Post-PCI Medication Management & Strategies for Improving Patient Experience

A presentation for HealthTrust Members

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Disclosures

- The presenters have no real or perceived conflicts of interest related to this presentation.

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Learning Objectives

- Explain pertinent pharmacotherapy and patient education pearls for the care of post-PCI
- Describe a successful pharmacist driven education program of ACS patients
- Describe two clinical pharmacotherapy pearls to improve patient satisfaction/experience in their own ACS population

ACS = Acute Coronary Syndrome
PCI = percutaneous coronary intervention

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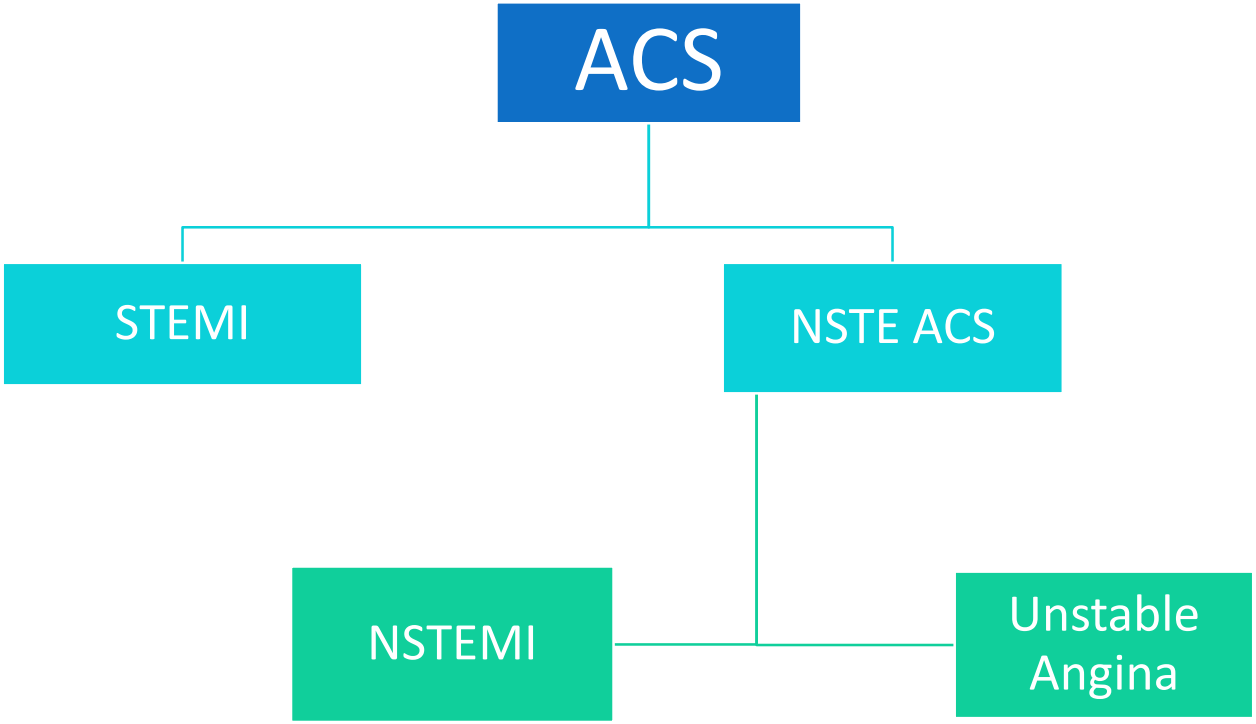
Pathophysiology



ACS=acute coronary syndrome; STEMI= ST segment elevation myocardial infarction; NSTE= non-ST segment elevation; NSTEMI= non-ST segment elevation myocardial infarction

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STEMI

- ST segment elevation $\geq$ 2 mm in men or 1.5mm in women in two contiguous leads
- Indicates nearly or completely occluded coronary artery
- Transmural injury of myocardium
- Most life-threating requires immediate intervention

STEMI= ST segment myocardial infarction; EKG= electrocardiogram

Source: *Circulation.* 2013;127:362–425.

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STEMI- Management

- Reperfusion (if symptoms within 12 hours)
  - Primary PCI preferred
    - "Door-to-balloon" in 90 minutes (120 minutes if transfer needed)
  - Fibrinolytic therapy if PCI unable to be performed in time
    - Administered within 30 minutes of arrival

PCI= percutaneous coronary intervention; STEMI= ST segment elevation myocardial infarction
Source: *Circulation*. 2013;127:362–425.

