Welcome to Hellerstein, Interns!

Andrew Hornick
PGY-2

Please do the following

- Go to

pollev.com/andrewhornic461

Who is better at basketball?

Lebron Jr, 12 years old

Revisiting #survivinghellerstein

- Discuss key elements of history and physical that should be collected as a successful Hellerstein intern
- Discuss key elements of daily presentations on Hellerstein
- Discuss #basic workup and evaluation of common Hellerstein pathology

6:59 pm on a Friday….

- Mr. Helly is a 67 year old male with a pmhx of HTN, DM, and DLD who presents to the ED with dyspnea and fatigue.

Case 1

Mr. H is a 67 year old male with a pmhx of HTN, DM, and DLD who presents to the ED with dyspnea and fatigue.

Pmhx:

- HTN
- DLD
- DM (A1c 9%)
- HFpEF (55%) on 2003 TTE

Meds:

- Statin
- Lisinopril
- Lasix (ran out last week)

Shx:

- Former smoker (40 pack-years)
- No alcohol

Assessing volume status

- Three GREAT questions:
  1. Do you become short of breath when you walk? After how far, how many flights of steps, how many feet, yards, meters, laps to the fridge, leagues?
  2. Do you have orthopnea? Or…how many pillows?
  3. Do you wake up in the middle of the night short of breath?

Why do we ask?

Finding	Sensitivity	Specificity	Positive LR	Negative LR
Symptoms				
PND	0.41	0.84	2.6	0.70
Orthopnea	0.50	0.77	2.2	0.65
Edema	0.51	0.76	2.1	0.64
Dyspnea on exertion	0.84	0.34	1.3	0.48
Fatigue and weight gain	0.31	0.70	1.0	0.99
Cough	0.36	0.61	0.93	1.0

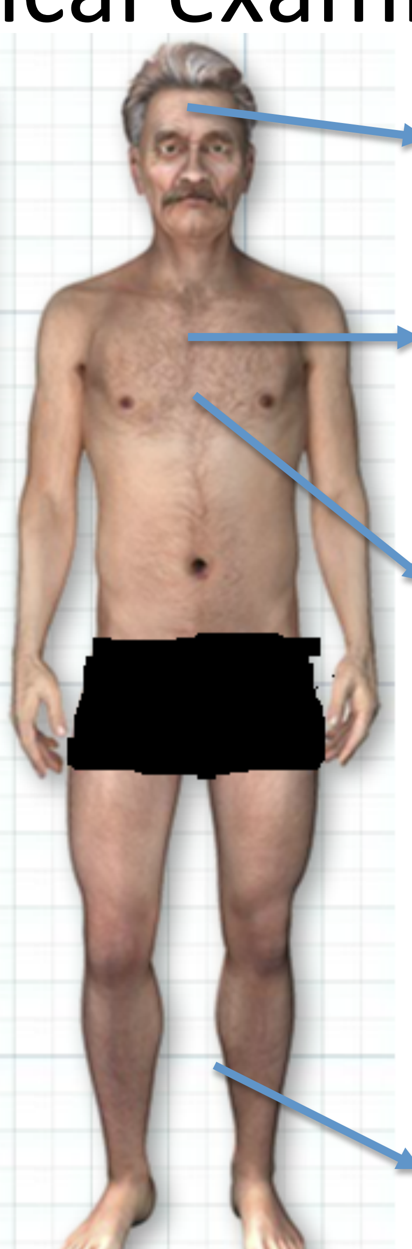
Diagnostic Accuracy of History and Physical Findings for the Presence of Volume Overload in ED Patients Presenting With Dyspnea (Wang CS et al, 2005)

Physical exami...

Vital Signs:
- Temperature 37.5^{0}C
- Pulse 95 bpm
- Blood pressure 142/89
- Respiratory rate 17 bpm
- SaO2 on RA 92%, 96% on 2LNC

General:

•AAOx3, WDWN, mild conversational dyspnea



Head, eyes, ears, nose and throat:
- Atraumatic, normocephalic
- +JVD to 10 cm
- No maxillary/frontal tenderness

Chest, lung:
- Crackles at the bases b/l; midway up the lung

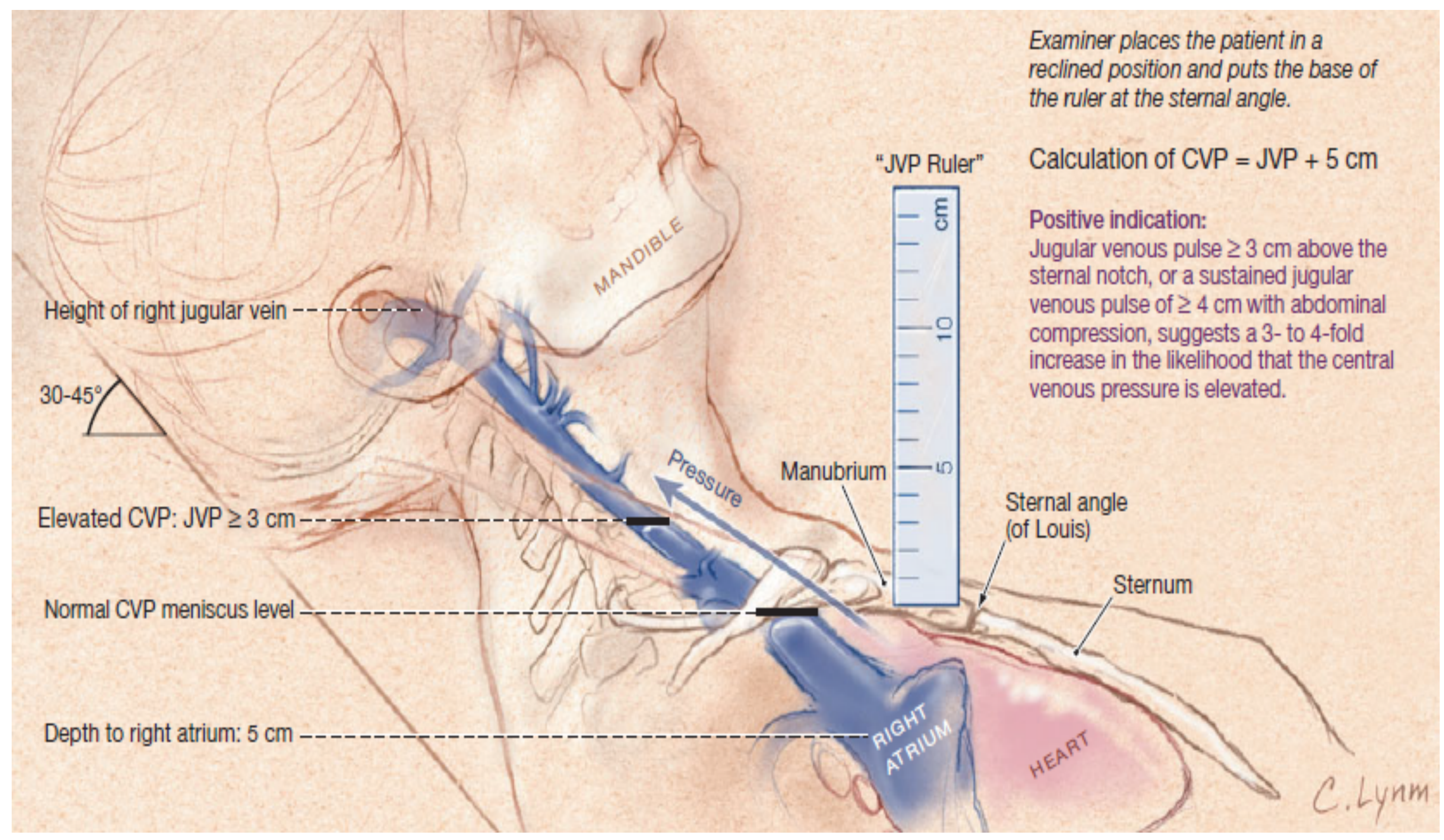
Heart:
- Tachycardia, normal S1 and S2, +S3
- 3/6 systolic murmur

