Managing Anti-platelet therapy in the surgical patient

Onaona Gurney

PGY 5
Outline of Discussion

• Overall Issues
• Cardiac Risk Assessment Review
• Coronary Artery Stents & Dual antiplatelet therapy (DAPT)
• ACC/AHA Guideline Updates on DAPT in patients with CAD
• Summary Recommendations
Daily Dilemma

- 65yoM sp PCI 6mo ago for IHD presents for cholecystectomy after severe gallstone pancreatitis
Daily Dilemma

• 65yoM sp PCI 6mo ago for IHD presents for cholecystectomy after severe gallstone pancreatitis

• 72yoF sp PCI for STEMI 14mo prior presents for worsening symptomatic ventral hernia repair
Daily Dilemma

• 65yoM sp PCI 6mo ago for IHD presents for cholecystectomy after severe gallstone pancreatitis

• 72yoF sp PCI for STEMI 14mo prior presents for worsening symptomatic ventral hernia repair

• 56yoF presents to ED with perforated duodenal ulcer 2 weeks after PCI for NSTEMI
What is the overall issue?

- Patient population requiring surgery has increasingly complicated medical history
What is the overall issue?

- Increasing frequency of non-cardiac surgeries in aging population
What is the overall issue?

- Cardiovascular complications remain a leading cause of post-operative morbidity and mortality
What about this population?

• Constitutes at risk population
  – More likely to have LV systolic dysfunction
  – Higher incidence of co-morbidities

• Exaggerated response to perioperative physiological stressors
  – Volume shifts
  – Blood loss
  – Acute phase reactions
Pre-Operative Cardiac Risk Stratification

• Surgical procedure assessment
• Patient factors
• Functional capacity assessment
Stepwise Approach to Perioperative Cardiac Assessment for CAD
STEP 1

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

Emergency

Yes
Clinical risk stratification and proceed to surgery

No
STEP 2

ACS† (Step 2)

Evaluate and treat according to GDMT†
STEP 3

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

• High Risk (>5%)
  – Aortic & other major vascular surgery
  – Peripheral vascular surgery
Surgical Factors

- Intermediate Risk (1-5%)
  - CEA
  - H&N
  - Intraperitoneal & Intrathoracic
  - Orthopedic
  - Prostate
  - Endovascular
Surgical Factors

• Low Risk (<1%)
  – Ambulatory
  – Endoscopic procedures
  – Superficial procedures
  – Cataracts
NSQIP Surgical Risk Calculator

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Risk Factors</th>
<th>Change Patient Risk Factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Laminectomy with exploration and/or decompression of spinal cord and/or cauda equina, without laminectomy, laminectomy or discectomy, 3 or 2 vertebral segments cervical</td>
<td>Age: Under 65, Female, Diabetes (yes), Hypertension, Previous cardiac, Opiate use (yes), Underweight</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Outcomes</th>
<th>Estimated Risk</th>
<th>Chance of Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>Serious Complication</td>
<td>6%</td>
<td>Average</td>
</tr>
<tr>
<td>Any Complication</td>
<td>8%</td>
<td>Above Average</td>
</tr>
<tr>
<td>Pneumonia</td>
<td>2%</td>
<td>Below Average</td>
</tr>
<tr>
<td>Cardiac Complication</td>
<td>&lt;2%</td>
<td>Average</td>
</tr>
<tr>
<td>Surgical Site Infection</td>
<td>2%</td>
<td>Below Average</td>
</tr>
<tr>
<td>Urinary Tract Infection</td>
<td>2%</td>
<td>Above Average</td>
</tr>
<tr>
<td>Venous Thromboembolism</td>
<td>1%</td>
<td>Below Average</td>
</tr>
<tr>
<td>Renal Failure</td>
<td>1%</td>
<td>Below Average</td>
</tr>
<tr>
<td>Return to OR</td>
<td>1%</td>
<td>Below Average</td>
</tr>
<tr>
<td>Death</td>
<td>&lt;1%</td>
<td>Below Average</td>
</tr>
<tr>
<td>Discharge to Nursing or Rehab Facility</td>
<td>13%</td>
<td>Below Average</td>
</tr>
</tbody>
</table>

Predicted Length of Hospital Stay: 2.0 days
STEP 4

Low risk (<1%) (Step 4)

No further testing (Class III NB)

Proceed to surgery
STEP 5

- Elevated risk (Step 5)
- Moderate or greater (≥4 METs) functional capacity
- No or unknown

- Excellent (>10 METs)
- Moderate/Good (≥4–10 METs)

- No further testing (Class Ila)
- No further testing (Class IIb)

