

### CASE 1: Afib post NSTEMI on the floor

#### Mr Harris.

75 yo male

**PMH:** HTN, cholesterol

Admitted for chest pain and elevated troponins two days ago. Called by the floor nurse at 10pm as the patient is feeling unwell.

- Patient feels dizzy and weak and occasionally having palpitations
- No chest pain or shortness of breath.
- Does not think he felt like this before.
- Different sensation then his heart attack

#### Initial set of vitals

HR 145-160  
BP 100/60  
O2 98% room air  
RR 16  
T 36.7

#### ON DEMAND

**ECG:** Afib

**CXR:** N/A

**Labs:**

CBC 10/145/400  
Lytes 137/106/4.7  
Creat 86  
Glucose 7.2  
Ck 108

#### Metoprolol/Diltiazem

HR 100-120 for 2-3 min  
then bounces back

#### Adenosine

HR 60 for 5 sec  
BP and other vitals stay  
the same

#### Amiodarone/Procainamide infusion or cardioverted

Rhythm converts to sinus  
Pt feels better

#### Meds

HCTZ 25  
Metoprolol 50  
Plavix 75  
ASA 81  
Lipitor 20

If not given Amiodarone or cardioverted  
**10 minutes** into the scenario

Pt experiences acute shortness of breath

↑ HR 180  
↓ BP 60/40

#### ACUTE Cardioversion

Any other treatment  
→ STEMI → Vfib → death

## **Learning Objectives**

- 1. Recognizing Afib on ECG**
- 2. Recognizing treatment options for acute (<48h) stable Afib:-rate vs rhythm control**
- 3. Recognizing criteria for instability with a tachyarrhythmia**
- 4. Address the need for sedation and analgesia for cardioversion**

## **Pro Tips**

- 1. Symptomatic does not equal unstable**
- 2. IV Metoprolol is often used, but only IV Diltiazem has evidence of efficacy in acute rate control**
- 3. Mean time of cardioversion with Procainamide is 55min, with Amiodarone, close to 6 hrs. We sped things up here for expediency**
- 4. Adenosine is a good tool to use if you can't decide Afib vs SVT vs fast sinus tach, as long as the rhythm is not wide and irregular**

**Case 2: 2<sup>nd</sup> degree type 2 AV nodal block after a wrong medication (a beta blocker) was given on the floor**

**Mr Denier**

68 yo male, admitted with CHF three days ago

**PMH:** MI 2 yrs ago, HTN, DM2  
Resident called in by the nurse after he found pt on the floor- he tried to go to the bathroom and collapsed. The nurse managed to get him in the bed and called for assistance.

-Pupils equal and reactive 3mm.  
- Patient not very conscious, rambling confused and quite somnolent.  
- Equal grips, no face droop.  
- Patient's **BP slowly drops by 5 systolic every 5 minutes**. It does not change with fluid administration.

**Meds**

HCTZ 25  
Ramipril 5  
Lasix 100

**Initial set of vitals**

HR 45  
BP 80/60  
RR 22  
O2 98% RA  
T 37.4

**ON DEMAND**

**Rhythm:** 2<sup>nd</sup> degree AV block, goes intermittently to 3<sup>rd</sup> degree block

**CXR:** N/A

**Labs:**

CBC 8/120/350  
Lytes 140/105/5  
Creat 108  
Glucose 14  
CK, Trops 99/0.01

**Atropine**

↑HR 65  
↑BP 100/80 for 5 min

**Dopamine drip**

↑HR 55  
↑BP 90/60  
Patient still confused

**Pacing at 120 mA**

Response noted  
Pt recovers BP and cognition

**\*Five minutes into the scenario**, the nurse realizes that her colleague has given her Metoprolol 150 mg from another patient's MAR by mistake.

## **Learning Objectives**

- 1. Recognizing unstable bradycardia**
- 2. Initiation of temporizing treatment for bradycardia- Atropine and/or Dopamine**
- 3. Recognizing an indication for transcutaneous pacing**
- 4. Proper “knobology” of the Lifepack 12 pacer**
- 5. Address the need for sedation and analgesia with pacing**

## **Pro Tips:**

- 1. Anticholinergics like Atropine only help HR, B1 agonists like Dopamine help HR and contractility and can be run as an infusion- they are a superior choice despite what ACLS says**
- 2. Fentanyl is a good pain control medication but only use it if have some BP to spare- Ketamine at 20mg aliquots is a good choice if the BP is in the boots**

### Case 3: Patient on the floor came with pneumonia develops STEMI-VFib

#### Mr Denny

82 yo male, from nursing home, admitted for pneumonia three days ago.

**PMH:** dementia, HTN, CRF, DM2

Called by the nurse after the pt is found forcefully gasping for air and not responding to her.

Nurse unsure if the patient has a DNR.

Patient is too busy gasping to respond to questions, whispers "help me" from time

#### Initial set of vitals

HR 82  
BP 155/75  
RR 22  
O2 96% RA  
T 37.8

#### ON DEMAND

**Rhythm:** sinus with ST elevations

**EKG:** inferior STEMI

**CXR:** pneumonia

**Labs:** unavailable

- Patient feels dizzy and weak and occasionally having palpitations
- No chest pain or shortness of breath.
- Does not think he felt like this before.
- Different sensation than his heart attack

#### Meds

Aricept  
HCTZ  
Lasix  
Metazone  
Azithromycin

#### No matter what the treatment

The patient develops **VTACH without a pulse 10 minutes into the scenario**

Does not respond to shock

→ Vfib after the **first** shock

→ Asystole after the **third** shock

**Note:** In debriefing it should be explained to them that you can sometimes do everything right and the patient still dies.

## **Learning Objectives**

- 1. Recognizing STEMI ECG pattern**
- 2. Ascertaining if pt has DNR or is a full code**
- 3. Recognizing VTACH without pulse**
- 4. Recognizing need for immediate defibrillation with pulseless VTACH**
- 5. Recognizing that running a proper code does not mean that the patient will survive- most of them will not even if you do everything right**

## **Pro Tips**

- 1. Witnessed VFIB arrest has 30% survival only, other types of arrest are at 1-5%**

**Case 4: Stable Vtach in a middle aged man with known ischemic cardiomyopathy and low ejection fraction in the ER**

**Mr Bonn.**

65 yo male, presented to the community ER with palpitations

**PMH:** STEMI 5 y ago, CHF, HTN, cholesterol

Felt palpitations come on this morning. No chest pain or shortness of breath, never had it before, didn't do anything special the night before. Drank his usual cup of coffee before he felt this start. Mention that his heart is bad and that he had an echo ultrasound two weeks ago but didn't get results.

**Meds**

\*after 5 min

HCTZ  
Metoprolol  
Ramipril  
ASA  
Lipitor

**Initial set of vitals**

HR 135  
BP 100/65  
RR 18  
O2 98% RA  
T 37.2

**ON DEMAND**

**Rhythm:** VT with pulse

**EKG:** Vtach

**CXR:** N/A

**Labs:**

CBC 9/129/350

Lytes 137/100/4.5

Creat 86

Glucose 7.3

CK 82/Troponins 0.01

**Echo** (results can be requested by the resident):

Normal aortic valve

Moderate mitral

regurgitation

Normal tricuspid valve

EF 30% estimated

**Metoprolol/Adenosine  
/Verapamil/Diltiazem**

Nothing much happens  
↓ HR ~100

**Amiodarone 150mg  
infusion or electrically  
cardioverted**

-convert to sinus

## **Learning Objectives**

- 1. Recognition of VTACH pattern on ECG**
- 2. Recognizing stable vs unstable condition**
- 3. Rate vs rhythm cardioversion**
- 4. Address sedation and analgesia with elective cardioversion**