Abdomen:
- Soft, nontender, nondistended
- +ve hepatojugular reflex

Extremities:

•3+ pitting edema up to knee b/l

Assessing JVD



Wait, why do we even try?

Finding	Sensitivity	Specificity	Positive LR	Negative LR
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Physical examination				
Third heart sound	0.13	0.99	11	0.88
Abdominal jugular reflux	0.24	0.96	6.4	0.79
Jugular venous distention	0.39	0.92	5.1	0.66
Rales	0.66	0.78	2.8	0.51
Any murmur	0.27	0.90	2.6	0.81
Lower extremity edema	0.50	0.78	2.3	0.64
SBP <100 mm Hg	0.06	0.97	2.0	0.97
Fourth heart sound	0.05	0.97	1.6	0.98
SBP >150 mm Hg	0.28	0.73	1.0	0.99
Wheezing	0.22	0.58	0.52	1.3
Ascites	0.01	0.97	0.33	1.0

Diagnostic Accuracy of History and Physical Findings for the Presence of Volume Overload in ED Patients Presenting With Dyspnea (Wang CS et al, 2005)

But we love peripheral edema…

BMJ Best Practice: Assessment of Peripheral Edema (Feb 2018)

Clinical observation	Score
Absence of clinical oedema	0
Slight pitting (2 mm)	1
Deeper pitting (4 mm)	2
Deep pitting (6 mm) with visible dependent swelling	3
Very deep pitting (8 mm) along with gross distortion of leg contour from swelling	4

What exam finding listed below has the highest LR for volume overload?

Crackles

JVD

Lower Extremity Edema

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Case 1- Labs

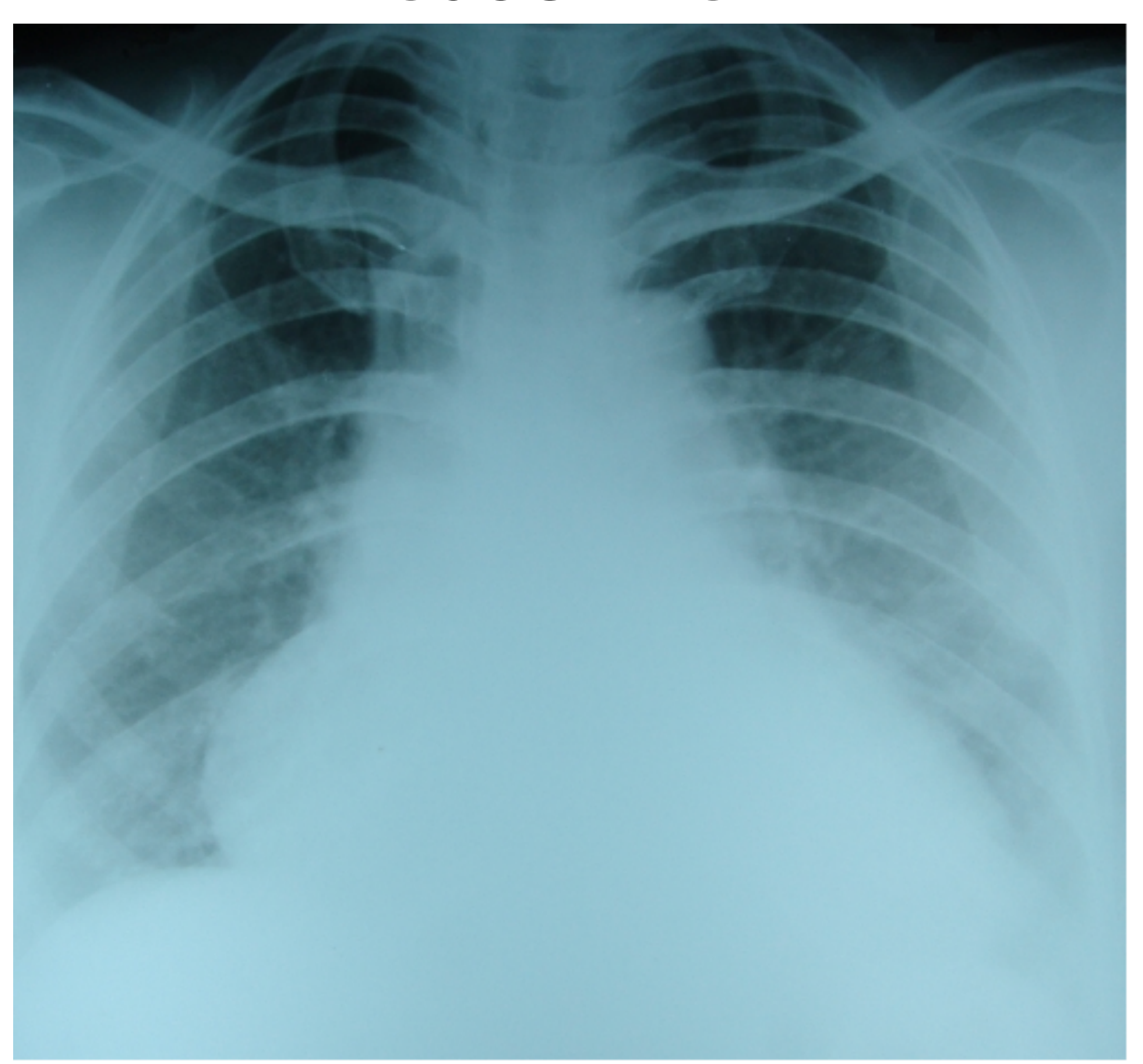
- CBC wnl
- RFP 136/4.7/103/24/30/1.5 (unknown baseline)
- INR wnl

- Trop: 0.02
- D-dimer: negative
- BNP: 9000 (no previous)

