Shortness of breath

PGY 3 - Jude Khatib

Learning objectives

1) Initial approach to a patient with acute SOB (within seconds)

Stabilizing the patient

2) Evaluation of a patient in SOB, DDx

Why is this patient SOB?

3) Management options in acute SOB

How can I fix this?

Case #1

You are the intern on NF, you get a page on the Hellerstein pager. You call the nurse back and she tells you that "Mr. K looks like he is struggling to breathe, he doesn't look good. I'm worried"

...Next question?

VITALS!

Initial approach (seconds/minutes)

1)Vitals : Stable/unstable –sick?

HR

- tachycardia (arrhythmia, ST 2/2 edema or PE, SIRS/sepsis)

BP

- Severe HTN (flash pulmonary edema), hypotension (large PE, MI, sepsis)

Temp Fever: PNA, VTE

O2 Sats

Current/baseline Oxygen requirement

- Is pt supposed to be on 4L at baseline and currently on RA? Supposed to be on BiPap but not? Simple fix!

Patient's appearance/mental status/new complaints (eg emesis, CP)

- Hypercapnia, hypoventilation, aspiration event

Recent meds/transfusions/IV fluids

- Consider narcotics→hypoventilation, TRALI, continuous IV fluids w/pulmonary edema

More information

Mr. K's Vitals: HR 110, BP:180/90, Sat 78% on 4L NC (baseline 94% 2L prior to this event), T:37.0

- Next steps?...

- Go see the patient!!

-Read your signout!

-Think about stabilizing patient (more oxygen)/reversible causes
-Code status

On your way

- Mr K is a 75 yo M with severe III COPD (on home 2L), HFrEF (EF20% in 03/2016), CAD (s/p PCI to LAD) who is presenting with weight gain, worsening SOB likely 2/2 to volume overload on a background of running out of his furosemide tabs, plan is to optimize volume status and continue diuresis.
  Code status: Full code

At the bedside

- Mr. K's Vitals: HR 110, BP:190/90, Sat 75% on 4L NC (baseline 94% 2L prior to this event), T:37.0

-Next step?..

-Stabilize: More 02??
 Nasal cannula ->Venti Mask ->Non rebreather-> NIPPV (MICU) -> Intubation (MICU)

--Recheck: HR 100, BP:170/80, Sat 90% on venti mask (baseline 94% 2L prior to this event), T:37.0

DDx

ADHF – Pulmonary Edema

COPD exacerbation

ACS

PE

Arrhythmia

Sepsis

……….

Initial approach (seconds to minutes)

1)Vitals (HR, BP, Sats, T)

2)Go see the patient/Stabilize the patient

a)More O2?

NC -> Venti mask -> Non rebreather -> NIPPV (MICU) ->Intubation (MICU)

b)Easily identifiable reversible cause

e.g. You look at your signout and it says FYI Patient with EF 20%, being diuresed. if SOB consider additional lasix

3)Help (code white team, senior)

-Code status

Oxygen therapy

- Nasal cannula: 24-44% FiO_2
  - Each "liter" is ~4% above 20% (1L is 24%, 2L 28%, 3L 32%, 4L 36%, 5L 40%)
- Venturi mask: ~50%
- Non-rebreather: 100%
- AmbuBag (Bag Valve Mask): 100% with manual ventilator support
- High flow oxygen therapy
- Continuous positive airway pressure (CPAP): useful in **hypoxia**
  - Reduces pulmonary edema (afterload reduction, direct effect on hydrostatic pressure)
- Bi-level positive airway pressure (BiPap): useful in **hypercapnia**
  - Gradient between iPap/ePap helps offload CO_2
- Endotracheal intubation
  - If patient is unable to protect their airway, vomiting (can't use NIPPV), or…you think they need it.

Evaluation of the patient – Why is this patient SOB?

1-Information available:

Signout, history, physical exam, recent labs/imaging, recent procedures?, DVT prophylaxis? , Is and Os?, recent meds? Blood transfusion/fluids?

2-Additional investigations??