Proceed to surgery
Functional Capacity

• 1 MET is the resting or basal O2 consumption of a 40yo, 70kg man

• In perioperative literature, functional capacity is defined as
  – Excellent >10 METs
  – Good 7-10 METs
  – Moderate 4-6 METs
  – Poor <4 METs
Assessment of Functional Capacity

**Duke Activity Status Index**

- Assess functional capacity
- Metabolic equivalent task (MET)
  - 1 MET = O2 3.5ml/kg/min (resting consumption of 70kg 40yr old man)

<table>
<thead>
<tr>
<th>METs</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt;10</td>
<td>Excellent</td>
</tr>
<tr>
<td>7-10</td>
<td>Good</td>
</tr>
<tr>
<td>4-7</td>
<td>Moderate</td>
</tr>
<tr>
<td>≤ 4</td>
<td>Poor</td>
</tr>
</tbody>
</table>

- 1 MET
  - Can you take care of self?
  - Eat, dress, use toilet?
  - Walk indoors in house?
  - Walk a block or two on level at 2-3 mph?
  - Do light housework like dusting or dishes?

- 4 METs
  - Climb a flight of stairs, walk up hill?
  - Walk on level at 4 mph?
  - Run a short distance?
  - Heavy housework
  - Golf, bowling, dancing, doubles tennis

- >10 METs
  - Swimming, singles tennis
  - Football, basketball
STEP 6

Poor OR unknown functional capacity (<4 METs): Will further testing impact decision making OR perioperative care? (Step 6)

Yes → Pharmacologic stress testing (Class Ila)

No

If normal

If abnormal

Coronary revascularization according to existing CPGs (Class I)
Last Step

Proceed to surgery according to GDMT OR alternate strategies (noninvasive treatment, palliation) (Step 7)
Brief History of PCI

• Methods for myocardial revascularization
  – 1st reported CABG in 1968
  – 1st coronary angioplasty 1977
• 1980s - Development of PCTA equipment
• 1986 - First coronary stent (bare metal)
• 1999 - First drug (sirolimus) eluting stent
• 2000s - Evolution of DES & anti-platelet tx
PCI

• PCI is critical in the management of ischemic heart disease
• Reduces mortality in ACS, and recurrent MI
• In 2014:
  – 373,543 PCI were performed in the acute setting
  – 59,375 were performed in the non-acute setting
Goal of Dual Antiplatelet Therapy

• To prevent thrombotic complications related to stent implantation
• Reduce systemic atherothrombotic events

• Previous 2011 ACC/AHA guidelines for PCI
  – 12 months of DAPT for ALL stents (BMS/DES)
Patient With Coronary Stent

- Stent implantation ≤4-6 wk yes → Elective surgery yes → Delay surgery until after optimal period (BMS: 30 d and DES: 365 d) (Class I)
- No → Risk of surgical delay is greater than risk of DES thrombosis
  - Yes → DES ≥30 d, but ≤365 d*
    - Yes → Continue DAPT unless risk of bleeding is greater than risk of stent thrombosis (Class I)
    - No → Proceed to surgery after 180 d (Class IIb)
  - No → Delay surgery until after optimal period (BMS: 30 d and DES: 365 d) (Class I)

- Does surgery demand discontinuation P2Y₁₂ inhibitors?*
  - Yes → Continue current DAPT regimen
  - No → Continue ASA and restart P2Y₁₂ ASAP (Class I)
DES evolved...So have the recommendations

- Duration of Dual Antiplatelet Therapy: A Systematic Review for the 2016 ACC/AHA Guideline Focused Update on Duration of Dual Antiplatelet Therapy in Patients With Coronary Artery Disease: A Report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines
Question 1

• In patients with non 1<sup>st</sup> generations DES for stable ischemic heart disease or ACS compared with 12mo of DAPT, is 3-6 mo as effective in
  – Preventing stent thrombosis
  – Preventing major adverse cardiac events (MACE)
  – Reducing bleeding complications
Question 2

• In patients treated with non 1\textsuperscript{st} generation DES, compared with 12mo of DAPT does 18-48 months result in
  – Differences in mortality rate
  – Decreased MACE
  – Decreased stent thrombosis
  – Increased bleeding
And Finally...

