Disclaimer

Ambulatory Care Case-Based Reviews

Chronic Cardiovascular Disorders

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> HIGH-YIELD MED REVIEWS

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Basic Rules

- Learning should be
 - Easy to understand clinically relevant
 - Evidence-based
 - Oriented to the patient but
- It also should be FUN

Introduction



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Agenda

- Case with 5 primary care indications
- A special coupon code & feedback
- Live Q&A

Integrated Case-Reviews







Case 1

- A 54-year-old female with a PMH of DM2, HTN, HFrEF, chronic low-back pain comes in by EMS with reports of waking up this morning with a sudden onset of shortness of breath and found to have flash pulmonary edema in the context of uncontrolled HTN and known HF.
- The patient was stabilized, underwent diuresis, and was sent home.
- What was the patient's cause for exacerbation?

HIGH-YIELD MED REVIEWS

Case 1

-	Drugs	to use	with	Caution -
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TABLE 13	Selected Prescription Medications That May Cause or Exacerbate HF						
	Associa	ted With HF					
Drug or Therapeutic Class	Causes Exacerbates Direct Underlying Myocardial Myocardial Toxicity Dysfunction		Magnitude of HF Induction or Precipitation	LOE for HF Induction or Precipitation	Possible Mechanism(s)	Onset	
COX, nonselective inhibitors (NSAIDs)		х	Major	В	Prostaglandin inhibition leading to sodium and	Immediate	
COX, selective inhibitors (COX-2 inhibitors)	XX, selective X Major B water retention, increased systemic vasc inhibitors X Major B resistance, and bunted response to dun (COX-2 inhibitors)		water retention, increased systemic vascular resistance, and blunted response to diuretics	Immediate			
Thiazolidinedione	15	х	Major	А	Possible calcium channel blockade	Intermediate	
Saxagliptin		х	Major	А	Delegence	Intermediate to delayed	
Alogliptin		х	Major	А	- Onknown		
Flecainide		х	Major	А	Negative inotrope, proarrhythmic effects Immediate to int		
Disopyramide		х	Major	В			
Sotalol X Major A		Proarrhythmic properties, beta blockade	Incore distante l'atorne d'ato				
Dronedarone		х	Major	А	Negative inotrope	 Immediate to intermediat 	
Alpha-1 blockers							
Doxazosin		х	Moderate	В	Beta-1-receptor stimulation with increases in renin and aldosterone	Intermediate to delayed	
Diltiazem		х	Major	В			
Verapamil		х	Major	В	Negative inotrope	Immediate to intermediate	
Nifedinine		x	Moderate	c	-		

JACC 2022;79(77):e263-e421.

Case 1

- Drugs to use with Caution -

- What other common drugs were missing from that chart?
 - Chemo (Anthracyclines): Doxorubicin, Daunorubicin
 - Antifungals: amphotericin B, +/- Itraconazole

Case 1

- Risk Factors for HF -

- What are the most common risk factors for HF in the US?
 - HTN
 - Ischemic heart disease
 - Valvular disorders
 - Others:
 - Chemotherapy
 - Viral myocarditis
 - OSA

Circulation 2016;134:e32-e69.

Case 1

- Comprehensive Care -

- What other information do we need at this point?
 - Ethnicity \rightarrow _____
 - Past medical history \rightarrow _____
 - Current Medications \rightarrow _____
 - Vital signs \rightarrow _____
 - Dry weight \rightarrow _
 - What about other "weights"? →

Case 1

- Comprehensive Care -

- What other data do we need at this point?
 - Cardiopulmonary exercise testing \rightarrow
 - Labs \rightarrow _____
 - When might BNP be falsely low?
 - Chest radiograph → _____
 - $\text{ECG} \rightarrow$ _____
 - ECHO results \rightarrow _____
 - Our patient: Baseline (______%) vs. Current (______%)

Case 1

- Evaluation & Workup -
- 54-yr-old female (Hispanic)
- PMH:
 - DM2, HTN, HFrEF
- Current Meds:
 Matformin_gluburide_lisingeril
 - Metformin, glyburide, lisinopril, metoprolol tartrate, furosemide
- Current VS:
 - T = 98.7, P = 68, BP = 145/91, RR = 14, O2Sat = 96%
 - Ht: 5' 7", Wt = 95 kg, Waist circumference = 42"
 - IBW = ____ kg and BMI = _____

Case 1

- Evaluation & Workup -
- Labs:
 - CBC = nml
 - BMP: Cr = 1.1, Glucose = 145 (fasting)
 - HgbA1C = 7.8%
 - TSH = 2.1
 - Lipids: TC = 205, HDL = 32, TG = 210, LDL = 131
 - BNP = 140 pg/mL
- ECHO:
 - EF: Baseline (____ %) vs. Current (____ %)
- NYHA Class II:
 - Mild symptoms & limitations during ordinary activity



