Care of the patient with acute coronary syndrome

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Objectives

- Review some recent guideline updates in the management of acute coronary syndrome
- Discuss the role of pharmacological therapy in the management of patient with acute coronary syndrome
- Discuss the role of cardiac rehabilitation
# Three phases of management of ACS

### Hyper-acute phase
- Aspirin
- P2Y12 receptor antagonists
- Heparin/analogues
- Beta blockers
- Statin
- Revascularization strategy

### Acute phase
- Aspirin
- P2Y12 receptor antagonists
- Beta blockers
- ACEI/ARB
- Statins
- Nitrates
- Lifestyle interventions

### Chronic phase
- Management of duration and complications of DAPT
- Beta blockers
- ACEI/ARB
- Statins
- Nitrates
- Lifestyle measures
Case 1

- You admit a 70 year old man who you have taken care of for a long time, with chest pain and lateral ST depressions on his ECG. His troponin is 2 ng/mL. His pain is finally relieved with iv morphine. The cardiologist who is asked to see him is prepared to perform coronary angiography. Since the patient is sleepy, the cardiologist asks you if “a drug eluting stent would be reasonable”.

- What is the role of drug eluting (DES) vs bare metal stents (BMS) in the management of ACS?
NORSTENT – drug eluting vs bare metal stents in patients with both acute and stable coronary syndromes

Bonaa KH et al; NEJM 2016
Drug eluting stents have evolved

### Stent type

<table>
<thead>
<tr>
<th>1st generation</th>
<th>2nd generation</th>
<th>3rd generation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cypher</strong></td>
<td><strong>Xience</strong></td>
<td><strong>Promus</strong></td>
</tr>
<tr>
<td><strong>Taxus</strong></td>
<td><strong>Endeavor</strong></td>
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</tbody>
</table>

**Material**
- **Stainless Steel**
- **Cobalt Chromium**
- **Platinum Chromium**
Stent thrombosis is relatively infrequent with modern DES unless DAPT is interrupted.

<table>
<thead>
<tr>
<th>Condition</th>
<th>Definite or probable stent thrombosis (%)</th>
<th>HR [95% CI]</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>No permanent interruption through 2-year study period *</td>
<td>0.83%</td>
<td>0.85 [0.12, 6.13]</td>
<td>0.87</td>
</tr>
<tr>
<td>Permanent interruption before 30 days</td>
<td>4.95%</td>
<td>6.13 [3.22, 11.68]</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Permanent interruption between 30 and 90 days</td>
<td>2.78%</td>
<td>3.36 [0.62, 13.82]</td>
<td>0.07</td>
</tr>
<tr>
<td>Permanent interruption between 90 and 180 days</td>
<td>0.78%</td>
<td>0.85 [0.12, 6.13]</td>
<td>0.87</td>
</tr>
<tr>
<td>Permanent interruption between 180 and 365 days</td>
<td>0.45%</td>
<td>0.52 [0.19, 1.43]</td>
<td>0.20</td>
</tr>
<tr>
<td>Permanent interruption between 365 and 730 days</td>
<td>0.16%</td>
<td>0.19 [0.06, 0.60]</td>
<td>0.002</td>
</tr>
</tbody>
</table>

* Denotes no interruption through the 2-year study period.

Genereux P et al; Circulation Cardiovascular Interventions; 2015
NORSTENT- stent thrombosis rates in BMS and DES

Bonaa KH et al; NEJM 2016
Case 2

- You are asked to seeing a 80 year old man with a h/o ST elevation ACS 3 months ago treated with a DES to his RCA. His orthopedic surgeon requested this appointment since the patient is scheduled to undergo a hip replacement next week for degenerative arthritis and wants “perioperative clearance”. He is doing well with no angina. He is on aspirin, clopidogrel and metoprolol.

- The patient’s cardiologist is on vacation in Cancun. How would you manage his dual anti-platelet therapy peri-operatively?
Indication for the stent matters!

Rates of Major Adverse Cardiac Events (MACE) by Time Between Coronary Stent Placement and Surgery, Stratified by Stent Indication

You see the patient back in 6 months. He underwent successful hip replacement 2 months ago. DAPT was resumed. He was diagnosed with post operative atrial fibrillation and is now on warfarin.

How should his medication regimen be managed?
Triple therapy- balancing benefits and risks

Assess ischemic and bleeding risks using validated risk predictors (e.g., CHA2DS2-VASc, HAS-BLED)

Keep triple therapy duration as short as possible; dual therapy only (oral anticoagulant and clopidogrel) may be considered in select patients

Consider a target INR of 2.0–2.5 when warfarin is used

Clopidogrel is the P2Y12 inhibitor of choice

Use low-dose (≤100 mg daily) aspirin

PPIs should be used in patients with a history of gastrointestinal bleeding and are reasonable to use in patients with increased risk of gastrointestinal bleeding

CHA2DS2-VASc indicates congestive heart failure, hypertension, age ≥75 years (doubled), diabetes mellitus, prior stroke or transient ischemic attack or thromboembolism (doubled), vascular disease, age 65–74 years, sex category; HAS-BLED, hypertension, abnormal renal/liver function, stroke, bleeding history or predisposition, labile INR, elderly, drugs/alcohol concomitantly; INR, international normalized ratio; and PPIs, proton pump inhibitors.

