CHF

Inpatient Management

Sam Ives
Internal Medicine

Disclosures

- I currently have no financial ties to any of the drugs, procedures or devices I might mention
- I am open to sponsorship deals PRN

Outline

- Diagnosis of CHF
  - DDx and mimics
  - Work up for new CHF
- Inpatient treatment for CHF exacerbation
- When to get a cardiology consult

Case #1

- 53 y.o. man with DM and HTN presents for fatigue.
- He reports feeling fatigued for one week and SOB with a cough.
- He works at food service location and reports difficulty moving crates due to SOB.

Case #1

- He has LE swelling
- Difficulty sleeping lying flat

- No fever
- Cough is dry
- No chest pain

Case #1

- PMH- DM, HTN, hypothyroidism, non-smoker

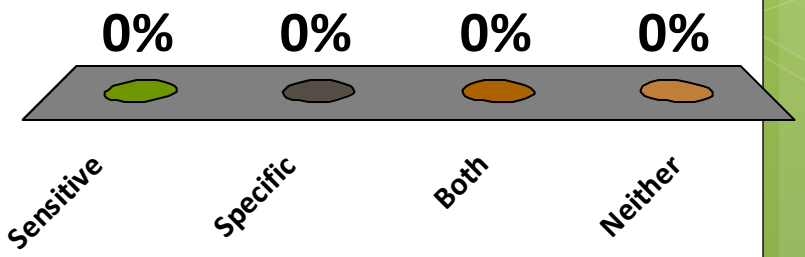
- Meds
  - Ibuprofen
  - HCTZ
  - Metformin/glipizide,/pioglitazone
  - Levothyroxine

Case #1

- 150/99, Pulse 85 (regular), RR 22, Sp02 97
- Heart- **+S3**, no murmur
- Lungs clear
- **2+ symmetric LE edema to knees**
- **Neck veins elevated to 12 cm H20**

Is the S3 a sensitive or specific marker of CHF?

A. Sensitive
B. Specific
C. Both
D. Neither



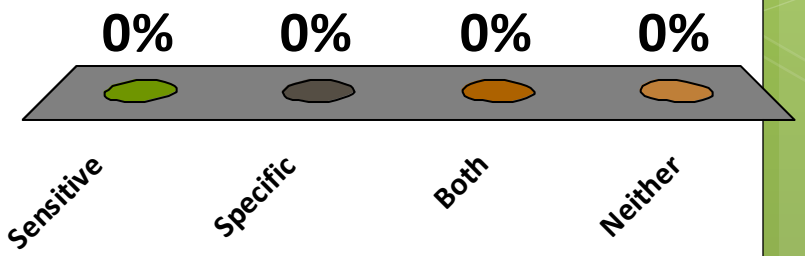
Case #1: Labs

- WBC 12.8, Hgb/Plt normal
- Cr 1.1

- **Troponin normal**
- **NT Pro-BNP 6282 pg/mL(normal 0-899)**

Is the NT-pro BNP a sensitive or specific marker of CHF?

A. Sensitive
B. Specific
C. Both
D. Neither



Framework- DEFEAT

- **D**iagnosis – Is it CHF?
- **E**tiology – If it is CHF, why do they have it?
- **F**luid status- how much volume?
- **E**jection Fraction- what type of CHF?
- **A**nd
- **T**herapy- How to treat?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HEART FAILURE CLINICS

Heart Failure Clin 3 (2007) 389–402

DEFEAT Heart Failure: Clinical Manifestations, Diagnostic Assessment, and Etiology of Geriatric Heart Failure

Ali Ahmed, MD, MPH[a,b,*]

[a]University of Alabama at Birmingham, Birmingham, AL, USA
[b]Birmingham Veterans Affairs Medical Center, Birmingham, AL, USA

Evaluation of possible CHF

- **Classic sx**
- Dyspnea, orthopnea, edema

- Other common sx
  - fatigue, cough, chest pain

- Chronic CHF- anorexia, abd pain

Evaluation of possible CHF

- Problems with the classic symptoms
- **Dyspnea** can be due to lots of causes
  - Cardiac, PNA, asthma, ILD, anemia etc
- **Orthopnea-** also seen in COPD, pulm HTN
- **Edema-** can be due to cirrhosis, nephrotic syndrome, OSA