A quick word on BNP

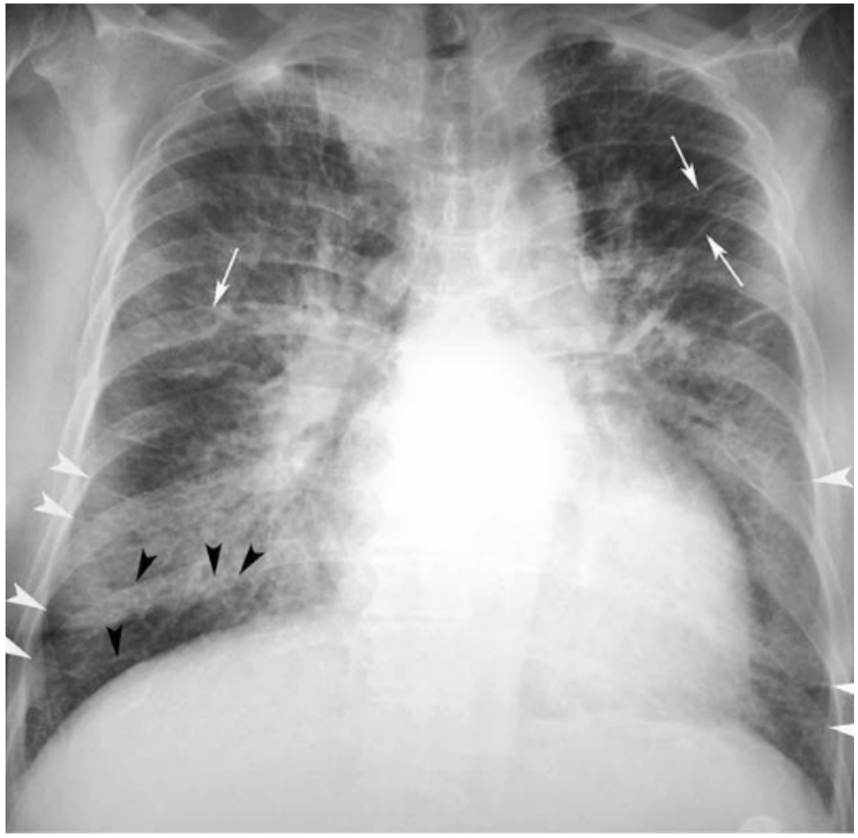
- ACC/AHA recommend assessing BNP
- Elevated BNP lends weight to the diagnosis, but should **not** be used in isolation to diagnose heart failure
- **B**reathing **N**ot **P**roperly trial: A plasma BNP >100 pg/mL diagnosed HF with a sensitivity and specificity of 90 and 76, respectively
- No evidence to trend BNP as marker of tx in acute heart failure
- Note, BNP remains elevated in CKD #Eckel

Case 1-CXR



Dx?

Kerley lines



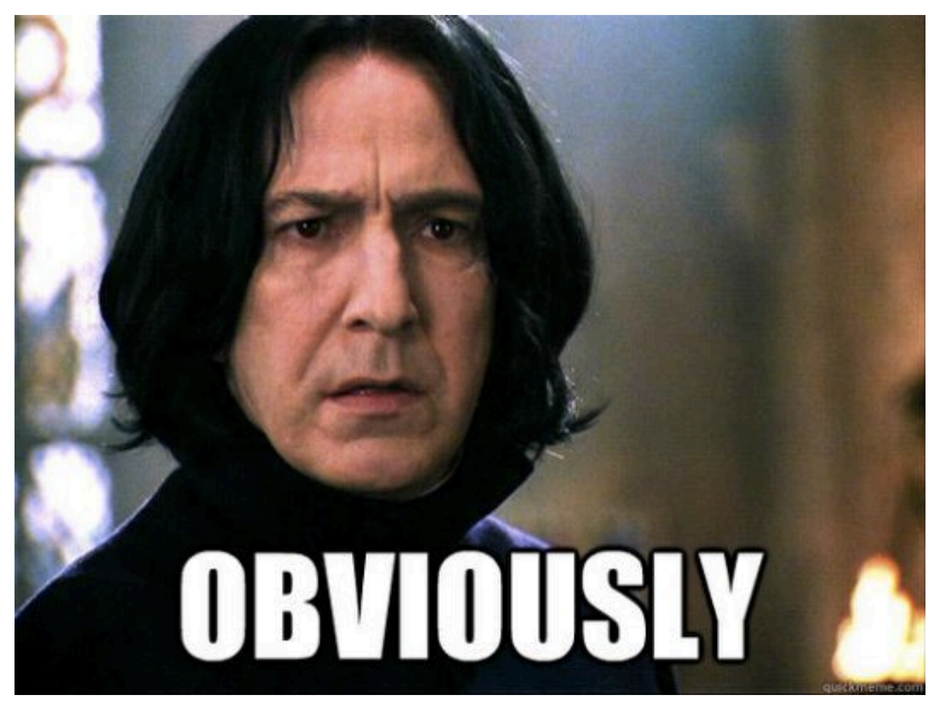
Kerley A- distention of anastomotic channels between peripheral and central lymphatics

Kerley B- edema of the interlobular septa

Kerley C- reticular opacities at lung base, representing Kerley B lines en face.

Mr. Helly has

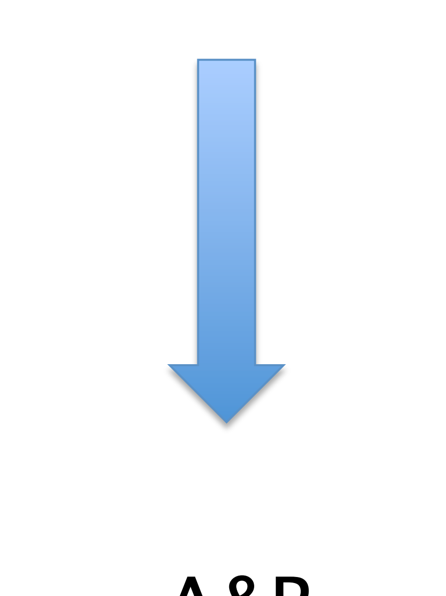
- Acutely decompensated heart failure



Etiologies of ADHF

- Illness
- MI
- Arrhythmias
- Uncontrolled HTN
- Medication noncompliance
- Diet noncompliance
- Anemia
- Hyperthyroidism

= H&P ROS



A&P

"ADHF likely 2/2... "

These are corgis

Winston

Libby

Classification of Heart Failure

NYHA Class	Level of Clinical Impairment
I	No limitation of physical activity. Ordinary physical activity does not cause undue breathlessness, fatigue, or palpitations.
II	Slight limitation of physical activity. Comfortable at rest, but ordinary physical activity results in undue breathlessness, fatigue, or palpitations.
III	Marked limitation of physical activity. Comfortable at rest, but less than ordinary physical activity results in undue breathlessness, fatigue, or palpitations.
IV	Unable to carry on any physical activity without discomfort. Symptoms at rest can be present. If any physical activity is undertaken, discomfort is increased.