At the bedside: Evaluation

- Mr. K's Vitals: HR 100, BP:170/80, Sat 90% on venti mask (baseline 94% 2L prior to this event), T:37.0
- How does the patient look?
- Talk to patient, brief hx
- Focused physical exam, Is and Os

Focused physical exam

Vitals: Temp 37, HR 100, BP 175/100, RR 22, Sating 90% on venti mask

GEN: Sitting forward in moderate distress, unable to speak in complete sentences due to SOB

CV: Distant heart sounds, tachycardic, regular rhythm, normal S1 & S2, S3 appreciated, + JVD

RESP: Coarse crackles bilaterally (bases > apices), few scattered wheezes throughout

EXT: 1+ pitting edema to mid shin, no cyanosis, pulses 2+ and symmetric throughout

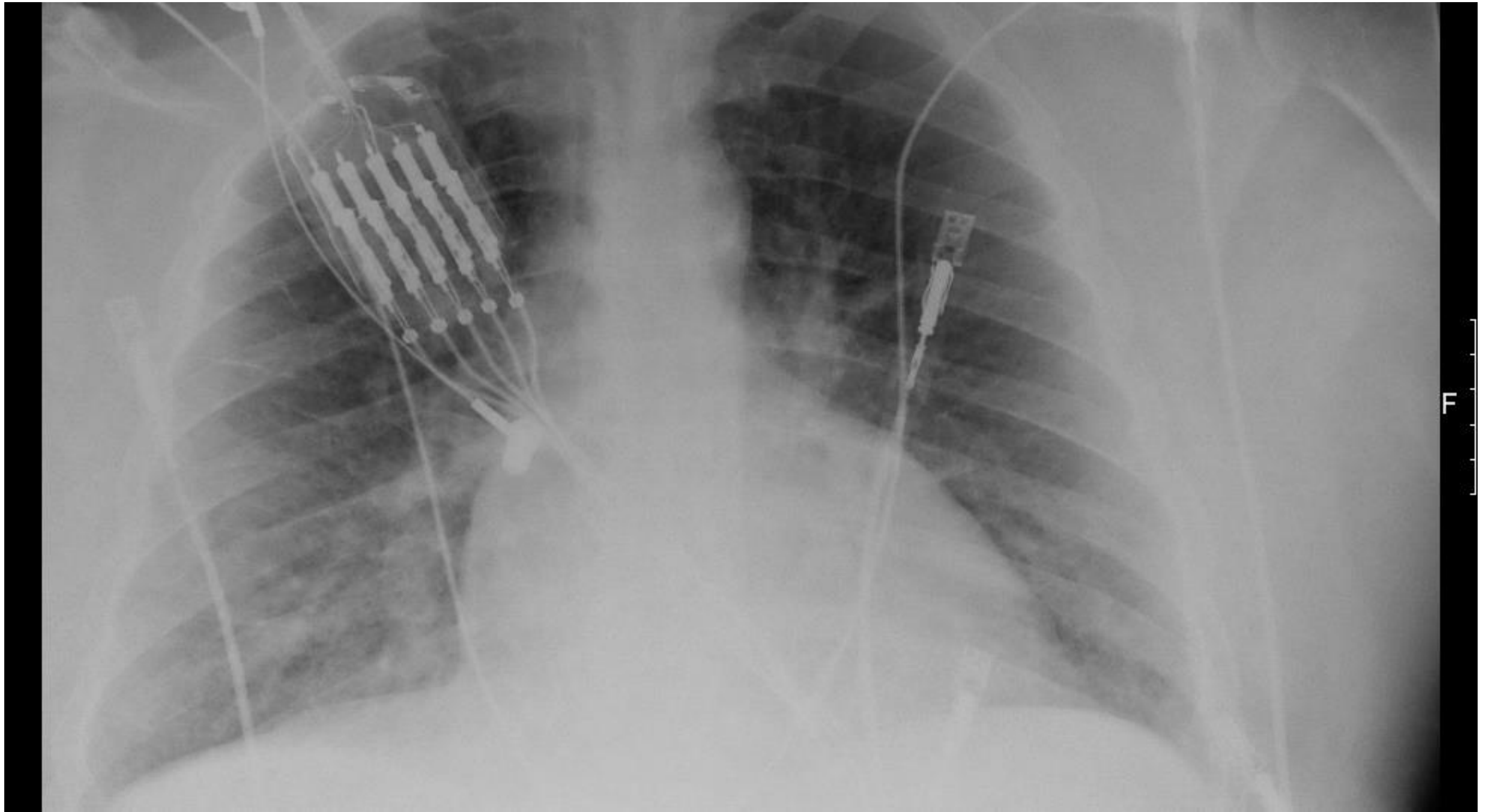
Additional investigations??