Evaluation of possible CHF- Exam

- Tachypnea common

- Lungs- crackles
- CV- S3
- Neck vein assessment
- LE edeam

Evaluation of possible CHF- Exam

- An S3 is a **specific** but not a sensitive marker of CHF
- That means, if you hear an S3, they likely have some degree of HF (Specific)
- If you don't hear an S3, doesn't mean they don't have CHF (not sensitive)

Evaluation of possible CHF- Labs

- **NT-pro BNP is a sensitive marker of CHF**
  - **At very high levels, NT-pro BNP is fairly specific for CHF**
- A stone cold normal NT-pro BNP (less than 300) really rules out CHF
- NT-pro BNP can be high in renal failure, sepsis
- NT-pro BNP being high does not mean that CHF is the only cause of all of the symptoms

Evaluation of possible CHF- Labs

- **NT-pro BNP is a sensitive marker of CHF**
  - **At very high levels, NT-pro BNP is fairly specific for CHF**
- That means, if NT-pro BNP is not elevated, they likely DO NOT have CHF (sensitive)
- If the NT-pro BNP is very elevated, they have some degree of ventricular stretch (somewhat specific)*
  - ***But they doesn't tell you why they have CHF***
  - **Lots of diseases can have high BNP (PE, MI, etc)**

Evaluation of possible CHF

- Flash pulmonary edema is a common presentation of new MI
- Should consider evaluating for an acute coronary syndrome at initial presentation
- "DO NOT MISS" diagnosis

When to get an echo?

- Suspected new CHF
- Previously dx CHF with new change in symptoms

Framework- DEFEAT

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- **F**luid status- how much volume?
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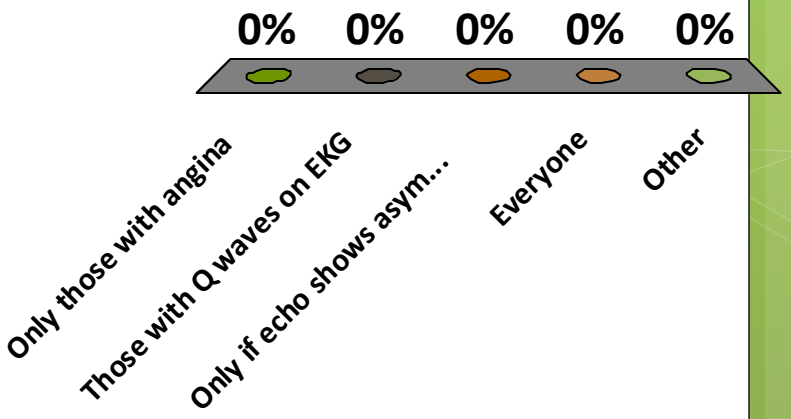
What is the cause of the CHF?

- **Ischemic**

- **Non-ischemic**
  - Classic causes- HTN, DM
  - Viral- (HIV, coxsackie)
  - Infiltrative- sarcoid, amyloid, hemochromatosis
  - Autoimmune
  - Meds
  - Metabolic- hypothyroidism, thiamine

Which patients with new CHF need a w/u for ischemic disease?

A. Only those with angina
B. Those with Q waves on EKG
C. Only if echo shows asymmetric WMA
D. Everyone
E. Other



Labs for a new dx CHF

- Hgb
- TSH- hypo and hyper can both cause CHF
- Iron studies – if considering HH
- HIV Ab

Further eval for new dx CHF

- **Cards consult**
  - **ALL Patients with new CHF**
- **Ischemia evaluation**
  - **ALL patients with new CHF**
  - Usually a cardiac catheterization
  - Stress test is probably ok

Back to the patient

- 53 y.o. man with DM and HTN presents for fatigue.
- Found to have LE edema, +S3, elevated BNP
- Echo shows EF of 25%
- Cardiology consulted. Angiogram does not show obstructive coronary artery disease.

