Cardiovascular Pharmacology: To Make Your Heart Race

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Dr. Brull lives and practices full-scope rural family medicine in Plainville, Kansas. She sees patients in office, hospital (critical access), emergency room, nursing home, hospice, and home settings. Her patients range in age from birth to more than 100 years old. Dr. Brull has volunteered as a clinical faculty member for the University of Kansas School of Medicine since 2002 and has been teaching at conferences for 12 years. Her areas of specialty include quality/performance improvement, EHR/HIE, social media, and the patient-centered medical home. In 2014, Dr. Brull received the University of Kansas School of Medicine's Student Assembly Ad Astra Outstanding Volunteer Award, and the CDC named her a Million Hearts Hypertension Control Challenge Champion.

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Learning Objectives

1. Establish protocols for the consistent application of current practice guidelines for the treatment of three common cardiovascular conditions.
2. Determine when a patient's medication history or overall health may produce severe side effects or interfere with treatment for a cardiovascular condition.
3. Develop a collaborative treatment plan for common cardiovascular conditions, emphasizing medication adherence and monitoring.
4. Design a care coordination and communication plan with all members of the cardiovascular care team.

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Audience Engagement System

Step 1 Step 2 Step 3

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Lecture Scope

- Acute Coronary Syndrome (ACS)
- Congestive Heart Failure (HF)
- Atrial Fibrillation (AF)

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AES Question

A 45 year old male with no previous cardiac history presents to the emergency room complaining of chest pain. EKG and cardiac markers are consistent with acute myocardial ischemia. Vitals include heart rate of 94, blood pressure of 130/90 and oxygen saturation of 96% on room air. Which of the following treatments are appropriate?

A. Oxygen
B. Nitrate
C. Ibuprofen
D. Beta Blocker

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Acute Coronary Syndrome

Operational term referring to a spectrum of conditions compatible with acute myocardial ischemia and/or infarction, usually due to an abrupt reduction in coronary blood flow.

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ACS Early Hospital Care

- Oxygen
- Nitrates
- Analgesic Therapy
- Beta-adrenergic Blockers
- Calcium Channel Blockers (CCBs)
- Cholesterol Management
- Angiotensin-Converting Enzyme Inhibitors (ACE)
- Antiplatelet/Anticoagulant Therapy

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ACS Late Hospital/Posthospital Care

- Ischemia Control
- Nitrates (PRN)
- ASA
- DAPT
- Avoid NSAIDs
- Avoid HRT
- No Benefit: Vitamin E, C, B

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AES Question

A 62 year old white female presents to establish care. She has a history of heart failure and brings a recent ECHO which demonstrates ejection fracture of 40%. She has not been taking any medication for the past 6 months due to lack of insurance but denies symptoms (no edema or dyspnea with normal activity). Which medications should you initiate at this visit?

A. ACE Inhibitor
B. Beta Blocker
C. Loop Diuretic
D. Aldosterone Antagonist

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Heart Failure Definitions

- HF with reduced EF = Systolic HF {EF ≤ 40%}
- HF with preserved EF = Diastolic HF {EF ≥ 50%}
- HF with borderline EF {EF 41-49%}

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ACCF/AHA Stages of HF		NYHA Functional Classification	
A	High Risk for HF, no structural heart disease or symptoms of HF	None	
B	Structural heart disease, no signs or symptoms or HF	I	No limitation of physical activity; no HF symptoms with ordinary activity
C	Structural heart disease with prior or current symptoms of HF	I	No limitation of physical activity; no HF symptoms with ordinary activity
		II	Slight limitation of physical activity; HF symptoms with ordinary activity, none at rest
		III	Marked limitation of physical activity; HF symptoms with mild activity, none at rest
		IV	HF symptoms with any physical activity or HF symptoms at rest
D	Refractory HF requiring specialized interventions	IV	HF symptoms with any physical activity or HF symptoms at rest

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HF Treatment: Stage A

Avoid or control conditions that may lead to or contribute to HF.

