A 61-year-old man is evaluated in the emergency department after he collapsed on a hot and humid day. He was playing in a marching band and had to stand in the sun for 2 hours while wearing a heavy uniform. No other medical information is available.

On physical examination, temperature is 40 °C (104 °F), blood pressure is 90/45 mm Hg, pulse rate is 110/min, and respiration rate is 20/min. His face is flushed, he is somnolent, and although he is arousable, he is not coherent. There are no signs of trauma.

His clothing is removed.

Which of the following is the most appropriate treatment?

A. Acetaminophen and a cooling blanket
B. Continuous alcohol sponge bath with cooling fans
C. Ice water immersion
D. Intravenous dantrolene
E. Sprayed water and cooling fans

TREATMENT

- **ABCs**
- Rapid cooling
  - Most effective: **Evaporative and convective**
  - Ice packs (axillae, neck, groin), cooling blankets, cold IV fluids (~22C)
  - Less common: cold water immersion, cold thoracic or peritoneal lavage
  - GOAL: **< 39C**
- Fluid resuscitation
  - **Avoid** alpha-adrenergic agonists
- Pharmacologic therapy (Tylenol, dantrolene) is **NOT** effective

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On physical examination, temperature is 40 °C (104 °F), blood pressure is 90/45 mm Hg, pulse rate is 110/min, and respiration rate is 20/min. His face is flushed, he is somnolent, and although he is arousable, he is not coherent. There are no signs of trauma.

His clothing is removed.

Which of the following is the most appropriate treatment?

24%	A	Acetaminophen and a cooling blanket
8%	B	Continuous alcohol sponge bath with cooling fans
22%	C	Ice water immersion
1%	D	Intravenous dantrolene
45%	E	Sprayed water and cooling fans

CC: Chest pain

HPI: 42 year old man
- Tightness, non-radiating, non-pleuritic, not reproducible, worse with exertion, better with rest
- On the day before admission, chest pain was present at rest
- Assoc w/ SOB
- Baseline 1 yr ago: walk 1+ miles
- Now: can walk only about 20 steps before feeling SOB
- Intermittent chest pain x2 yrs

- Hx tib/fib fracture ~2019 c/b PE s/p 3 months of anticoagulation
- Hx stress test ~2019, which was reportedly negative

PMH:
- HTN, HLD, hx PE (~2019) s/p AC

SH:
- 10 cigarettes/day x 7yrs → 3 cigarettes/day x ½ week
- Hx EtOH use (12 pack / day x4 yrs), quit 5/2021
- No current ETOH or drug use.

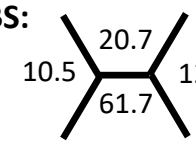
FH:
- HTN
- Father: CAD s/p stents in his 40-50s
- Mother: T2DM

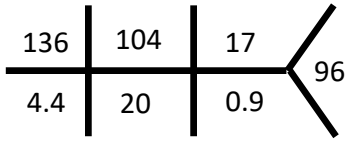
MEDS:
- Losartan
- Lipitor
- Metoprolol

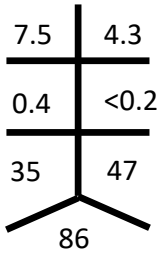
PHYSICAL EXAM:

Tmax: 36.3C, **BP:** 140/93, **HR:** 76, **RR:** 18, **SpO2:** 98% on RA, **BMI:** 28
General: Well developed, well nourished man in NAD
HEENT: PERRLA, nonicteric sclera, MMM, supple neck
CV: RRR, no M/R/G
Pulm: Unlabored breathing on room air, CTAB
GI: Nondistended, normal bowel sounds, soft, nontender
MSK: No edema, pulses 2+, warm extremities
Skin: No rashes, no lesions
Neuro: A&O x3, moving all extremities spontaneously

LABS:







Trop: 9 → 10

NT-proBNP: 50

INR: 0.9
PTT: 33

Ddimer: 3.47

EPO: 9 (nml: 4-27)

CarboxyHgb: 1.7% (nml: 0.5-1.5%)

JAK2 V617F: negative
CALR & MPL: pending

CXR: negative

CTA PA: negative for PE

TTE: LV EF 55-60%, nml diastolic, basal to mid inferior/inferoseptal hypokinesis.