Case 1

- Evaluation & Workup -

- Problem List:
- HFrEF by history, labs, and ECHO
 - HTN (uncontrolled?)
 - Hyperlipidemia (uncontrolled and untreated)
 - DM2 (uncontrolled)
 - Obesity

Table 6. Classification of Overweight and Obesity by BMI and Waist Circumference (31 [EL 4; NE]) BMI Waist Waist Circumference and <u>Co</u>morbidity Risk norbidity Risk Underweight <18.5 Low but other problems 18.5-24.9 Average Normal weight Overweight 25-29.9 Increased Increased High Obese class I 30-34.9 High Very high Moderate 35-39.9 Severe Obese class II Very high Very high Very severe Extremely high Extremely high Obese class III ≥40 Abbreviations: BMI = body mass index; in = inches

AACE Obesity Guidelines 2016



Integrated Case-Reviews

- Evaluation & Work-Up: Case 1 -

Level of Evidence



Case 1 - Classification of HF -



JACC 2022;79(77):e263-e421.



JACC 2022;79(77):e263-e421.



Case 1 - Hypertension -

Does our patient have uncontrolled HTN?



Hypertension 2018;71:1269-1324.

ACC/AHA/AAPA/ABC/ACPM/AGS/ASH

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Hypertension 2018;71:1269-1324.

ACC/AHA/AAPA/ABC/ACPM/AGS/ASH - Hypertension Guidelines -

Patient Group	Blood Pressure (mm Hg)	Initial Treatment Options
Normal	< 120 / < 80	
Elevated	120 – 129 / < 80	Lifestyle Modifications
Stage 1	130 – 139 / 80 - 89	Thiazide diuretics* CCBs* ACE or ARBs
Stage 2	≥ 140/90	Combination with 2 first line agents of different classes
		* Preferred if black adults

What drug classes are missing?

What are the ideal antihypertensive medications?

Hypertension 2018;71:1269-1324.

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Ideal Antihypertensives



Ideal Antihypertensives Trough:Peak Ratio

- Goal: Maintain antihypertensive effects over the entire 24-hour period.
 - Trough: Peak ratio.
 - The trough is the decrease in blood pressure maintained at the end of the dosing interval versus the peak lowering, usually around the Cmax. To offer 24-hour control, drugs need a T:P ratio of ______

FDA

Case 1 - Management Strategies -



Case 1

- Evaluation & Workup -

- Problem List:
 - HFrEF (Stage C)
 - HTN (uncontrolled?)
- Hyperlipidemia (uncontrolled and untreated)
 - DM2 (uncontrolled)
 - Obesity

Case 1 - Hyperlipidemia -

Does our patient need primary, secondary, or tertiary prevention?



Kisling LA, Das J. Prevention Strategies. In: StatPearls [Internet].

Case 1 - Hyperlipidemia -

What is our patient's risk for ASCVD?

GE of ASC	CVD Risk Estimator Plus	\$		Estimate Ri	SK T.
		10.3% ^g	irrent 10-Year		
		Lifetime ASCVD Risk: 50% O	otimal ASCVD Risk:	1.2%	
	Current Age 🛛 *	Sex *	Race *		
	54	Male 🖌 Female	White	African American	🗸 Other
	Age must be between 20-79		A See the Estimate		
	Note: These estimates may underst (e.g., of south Asian ancestry), and s ancestry) and serve Hisparics (e.g., 1 reduction through lifestyle change, t	incer the 10-year and lifetime risk for persons from a one Hispanics (e.g., Puerto Ricans), and may oversore Noncern Americans). Because the primary use of the he imprecision introduced is small enough to justify	ome race/ethnic groups, es use the risk for others, indi e risk estimates is to facilita proceeding with lifestyle cha	pecially American Indians, some Asian uding some Asian Americans (e.g., of o are the very important discussion rega ange counseling informed by these re	n Americans Sast Asian Inding risk Suits.
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What do we make of the lipid profile?



Pathology of Type 2b Dyslipidemia



Small LDL Patterns & HDL Removal



Ginsberg HN. J Clin Invest 2000;106:453-458

Why TG & non-HDL Goals?







What is the evidence for statins in primary vs. secondary prevention?

