

Type 2 Diabetes: A Blood Vessel Disease

Suzanne Hughes MSN RN

Director, Health Education and Nursing Research
Robinson Memorial Hospital
Ravenna, OH

shughes@rmh2.org

"I just had a heart attack...I got out of the hospital a few weeks ago."

- David, 52-year-old male
- Recently hospital admission w/ severe chest pressure
- Non-ST-segment MI (NSTEMI)
- Focal 90% occlusion of the proximal left cx
- Single DES was placed
- d/c 2 days later in stable condition (18 days ago).

Background

- Prior to his hospitalization, David had not been receiving regular medical care- no PCP
- He is referred to your clinic for the first time; you are the first provider he is seeing after his hospital discharge
- Reports doing well; no recurrence of chest pain
- Taking all of the medications prescribed and does not report any adverse effects
- He brings a list of medications, as well as a discharge summary from his hospitalization.

History

- Coronary artery disease, status post NSTEMI
- Hypertension (diagnosed during hospitalization)
- Right knee surgery when a teenager
- Family and social hx
 - Married; 2 grown children in college
 - Works as an accountant; sedentary lifestyle with no regular exercise
 - Remote smoking history, 20 pack-years, quit 12 years ago
 - Father- MI at age 67, still living
 - Mother -no CVD hx; t2DM x 20 years
 - One sister who has no cardiovascular history.

Physical exam

- Height: 5 ft 10 in; Wt: 205#; BMI: 29.4
- Waist circumference: 42 in
- BP: 132/84 Pulse: 71
- Thyroid: Non-palpable Neck: Unremarkable
- Lungs: Clear to auscultation
- Heart: Regular rate and rhythm, no murmurs, gallops, rubs, normal PMI
- Abdomen: Protuberant, non-tender
- Extremities: Pedal pulses 2+ bilaterally

Medications

- Aspirin 325 mg daily
- Clopidogrel 75 mg daily
- Metoprolol XL 100 mg daily
- Rosuvastatin 10 mg daily

Labs from D/C summary

- Na: 141 mEq/L
 - Chl: 105 mEq/L
 - BUN: 15 mg/dL
 - Glucose: 172 mg/dL
 - Total cholesterol: 220 mg/dL
 - Triglycerides: 167 mg/dL
 - HDL-C: 39 mg/dL
 - Calculated LDL-C: 148 mg/dL
- K⁺ 3.9 mEq/L
 - CO₂: 24 mEq/L
 - Cr: 1.2 mg/dL

Which of the following is NOT a CHD risk equivalent according to the NCEP ATP III guidelines?

- A. Diabetes
- B. Metabolic syndrome
- C. Aortic abdominal aneurysm
- D. Peripheral arterial disease
- E. Symptomatic carotid artery disease
- F. Framingham risk score > 20%

- Long-term use of an ACE inhibitor is highly recommended if he has any of the following conditions EXCEPT:

A. Diabetes mellitus

B. Hypertension

C. Clinical heart failure

D. Left ventricular ejection fraction < 40%

E. Atrial fibrillation

For which of the following is an antiplatelet agent such as aspirin NOT recommended?

- A. Diabetes mellitus
- B. History of ST-segment elevation myocardial infarction
- C. History of non-ST-segment elevation myocardial infarction
- D. Uncontrolled hypertension
- E. Ischemic stroke
- F. Transient ischemic attacks

When not to give aspirin?

- Alternative antiplatelet agents are acceptable in aspirin-intolerant patients
- In patients with uncontrolled hypertension, the risk of intracranial hemorrhage from ASA may outweigh the CV benefit, and so aspirin is not recommended for this condition in the absence of other CVD risk factors.
- ASA not recommended in individuals < 30 years of age due to lack of evidence of benefit
- It is contraindicated in those < 21 years of age due to the risk of Reyes syndrome.

Priorities for this Visit

- S/P NSTEMI, PCI
- Multiple risk factors for a recurrent CVD event
 - Known CHD
 - Hypertension
 - Dyslipidemia
 - Metabolic syndrome
 - all 5 features present

What next?