NM Stress: LV EF 52%, wall motion nml, mild ischemia at apex

CT CTA Coronary arteries: Multivessel CAD in LAD, LCX, & RCA

Cardiac cath:
- Distal LAD: chronic total occlusion (100%)
- LCX: chronic total occlusion (100%)
- Ramus: diffuse 80-90% prox-mid disease
- RCA: chronic total occlusion (100%)

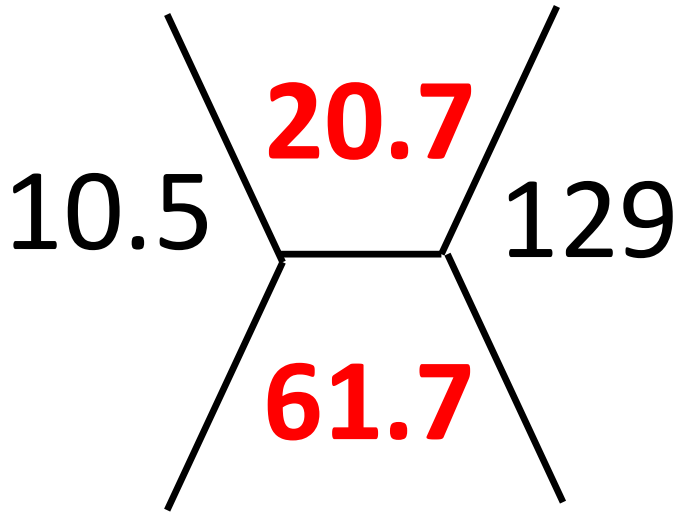
PROBLEM REPRESENTATION:

Young man w/ HTN, HLD, hx PE s/p AC, tobacco use disorder, family cardiac history, presenting with acute on chronic chest pain, and found to have…

POLYCYTHEMIA

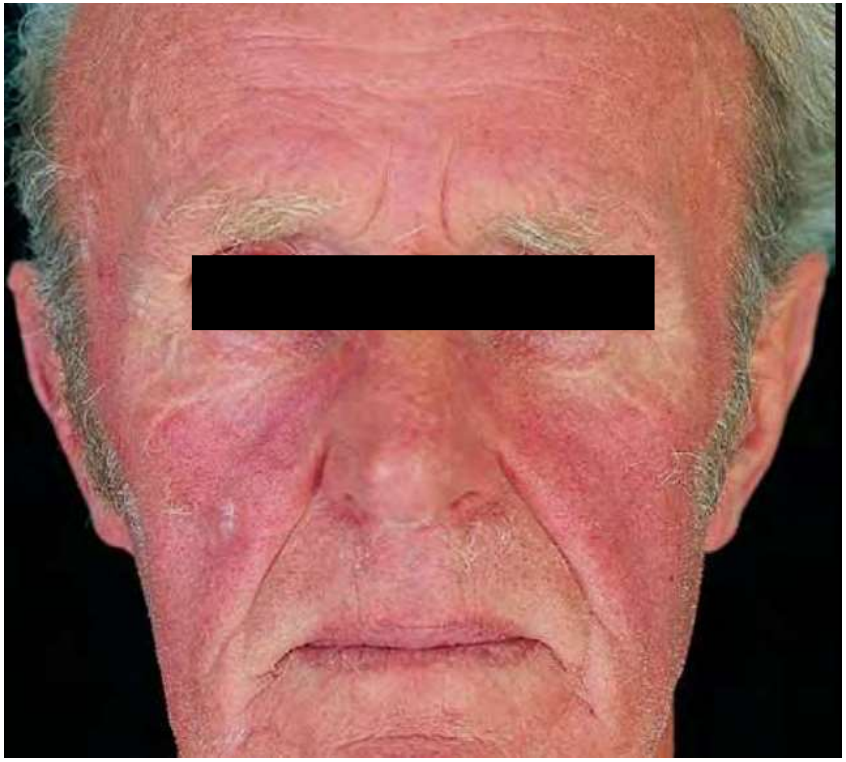
DEFINITION

- Hemoglobin:
  > 16.5 g/dL in men OR
  > 16 g/dL in women
- Hematocrit
  > 49% in men OR
  > 48% in women