- CXR
  - Diffuse process (alveolar vs interstitial)
  - Focal infiltrate (PNA, atelectasis, aspirate, infarction)
  - Extrapulmonary findings (pleural/pericardial effusion, PTX)
- EKG
  - Ischemic changes
  - Arrhythmias
  - Signs of Right heart strain
- ABG
  - Resp acidosis? (acute vs chronic vs acute on chronic) /resp alkaslosis other derangements
- Well's Criteria: consider D-dimer vs CT Angiography vs V/Q scan
- Consider CBC, RFP, BNP, Troponin

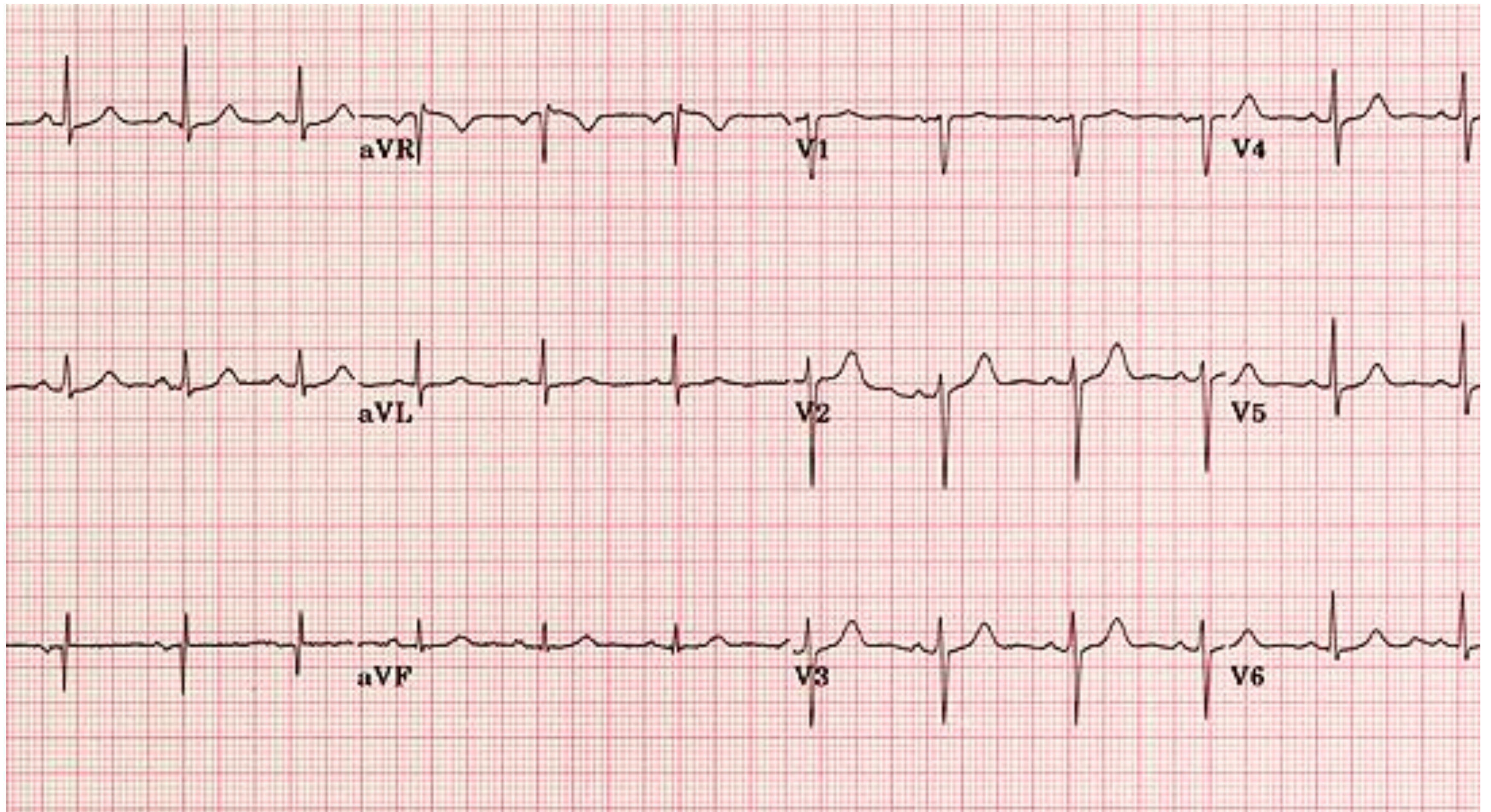
ABG

- ABG
  - Respiratory acidosis or alkalosis → Acute vs chronic? Acute on chronic?
    - For every change in pCO_2 of 10 (deviating from norm of 40)
      - pH changes 0.08 in the acute setting
      - pH changes 0.04 in chronic CO_2 retention
  - Metabolic acidosis or alkalosis → Respiratory compensation? Appropriate or inappropriate?
    - Winter's formula: measured Bicarb x 1.5 +8 $\pm$ 2 = expected pCO_2
      - If pCO_2 is lower, there is an independent respiratory alkalosis
      - If pCO_2 is higher, there is also respiratory acidosis
  - Does the pCO_2 *make sense* given the pt's degree of tachypnea?
    - If the RR is 40 and the pCO_2 is normal, you should be concerned that the patient is tiring.
  - If you cannot obtain an ABG, a VBG is acceptable to check pCO_2 and pH.

Mr. K



Mr. K



Labs

ABG: 7.35/53/68

CBC: 9/13/41/240

RFP: 140/4.1/104/28/25/0.97/242

NT-pro BNP: 1710

LFTs: AST 15, ALT 28, Tbili 0.3, Alk Phos 86, Total protein 6.7, Albumin 3.2

Troponin: 0.1

Mr. K

Differential Diagnosis ???

- CHF exacerbation
- MI
- COPD exacerbation
- PE

Management

Positioning

Lasix

Need for nitro drip? BP?

Need for CPAP?

Reassess

-If patient not improving re-consider ddx and/or try other management option

-Duonebs in this pt given hx of COPD

Often..

A.P is a 68 year old female with COPD, M.S, CAD s/p PCI, CHF, DVTX2 (not on coumadin), hep C cirrhosis who is hosp day 5 for CAP, mild COPD flare.

FYI: s/p diagnostic thoracentesis today

Often..