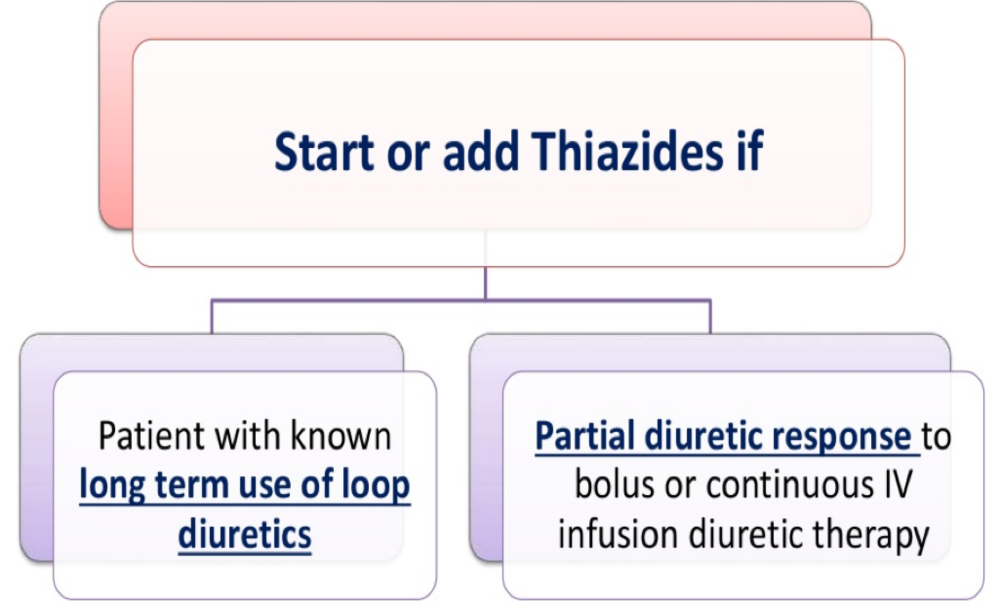
Management of ADHF

- Diurese
  - How hypervolemic is the patient?
  - Lasix-naïve?
  - Kidney function
  - Blood pressure

  - Start with intermittent bolus and assessing i/os and uptitrate accordingly
  - When bolus` insufficient, transition to drip
  - If multiple offender, check out portal to see what worked in the past

Equivalent Diuretic Doses

Furosemide (po)	Furosemide (IV)	Torsemide (IV/PO)	Bumetanide (IV/PO)
40 mg	20 mg	10 mg	1 mg



Management of ADHF

- Diuresis
- RFP bid, K$>$4, Mg $>$2

Management of ADHF

- Diuresis
- RFP bid, K>4, Mg >2
- Strict i/os
- Daily weights

Print a fresh HOT every morning…

34/0.81 (7/21) --> 30/0.78 (7/22) --> 33/0.74 (7/23) --> 27/0.76 (7/24) --> 24/0.7 (7/25)
INR: 1.4 --> 1.5 (7/23)

Cultures
Urine (7/6) OSH - NG (7/8)
Blood (7/7) OSH - MRSA (7/11) - (S to Gent, Rifampin, Tetra, TMP-SMX, Vanc, Dapto) Vanc MIC = 2, Dapto MIC = 1
Blood x2 (7/8) - MRSA (7/10)
Blood (7/9) - MRSA (7/11)
Blood (7/10) - NG x 3, MRSA (7/14)
Urine (7/10) - NG (7/11)
Blood x2 (7/12)- NG (7/17) Final
Blood (7/13) Central- NG (7/18) Final
Blood cx (central line) - (7/13) - NG (7/18) Final
Blood (7/15) Central - NG (7/21) Final
Blood central line (7/16)- NG (7/21) Final
Blood (7/17)- NG (7/22) Final
Blood (7/18) Central- NG (7/23) Final
Throat Fungal (7/22)- Candida albicans (S pending) 7/24- will take a few days--f/u

Neuro/NSG

IntraVenous Flush According to Flush Policy
Sodium Chloride 0.9% Injectable Flush PRN 20mL
IntraVenous Flush According to Flush Policy

Vitals

T_{curr}:35.6° **T_{max}**:36.1° @ 25 Jul 19:32
HR: 63 (60 - 80)
BP: 108/68 (108/68 - 130/76)
RR: 18 (18 - 20) | **SpO_2:** 94% (90 - 96)

I & Os

	6A-2P	2P-10P	10P-6A	24h	6A-
0.9% Sodium Ch...	137	0	0	**137**	0
Heparin	225	0	57	**282**	0
IV Fluid	50	0	0	**50**	0
Measured Intake	0	0	50	**50**	0
other drip	200	0	0	**200**	0
PO Fluid/Feed ...	120	0	0	**120**	0
Total In	**732**	**0**	**107**	**839**	**0**
Urine: Indwell...	750	850	375	**1975**	150
Total Out	**750**	**850**	**375**	**1975**	**150**
TOTAL NET	**-18**	**-850**	**-268**	**-1136**	**-150**

Labs

139	99	20
3.3	32	0.75

(269 - 7.4 - 1.83 - 2.4 *07/26/15 06:00*

8.8 N:75.3% L:11.7%

- 99.9% of the time "zeros" signify inaccurate ins and outs by nursing, rarely anuria (will not need HD, no nephrology c/s.
- At the VA, these are found in the bedside chart (and you will likely need to calculate totals).

Management of ADHF

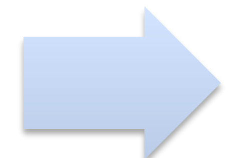
- Diuresis
- RFP bid, K>4, Mg >2
- Strict i/os
- Daily weights
- ½ vs full dose BB

- Back off diuresis when:
  - Clinically euvolemic
  - Hypotension
  - Kidney function worsens