Landmark Primary Prevention Trials Landmark Secondary Prevention Trials

Study	Year	n	Drug	Results
LRC-CPPT	1984	1,906	cholestyramine	CHD incidence ↓ 18.9%
ннѕ	1987	2,051	Gemfibrozil	CHD incidence ↓ 34%
WOSCOPS	1995	3,302	Pravastatin	Death from all CVD ↓ 32%; non- fatal MI ↓ 31%
AFCAPS/ TexCAPS	1998	3,304	Lovastatin	First acute event ↓ 37%
PROSPER	2002	3,239 / 5804	Pravastatin	HR, 0.94 (0.77-1.15; p=0.19). Combined CVD no different
ASCOT-LLA	2003	10,305	Atorvastatin	Stopped early. Nonfatal MI & fatal CHD ↓ 36%. Fatal & non- fatal stroke ↓ 27%.
Juniper	2008	17,802	Rosuvastatin	In pts with hsCRP>2 mg/dL; 20% risk reduction in overall mortality

LRC-CPPT = Lipid Research Clinics Coronary Primary Prevention Trial; HHS = Helsinki Heart Study; WOSCOPS = West of Scotland Coronary Prevention Study; AFCAPS/TexCAPS = Air Force/Texas Coronary Atherosclerosis Prevention Study; PROPSER = PROSpective Study of Pravastatin in the Eldery at Risk; ASCOT-LLA = Anglo-Scandinavian Cardiac Outcomes Trial-Lipid Lowering Arm

Study	Year	n	Drug	Results
4S	1994	2,221	Simvastatin	CHD mortality ↓ 42%
CARE	1996	2,081	Pravastatin	CHD death or nonfatal MI ↓ 24%
LIPID	1998	4,512	Pravastatin	CHD death ↓ 24%
MIRACL	2001	1,538	Atorvastatin	Recurrent events ↓ 16%; stroke ↓ 50%
PROSPER	2002	2,565	Pravastatin	Elderly pts* (70-82 yrs) Combined CVD ↓ by 22%
HPS	2002	20,536	Simvastatin	All cause mortality ↓ by 13%; Coronary death rate ↓ 18%
PROVE IT	2004	4,162	Atorvastatin vs Pravastatin	Composite CVD ↓ 16%

45 = Scandinavian Simvastatin Survival Study; CARE = Cholesterol and Recurrent Events Trial; LIPID = Long-term Intervention with Pravastatin In Ischemic Disease Study; MIRACL = Myocardial Ischemia Reduction with Aggressive Cholesterol Lowering Study; PROSPER = PROspective Study of Pravastatin in Elderly at Nisk; HPS = Health Protection Study; PROVE IT TIMI 22 = Pravastatin or Atorvastatin Evaluation and Infection Therapy – Thrombolysis in MI 22 Study.

Statin Therapy

	High-Intensity Statins	Moderate Intensity	Low Intensity
Primary Prevention	ASCVD Risk of ≥ 20% or "High Risk"	ASCVD Risk of ≥ 7.5% to < 20% or "Intermediate Risk" ASCVD Risk of 5% to < 7.5% or "Borderline Risk" + ASCVD Risk Enhancers	ASCVD Risk of < 5% or "Low Risk"
Secondary Prevention	"Very High Risk" ASCVD	ASCVD + Unable to Tolerate High-Intensity Statins	ASCVD + Unable to Tolerate Moderate-Intensity Statins
LDL-c Lowering	≥ 50%	30% - 49%	< 30%
Statins	 Atorvastatin 40 – 80 mg Rosuvastatin 20 – 40 mg 	 Atorvastatin 10 – 20 mg Rosuvastatin 5 – 10 mg Simvastatin 20 – 40 mg Pravastatin 40 – 80 mg Lovastatin 40 – 80 mg Fluvastatin 40 mg BID Fluvastatin 40 mg BID 	 Simvastatin 10 mg Pravastatin 10 – 20 mg Lovastatin 20 mg Fluvastatin 20 – 40 mg

JACC 2019:73(24):e285-350.

Hyperlipidemia Guidelines



Case 1 - Management Strategies -



Integrated Case-Reviews

- Other Considerations -



Case 1 - Less Likely Tested But ... -



JACC 2022;79(77):e263-e421.

Case 1 - Plan -

Problem List:

- HFrEF (Stage C)
 - Switch patient from _____
 - Switch metoprolol tartrate to _____
 Add SGLT2i (Dapagliflozin or ______
 - +/- MRA
 - Consider ICD placement since HFrEF with EF < 35% + NYHA II
- HTN (uncontrolled?)
- Re-evaluate after the above for HF
- Hyperlipidemia (uncontrolled and untreated)
 Improved DM control + weight loss
 - Moderate-intensity statin (atorvastatin, rosuvastatin)
- DM2 (uncontrolled)
 - SGLT2i
 - What about GLP-1 agonist (DM, HF, & Obesity): _____
 But NO →
- Obesity

Case 1

- Evaluation & Workup -

- Problem List:
 - HFrEF (Stage C)
 - HTN (uncontrolled?)
 - Hyperlipidemia (uncontrolled and untreated)
- DM2 (uncontrolled)
- 🛑 Obesity

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