- Hypertension
- Lipid Disorders [Level A]
- Obesity
- Diabetes
- Tobacco Use [Level C]

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HF Treatment: Stage B

- ACE (or ARB) [Level A] + Beta Blocker [Level B/C]
  - History of MI + Reduced EF
  - ACS + Reduced EF
  - Reduced EF (alone)
- Statin
  - History of MI
  - History of ACS
- AVOID nondihydropyridine calcium channel blockers in patients with low EF

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HF Treatment: Stage C

- NYHA Class I: ACE or ARB + Beta Blocker
- NYHA Class II-IV:
  - If volume overload ADD Loop Diuretics [Level C]
  - If creatinine clearance > 30 and K+ < 5.0 ADD Aldosterone Antagonist [Level A]
- NYHA Class III-IV:
  - If African American persistently symptomatic ADD Hydral-Nitrates [Level A]

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HF Treatment: Stage D

- Inotropic support
- Mechanical circulatory support
- Cardiac transplantation

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HF: GDMT Benefits

GDMT	RRR Mortality	NNT	RRR Hospital
ACE/ARB	17%	26	31%
Beta Blocker	34%	9	41%
Aldosterone Antagonist	30%	6	35%
Hydralazine+Nitrate	43%	7	33%

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Strategies for Achieving Optimal GDMT

1. Titrate medications slowly
2. Schedule follow up appointments and lab monitoring at appropriate intervals
3. Monitor vital signs closely
4. Alternate adjustments of medication classes
5. Educate and reassure patients about transient effects with changes in therapy
6. Discourage sudden discontinuation of GDMT medications
7. Partner with patients and families around benefits of achieving GDMT

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AES Question

A 78 year old black female presents to the urgent care center complaining of palpitations for the last 4-5 days. She reports a history of hypertension (controlled) but denies any other medical history. An EKG reveals atrial fibrillation with a rate of 80. Which medications would be appropriate choices for anticoagulation?

A. warfarin
B. dabigatran
C. rivaroxaban
D. apixaban
E. none of the above

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Atrial Fibrillation Definitions

- Paroxysmal AF
- Persistent AF
- Long-standing Persistent AF
- Permanent AF
- Nonvalvular AF

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Atrial Fibrillation

Antithrombotic therapy should be individualized based on shared decision making after discussion of the absolute and relative risks of stroke and bleeding and the patient's values and preferences.

[Class I, Level C]

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Atrial Fibrillation Risk Stratification

- $CHADS_2$

  [C]HF + [H]TN + [A]ge>75 + [D]M + Prior [S]troke/TIA/DVT/PE (x2)

- CHA_2DS_2-VASc

  [C]HF + [H]TN + [A]ge>75 (x2) + [D]M + Prior [S]troke/TIA/DVT/PE (x2) + [V]ascular Dz + [A]ge 65-74 + [S]ex

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Atrial Fibrillation Anticoagulation

- Mechanical Valve: warfarin
- Prior Stroke, TIA or CHA_2DS_2-VASc > 2 [Level B]
  - warfarin (INR 2.0-3.0)
  - dabigatran
  - rivaroxaban
  - apixaban

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Atrial Fibrillation: Bridging

Balance vs. risk of bleed
Avoid if AF with NO risk factors

Higher Risk:
- Rheumatic Heart Disease
- Thromboembolic Stroke
- CHF with EF < 30%
- Mechanical Valve

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AES Question

A 56 year old Hispanic male patient returns to clinic for follow up on his hypertensive heart disease and heart failure. He missed his routine follow up appointment last week due to "transportation issues" and reports that he has not been taking medications regularly and has noted increasing weight and edema over the past two weeks. He continues to smoke tobacco. Which of the following is the most important next step?

A. Advise the patient to quit smoking
B. Send refills for the diuretic to the pharmacy
C. Draw labs to ensure normal renal function
D. Discuss the reasons for treatment nonadherence

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Practice Recommendations

- Bring it home: tell a friend
- Utilize EHR tools for population management
- Reach out to cardiology colleagues
- Connect with the hospital
- Personalize the message to your patients

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Questions

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Contact Information

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Reference Slide

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When services performed in conjunction with:

Office Visit + EKG 992xx - 25 + 93000

*Time-based selection documentation criteria:

- Face-to-face time
- greater than 50% spent counseling/coordinating care

Chronic Care Management 99490

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Associated Session

- Cardiovascular Pharmacology: Ask the Expert

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