## **Pro Tips**

- 1. Hearts with EF<30% have a propensity to run VTACH-usually the lethal kind. We are just being nice here.**
- 2. AV nodal blockers have no effect on VTACH as the re-entry circuits are below the level of the AV node**



### Case 5: SVT in a panicking teenager in the ER

**Bob Aire**

16 yo male

**PMH:** anxiety and ADHD,  
Presents to community ER with a sudden onset of palpitations while walking to school. Never had it before. Denies drugs, alcohol, over the counter meds. Taking his usual medications. Extremely anxious and panicking. Feels SOB because he is hyperventilating. Feels palpitations and concerned that "his heart is gonna explode out of my chest"

The patient calms down if the resident works with his anxiety and explains what is going on.  
RR↓ and he stops being SOB

**Meds**

Ativan  
Concerta

**Initial set of vitals**

HR 180  
BP 120/80  
RR 32  
O2 100% RA  
T 37.6

**ON DEMAND**

**Rhythm:** SVT  
**ECG:** SVT  
**CXR:** N/A

**Labs:**

CBC 8/135/300  
Lytes 135/100/4.5  
Creat 65  
CK/Trop 65/0.01

**Adenosine 6mg**

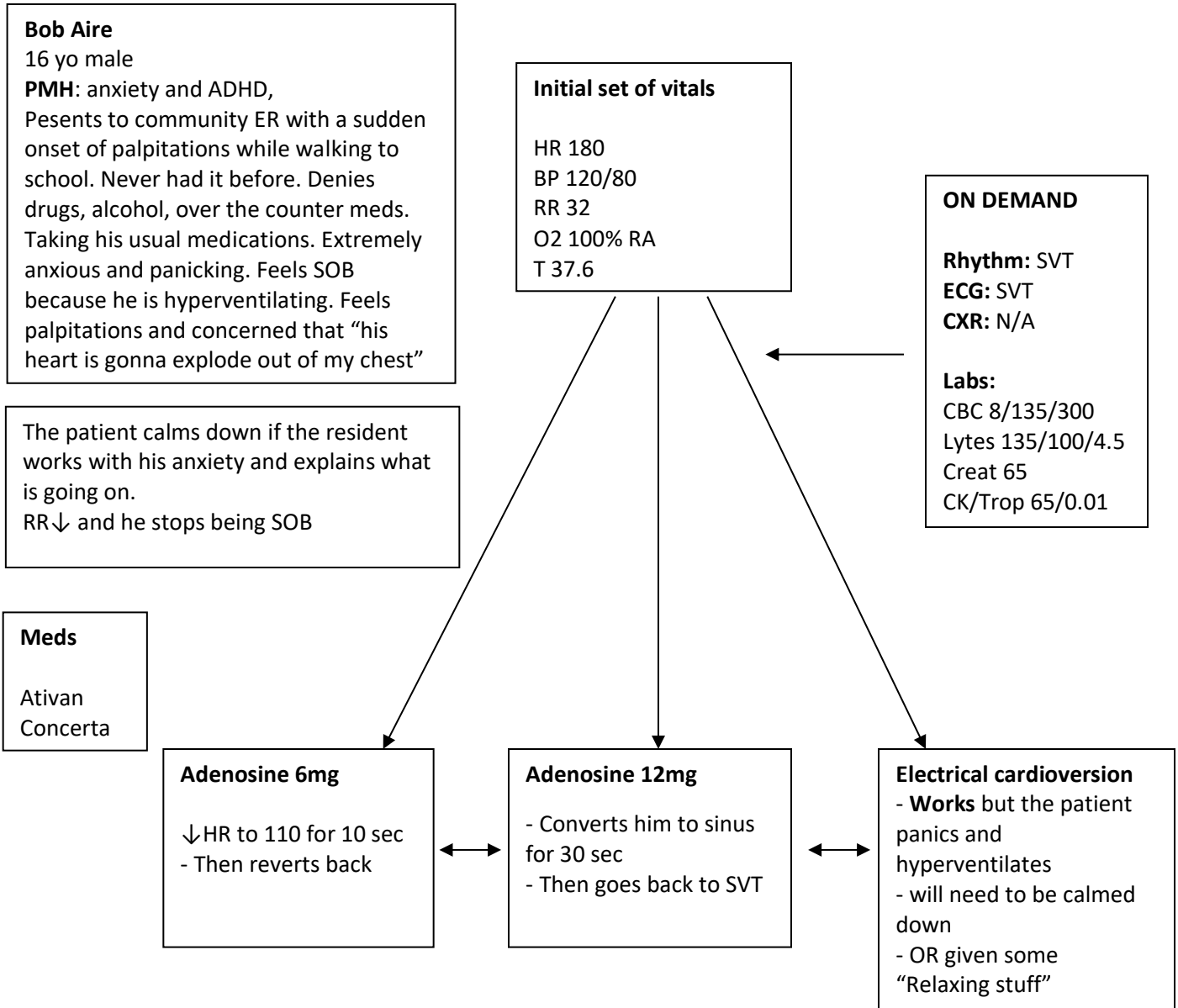
↓HR to 110 for 10 sec  
- Then reverts back

**Adenosine 12mg**

- Converts him to sinus for 30 sec  
- Then goes back to SVT

**Electrical cardioversion**

- **Works** but the patient panics and hyperventilates  
- will need to be calmed down  
- OR given some "Relaxing stuff"



## **Learning Objectives**

- 1. Recognition of SVT pattern on ECG**
- 2. Recognizing stable vs unstable**
- 3. Indications for therapeutic use of Adenosine**
- 4. Recognize the need for electrical synchronized cardioversion**
- 5. Address the need for sedation and analgesia**

## **Pro Tips**

- 1. SVT is the nursemaid's elbow of cardiology. It generally requires no workup and no cardiology follow up. If very frequent and symptomatic, a consideration of ablation or "pill in the pocket" approach can be tried.**

## Case 6: CHF after too-aggressive fluid management of urosepsis in an elderly patient on the floor

### Mr Cooler

82 yo male, admitted yesterday for urosepsis with hypotension

**PMH:** BPH, HTN, COPD, MI, CHF

Called in the morning by the nurse after she found him in respiratory distress. Patient says the SOB started during the night and has gotten worse. He tried to sleep but found he kept waking up feeling he is going to suffocate. He is now quite panicky and feels that he is not going to make it.

- Crackles bilaterally in the lungs
- Patient is in moderate respiratory distress- mostly tachypnea
- Nurse can **note 10 minutes into** the scenario that his legs have swollen since he has been admitted
- Patient gets a little better with administration of O2
- ↑O2 86% with 100% O2