Framework- DEFEAT

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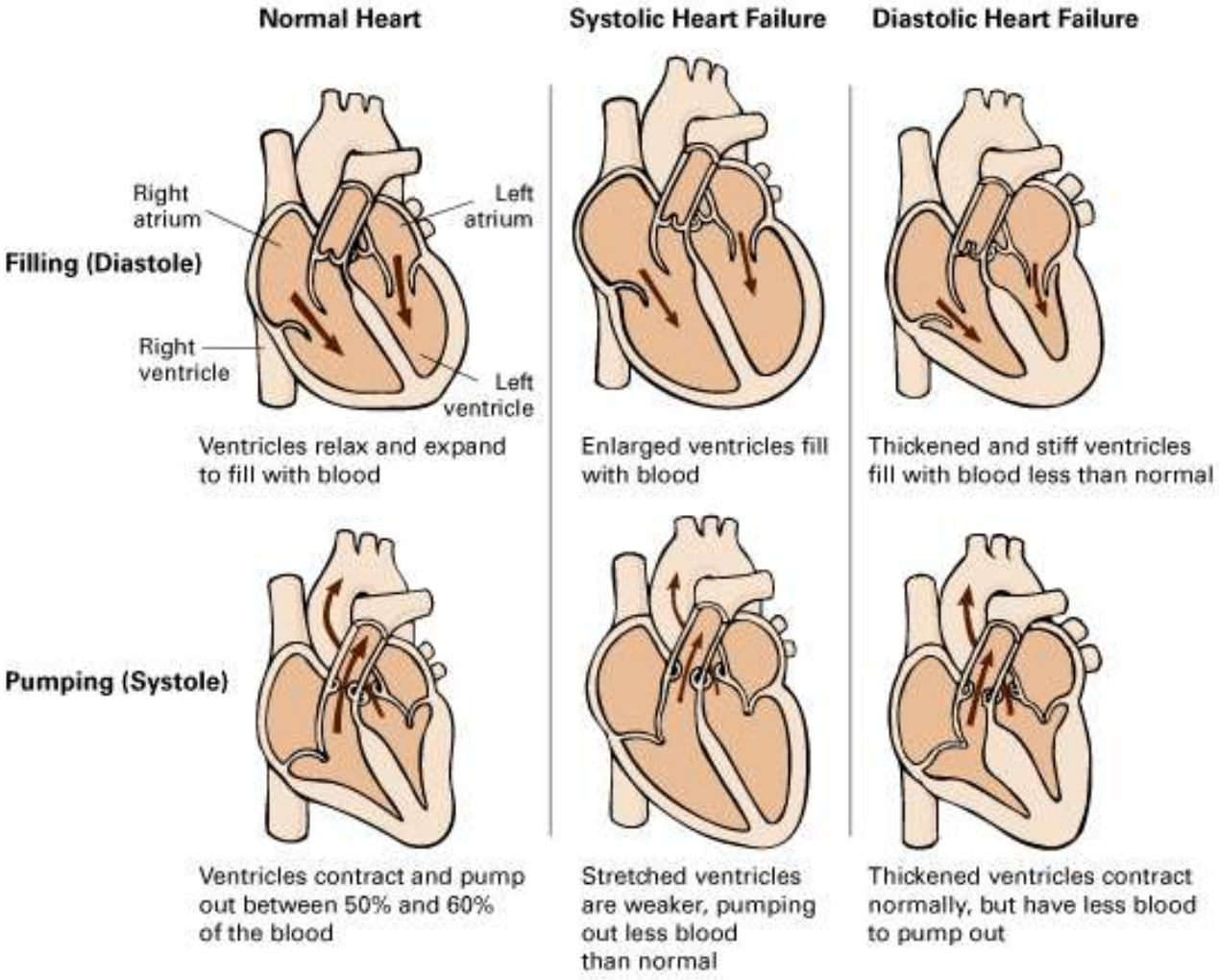

Normal Heart
Systolic Heart Failure
Diastolic Heart Failure
Filling (Diastole)
Right atrium
Left atrium
Right ventricle
Left ventricle
Ventricles relax and expand to fill with blood
Enlarged ventricles fill with blood
Thickened and stiff ventricles fill with blood less than normal
Pumping (Systole)
Ventricles contract and pump out between 50% and 60% of the blood
Stretched ventricles are weaker, pumping out less blood than normal
Thickened ventricles contract normally, but have less blood to pump out

Systolic vs Diastolic

- Systolic HF = low EF
  - pump problem
- Diastolic HF = Impaired filling
  - relaxation problem
  - Heart failure w/Preserved EF (HF-PEF)