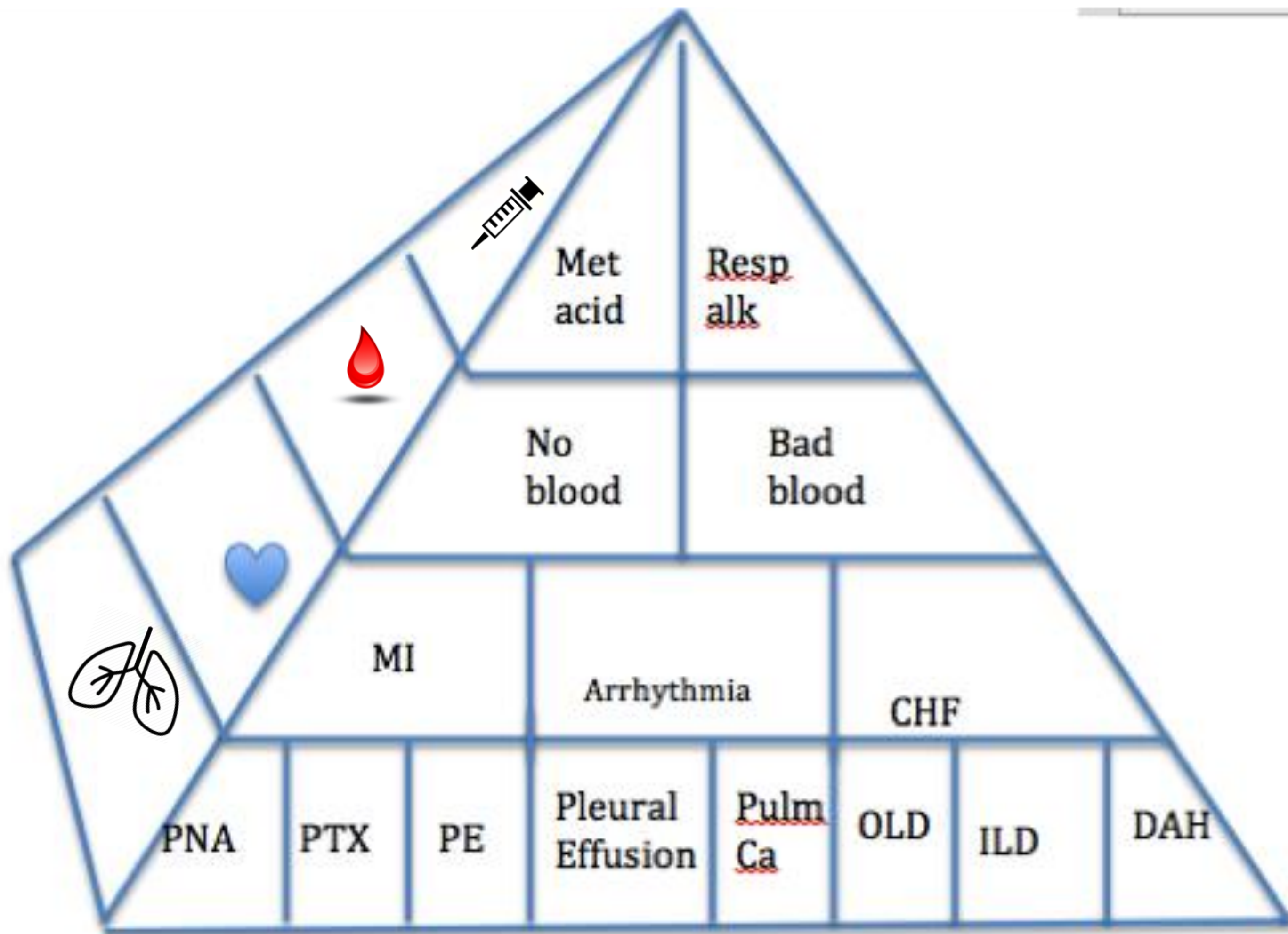
A.P is a 68 year old female with COPD, M.S, CAD s/p PCI, CHF, DVTX2 (not on coumadin), hep C cirrhosis who is hosp day 5 for CAP, mild COPD flare.

FYI: s/p diagnostic thoracentesis today

→ Stepwise approach

Causes of dyspnea

Dyspnea pyramid!


Met
acid
Resp
alk
No
blood
Bad
blood
MI
Arrhythmia
CHF
PNA
PTX
PE
Pleural
Effusion
Pulm
Ca
OLD
ILD
DAH

Management options – Depends on the cause!

-CHF/Pulmon edema → Lasix (push or gtt)

-COPD exacerb →Bronchodilators/Steroids

-Suspect PNA →Antibiotics

-Chest pain/EKG changes ->Treat for MI

-P.E →Heparin gtt

Other:

-Suctioning (Nasotracheal suctioning for mucous plugs)?

-Anxiolytics?

ICU transfer?

Learning objectives

1) Initial approach to a patient with acute SOB (within seconds)

Stabilizing the patient

2) Evaluation of a patient in SOB, DDx

Why is this patient SOB?

3) Management options in acute SOB

How can I fix this?

Questions??

Thank you! :)