### Meds

Lipitor  
HCTZ  
Lasix  
Finesteride  
ASA  
Atorvent  
Ventolin

### Since admission

Cipro IV  
2 L NS given overnight

### Initial set of vitals

HR 110  
BP 100/80  
RR 24  
O2 82% RA  
T 38.2

### ON DEMAND

**Rhythm:** sinus tachycardia

**ECG:** sinus tachycardia

**CXR:** pulmonary edema

### Labs:

CBC 16/140/350  
Lytes 132/105/4.2  
Creat: 65  
Ck/Trops 107/0.03

### No treatment, only O2

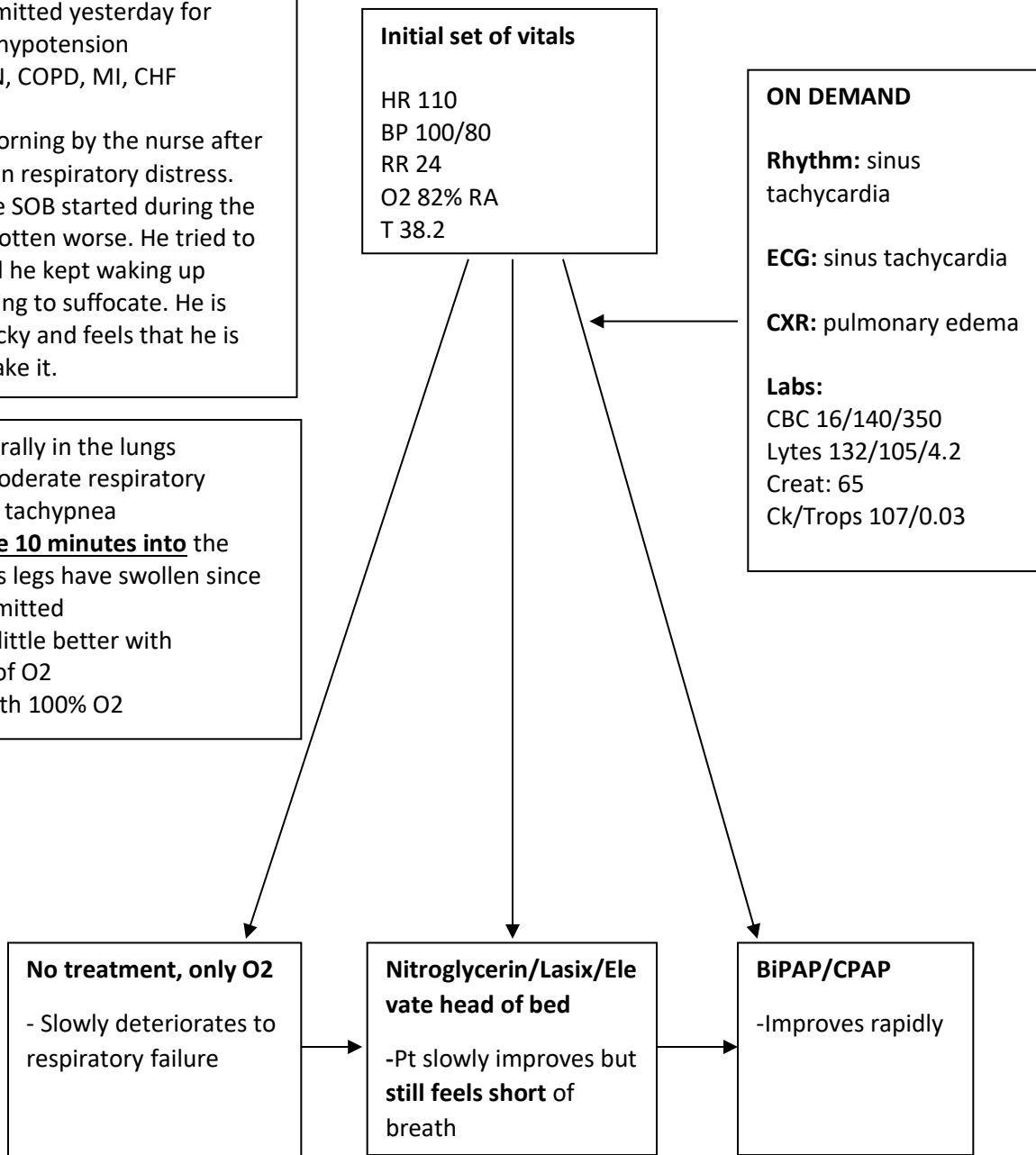
- Slowly deteriorates to respiratory failure

### Nitroglycerin/Lasix/Elevate head of bed

- Pt slowly improves but **still feels short of breath**

### BiPAP/CPAP

- Improves rapidly



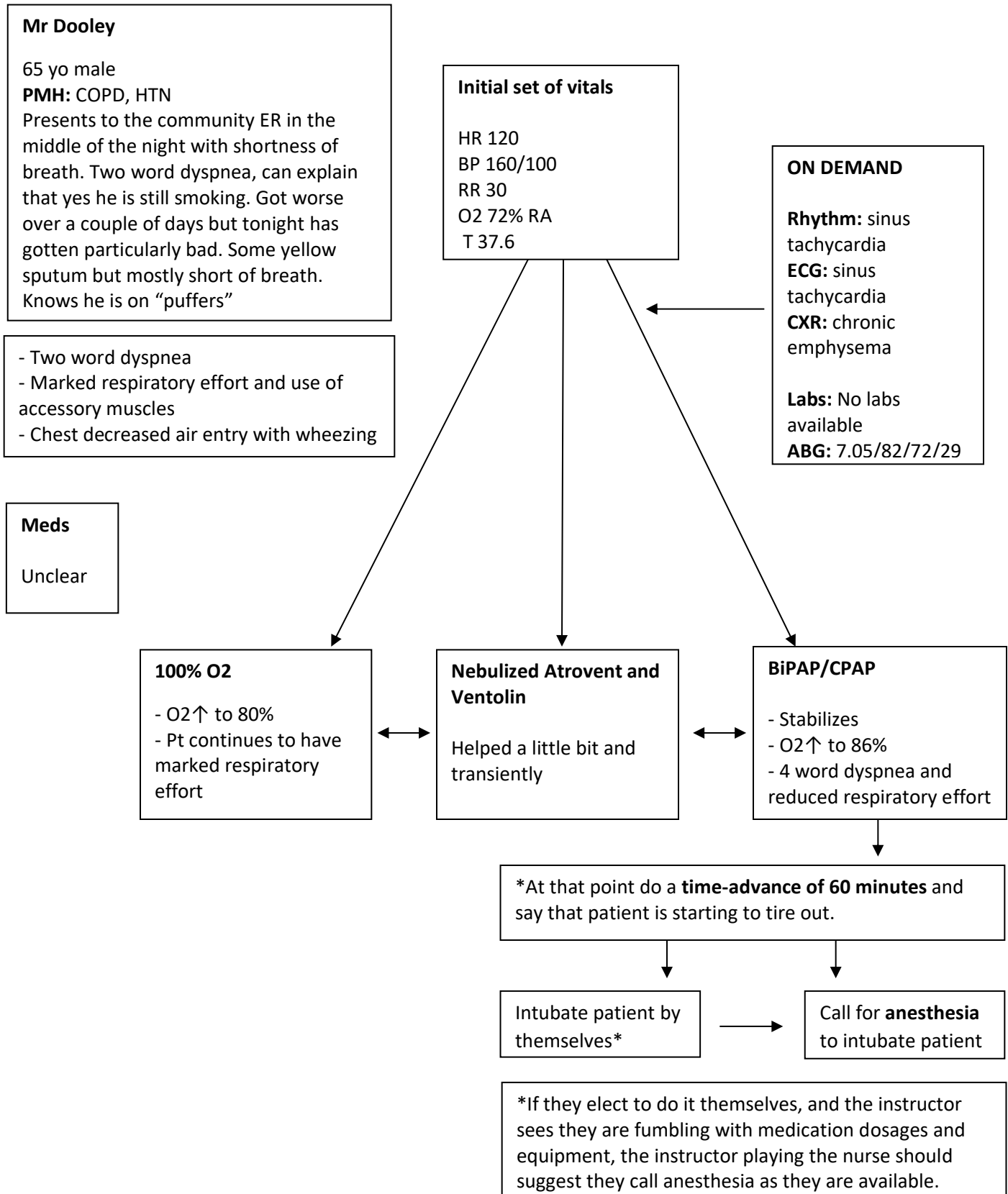
## **Learning Objectives**

- 1. Escalation of FiO<sub>2</sub> in a hypoxic patient**
- 2. Working through the SOB algorithm**
- 3. Use of condition-specific treatments (Nitro, Lasix)**
- 4. Escalation to NIPPV**

## **Pro Tips**

- 1. NIPPV is order of magnitude more effective than Lasix and Nitro in CHF- use it early and often**