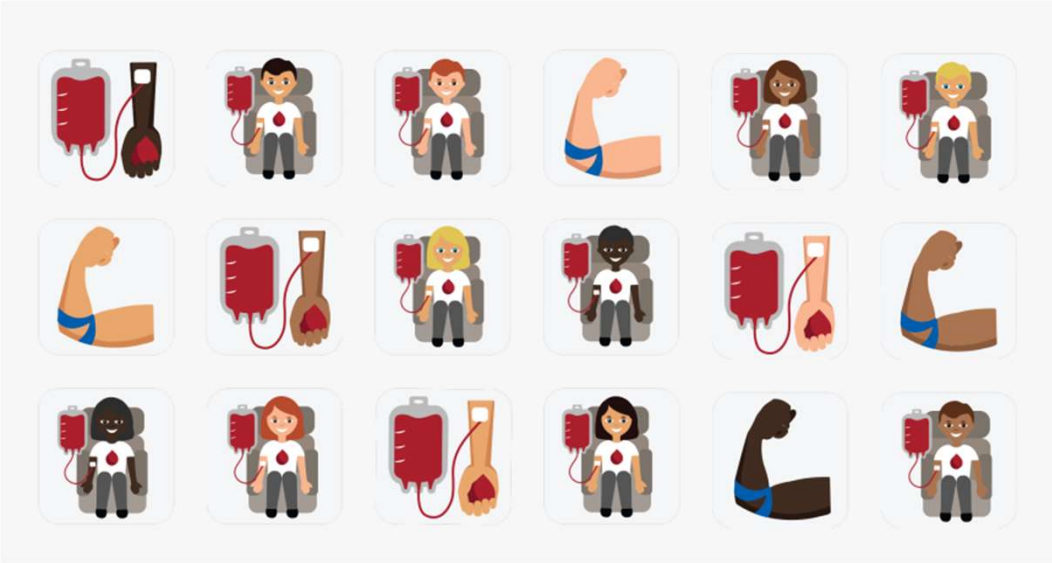
CLINICAL MANIFESTATIONS

- Aquagenic pruritus
- Erythromelalgia
- Facial plethora (ruddy cyanosis)
- Thrombosis (CVA, MI, DVT, PE, etc)



TREATMENT

- Low risk vs High risk
  - Low risk: ≤60 yr old AND no hx of thrombosis
- **Therapeutic Phlebotomy**
  - **Goal Hct <45%**
- **Low-dose aspirin**
- Cytoreductive agents (hydroxyurea); high risk PV



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LABS:

20.7		
10.5		129
61.7		

136	104	17
4.4	20	0.9

96

7.5	4.3
0.4	<0.2
35	47

86

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DIAGNOSIS: POLYCYTHEMIA

LEARNING POINTS:

- Ddx for polycythemia
  - Relative (hemoconcentration)
  - Absolute
    - Primary / Polycythemia Vera (PV)
    - Secondary polycythemia
      - Hypoxia: pulm diseases, heart diseases, OSA/OHS, CO, impaired O2 sensing by kidneys
      - Tumor-associated (EPO secretion): RCC, HCC, pheochromocytoma
      - Misc: blood doping, exogenous EPO, androgen/steroids
- Clinical manifestations of PV
  - Aquagenic pruritus
  - Erythromelalgia
  - Facial plethora
  - Thrombosis (CVA, MI, DVT, PE)
- Treatment of PV
  - Therapeutic phlebotomy: goal Hct < 45%
  - Low-dose ASA
  - Cytoreduction (hydroxyurea) – high risk PV