What have we learned about #survivinghellerstein: VS 2.0

Typical Ward Daily Presentation

- Subjective
- Objective
  - Temp, HR, RR, BP, sats
  - Exam



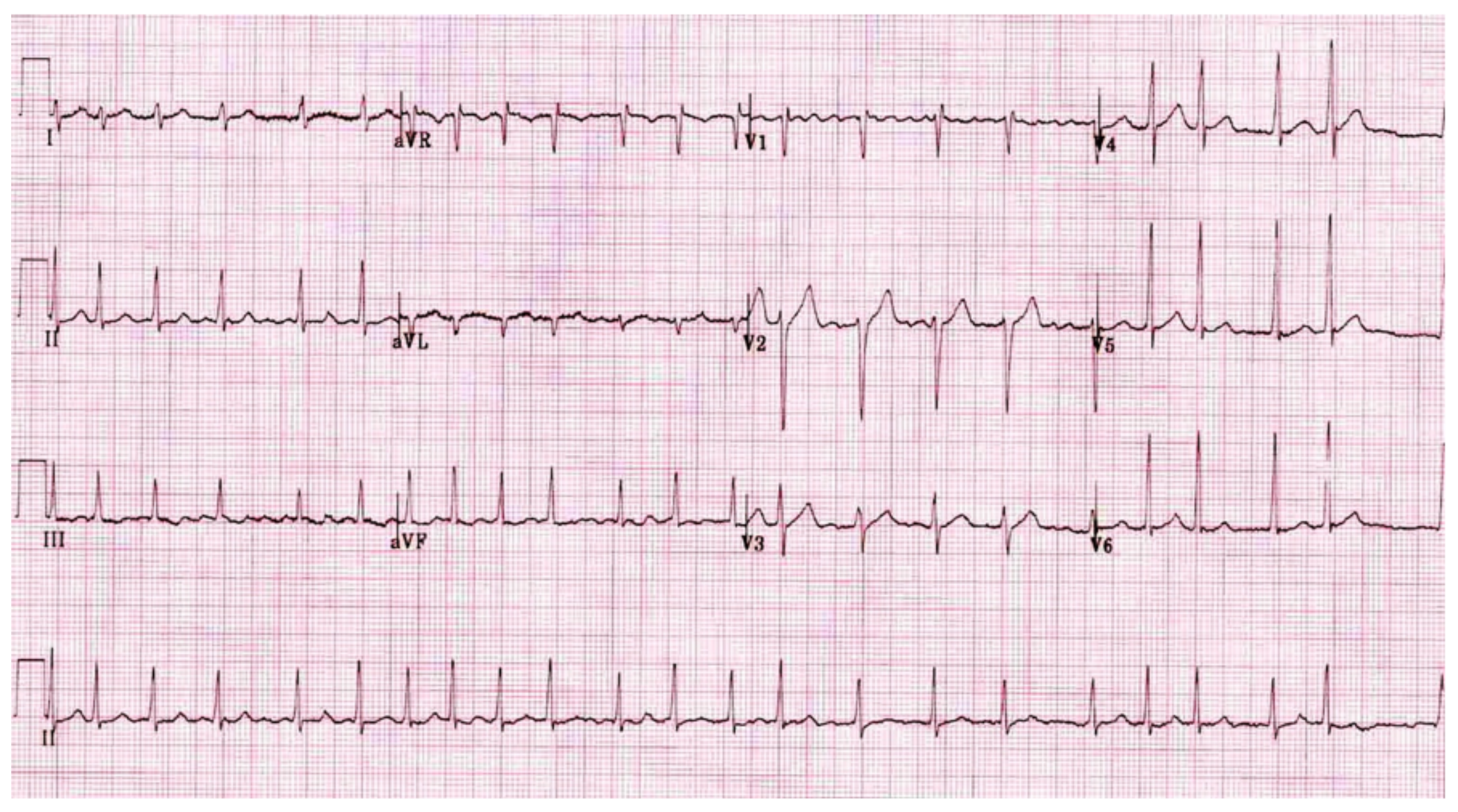
Hellerstein Daily Presentation

- Subjective
- Objective
- Temp, HR, RR, BP, sats
- **I/Os
- **daily weight
- **

Hospital day 2

- It's a black weekend and you are on your way to Rainbow to find the Oreos in their nutrition rooms that your med-peds colleagues told you about when you get paged…

Case 2- ECG



What is this?

Sinus tach

Atrial fibrillation

Not sure. Squiggles on paper, not otherwise specified

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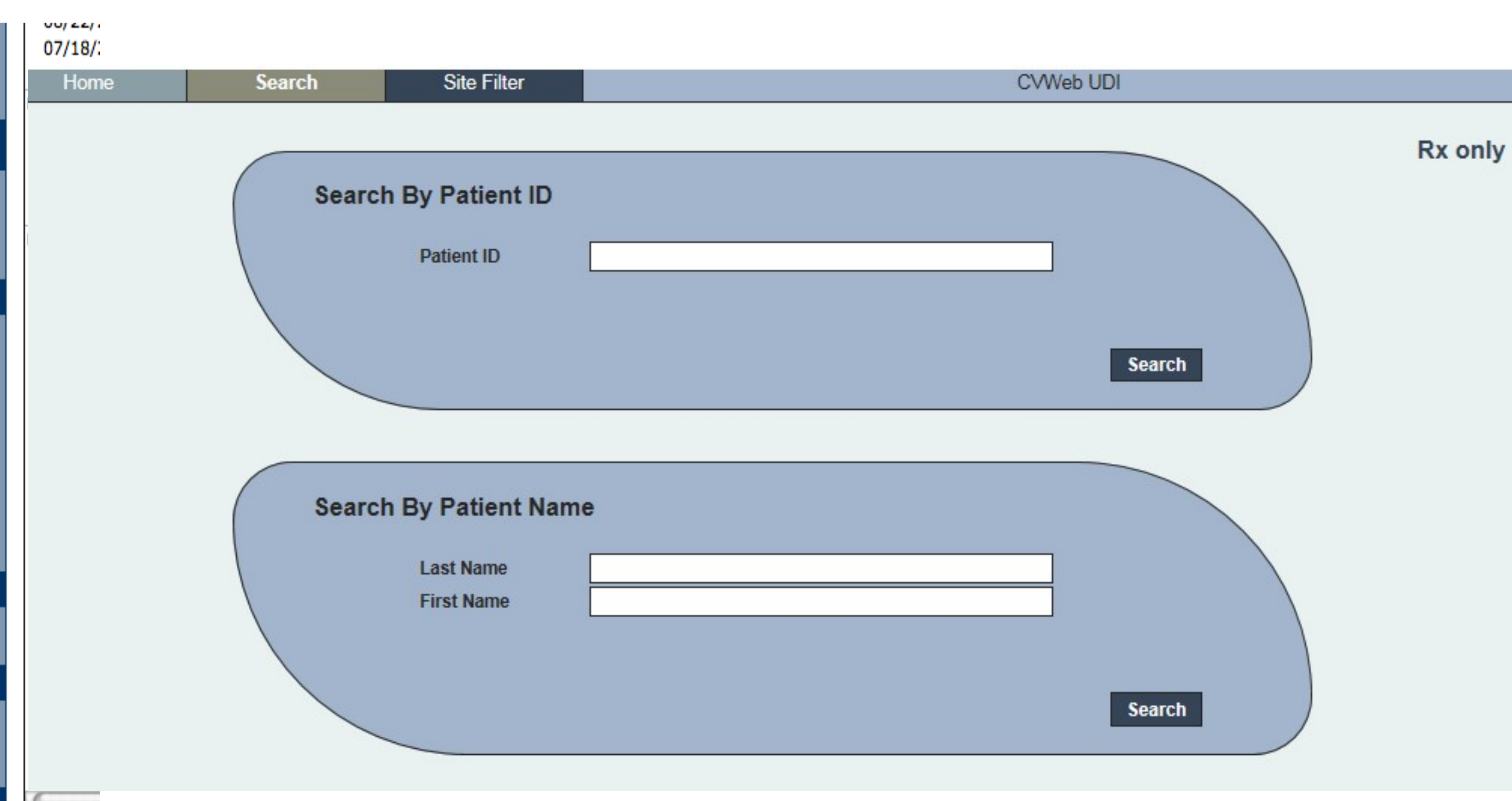
#survivinghellerstein: EKG fun



Log in with UHHS username and password
Search by MRN, if it doesn't show up, keep adding 0's before the MRN until it does. Obviously.