## Case 7: Acute exacerbation of COPD requiring BiPAP on the floor



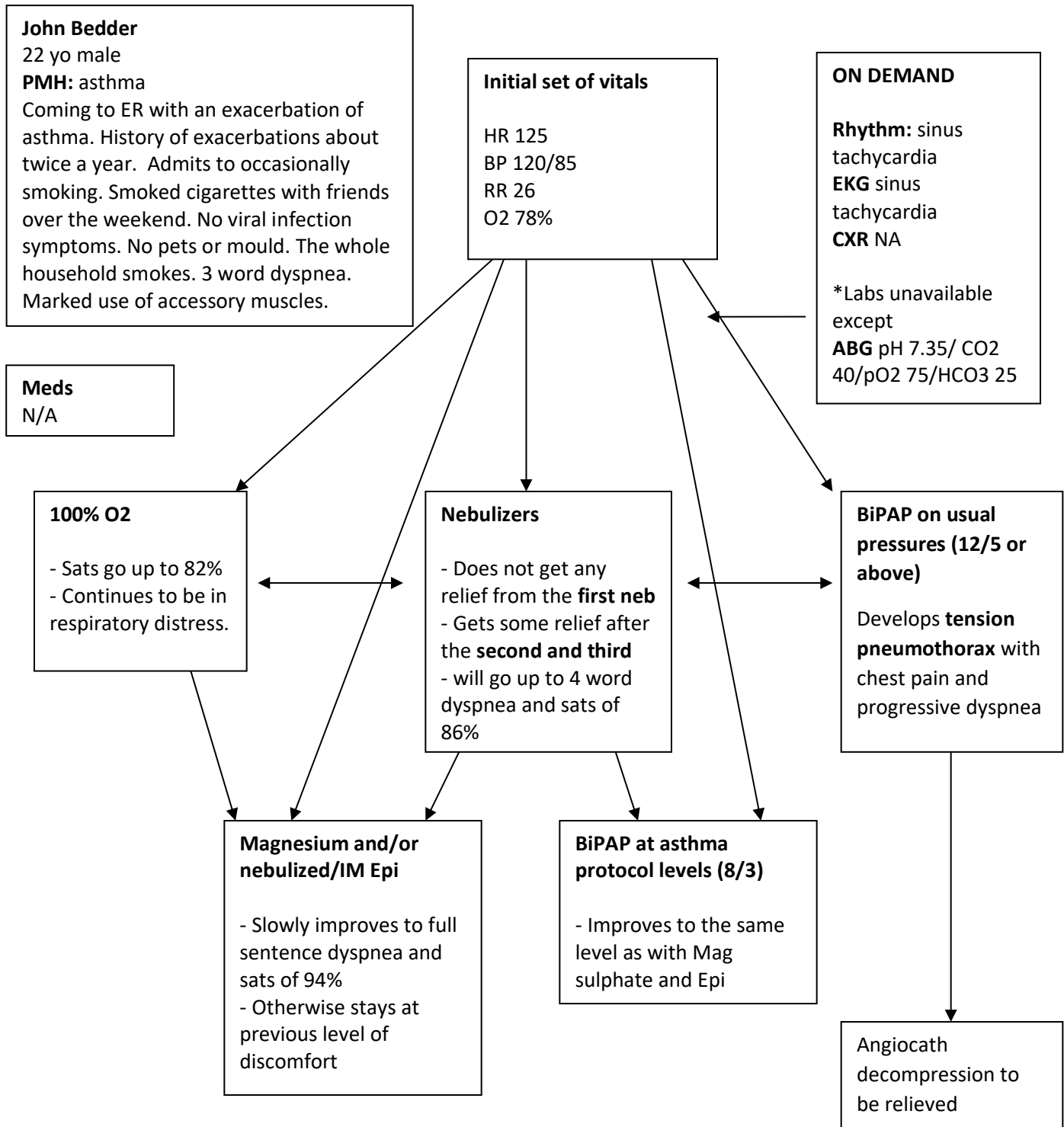
## **Learning Objectives**

- 1. Escalating FiO<sub>2</sub> in a hypoxic patient**
- 2. Working through the SOB algorithm**
- 3. Use of condition-specific treatment (nebulizers)**
- 4. Escalation to NIPPV**
- 5. Recognition of NIPPV failure and need for invasive ventilation**

## **Pro Tips**

- 1. NIPPV works very well early in COPD exacerbation as long as there is no pneumothorax**
- 2. If work of breathing, pH or pCO<sub>2</sub> have not improved by 60 min on NIPPV, they usually need an ETT**

## Case 8: Young guy with asthma initially resistant to nebulized meds



## **Learning Objectives**

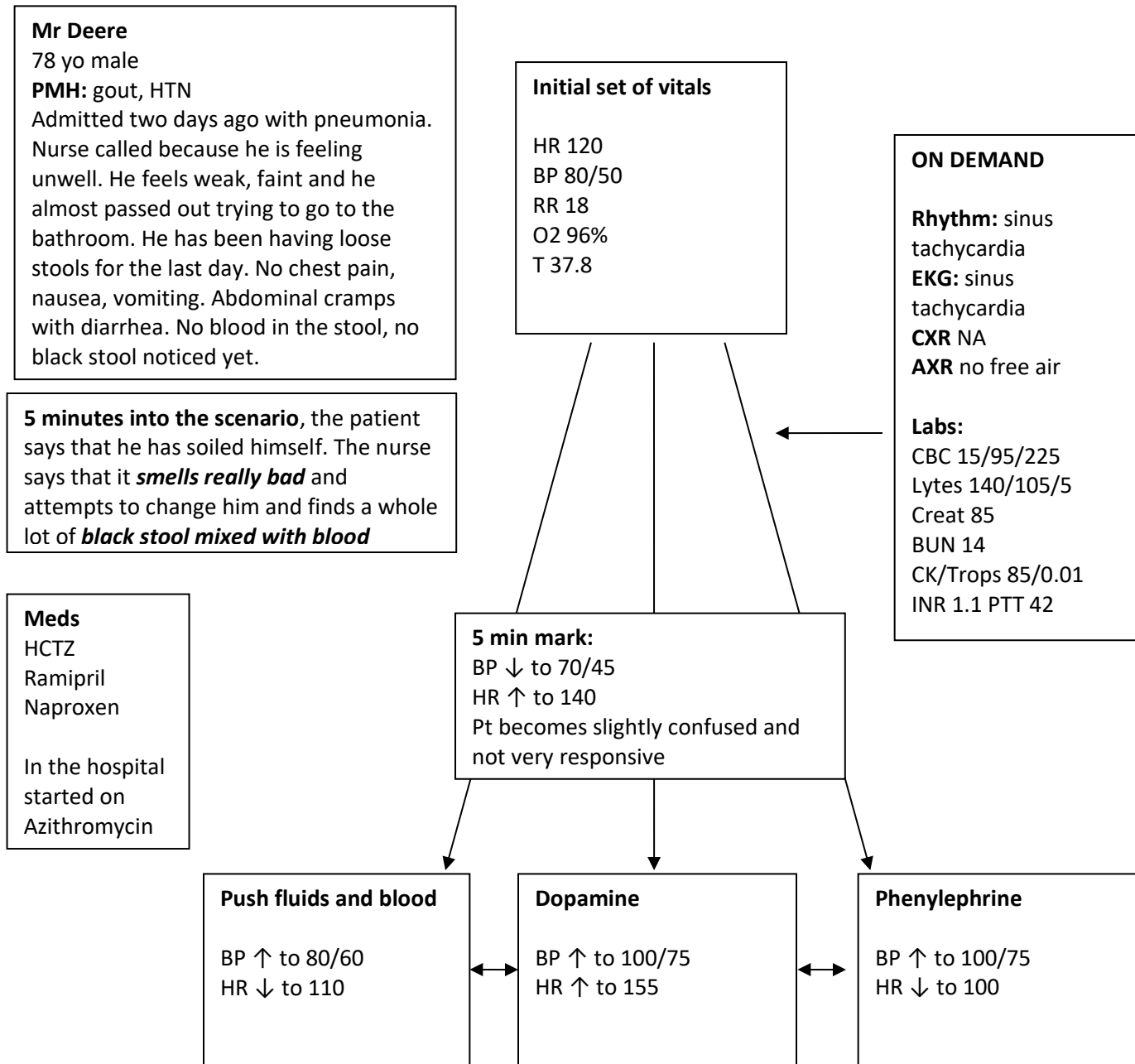
- 1. Escalating FiO<sub>2</sub> in a hypoxic patient**
- 2. Working through the SOB algorithm**
- 3. Use of asthma adjunct medications**
- 4. NIPPV settings for pt with asthma**
- 5. Recognition of signs and symptoms of tension pneumothorax**

