardiac monitors increased detection of atrial fibrillation at 6 months compared with usual follow-up.

Journal Club conclusion:
For most patients with cryptogenic stroke or TIA, prolonged ECG monitoring for approximately 30 days should be done to improve AF detection. When clinically relevant AF is detected, initiation of anticoagulation could reduce risk for recurrent stroke in these patients.
Identifying Atrial Fibrillation After Stroke: When and How?

At some point during poststroke monitoring, almost one quarter of patients received diagnoses of AF. Mean time from onset of stroke or TIA to initiation of AF evaluation was 2.9 days for inpatient Holter monitoring, 39.9 days for outpatient Holter monitoring, and 26.7 to 74.8 days for prolonged monitoring devices. The percentage of patients with AF diagnoses was 7.7% during phase 1, 5.1% during phase 2, 10.7% during phase 3, and 16.9% during phase 4. Overall, 23.7% of patients received diagnoses of AF at any time point.
standard of care treatment for stroke

are we giving it?

3 recent well named studies:

MR CLEAN
ESCAPE
EXTEND IA

IAT ie mechanical thrombectomy improves stroke outcome in certain populations
Intraarterial treatment for stroke

Question

In patients with acute ischemic stroke caused by proximal intracranial occlusion, what are the efficacy and safety of early intraarterial treatment (IAT)?
Intraarterial treatment for stroke - MR CLEAN

- RCT 502 patients >18 yo
- Acute ischemic stroke from prox arterial occlusion in anterior circulation confirmed by imaging
- NIHSS score >2
- Possibility of IAT within 6 hours
- Follow Up - 90 days
- Outcome - modified Rankin scale
<table>
<thead>
<tr>
<th>OUTCOMES</th>
<th>Median</th>
<th>At 90 d</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>IAT + UC</td>
<td>UC</td>
</tr>
<tr>
<td>Modified Rankin score§</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Event rates</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Modified Rankin score 0 to 2§</td>
<td>33%</td>
<td>19%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Any serious adverse event</td>
<td>47%</td>
<td>42%</td>
</tr>
<tr>
<td>New ischemic stroke</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Symptomatic intracerebral hemorrhage</td>
<td>7.7%</td>
<td>6.4%</td>
</tr>
<tr>
<td>SCORE</td>
<td>DESCRIPTION</td>
<td></td>
</tr>
<tr>
<td>-------</td>
<td>-------------</td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>No symptoms at all</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>No significant disability despite symptoms; able to carry out all usual duties and activities</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Slight disability; unable to carry out all previous activities, but able to look after own affairs without assistance</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Moderate disability; requiring some help, but able to walk without assistance</td>
<td></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>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Severe disability; bedridden, incontinent and requiring constant nursing care and attention</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Dead</td>
<td></td>
</tr>
</tbody>
</table>
Conclusion?

In patients with acute ischemic stroke caused by proximal intracranial arterial occlusion of the anterior circulation, early intraarterial treatment plus usual care improved functional independence compared with usual care alone.
EVERYONE POOPS
By Taro Gomi
FMT - OUR MH DATA

- **Middlesex Hospital:** One of a handful of CT hospitals with a clear and timely protocol for FMT
- Open Biome frozen poop-no donor screening wait period or messy prep (blenders)
- Patients from other hospitals are banging down Dr. Hussain’s door

**APRIL 2014 - APRIL 2015**
- 11 procedures - ~ 50% inpatient
- >75% success rate
Systematic Review of Fecal Microbiota Transplantation for *C. difficile* Infection


two small RCTs; 28 case series; and 5 case reports. -
Poop Transplant

Results:
- 1 trial resolution of sx: **81% with FMT** vs **31% with vancomycin** (P<0.001).
- 1 trial- comparison of *nasogastric versus colonoscopic* administration of FMT showed no difference in resolution (60% vs. 80%; P=0.63).

- A 21 case series w/ 480 patients w/ recurrence of *C. difficile* infection, *symptom resolution was 85%*. The overall resolution in studies of patients with refractory disease was **55%**.
“the large clinical response rate in FMT series compared with continued attempts at antibiotic eradication in recurrent C. difficile infection warrants enthusiastic and liberal use of FMT in patients with multiple recurrences.

Additional data are certainly needed for patients with refractory and severe C. difficile infection.
CHOICE OF FLUID IN SEPSIS RESUSCITATION


Review: In sepsis, the effect of resuscitation with crystalloid and colloid fluids on mortality varies

Question

In patients with sepsis or septic shock, what are the effects of different resuscitative fluids on mortality?
1. Colloids - no evidence - don’t use
2. Albumin - no good evidence it helps but a. it’s better than starch.
3. Heta Starch - harmful (AKI and RRT)
4. Normal Saline - risk of hyperchloremic metabolic acidosis and renal failure
5. Balanced crystalloids (LR) - eliminates risks found in NS

USE LR FOR VOLUME RESUSCITATION
1. Get familiar with new Peri-Op guidelines
   a. Use risk assessment tools to determine risk
   b. Communicate with family and treatment team
   c. Be careful with starting beta blockers
   d. Don’t do too much preop testing!
2. Use bridging anticoagulation judiciously in patients with AFIB and await BRIDGE trial.
   a. You probably don’t need to bridge patients on NOACs
   b. You can anticoagulate through low risk procedures (dental)
3. Periodic PPI is as good as PPI drip in UGIB
4. 5 days of steroids for COPD exacerbation is probably enough. PO as good as IV
5. US before CT scan to look for kidney stones if worried about XRT exposure
6. 30 days of continuous EKG monitoring for cryptogenic embolic stroke
7. Use TPA here when appropriate but consider possible transfer to tertiary care center for IAT for appropriate candidates.
8. Be generous and enthusiastic with use of FMT for recurrent C. Diff!
9. Consider Ringers Lactate instead of normal saline in large fluid resuscitations as in sepsis
Thank You

Peter Schulman, MD, Professor of Medicine and cardiology fellowship director for sharing his slides and opinions with me

Alessandra Cornelio who makes all things possible

Dr. David Baggish, Mark Coman, Dr. John Machado and Dr. Safalow for being interested in medicine and always having my back

Terri Savino - for sharing articles on sepsis

and

THE MIDDLESEX HOSPITAL LIBRARY STAFF
QUESTIONS?
(why does she get both beds and all the toys?)