VA: ECGs under Vista Imaging

#survivinghellerstein: beyond reading ECGs

- **PRINT** the OLD ECG
- **COPY** the admission (ED) ECG- do not take the original! ED needs the read!
- **KEEP** both with you for AM rounds presentation

Atrial fibrillation

- Types:
  - Paroxysmal – self terminating, <7 days
  - Persistent – not self terminating, > 7 days
  - Permanent – >1 year where rate control unsuccessful

So now what?

- Etiologies:
  - MI
  - PE
  - Electrolyte disturbances
  - Infectious
  - Valvular heart disease
  - Thyrotoxicosis
  - Drugs (sympathomimetics)

Rate control in the acute setting

Drug	Relative contraindications
Beta-blocker *--metoprolol 5 mg IV push x3 (5 min apart)*	Monitor for hypotension Asthma/COPD Avoid in low EF
Calcium channel blocker *--diltiazem 10 IV push then drip*	Monitor for hypotension Avoid in low EF
Digoxin *-- loading: 0.5 mg IV push then 0.25 mg then 0.25 mg 6 hours apart*	Renal failure/elderly Long ½ life Can be dangerous at high levels
Amiodarone *--loading dose (150) then 1 mg/min for the first 6 hours, then 0.5 mg/min for 18 hours*	Hepatoxicity Pulmonary fibrosis

When to anticoagulate…

CHA_2DS_2-VASc Score for Atrial Fibrillation Stroke Risk

Calculates stroke risk for patients with atrial fibrillation, possibly better than the $CHADS_2$ score.

Age in Years

<65 0 | 65-74 +1 | ≥75 +2

Sex

Male 0 | Female +1

Congestive Heart Failure History +1 NO

Hypertension History +1 NO

Stroke/TIA/Thromboembolism History +2 NO

Vascular Disease History +1 NO

Diabetes Mellitus +1 NO

Score ≥2= warfarin (or other AC)

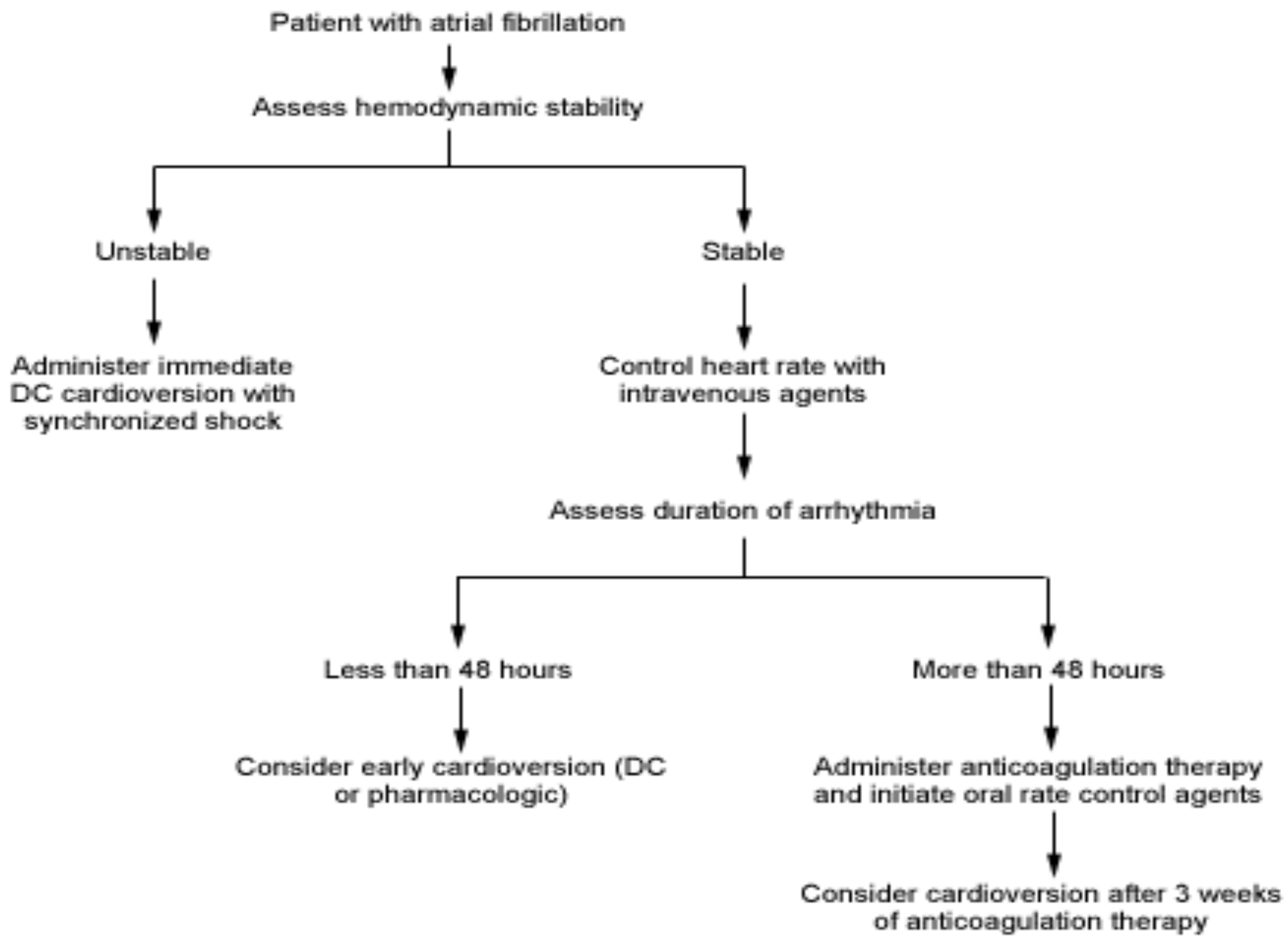
You give 5 IV metoprolol…

- Now Mr. Helly is confused and slow to respond…
- You assess the patient and his repeat vitals are:
  - Temp: 37.5
  - HR: 167 bpm
  - Sats 95%
  - BP: 86/48

  - What do you do next?

Cardioversion

- Indicated if hemodynamic instability
  - 150 joules
  - Sync with rhythm (otherwise can cause VT!)
  - Sedate the patient
  - So why do we not cardiovert all patients with afib?



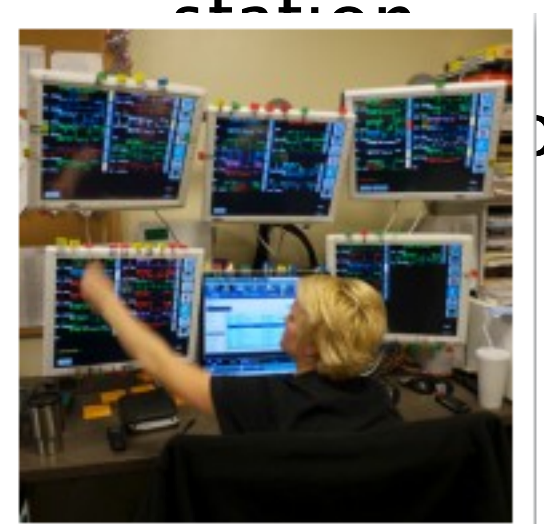
**TEE to r/o thrombus

Hospital day 3…

- Mr. Helly's cardiac exam sounds… regular when you pre-round, but he states he had some mild palpitations overnight….
- How can you check his rhythm?