## **Pro Tips**

- 1. Don't get focused on Ventolin only, you have other treatment options**
- 2. NIPPV at low pressures works well for asthma, be on the lookout for pneumothorax**
- 3. Ketamine is a bronchodilator and can be used at 20 mg aliquots to help settle an asthmatic**



## Case 9: Occult GI bleed leading to shock in a floor patient with pneumonia



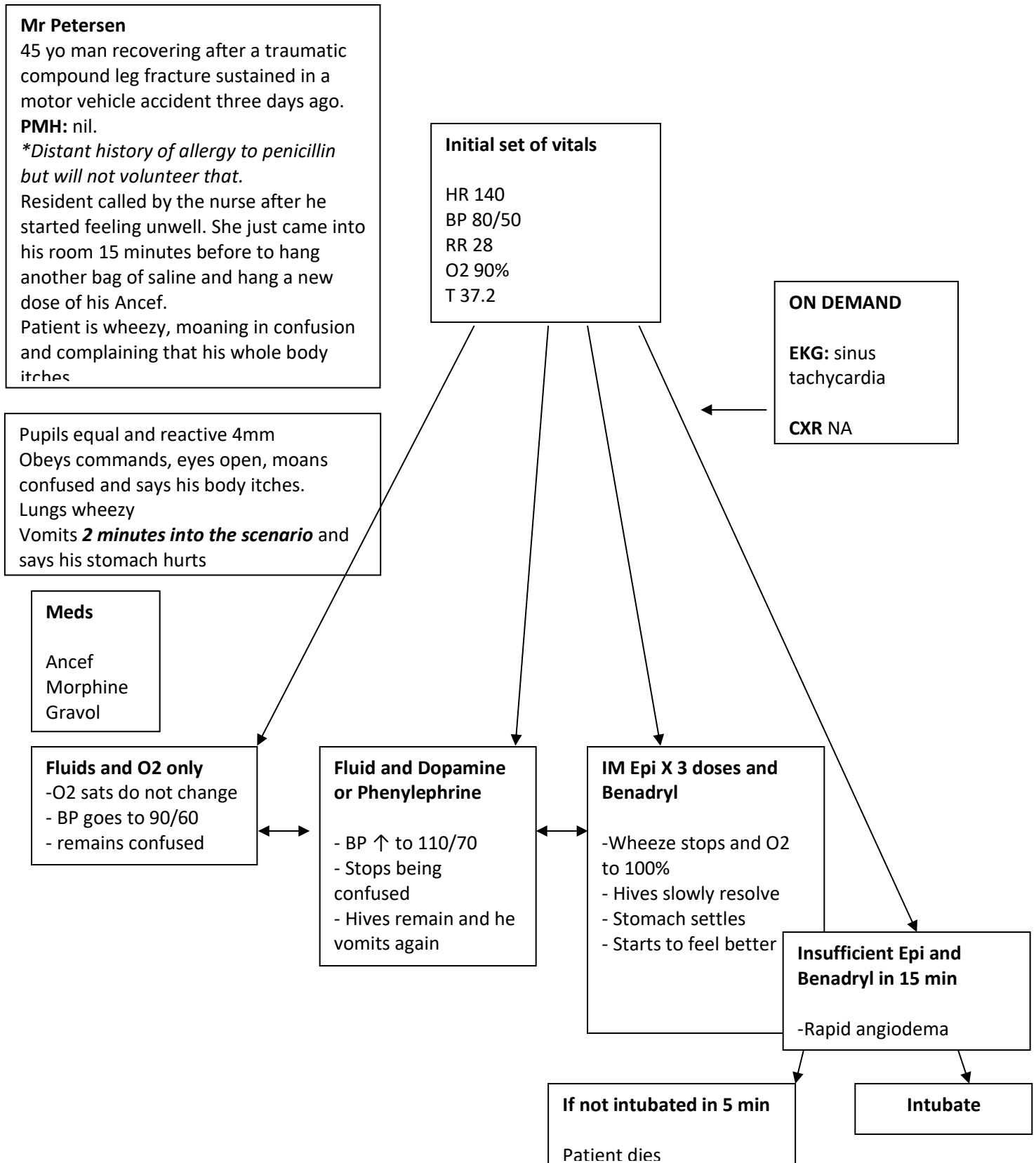
## **Learning Objectives**

- 1. Recognition of hypovolemic shock**
- 2. Use of pressurized fluid boluses**
- 3. Need for blood products in decompensated bleeding**
- 4. Temporizing use of pressors**

## **Pro tips**

- 1. Bleeding patients need fluids and blood**
- 2. If that is not enough, assist with pressors**
- 3. Dopamine is BP+HR increase, Phenylephrine is BP without tachycardia**