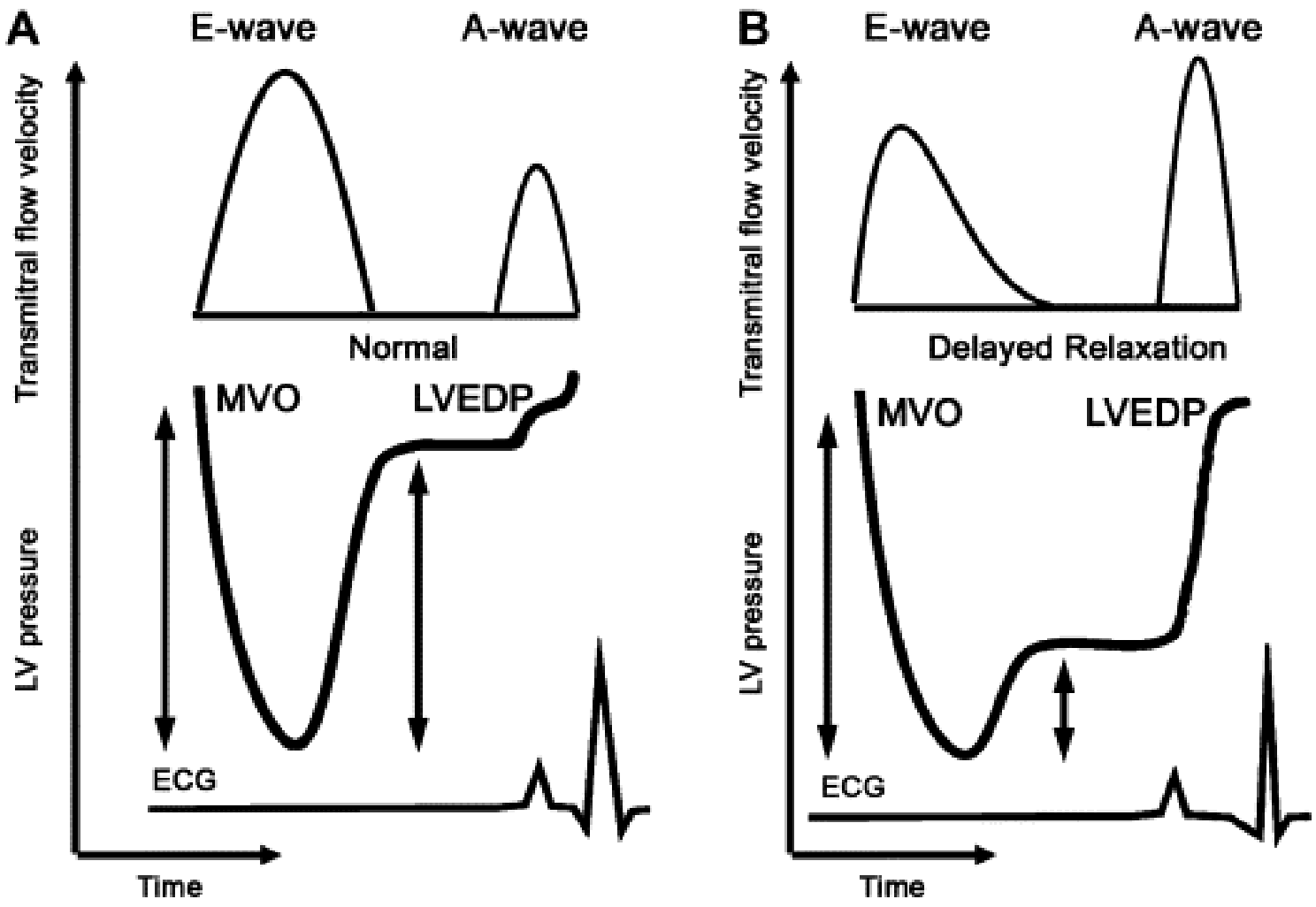
Diastolic HF- Echo

- Doppler mitral inflow velocity
- Pulmonary venous flow pattern
- Tissue doppler

- Assessment of LV relaxation

Diastolic Heart Failure- Echo

- Normally when mitral valve opens, LV is relaxing, a lot of blood fills ventricle EARLY
  - E WAVE
- Atrium contracts later- A WAVE
- If ventricle is stiff, not as much early filling, more later
  - SMALLER E WAVE, BIGGER A WAVE


A
E-wave
A-wave
Transmitral flow velocity
Normal
MVO
LVEDP
LV pressure
ECG
Time
B
E-wave
A-wave
Transmitral flow velocity
Delayed Relaxation
MVO
LVEDP
LV pressure
ECG
Time