- Stable from a cardiac perspective
- On the evidence-based cocktail of medications for 2nd prevention and tolerating meds
- Critical opportunity to address issues that may not have been adequately addressed during David's hospitalization.
- The primary objective is to ↓ David's risk of having a future CV event.

Criteria for clinical diagnosis of the metabolic syndrome

Measure	Categorical cut points
Elevated waist circumference	Population- and country-specific definitions
Elevated triglycerides (or drug treatment for elevated Tg)	≥ 150 mg/dL
Reduced HDL cholesterol (or drug treatment for reduced HDL-C)	<40 mg/dL (males) <50 mg/dL for females
Elevated blood pressure (or drug treatment for elevated BP)	Systolic ≥ 130 mm Hg and/or diastolic ≥ 85 mm Hg
Elevated fasting glucose (or drug treatment for elevated glucose)	≥ 100 mg/dL

- On the next slide is a list of requests from which you will select in order to receive additional information re: this visit.
- You may select only six of the ten requests listed.
- (You do not need to rank your choices)

You may choose 6 of these 10

1. Determine the Framingham risk score
2. Order a fasting lipid profile
3. Order acute phase biomarker profile
4. Order liver function tests
5. Order fasting plasma glucose
6. Order hemoglobin A1C
7. Perform a dipstick urinalysis
8. Ask David about his sleep habits
9. Ask David about any recent weight changes
10. Review labs from hospital records.

1. Determine the Framingham risk score

- A. Yes, I choose this as one of 6 priorities
- B. No, I do not view this option as a priority

2. Order a fasting lipid profile

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3. Order acute phase biomarker profile

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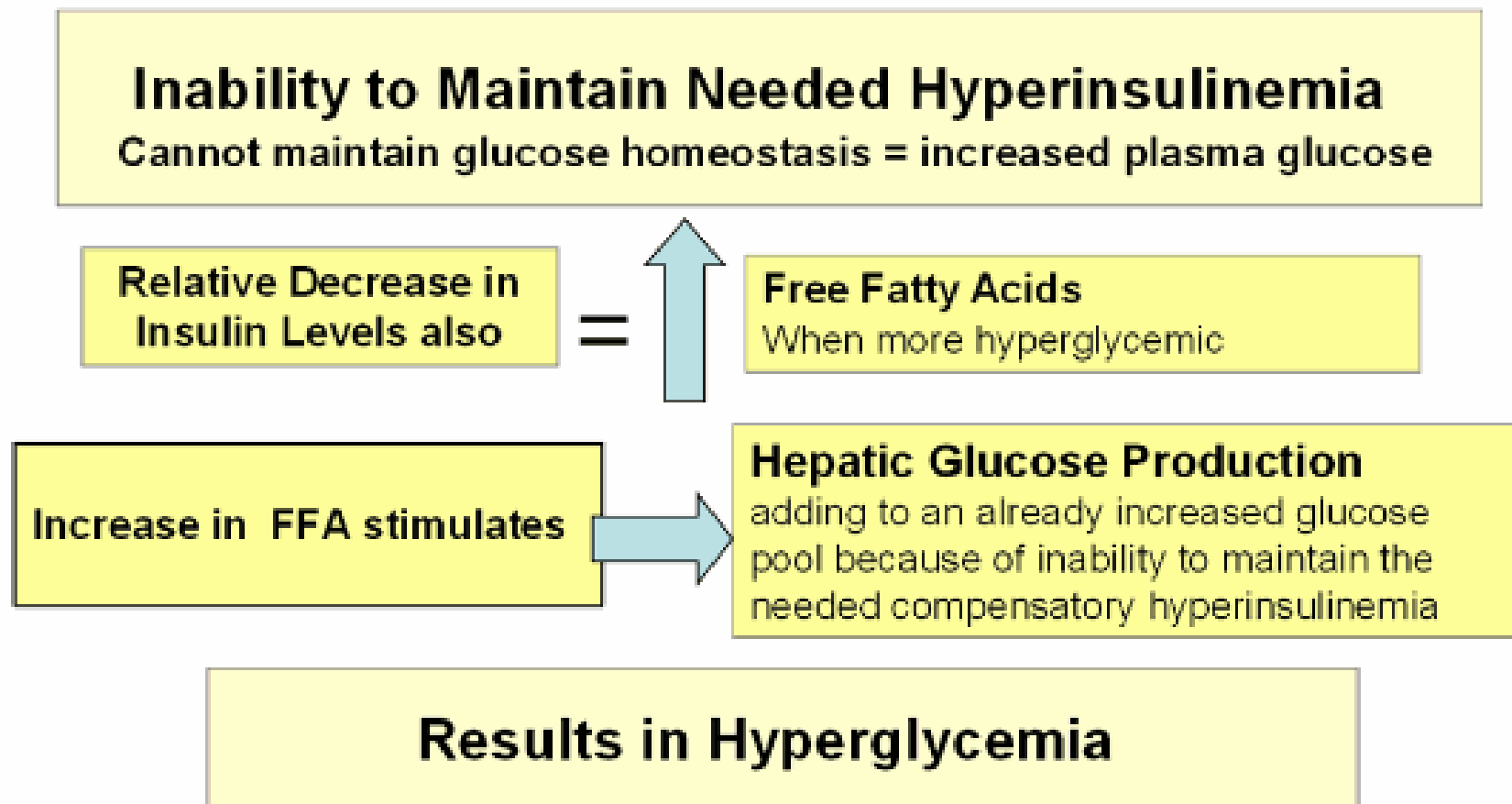
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Link Between Insulin Resistance and Type 2 Diabetes