## Case 10: Anaphylaxis and shock requiring vasopressors after a wrong medication given on the floor



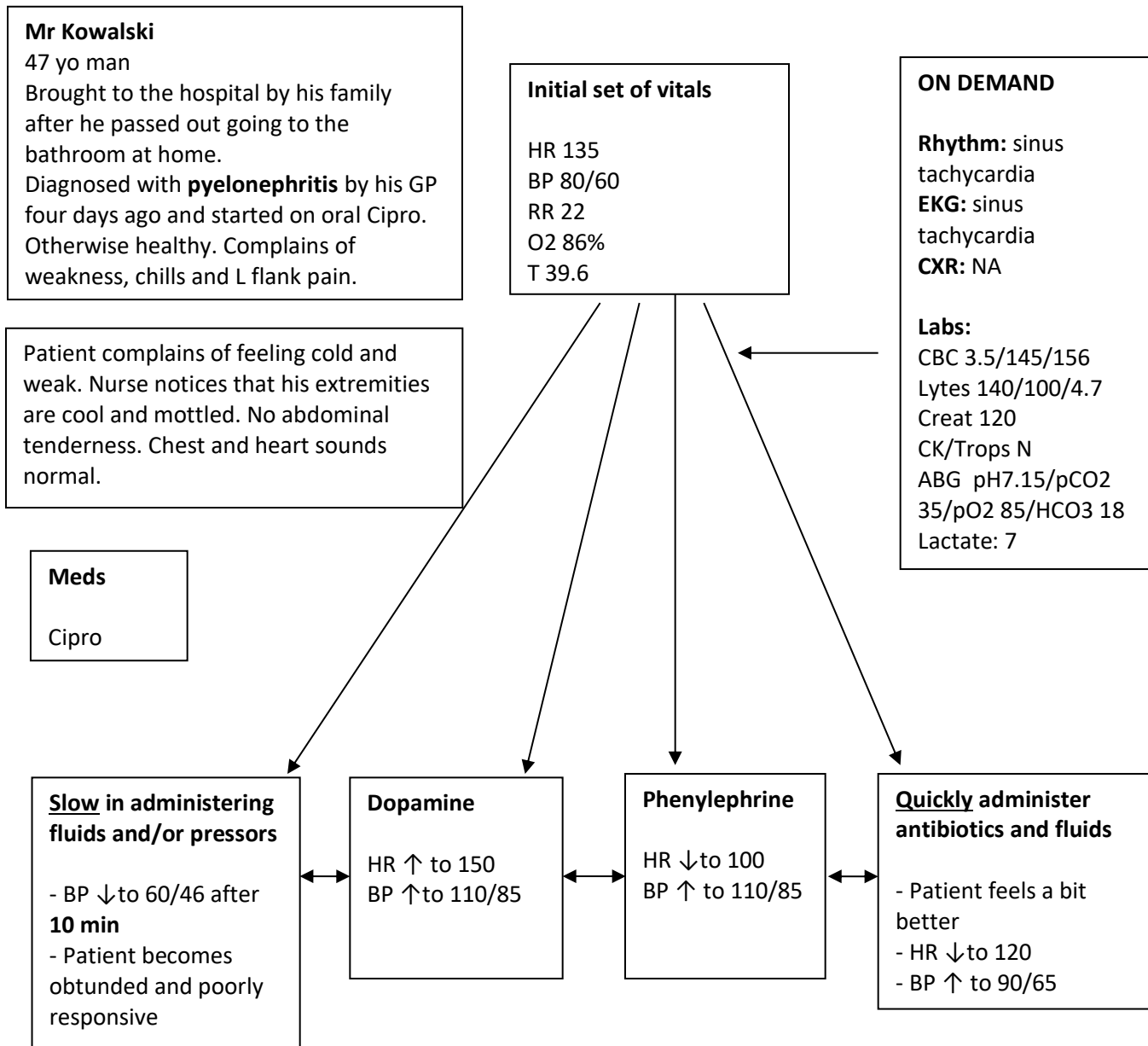
## **Learning Objectives**

- 1. Recognition of signs of anaphylactic/distributive shock**
- 2. Aggressive use of repeated IM Epi and Benadryl**
- 3. Use of anaphylaxis adjunct treatment (Dopamine, Phenyl, Ranitidine)**
- 4. In case of airway closure, rapid need for invasive ventilation**

## **Pro Tips**

- 1. IM Epi is used because it is quick and accessible and has less systemic side-effects than IV**
- 2. Other vasoconstrictors like Phenylephrine or high-dose Dopamine are also effective**

**Case 11: Septic shock that started as pyelonephritis in an otherwise healthy 45 yo, on the floor**



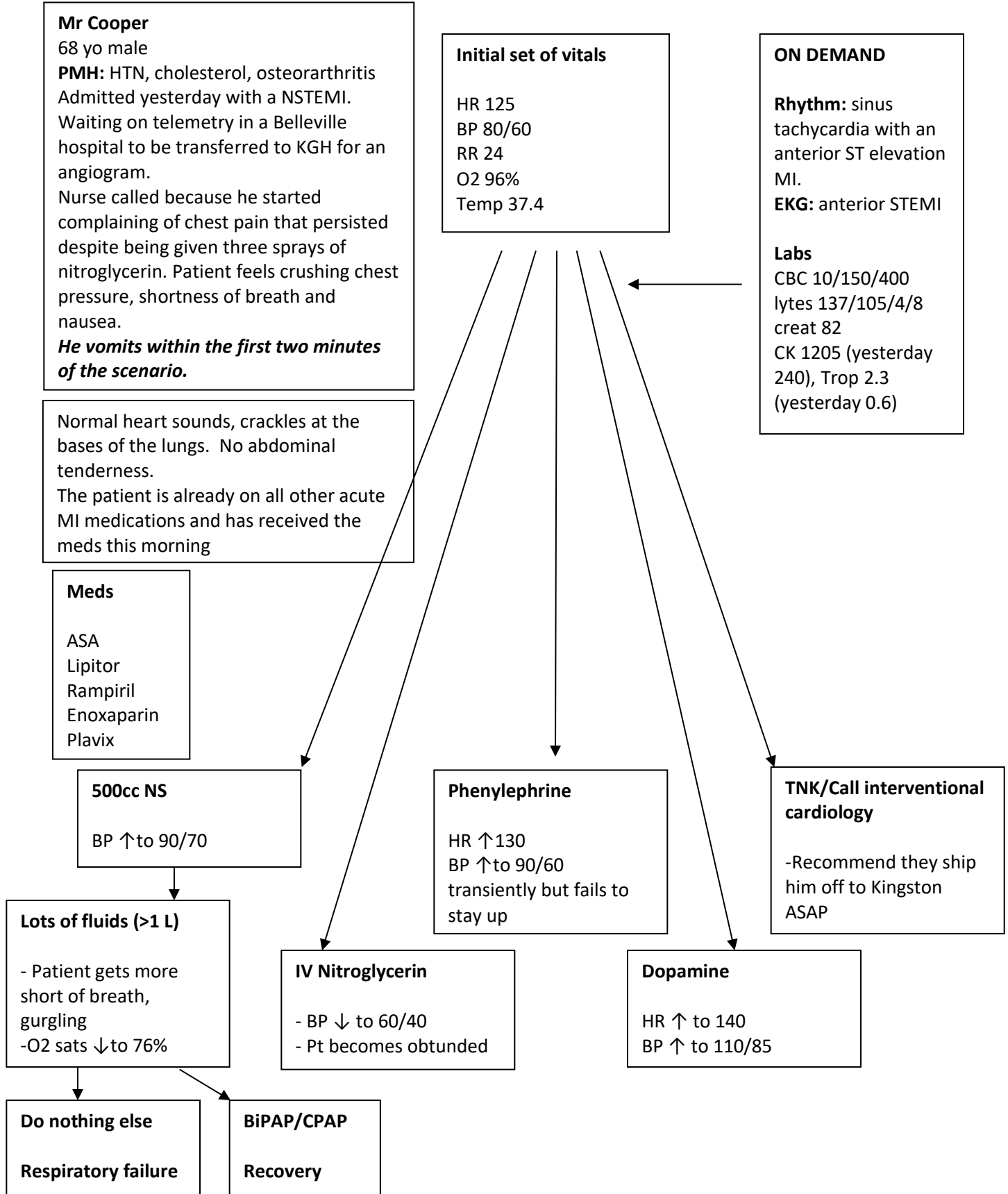
## **Learning Objectives**

- 1. Recognition of septic shock**
- 2. Rapid need for antibiotics and pressurized fluid boluses**
- 3. Need for pressors if MAP<65**
- 4. In case of progressive shock, need for invasive ventilation**

## **Pro Tips**

- 1. Each hour that antibiotics are delayed, mortality goes up 8%**
- 2. Antibiotics for undifferentiated sepsis are Vanco 1.5gr +Ceftriaxone 2g, OR Imipenem/Meropenem**
- 3. Usual fluid deficit in septic shock is 4-6 litres**