2016 ACC/AHA Focused Update on dual antiplatelet therapy
How about “prolonged DAPT”?

**Table 5: Factors Used to Calculate a “DAPT Score”**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age ≥75 y</td>
<td>-2</td>
</tr>
<tr>
<td>Age 65 to &lt;75 y</td>
<td>-1</td>
</tr>
<tr>
<td>Age &lt;65 y</td>
<td>0</td>
</tr>
<tr>
<td>Current cigarette smoker</td>
<td>1</td>
</tr>
<tr>
<td>Diabetes mellitus</td>
<td>1</td>
</tr>
<tr>
<td>MI at presentation</td>
<td>1</td>
</tr>
<tr>
<td>Prior PCI or prior MI</td>
<td>1</td>
</tr>
<tr>
<td>Stent diameter &lt;3 mm</td>
<td>1</td>
</tr>
<tr>
<td>Paclitaxel-eluting stent</td>
<td>1</td>
</tr>
<tr>
<td>CHF or LVEF &lt;30%</td>
<td>2</td>
</tr>
<tr>
<td>Saphenous vein graft PCI</td>
<td>2</td>
</tr>
</tbody>
</table>

A score of ≥2 is associated with a favorable benefit/risk ratio for prolonged DAPT while a score of <2 is associated with an unfavorable benefit/risk ratio. Adapted with permission from Yeh et al. (61).

Mauri L et al, DAPT study, NEJM 2014
A 67 yr. old man with DM is admitted to the hospital with a non-ST elevation ACS. He undergoes coronary angiography and has a drug eluting stent placed to his left anterior descending artery. Two days later, he is doing well. He is on aspirin, clopidogrel, metoprolol succinate 100 mg daily, simvastatin 10 mg daily and Lisinopril 40mg daily. An echocardiogram showed anterior hypokinesis with a measured LV ejection fraction of 30%.

What additional pharmacological interventions are indicated to improve morbidity and mortality in this patient?
High intensity statin improves outcomes after ACS

Cannon CP, PROVE IT TIMI 22; NEJM 2003
# Inhibitors of Renin-Angiotensin-Aldosterone System

<table>
<thead>
<tr>
<th>Recommendations</th>
<th>COR</th>
<th>LOE</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACE inhibitors should be started and continued indefinitely in all patients with LVEF less than 0.40 and in those with hypertension, diabetes mellitus, or stable CKD (Section 7.6), unless contraindicated.</td>
<td>I</td>
<td>A</td>
</tr>
<tr>
<td>ARBs are recommended in patients with HF or MI with LVEF less than 0.40 who are ACE inhibitor intolerant.</td>
<td>I</td>
<td>A</td>
</tr>
<tr>
<td>Aldosterone blockade is recommended in patients post–MI without significant renal dysfunction (creatinine &gt;2.5 mg/dL in men or &gt;2.0 mg/dL in women) or hyperkalemia (K &gt;5.0 mEq/L) who are receiving therapeutic doses of ACE inhibitor and beta blocker and have a LVEF 0.40 or less, diabetes mellitus, or HF.</td>
<td>I</td>
<td>A</td>
</tr>
</tbody>
</table>

Amsterdam E et al, 2014 AHA/ACC guideline on management of NSTEACS
EPHESUS trial—significant reduction in mortality with aldosterone blockade early after MI

Pitt B; N Engl J Med 2003
Does he need “protection” from sudden cardiac death?

Kutyifa V et al, WEARIT II registry, Circulation, 2015
Use of WCDs may be reasonable when there is concern about a heightened risk of SCD that may resolve over time or with treatment of left ventricular dysfunction, for example, in ischemic heart disease with recent revascularization, newly diagnosed nonischemic dilated cardiomyopathy in patients starting guideline-directed medical therapy, or secondary cardiomyopathy (tachycardia mediated, thyroid mediated, etc) in which the underlying cause is potentially treatable.\textsuperscript{53,54,56}
Case 4

- You are seeing a patient in your clinic a month after she underwent three vessel coronary artery bypass grafting. She was admitted with NSTE-ACS a month ago and angiography revealed 70% left main and 99% right coronary artery stenosis. Her LV ejection fraction was preserved. She is recovering slowly and has no angina. She is on appropriate GDMT including aspirin and a high intensity statin.

- What additional interventions are indicated?
It takes more than pills to improve heart health.
Cochrane review - Exercise only cardiac rehab reduces cardiovascular mortality

Cochrane review- Exercise only cardiac rehab reduces hospitalization
The insurance situation is not as dire as it used to be

Who's eligible?
People with Part B are covered. You must be referred by your doctor and have had any of these:

- A heart attack in the last 12 months
- Coronary artery bypass surgery
- Current stable angina pectoris
- A heart valve repair or replacement
- A coronary angioplasty or coronary stent
- A heart or heart-lung transplant
- Stable chronic heart failure
Case 5

- You are seeing a 60 year old patient with CAD (s/p DES to LAD 5 years ago) in the hospital who is admitted with lobar pneumonia. Blood cultures grew Streptococcus pneumonia. A troponin drawn in the ER was 1 ng/mL and trended down to 0.4 ng/mL in a day. ECG shows minor non-specific ST-T changes. He denies any chest pain and had no h/o exertional angina prior to his hospitalization.

- What is the next step in management?
The Type 2 MI epidemic

Thygesen K et al, Third Universal definition of MI, 2012
Workup and management

- No evidence based studies; largely driven by clinical judgement
- A commonly employed strategy is evaluation of LV function by echocardiography and symptoms.
- If symptoms present or LV function reduces/regional wall motion abnormalities present, then consider evaluation of epicardial coronary arteries.
- These patients should be considered high risk for future events and probably treated with aspirin and a high intensity statin (limited evidence)
Summary

- Modern DES design has reduced the incidence of stent thrombosis
- Dual antiplatelet therapy is the cornerstone of the management of ACS
- Cardiac rehabilitation improves quality of life and cardiovascular mortality