Systolic vs Diastolic

- Why should I care?
- Different treatments

Framework- DEFEAT

- **D**iagnosis – Is it CHF?
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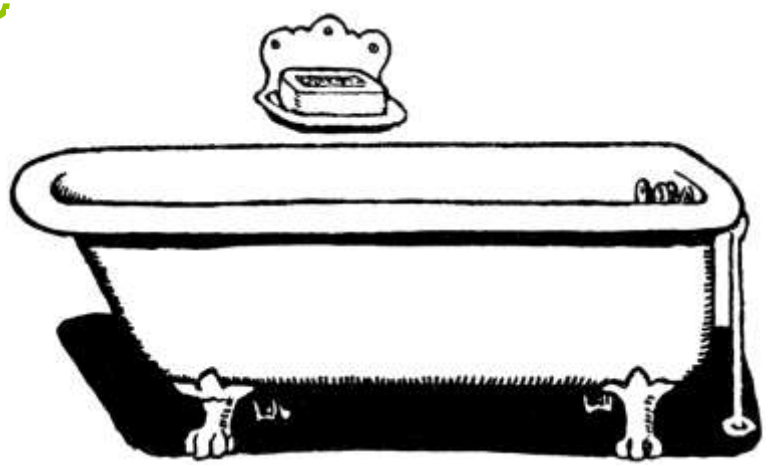
- Fluid status- how much volume?
- Ejection Fraction- what type of CHF?
- And
- **Therapy- How to treat?**

How to treat CHF exacerbation?



- Limit Intake
- Encourage Output
- Control BP
- *CARDIOGENIC SHOCK TX IS DIFFERENT *

Limiting intake

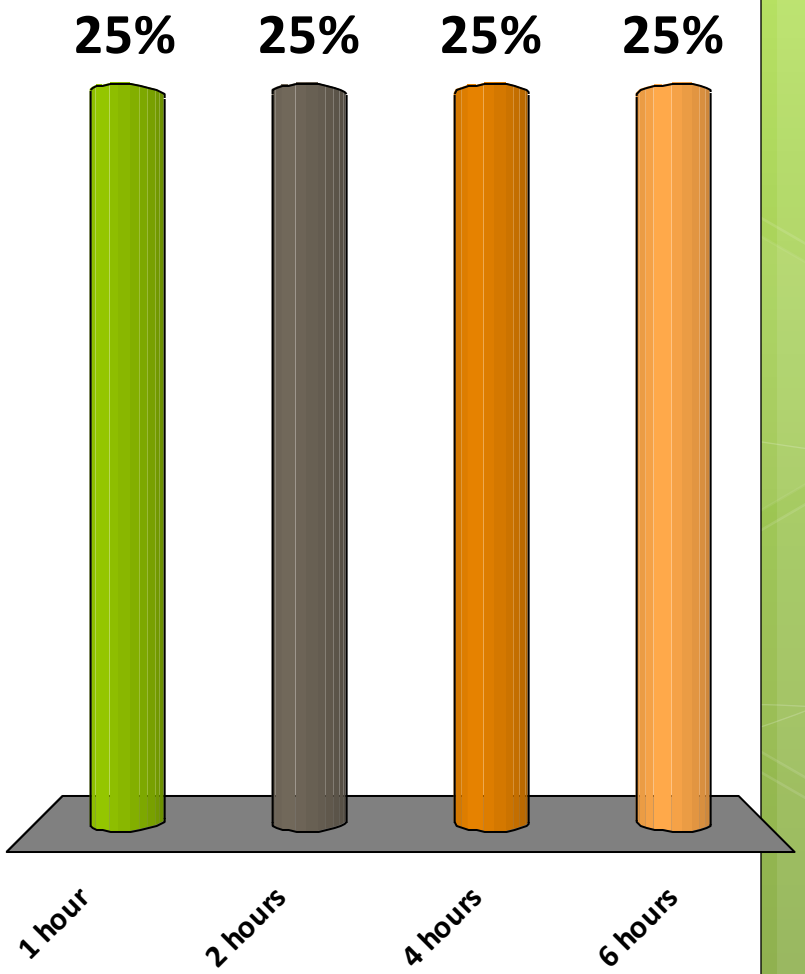
- Fluid restrict
  - At least 1.5 L/day
- Low sodium diet