## Case 12: Cardiogenic shock after a re-infarct in a patient admitted to telemetry with a NSTEMI



## **Learning Objectives**

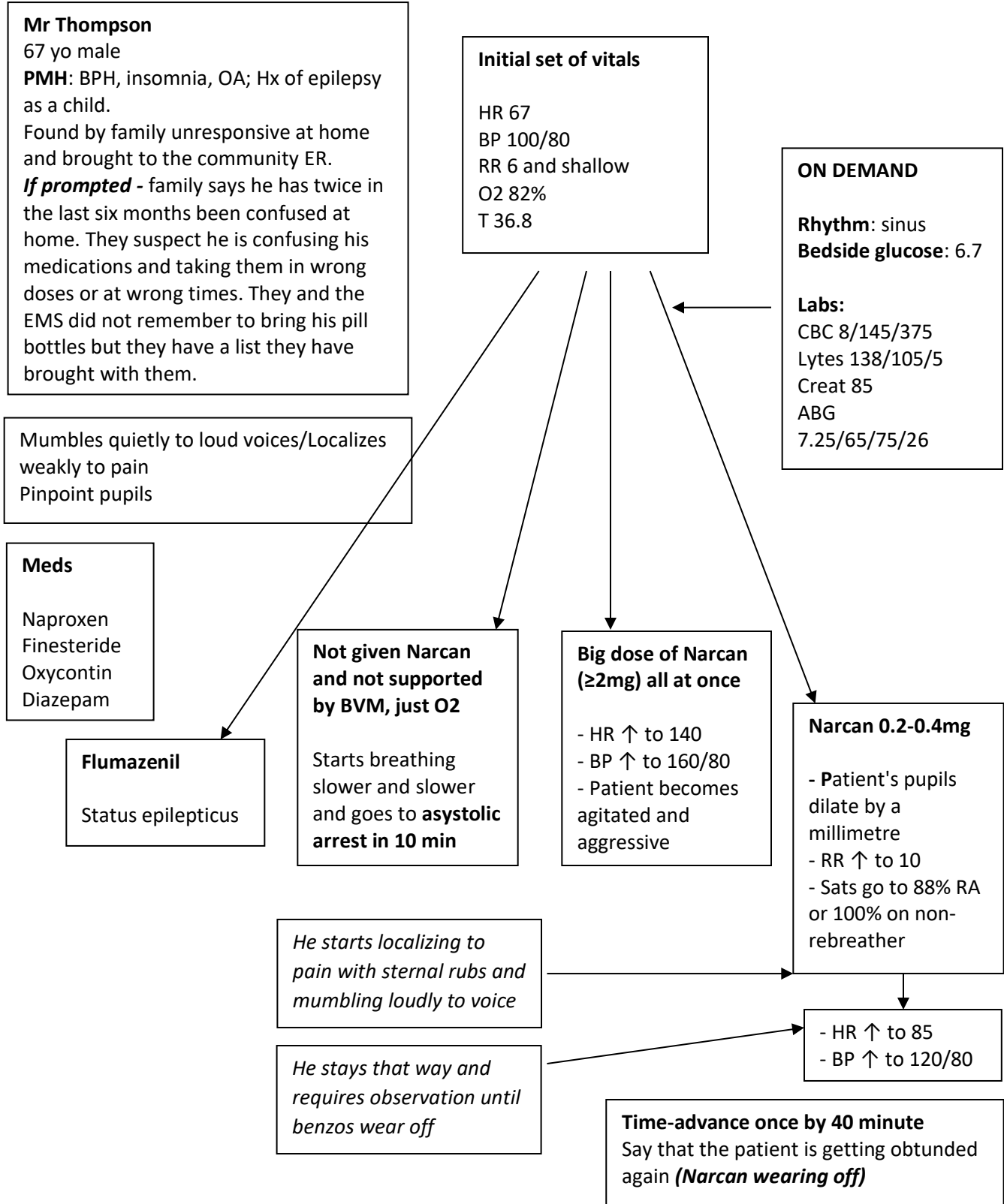
- 1. ECG interpretation of STEMI**
- 2. Recognition of cardiogenic shock**
- 3. Need to avoid fluid overload**
- 4. Recognition and planning for TNK or PCI**
- 5. Need for NIPPV if CHF develops**

## **Pro Tips**

- 1. Don't give Nitro or pain killers when STEMI has cardiogenic shock**
- 2. Dopamine gives you tachycardia and potential for tachyarrhythmia with cardiogenic shock but it is acceptable for short term use**
- 3. Phenylephrine increases SVR without increasing contractility- it will thus decrease coronary blood flow and is thus a wrong choice**



**Case 13: Inadvertent overdose of narcotics and benzos in an elderly man chronically using both, in the ER**



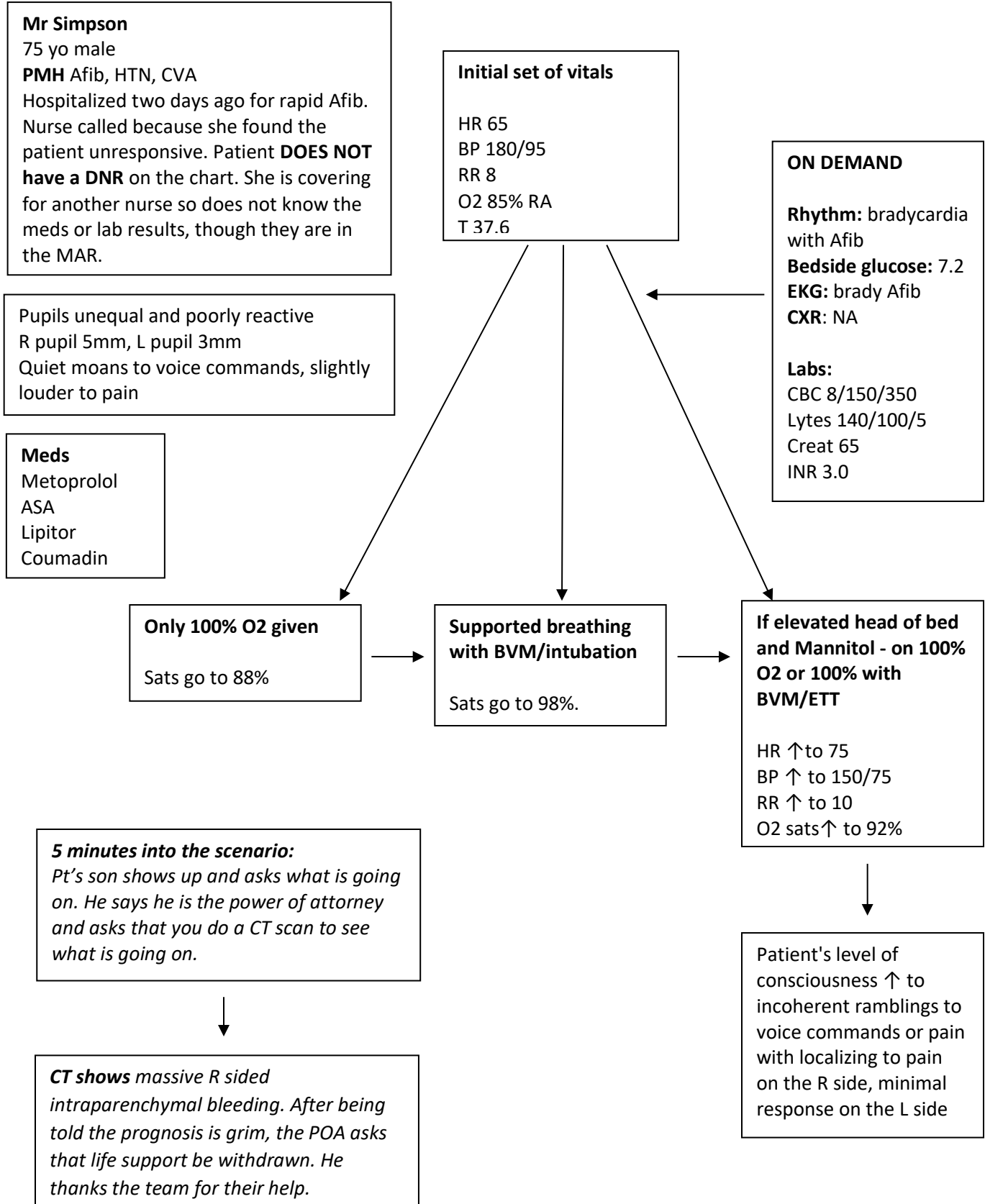
## **Learning Objectives**

- 1. Approach to evaluation of a pt with decreased level of consciousness**
- 2. Recognition of opioid toxidrome**
- 3. Judicious use of Narcan in a narcotic overdose**
- 4. Awareness of Narcan's short half-life**

## **Pro Tips**

- 1. If you give big doses of Narcan, they will wake up and start swinging**
- 2. We just want them conscious enough to breathe spontaneously and protect the airway**
- 3. Half life of Narcan is 45min- all narcotics last longer. Put them on a drip at 2/3 of the dose it took to wake them up per hour**

# Case 14: Head bleed in a patient coumadinized for Afib



## **Learning Objectives**

- 1. Approach to evaluation of a pt with decreased level of consciousness**
- 2. Recognition of raised ICP (sluggish pupils, Cushing's response)**
- 3. Avoidance of hypoxia when ICP is raised +/- need for invasive ventilation**
- 4. Clarification of code status**

## **Pro Tips**

- 1. Bradycardia with Hypotension = raised ICP. Bradycardia happens because the vagus nerve ganglion in the medulla gets compressed which increases vagal stimulation. BP goes up because  $CPP = MAP - ICP$ . As ICP rises, brain increases the MAP to keep the CPP stable**
- 2. Hypoxia and hypotension double mortality in head bleeds**
- 3. Mannitol 1gr/kg is the most effective treatment we have for increased ICP**

## Case 15: Status Epilepticus in a known epileptic

### Jimmy Drake

16 yo male

**PMH** epilepsy

Brought in by the EMS to a community ER at 2am.