#survivinghellerstein: telemetry

- Where is it?
  - Tower: cubby behind secretary's desk (T7, T5, T3)
  - Lakeside: behind the nurses's station
  - Seidman: in the team room/nursing station
  - of PCU, nursing station 4A
  - follow the beeping.



Review alarms
Trend HR
Review waveforms
PRINT any interesting strips

#survivinghellerstein: telemetry

– Helllerstein AM presentation

– Subjective
– Objective
  - Vitals
  - I/Os
  - Daily weights
  - “On telemetry review, went back into afib at 1 am and here is the strip…”

Hospital day 4

- Mr. Helly was missing from rounds this morning because he was down getting his echocadiogram.
- Cardiology fellow comes in incredibly excited. Mr. Helly's AVA was 0.7 cm2, with a mean pressure of 45 and a max velocity of 5 mmHg.
- What is he/she talking about?

How severe is the AS?

- Based off echocardiogram

AHA Guidelines for Severity of Aortic Stenosis			
	Valve Area (cm2)	Maximum Aortic Velocity (mmHg)	Mean Pressure Gradient (mmHg)
Mild	1.5-2	2.5-3.0	< 25
Moderate	1.0-1.5	3.0-4.0	25-40
Severe	0.6-1.0	>4.0	>40
Critical	< 0.6		

Symptoms of AS

Symptoms	Mechanism
Angina	LVH because of increased pressure required to overcome obstruction gradient—arteries cannot supply blood to myocardium
Syncope	Fixed cardiac output through stenosed vavle→peripheral vasodilation→heart rate cannot compensate→syncope
Heart failure	LVH +diastolic dysfunction + systolic dysfunction

Mortality in AS

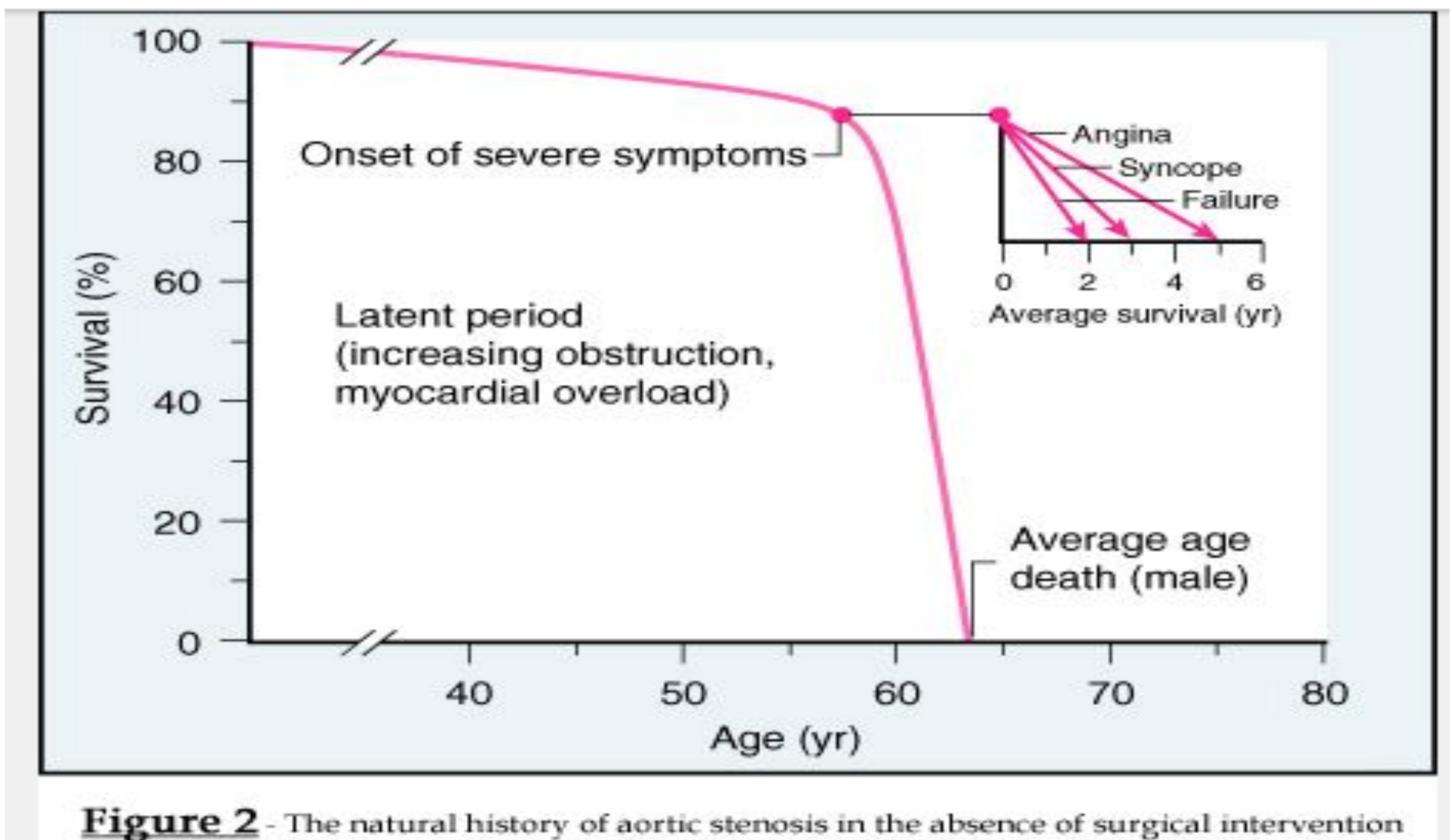


Figure 2 - The natural history of aortic stenosis in the absence of surgical intervention (From Ross, Braunwald: Aortic Stenosis. Circulation 38 [Supplement V]: 61, 1968).

Angina: 5 year mortality 50%
Syncope: 3 year mortality 50%
Heart Failure: 2 year mortality 50%

Management of AS

- Medical management
- Surveillance echos (more frequent based on severity)
- When to pursue surgery…?