Encourage output

- Diuresis

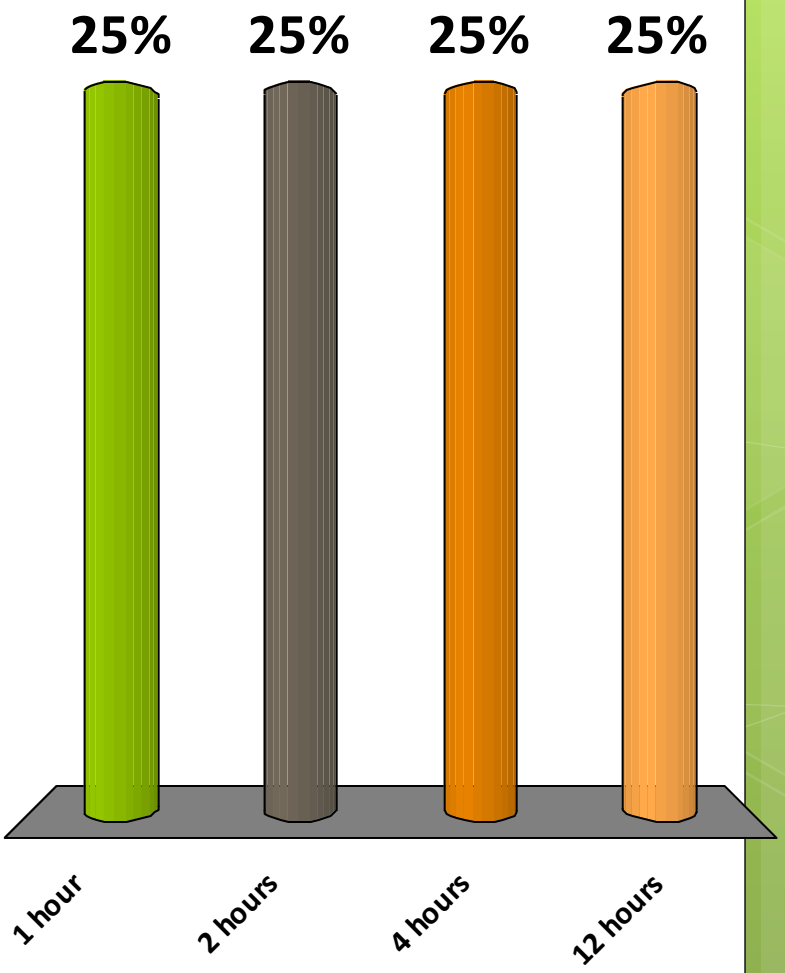
How long does lasix last?

A. 1 hour
B. 2 hours
C. 4 hours
D. 6 hours



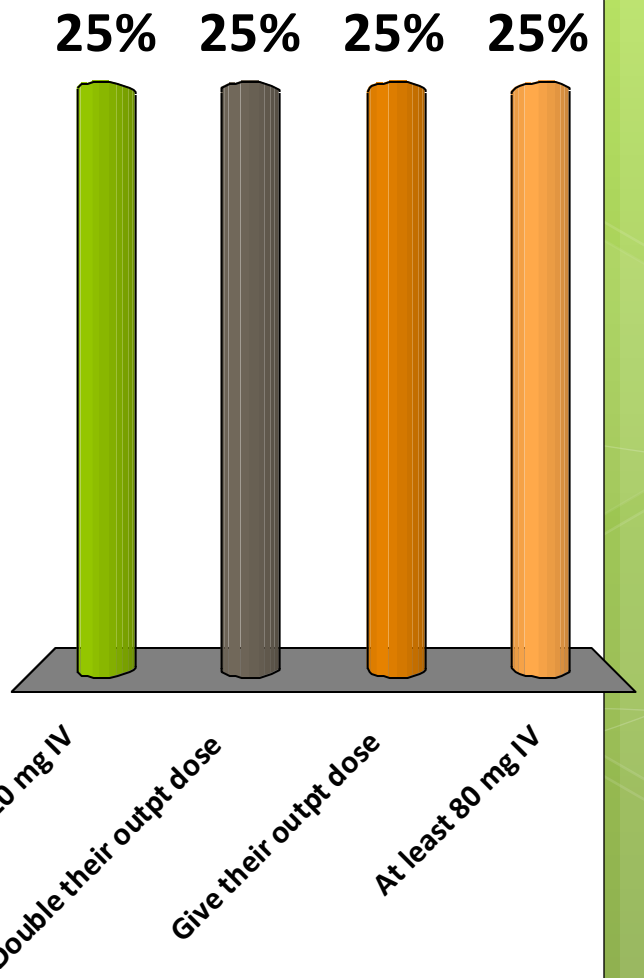
After giving lasix, how long does it take to see most of the effect?