They picked him up in front of a local bar where he was with friends- they said he was doing fine, having a good time drinking with them and smoking some weed then said he is not feeling well, sat down then started seizing. They apparently have not seen him seize in a while. They say they were pretty sure he was on epilepsy medications but don't know for sure. No other history is available.

EMS gave him **2 mg Ativan IV** with no effect.

Started seizing 10 minutes ago

### Initial set of vitals

HR 120  
BP 120/80  
RR 12  
O2 94% RA  
T 37.6

### ON DEMAND

**EKG:** sinus  
**Bedside glucose:** 6.5

### Labs

CBC 12.5/154/345  
Lytes 140/106/4.8  
Creat 56  
EtOH 25  
Dilantin level: 0  
Osmolality is a send-out lab  
VBG 7.36/42/65/25  
Urine tox screen:  
THC

Pupils equal and reactive 3mm  
Tonic clonic movement all limbs

### Meds

Unknown

Phenobarbital not in the formulary

Dilantin infusion will have no effect.

**Total of 80 mg Diazepam  
OR 20 mg Ativan OR 10mg  
of Midazolam OR Propofol  
infusion**  
Pt stops seizing

*Will need **assists with BVM during seizing**, otherwise his O2 sats ↓ to 86% despite 100% O2.*

Will require an **intubation** after he stops seizing due to sedation (unresponsive to voice, minimally responsive to pain)

Can be supported by **BVM or an LMA** instead until anesthesia arrives

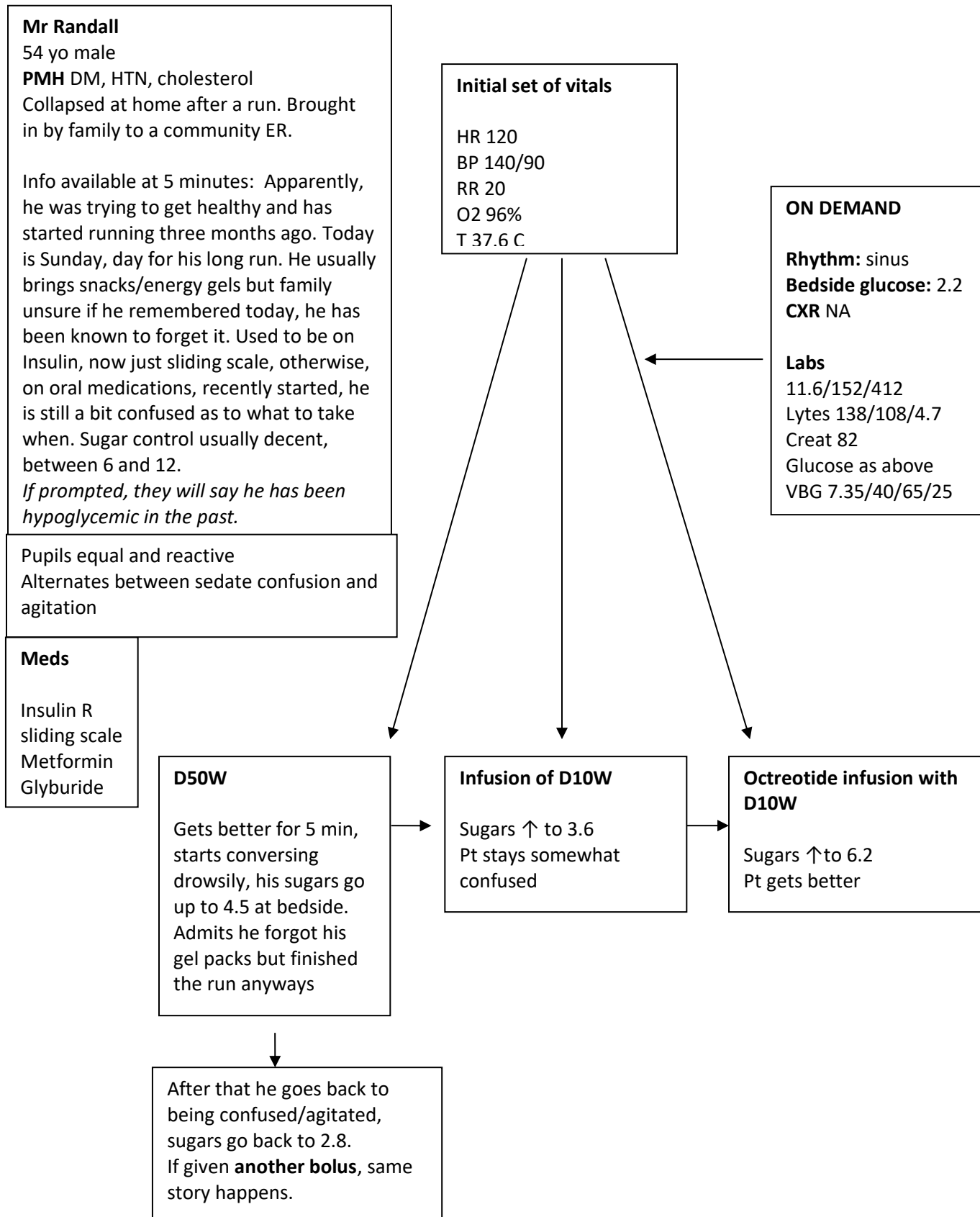
## **Learning Objectives**

- 1. Recognition of status epilepticus (>15min seizure)**
- 2. Avoidance of hypoxia**
- 3. Aggressive use of benzos**
- 4. Escalation to Propofol if needed**
- 5. Recognition of potential need for invasive ventilation post-treatment**

## **Pro Tips**

- 1. Longer seizure = higher chance of hypoxia-like damage to the brain from persistent hyperexcitation**
- 2. Use Benzos aggressively and often, there is no max dose**
- 3. Dilantin does not work quickly enough and can't be run through the same line as Benzos- it will precipitate**
- 4. Escalate to Propofol or Ketamine induction doses if no seizure control at 15 minutes**

## Case 16: Coma and persistent hypoglycemia in an inadvertent sulfonylurea overdose



## **Learning Objectives**

- 1. Need to measure glucose in altered LOC patients**
- 2. Use of glucose boluses in obtunded hypoglycemia**
- 3. Potentially persistent hypoglycemia with sulfonylureas**
- 4. Use of Octreotide as a sulfonylurea-blocker**

## **Pro Tips**

- 1. Hypoglycemia can cause obtundation, coma, aggression, confusion and seizures. Measure it in everyone who is altered LOC**
- 2. Sulfonylureas stimulate the pancreas to release more insulin the more glucose you give them, and they stay in the system for quite a while**
- 3. You might need to give Octreotide, a somatostatin analogue which blocks Insulin release**