7. Perform a dipstick urinalysis

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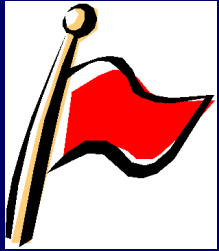
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- B. No, I do not view this option as a priority

Labs from 5:00 AM on the day before discharge (prior to cath)

- Electrolytes nl
- BUN 15 mg/dL Creatinine 1.2 mg/dL
- Glucose 211 mg/dL
- Cholesterol 220 mg/dL
- Triglycerides 167
- HDL-C 39
- LDL-C 148
- Creatine kinase 52 ng/mL CK-MB 3.1 ng/mL
- Troponin I 5.4 ng/mL

Significance of in-hospital lab work

- Laboratory data provides valuable info
- Indicates that David is at very high-risk and may need to be monitored very closely post-discharge.



Abnormal fasting glucose

- Red flag: elevated fasting glucose level (172 mg/dL). This elevation is confirmed on another day.
- A fasting plasma glucose test checked during this clinic visit (161 mg/dL), as well as his hemoglobin A1C level (9.6%), confirms the diagnosis of diabetes.
- He also has other symptoms and findings that are consistent with DM: glucose in the urine, polyuria, and unintentional weight loss. His diabetes has not yet resulted in serious microvascular sequelae such as nephropathy.

Persistent hyperglycemia during ACS

- Seen in over 40% of ACS pts
- High short- and long-term mortality, esp if no hx DM
- A substantial proportion have unrecognized IFG or DM
- In 3 studies of hospitalized ACS patients without a prior diagnosis of DM, 31%, 14%, and 27% met criteria for DM, with many more meeting criteria for IFG.
- Most are discharged without a diagnosis of diabetes or IFG.
- Majority continue to have abnormal glucose metabolism 3 months post D/C