- In post-MI patients who are clinically stable and >12mo past their event, does DAPT, compared with ASA monotherapy, result in differences in
  - Mortality rate
  - Decreased nonfatal MI
  - Decreased MACE
  - Increased bleeding
<table>
<thead>
<tr>
<th>Study</th>
<th>Random Sequence Generation</th>
<th>Allocation Concealment</th>
<th>Blinding of Participants, Personnel, and Outcome Assessment (Mortality)</th>
<th>Blinding of Participants, Personnel, and Outcome Assessment (MI and Bleeding)</th>
<th>Incomplete Outcome Data</th>
<th>Selective Reporting</th>
<th>Other Bias</th>
<th>Relevance of Study Sample, Interventions, Follow-Up Period, and Setting</th>
<th>Fidelity—Assessment of Monitoring, Protocol Adherence, and Data Validity</th>
</tr>
</thead>
<tbody>
<tr>
<td>DES LATE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Intermediate relevance</td>
<td>Intermediate fidelity</td>
<td></td>
</tr>
<tr>
<td>PRODIGY</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Intermediate relevance</td>
<td>High fidelity</td>
<td></td>
</tr>
<tr>
<td>EXCELLENT</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>High relevance</td>
<td>Intermediate fidelity</td>
<td></td>
</tr>
<tr>
<td>RESET</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Intermediate relevance</td>
<td>Unclear fidelity</td>
<td></td>
</tr>
<tr>
<td>OPTIMIZE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>High relevance</td>
<td>High fidelity</td>
<td></td>
</tr>
<tr>
<td>ARCTIC</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>High relevance</td>
<td>Intermediate fidelity</td>
<td></td>
</tr>
<tr>
<td>SECURITY</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>High relevance</td>
<td>Intermediate fidelity</td>
<td></td>
</tr>
<tr>
<td>ITALIC</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>High relevance</td>
<td>Intermediate fidelity</td>
<td></td>
</tr>
<tr>
<td>ISAR-SAFE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>High relevance</td>
<td>High fidelity</td>
<td></td>
</tr>
<tr>
<td>DAPT</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>High relevance</td>
<td>High fidelity</td>
<td></td>
</tr>
<tr>
<td>OPTIDUAL</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Intermediate relevance</td>
<td>Intermediate fidelity</td>
<td></td>
</tr>
<tr>
<td>CHARISMA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Intermediate relevance</td>
<td>High fidelity</td>
<td></td>
</tr>
<tr>
<td>PEGASUS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>High relevance</td>
<td>High fidelity</td>
<td></td>
</tr>
</tbody>
</table>

*Risk of bias is denoted as low risk of bias (green box), high risk of bias (red box), or unclear risk of bias (yellow box). Trials stopped early for poor enrollment* and the trial analyzed using post hoc definitions* are denoted as having a high risk of bias.*

Stent trial acronyms are defined in Table 1. CHARISMA indicates Clopidogrel for High Atherothrombotic Risk and Ischemic Stabilization, Management, and Avoidance; PEGASUS–TIMI 54, Prevention of Cardiovascular Events in Patients with Prior Heart Attack Using Ticagrelor Compared to Placebo on a Background of Aspirin–Thrombolysis in Myocardial Infarction 54; and RCT, randomized controlled trial.
What the data showed

- In patients with non 1\textsuperscript{st} generations DES for stable ischemic heart disease or ACS compared with 12mo of DAPT, is 3-6 mo as effective in
  - Preventing stent thrombosis
    - No credible difference
  - Preventing major adverse cardiac events (MACE)
    - No credible difference
  - Reducing bleeding complications
    - No credible difference
What About?

- In patients treated with non 1\textsuperscript{st} generation DES, compared with 12mo of DAPT does 18-48 months result in
  - Differences in mortality rate
    - No difference*
  - Decreased MACE
    - Reduced risk
  - Decreased stent thrombosis
    - Reduced risk
  - Increased bleeding
    - Increased major hemorrhage
And Finally....

• In post-MI patients who are clinically stable and >12mo past their event, does DAPT, compared with ASA monotherapy, result in differences in
  – Mortality rate
    • Reduced risk
  – Decreased nonfatal MI/MACE
    • Reduced risk
  – Increased bleeding
    • Increased risk
So what does it all mean?
So what do you do?

• 65yoM sp PCI 6mo ago for IHD presents for cholecystectomy after severe gallstone pancreatitis

• 72yoF sp PCI for STEMI 14mo prior presents for worsening symptomatic ventral hernia repair

• 56yoF presents to ED with perforated duodenal ulcer 2 weeks after PCI for NSTEMI
Summary of Guidelines

• PCI for Ischemic Heart Disease
  – BMS: 1 mo DAPT
  – DES: 6 mo DAPT

• PCI for ACS
  – BMS/DES: 12 mo DAPT

• Any other therapy for ACS
  – 12 mo DAPT
Thank you
References

• The Impact of Appropriate Use Criteria on Clinical Practice of PCI. Apr 18, 2016; Steven M. Bradley, MD, FACC; Paul S Chan, MD


• Duration of Dual Antiplatelet Therapy: A Systematic Review for the 2016 ACC/AHA Guideline Focused Update on Duration of Dual Antiplatelet Therapy in Patients With Coronary Artery Disease: A Report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines