



Help I'm Drowning Congestive Heart Failure

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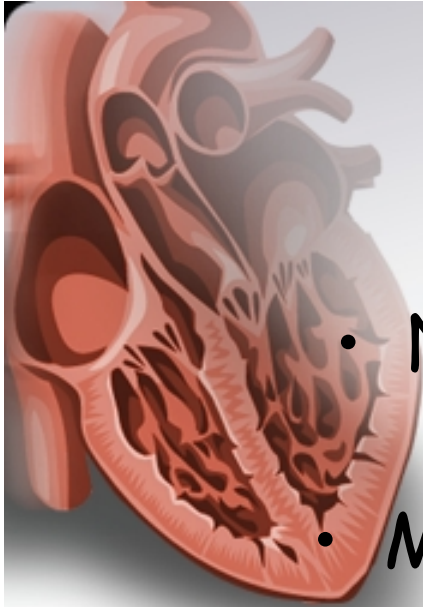
Springfield, Missouri





Goals for today

- Understand CHF
- Review the treatment options
- Discuss new information/drugs



Congestive Heart Failure: Scope of the Problem

- Nearly 900,000 annual hospital admissions (increased 90% in past 10 years)¹
- Most common discharge diagnosis for patients older than 65 years²
- 6.5 million hospital days per year¹
- Single largest expense for Medicare¹
- Annual hospital/nursing home costs: \$15.4 billion³

1. Hunt SA et al. *ACC/AHA Guidelines for the Evaluation and Management of Chronic Heart Failure in the Adult*. 2001.

2. Graves EJ, Gillum BS. *1994 Summary: National Hospital Discharge Survey*. National Center for Health Statistics; 1996.

3. American Heart Association. *2002 Heart and Stroke Statistical Update*. 2001.



? But what is it

Inability of the heart to maintain adequate vital organ perfusion, resulting in impaired exercise capacity. It is associated with a constellation of predictable neurohumeral, autoendocrine, and paracrine features that initially are compensatory but later become maladaptive.

HOW???



- **Bad pump**
- **Can't fill**
 - Stiff heart
 - No volume
- **Can't pump out**
 - Rhythm problems
 - Too much pressure



Two forms of failure

Systolic: reduced EF

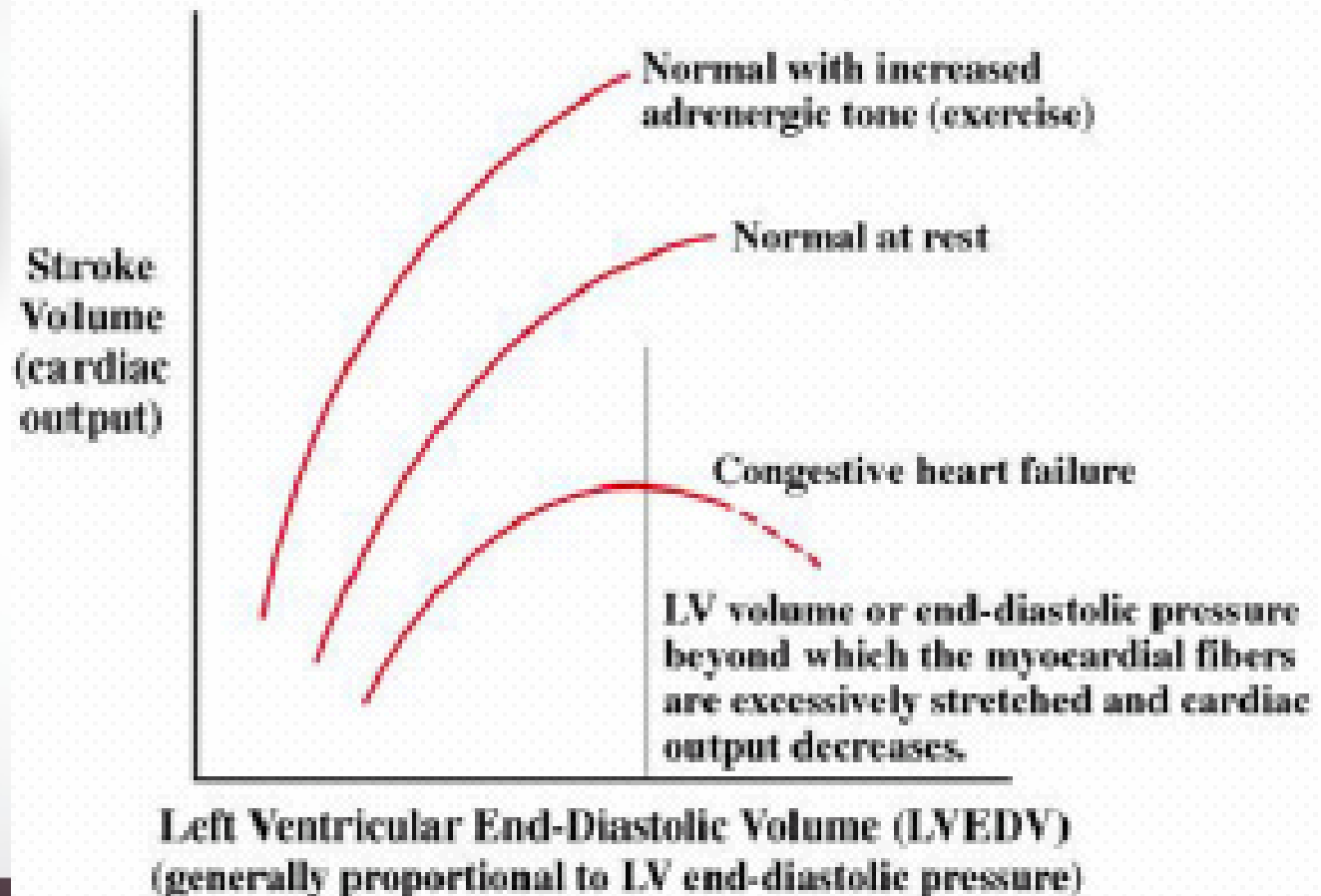
– Most widely studied

Diastolic: Normal EF

Stiff ventricle can't fill

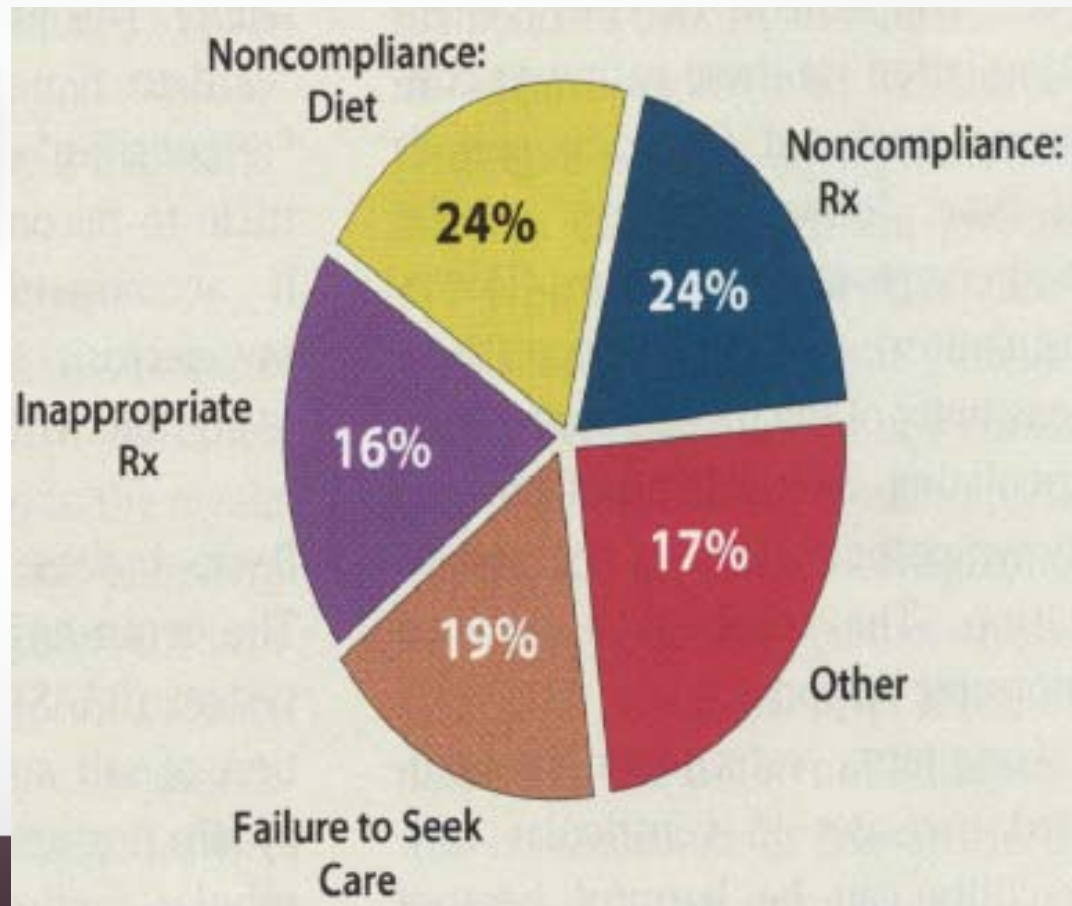


The Frank-Starling Curve





Causes of Acute Decompensation





So How Do We Diagnosis It??

- Clinical?
- Chest x-ray?
- B-naturetic peptide?
- Echo?
- Psychic hotline?



Acute Pulmonary Edema Treatment

- Nitrates
- Nitrates
- Oxygen
- Ace Inhibitors
 - Niseritide
- Ventilatory Support
 - Morphine
 - Diuretics
 - Inotropes



NITRATES

- Reduce preload
- Reduce Afterload
- Improve Coronary perfusion
- Can be given IV SL TD
- Superior to morphine and Lasix*



Nitrates major problems

- Inadequate dosage
- Inadequate dosage
- Inadequate dosage
- VIAGRA

SL 0.4mg (400micrograms) q 5 min X3 =1200
micrograms/10 min =120 microgram/min

IV where do we start??

5 microgram/min



Pop Quiz #1

- What is the FDA approved maximum dose for IV Nitro???

640 mcg/min!!!!!!



Ace Inhibitors

- Clearly beneficial long term
- Similar effects as nitrates
- Slower onset
- Few good comparison studies
- Can be given SL (captopril 25mg) or IV (enalapril 0.625-1.25)



Inotropes

- Dobutamine
- Dopamine
- Milrinone

Dobutamine used to "enhance quality of life"

Mortality with Dobutamine 31% vs 15% without*

* Ewy GA, J Am Coll Card Feb 1999



Controversial drugs

- Morphine
- Diuretics



Morphine

- Probably worse rap than deserved
- Myocardial depressant
- Insignificant or negative effect on PCWP
- Anxiolysis

Diuretics



- Take too long
- Long term effect
- Often get diuresis from nitrates and improved CO



Ventilatory support

- CPAP
- BIPAP
- **INTUBATION**



CPAP

- Breathing against a pressure (5-10 cm H₂O)
- Opens alveoli
- "drives water out of lungs"

Hoover Vacuum tech 1930



BiPAP

- Different inspiratory and expiratory pressures.
- Generally just covers the nose



Intubation

A near death experience

- RSI
- Most experienced intubator
- High risk experience
Catacholamine depletion
Hypoxic,
Arrythmias





WHAT ABOUT Nesiritide



Nesiritide



- B-naturetic peptide
- Synthesized in the Left Ventricle
- Arterial and venous dilator
- Produces sodium excretion
- Suppresses the renin angiotensin aldosterone system
- Suppresses the sympathetic system



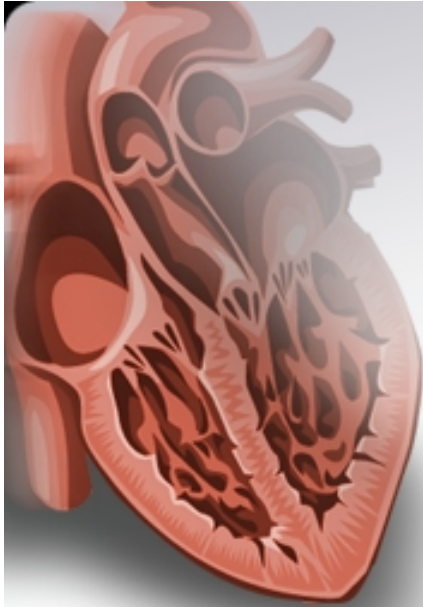
VMAC Trial

- 489 patients admitted with CHF
- Compared, Nitroglycerin, Nesiritide, and placebo
- Nesiritide better than placebo but not nitro for clinical outcomes



Other VMAC facts

- 24 hr difference in PCWP 2mm
- Same incidence of hypotension in both but nesiritide significantly longer (2.2 hrs)
- Used "usual" (read inadequate) nitroglycerine.
- Dyspnea at 3 hrs no difference nitro vs nesiritide
- No difference in rate of hypotension, ischemia, or arrhythmia



Nesiritide summary (mine)

- Works as well as nitro
- Is probably no better than nitro (especially in good doses)
- Much more expensive
- Increased renal failure
- Increased death
- Use in special circumstances only.



What about the BNP test?

- Correlates with CHF
- Unfortunately appears least sensitive where needed most
- Not clear what clinical utility
- Expensive



CHF Summary

- CHF is bad
- Unload the patient **Beware Viagra**
- Nesiritide no better than Nitro
- Look for underlying event
- Use noninvasive ventilation early
- Intubation is scary