A. 1 hour
B. 2 hours
C. 4 hours
D. 12 hours



How much lasix should you give to a pt w/CHF?

A. 20 mg IV
B. Double their outpt dose
C. Give their outpt dose
D. At least 80 mg IV



Encourage output- LASIX

- LASIX- "lasts six" hours
  - Most of the effect occurs after 1 hour
    - if given IV
- Don't wait 12 hours to repeat dose
- Check UOP after 1 hour. Goal diuresis at least 1-2 L per day

Encourage output- LASIX

- LASIX- If no effect after 1 hour?
- Repeat same dose or double dose
- Consider if they aren't actually volume overloaded

Encourage output- LASIX

- How much lasix to give?
- DOSE TRIAL

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ORIGINAL ARTICLE

Diuretic Strategies in Patients with Acute Decompensated Heart Failure

G. Michael Felker, M.D., M.H.S., Kerry L. Lee, Ph.D., David A. Bull, M.D., Margaret M. Redfield, M.D., Lynne W. Stevenson, M.D., Steven R. Goldsmith, M.D., Martin M. LeWinter, M.D., Anita Deswal, M.D., M.P.H., Jean L. Rouleau, M.D., Elizabeth O. Ofili, M.D., M.P.H., Kevin J. Anstrom, Ph.D., Adrian F. Hernandez, M.D., Steven E. McNulty, M.S., Eric J. Velazquez, M.D., Abdallah G. Kfoury, M.D., Horng H. Chen, M.B., B.Ch., Michael M. Givertz, M.D., Marc J. Semigran, M.D., Bradley A. Bart, M.D., Alice M. Mascette, M.D., Eugene Braunwald, M.D., and Christopher M. O'Connor, M.D. for the NHLBI Heart Failure Clinical Research Network

N Engl J Med 2011; 364:797-805 March 3, 2011 DOI: 10.1056/NEJMoa1005419

Encourage output- LASIX

- How much lasix to give?

- DOSE TRIAL – either gave same home dose as IV dose or gave 2.5 x home dose
  - For example if pt on 40 mg po bid
  - 40 mg po = 20 mg IV

  - Pt either got 20 mg IV bid OR 2.5 x this dose
    - 50 mg IV bid

Encourage output- LASIX

- How much lasix to give?
- DOSE TRIAL
- No difference in sx b/w two groups
  - Higher dose lost more wt, more ↑Cr
  - Lower dose lost less wt, less ↑Cr

Encourage output- LASIX

- How much lasix to give?
- Give AT LEAST their home dose.
- Give it IV
- Check UOP after 1 hour and repeat dose or double dose if no UOP

Encourage output- LASIX

- **When to consult cardiology?**
- Looks like CHF, but no response to lasix
- Cr increasing after giving lasix
- Lots of volume overload
  - 10 or 20 kg of water wt

Treat blood pressure

- Don't stop beta blocker UNLESS they are in shock (low BP)
- OK to continue ACE-I unless Cr increasing
- Be careful starting too many BP meds at once

Treat blood pressure

- CORE MEASURES

- ALL PTS w/CHF should be on bblocker and ACE-I
  - Not any Bblocker (specific Bblockers are indicated)
  - **Need a good reason not to give one of these**

Top 10 Things to know

- 1. Lots of things mimic CHF, but anyone hearing an S3 or a very high BNP help make dx
- 2. Not everyone with edema or orthopnea has CHF
- 3. Always consider acute coronary syndrome in a pt presenting w/pulmonary edema
  - crack in a plaque w/a thrombus leading to low EF
- 4. Everyone with new heart failure should be evaluated for ischemia as cause of CHF (3 vessel disease)
- 5. This means everyone with new CHF needs a cards consult

Top 10 Things to know

- 6. Give lasix IV for CHF exacerbation
- 7. Check UOP after 1 hour (not 12) and repeat (or double) dose if not working
- 8. Consult cards for CHF w/poor UOP
  - Or if increasing Cr on lasix
  - Or if lots and lots of volume overload
- 9. Everyone needs to end up on bblocker and ACE-I prior to discharge
- 10. Close f/u needed as re-admission rate high

Questions?