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NSTEMI

- No ST segment elevation on EKG
- Could have ST segment depression, t-wave inversion or other signs of ischemia
- Positive troponins or other myocardial biomarker
- Generally not a fully occluded vessel and no transmural injury

EKG=electrocardiogram

Source: J Am Coll Cardiol. 2014;64(24):2645-2687

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Unstable Angina

- No ST segment elevation on EKG, possibly other ischemic signs on EKG
- No cardiac biomarker elevations
- History significant for **acute** myocardial ischemia

EKG=electrocardiogram

Source: J Am Coll Cardiol. 2014;64(24):2645-2687

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NSTEMI/UA

- Early invasive versus ischemia-guided strategies
  - Early invasive: rapid, definitive, earlier revascularization if needed
  - Ischemia guided: avoids routine invasive procedures, if patient stabilizes on medical therapy no coronary angiography needed
- Early invasive (within 24 hours) in high risk patients
- Delayed invasive (25 to 72 hours) in lower risk patients
- Medical management
  - Aspirin indefinitely
  - $P2Y_{12}$ Inhibitor for at least 1 year
  - Anticoagulant
    - UFH for 48 hours
    - LMWH for duration of hospitalization

NSTEMI= non-ST segment elevation myocardial infarctions; UA= unstable angina; UFH= unfractionated heparin; LMWH= low molecular weight heparin

Source: J Am Coll Cardiol. 2014;64(24):2645-2687

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Pharmacotherapy: Post-PCI

Aspirin

- MOA:
  - Inhibition of cyclooxygenase 1 and 2 thus inhibiting platelet aggregation irreversibly by inhibiting platelet cyclooxygenase preventing the formation of thromboxane A_2

MOA= mechanism of action
Source: Aspirin. Lexicomp Online.

$P2Y_{12}$ Inhibitors

- Clopidogrel, prasugrel, ticagrelor, cangrelor

- Mechanism of Action (MOA): Inhibition of $P2Y_{12}$ portion of ADP receptors which are responsible for activation of GP IIb/IIIa, which in turn inhibits platelet aggregation
  - Clopidogrel/prasugrel- irreversible inhibition
  - Ticagrelor- reversible inhibition

Drug-drug Interaction (DDI):

- Ticagrelor—can not be used with ≥100mg of aspirin
- Clopidogrel—reduced level of active metabolite when used with omeprazole

Sources: Plavix (clopidogrel) [package insert].
Effient (prasugrel) [package insert].
Brilinta (ticagrelor) [package insert].
Kengreal (cangrelor) [package insert].

$P2Y_{12}$ Inhibitors: Kinetics

- **Clopidogrel**
  - Onset: 300-600mg ~ 2 hours
  - Peak effect
    - 300-600mg : ~6 hours
    - 75mg daily dose: 5-7 days
  - Duration: patient returns to baseline function ~5 days post discontinuation
  - Prodrug – CYP 2C19
- **Prasugrel**
  - Onset: 60mg load <30 minutes
  - Peak effect: 60mg load ~4 hours
  - Duration: Baseline in 5-9 days
  - Prodrug

Sources: Plavix (clopidogrel) [package insert].
Effient (prasugrel) [package insert].

$P2Y_{12}$ Inhibitors: Kinetics

- **Ticagrelor**
  - Onset: 180mg load within 30 minutes
  - Peak effect: 180mg load ~2 hours
  - Duration: return to baseline at around 3 days

- **Cangrelor**
  - Intravenous $P2Y_{12}$ inhibitor (reversible)
  - Reaches C_{max} within 2 minutes of administration
  - Half life 3–6 minutes

Sources: Brilinta (ticagrelor) [package insert].
Kengreal (cangrelor) [package insert].

Comparison of Antiplatelet Medications

Medication	Loading Dose	Maintenance Dose	Comparison	Special Info
Aspirin	325mg orally	81-325mg orally daily		81mg as effective as 325mg with less bleed risk
Clopidogrel	300mg-600mg orally	75mg orally daily	In addition to ASA better than ASA alone	DDI- omeprazole Hold 5 days for surgery CYP 2C19 Enzyme interaction
Ticagrelor	180mg orally	90mg orally twice daily (60mg twice daily after one year)	Superior in efficacy to clopidogrel with similar bleeding	Side effect of dyspnea Do not use with ≥100mg ASA
Prasugrel	60mg orally	10mg orally daily (5mg in 60kg or less)		Do not use with h/o stroke or TIA Hold 7 days for surgery
Cangrelor	30mcg/kg	4mcg/kg/min infusion for 2 hours or duration of PCI which ever is longer		Conversion to oral agent: • Clopidogrel/prasugrel: give load immediately after stopping infusion • Ticagrelor: give at any time during infusion or immediately after stopping infusion

Sources: *Circulation*. 2013;127:362–425.
J Am Coll Cardiol.
Plavix (clopidogrel) [package insert].
Effient (prasugrel) [package insert].
Brilinta (ticagrelor) [package insert].
N Engl J Med. 2014;371:2155-66.
Kengreal (cangrelor) [package insert].