Persistent hyperglycemia during ACS

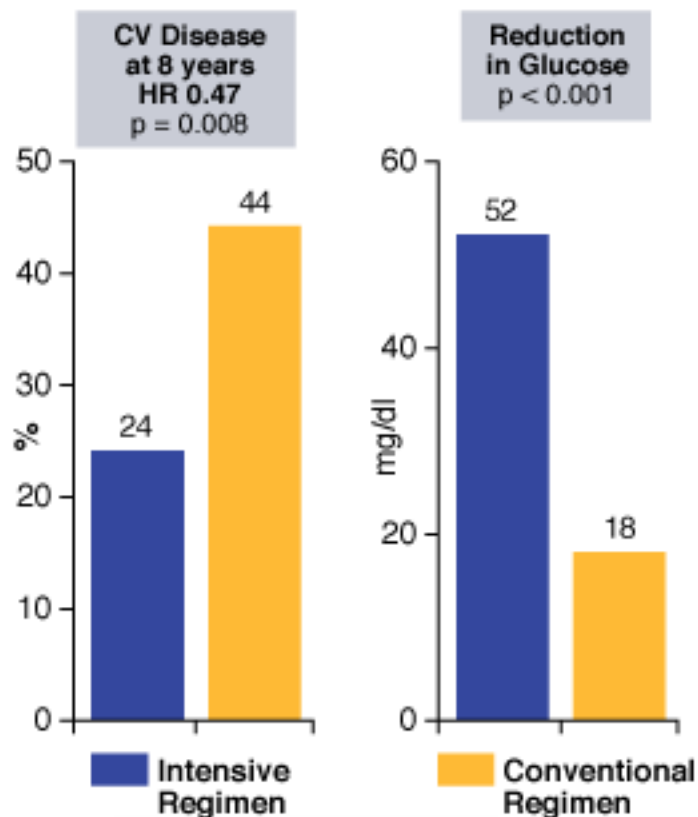
- If the diagnosis is not made during the hospitalization, the first follow-up outpatient visit is a prime opportunity to review the inpatient record and, if warranted, perform the appropriate testing to confirm the diagnosis and initiate DM therapy.

Persistent hyperglycemia during ACS

- The recognition of previously undiagnosed DM should give providers extra motivation to aggressively treat these pts, both to reduce CVD risk and to prevent microvascular complications.
- While the exact glucose control targets in t2DM patients remain subjects of current debate, improving glucose control in someone with the new DM diagnosis and A1C of > 9% will likely reduce microvascular complications (UKPDS), and may reduce the risk of macrovascular complications.
- David's A1C of 9.6% warrants counseling on lifestyle changes along with pharmacologic Rx

Steno-2 Study

Trial Design: Patients with type 2 diabetes and microalbuminuria were randomized to an intensive intervention regimen (n=80) of behavior modification and polypharmacologic therapy or a conventional therapy regimen (n=80) in accordance with national guidelines. The primary endpoint was a composite of cardiovascular disease, defined as death from cardiovascular causes, nonfatal MI, nonfatal stroke, revascularization, or amputation at 8 years follow-up.



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Results

- No significant difference in change in exercise, smoking, or caloric intake
- Intensive therapy group had larger reductions in glucose (Figure), glycosylated hemoglobin (-0.5% vs 0.2%, p<0.001), triglycerides (-41 mg/dl vs 9 mg/dl, p=0.015), total cholesterol (-50 mg/dl vs -3 mg/dl, p<0.001) and LDL (-47 mg/dl vs -13 mg/dl, p<0.001)
- Risk of primary endpoint of CV disease ↓ in intensive group (Figure), nephropathy (HR 0.39, 20% vs 39%, p=0.003), and retinopathy (HR 0.42, p=0.02)

Conclusions

- Among patients with type 2 diabetes and microalbuminuria, use of an intensive intervention regimen of behavior modification and polypharmacologic therapy was associated with a reduction in long-term cardiovascular disease compared with a conventional therapy regimen
- Benefits continued throughout 8 years of the study with ongoing divergence of event curves, suggesting continual reinforcement of risk factor reduction was effective

N Engl J Med 2003;348:383-93

Convergence of DM and CVD: ABCs

- A1C Target and aspirin
- Blood pressure
- Cholesterol and Cigarette smoking cessation
- Diabetes and prediabetes lifestyle mgt
- Exercise
- Food Choices



Convergence of Diabetes & Cardiovascular Disease



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BOARD

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ASSESSMENT

OBJECTIVES

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& OUTCOMES

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- Protect your Heart: Check Food Labels to Make Heart-Healthy Choices
- All About Carbohydrate Counting
- All About Physical Activity for People with Diabetes
- Learning How to Change Habits
- Recognizing and Handling Depression for People with Diabetes
- Know the Warning Signs of a Heart Attack
- Taking Aspirin to Protect Your Heart

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