Treatment for AS

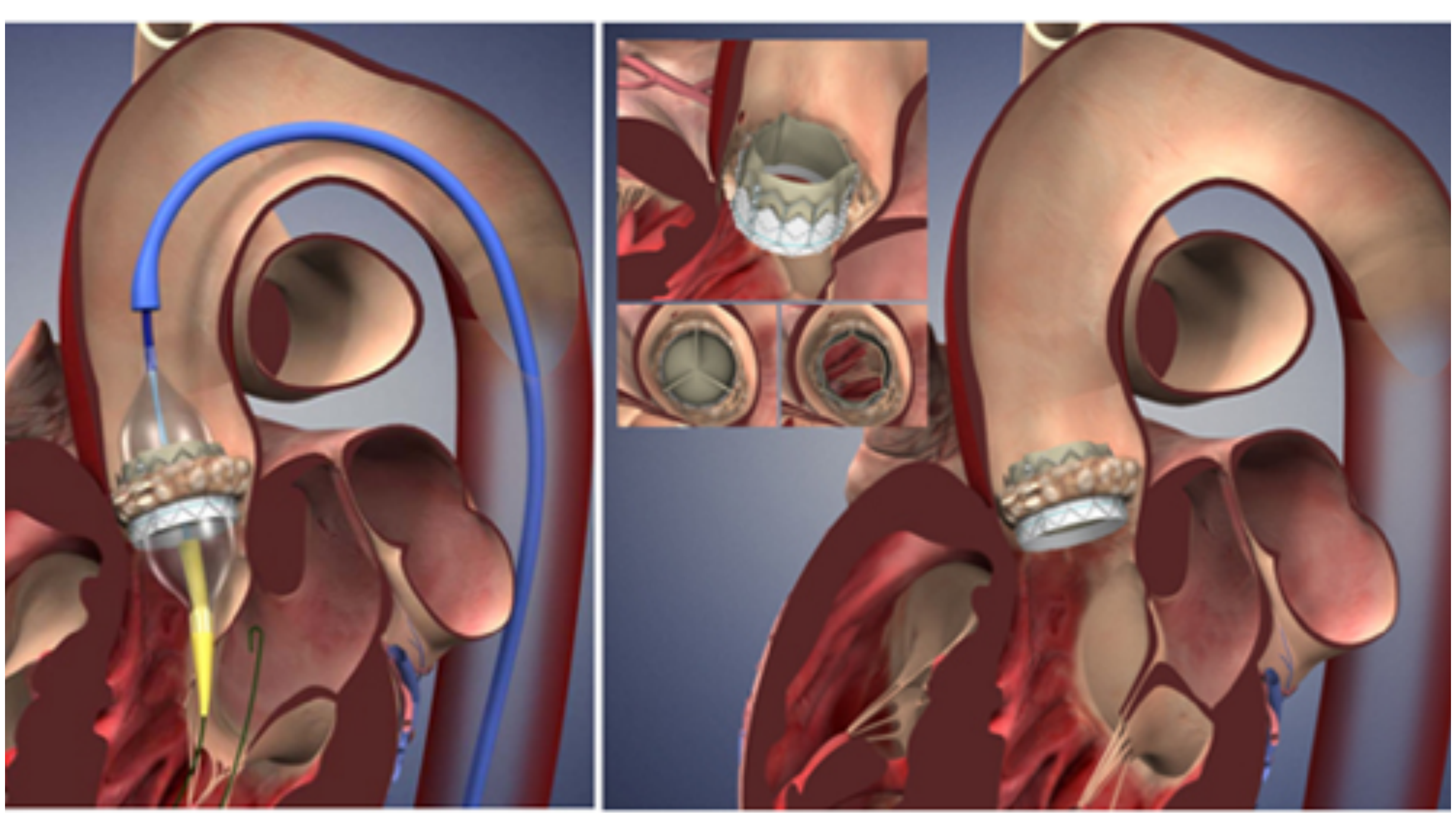
- Indications for surgery (SAVR)
  - Severe AS + symptoms
  - Severe AS with EF <50%
  - Severe or mod AS undergoing cardiac surgery for coronary or other vulvular disease

  - What if the pt is too high risk for surgery?

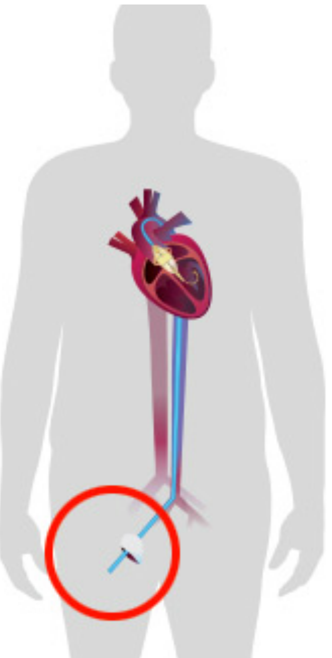
TAVI

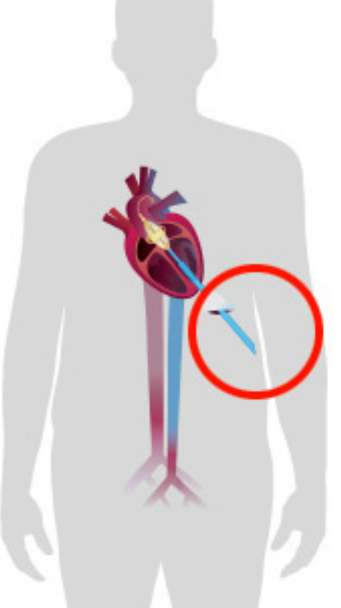
- Not a surgical candidate
- Typical characteristics:
  - Advanced age
  - Previous heart surgery
  - Severe COPD
  - Severe DM
  - On home oxygen
  - pHTN
  - Radiation to chest
  - Porcelain aorta (calcificed aorta)
  - Frailty

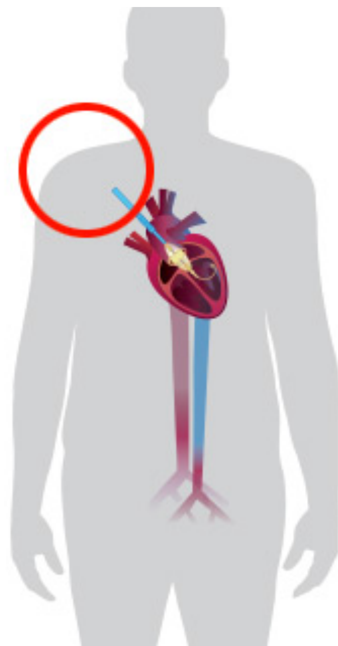
TAVI



TAVI approaches







So what do I do?

- NPO after MN!
- Hold diuresis in anticipation of contrast load, pre-hydrate
- Kellee Popovich is your new BFF-pager on hellerstein board
- Magically disappears to CICU after TAVR
- AKA your new favorite hellerstein admission

#survivinghellerstein: the expanded pmhx

- All H&Ps should have “previous cardiac hx”
- Include:
  - Last echo
  - Last RHC, LHC (w/ dates)
  - Stress tests
  - Cardiologist
  - CABG/surgeries: anatomy, year, surgeon
  - THEN “other pmhx:”

Beware

- Not all reports in portal are under cardiac imaging.
- St. Vincent's and other OSH will have reports under "operative reports" or "transcribed notes."
- Make sure you check here for hidden cardiac testing/procedures.

Hellerstein specials

- NPO at MN for all new admissions
- Do not order imaging/testing overnight—attending wants to see the patient in the AM
- Cross-coverage during the weekend—use the primary team to do on HOT! High turn-over service!
- VA NF pearl: can only draw one trop on floor. Must transfer to PCU for trending trops.
- Assess need for telemetry everyday!
- Avoid long-acting drugs.

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