DDI= drug-drug interaction; ASA= aspirin; TIA= transient ischemic attack; PCI= percutaneous coronary intervention

Post ACS Medication Management

- Dual Antiplatelet Therapy (DAPT)
  - Aspirin
    - Continued indefinitely
    - 81mg dose as effective as 325mg daily (CURRENT-OASIS 7)
  - $P2Y_{12}$ Inhibitor
    - Clopidogrel, Ticagrelor, Prasugrel
    - Duration: At least 1 year regardless of stent type (in ACS)
      - May be reasonable to continue beyond 1 year if low risk of bleeding/high risk of recurrent myocardial infarction (DAPT Score)
      - Decrease dose of ticagrelor to 60mg twice daily after one year

ACS = Acute coronary syndromes

Sources: *Circulation*. 2013;127:362–425.
J Am Coll Cardiol. 2014;64(24):2645-2687
J Thorac Cardiovasc Surg. 2016;152(5):1243-1275.

Post ACS Medication Management, *Cont'd*

- Assess need for gastroprotective agent while on DAPT
  - Age > 60 years old
  - Concurrent anticoagulant, NSAID or corticosteroid
  - History of GIB or H. Pylori infection
  - PPI preferred over H_2RA
  - Avoid clopidogrel-omeprazole interaction
    - Pantoprazole—best alternative choice

GIB= gastrointestinal bleeding; PPI= proton pump inhibitor; H_2RA= histamine 2 receptor antagonist ; NSAID= nonsteroidal anti- inflammatory drug

Sources: *Circulation*. 2008;118(18):1894-909.
J Am Coll Cardiol. 2010;56(24):2051-66.

Post ACS Medication Management, *Cont'd*

- High intensity statin in all patients with Acute Coronary Syndrome (ACS); with no contraindications (atorvastatin 40–80mg, rosuvastatin 20–40mg)
  - Liver Function Test (LFT), Fasting Lipid Panel (FLP)
  - PROVE-IT – Pravastatin 40mg versus Atorvastatin 80mg after ACS
    - Primary Endpoint: Composite of death from any cause, myocardial infarction, unstable angina requiring hospitalization, revascularization
    - Results (at 2 years):
      - Pravastatin 26.3 % versus atorvastatin 22.4% (p= 0.005; 95% confidence interval 5-26%)
      - Relative risk reduction of 16%
  - Statin Intolerance

Sources: *Circulation*. 2013;127:362–425.
J Am Coll Cardiol. 2014;64(24):2645-2687
N Engl J Med 2004;350:1495-504

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Post ACS Medication Management, *Cont'd*

- Beta blockers
  - Initiated within 24 hours of STEMI
    - Unless signs of heart failure, low cardiac output state or at risk for cardiogenic shock
    - Other Contraindications: second or third degree block, active asthma or reactive airway disease, PR interval more than 0.24 seconds
  - Continued during and after hospitalization (at least 3 years, most likely indefinitely)
- ACE Inhibitor
  - STEMI with anterior location, HF, or EF ≤ 40
  - ARB if ACE-I intolerance
- Aldosterone Antagonist
  - EF ≤ 40, once stable on max tolerated ACE-I and BB, with symptomatic heart failure or DM

EF= ejection fraction; ARB= angiotensin 2 receptor blocker; DM= diabetes mellitus

Sources: *Circulation*. 2013;127:362–425.
J Am Coll Cardiol. 2014;64(24):2645-2687

Pharmacy Education Pearls

Education Overview

- Educate on indication, side effects, drug interactions, missed doses & proper storage.
- Emphasis on compliance with dual antiplatelet therapy.
- Coordinate with cardiac rehab, case management, and/or physician for patients who express concerns about ability to afford or obtain medications.

Dual Antiplatelet Therapy

- Why is it important?
  - Prevents stent thrombosis
- Duration?
  - Typically at least 1 year then aspirin lifelong
- Side effects?
  - Bleeding – review signs and symptoms to monitor
  - Dyspnea with ticagrelor
- Drug interactions
  - Nonsteroidal anti- inflammatory drug (NSAIDs
  - Over-the-counter supplements
  - ASA doses >100mg/day and ticagrelor
  - Omeprazole and clopidogrel

Sources: Thorac Cardiovasc Surg. 2016;152(5):1243-1275
Plavix (clopidogrel) [package insert].
Brilinta (ticagrelor) [package insert].

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Statins

- Why are they important?
  - Prevents recurrent heart attack
- Side effects?
  - Diarrhea
  - Arthralgias
    - Report unexplained muscle pain, tenderness, weakness, or tea-colored urine, especially if accompanied by malaise or fever, to physician

Sources: Atorvastatin. Lexicomp Online.
Circulation. 2013;127:362–425.

Beta-Blockers

- Why are they important?
  - Reduces stress on the heart
  - Increases long-term survival
- Side effects?
  - Fatigue
  - Dizziness
  - Orthostatic hypotension
    - Recommend taking with meals

Sources: Carvedilol. Lexicomp Online.
J Am Coll Cardiol. 2014;64(24):2645-2687

Pharmacy Post PCI-Education

Background & Implementation at Research Medical Center

Research Medical Center

Background

- January 2017: Patient Satisfaction Scores
  - Communication about medications
    - Always – 56.4% (7th percentile in HCA)
  - "Tell you what new medicine was for"
    - Always – 72% (17th percentile in HCA)
  - "Staff described medicine side effect"
    - Always – 40.9% (6th percentile in HCA)
- Plan-Implement Pharmacist Education

Pharmacy Post-PCI Education Process

- Target Patients – ACS Patients
  - Pharmacist reviews list of patients on dual antiplatelet therapy to identify patients
  - Goal to counsel all ACS patients
- Pharmacist and/or pharmacy student reviews chart
- Meets with patient
  - Target 24–48 hours prior to discharge
  - Goal of about 15-minute duration
  - Provides med counselor sheets from Clinical Pharmacology for cardiac medications
- Leave with card to contact pharmacist with any further questions
- Documentation in chart and your clinical surveillance system

Implementation—Training of Team

- Initial Training
  - Meeting about overview of process with pharmacy team
  - Provided a 1 hour in-service
    - Disease state
    - Pharmacotherapy review
    - Education pearls
  - Competency quiz
- Training of pharmacy students
  - Paid interns – On the job training during 2nd year of pharmacy school
  - Rotation students – Topic discussion first day of rotation, go over process and competency quiz
  - Observe pharmacist, pharmacist observes student, when comfortable with competency—student free to provide counseling solo

Post-PCI Education Follow-up

- Revisit patients after initial education to promote retention of information provided, if necessary
- Address patient concerns with multidisciplinary team
- Contact cardiology if an indicated medication is not ordered

Barriers to Implementation / Lessons Learned

- Identifying patients
  - No quick list to identify these patients real time
  - Utilize search in your clinical surveillance system
  - Patients on aspirin and $P2Y_{12}$ inhibitors
  - 5–10 minutes daily to review patients for correct list
- Perception from other departments
- Integrating into workflow
  - Navigating around rounding schedules
  - Delegation to students
- Short lengths of stay
  - Missing patients discharging in the morning
  - Missing patients admitted Friday night and discharged over the weekend

Initial Outcomes

Background & Implementation at Research Medical Center

Initial Outcomes

	January 2017	June 2017
Communication about medications		
• Always (%)	56.4	**92.3**
• HCA (%ile)	7	**99**
Tell you what new medicine was for		
• Always (%)	72	**96.1**
• HCA (%ile)	17	**99**
Staff describe medicine side effect		
• Always (%)	40.9	**88.4**
• HCA (%ile)	6	**99**

Assessment Question 1:

A patient calls you a few days after being discharged on aspirin, ticagrelor (new medication), atorvastatin (new medication) and metoprolol. The patient complains of periods of shortness of breath since discharge. What medication is most likely contributing?

A. Aspirin
B. Ticagrelor
C. Atorvastatin
D. Metoprolol
E. All of the Above

Assessment Response 1:

A patient calls you a few days after being discharged on aspirin, ticagrelor (new medication), atorvastatin (new medication) and metoprolol. The patient complains of periods of shortness of breath since discharge. What medication is most likely contributing?

A. Aspirin
B. **Ticagrelor**
C. Atorvastatin
D. Metoprolol
E. All of the Above

Assessment Question 2:

Dual antiplatelet therapy is prescribed to reduce the risk of which of the following complication(s) of coronary stenting?

A. In stent Restenosis
B. Pulmonary Embolism
C. Transient Ischemic Attack
D. Stent Thrombosis
E. All of the above

Assessment Response 2:

Dual antiplatelet therapy is prescribed to reduce the risk of which of the following complication(s) of coronary stenting?

A. In stent Restenosis
B. Pulmonary Embolism
C. Transient Ischemic Attack
D. **Stent Thrombosis**
E. All of the above

Conclusions

- Targeted pharmacist education can improve patient satisfaction scores and reimbursement in ACS population
- This process can be generalized to other disease states and patient populations in an attempt to boost patient satisfaction and reimbursement
- Utilization of pharmacy interns and rotation students as pharmacist extenders to help expand impact of pharmacy department on patient satisfaction and outcomes

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