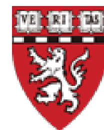
Dana-Farber Cancer Institute

BRIGHAM AND WOMEN'S HOSPITAL


HARVARD MEDICAL SCHOOL TEACHING HOSPITAL

Classical Hematologic Emergencies & Urgent Consults

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- *Brigham and Women's Hospital*
- *Dana Farber Cancer Institute*
- *Harvard Medical School*

Overview of Topics

- Hemophilia + trauma
- DIC
- Single digit thrombocytopenia
- Thrombotic microangiopathies
- Acute chest syndrome
- Brisk hemolysis

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Hemophilia basics

- Hemophilia A = FVIII deficiency
- Hemophilia B = FIX deficiency

Severity	Factor Level	Presentation	Treatments	Inhibitor Risk
Mild	>5%	Bleeding only with trauma	Desmopressin, factor replacement	Very rare
Moderate	1-5%	Sometimes spontaneous; more commonly traumatic	Factor replacement	Uncommon
Severe	<1%	Spontaneous common; exaggerated with trauma	Factor replacement, emicizumab	High

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Back to page: trauma + hemophilia

- With trauma OR known bleeding = Treat first!
- Don't wait for
  - Imaging
  - Lab
  - Hematology call back
  - Anything
- Definitely call hematology

How much factor to give?

- Goal factor level is 100%
- Call hematology
- Cheats
  - Outpatient hemophilia clinic notes
  - Acute care plan

- Hemophilia A: 1u/kg = 2% increase
  - 50u/kg → anticipated 100% lvl
- Hemophilia B: 1u/kg = 1% increase
  - 100u/kg → anticipated 100% lvl

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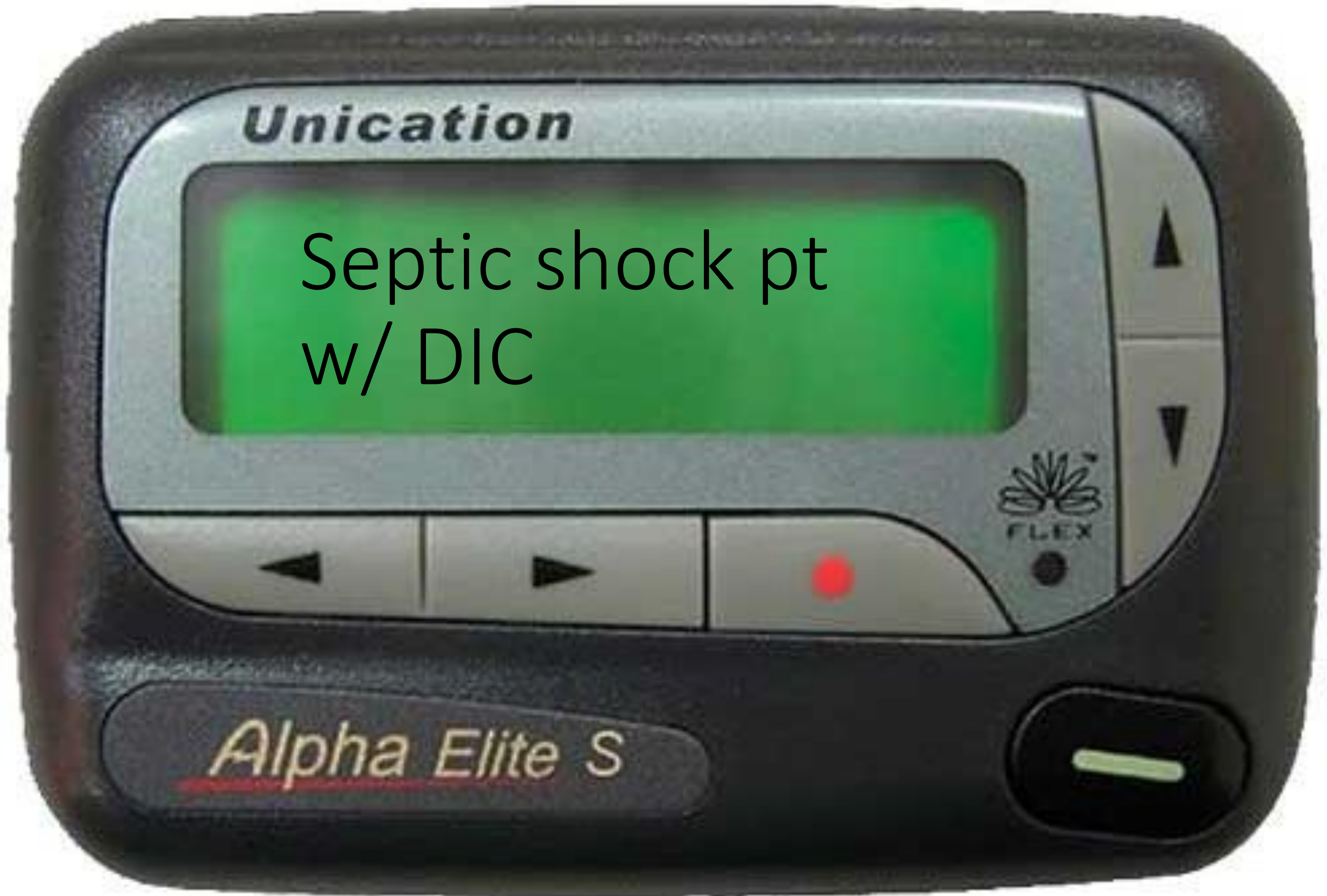
It get’s worse… an inhibitor!

- **Always** check for this
- Won’t respond factor replacement
- Prevention for FVIII inhibitor: emicizumab
  - NOT treatment for a bleed
- Use a bypassing agent
  - rFVIIa aka NovoSeven
  - Activated prothrombin complex concentrate (aPCC) aka FEIBA (DON’T USE W/ EMICIZUMAB)
    - IIa, VIIa, IXa, Xa
- Used for acquired hemophilia A as well



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DIC “Dos”

- Assure fibrinogen replete w/ cryo
  - >100 if not bleeding
  - >150 if bleeding OR some people prefer
  - Consider >200 if pregnant
- Consider vitamin K
- Platelets if needed
  - >50 if bleeding
  - >20 vs >10K if no bleeding
- Hold VTE ppx

DIC "Don'ts"

- Give plasma if not bleeding & no procedures
- Give excessive platelets
- Forget to monitor fibrinogen
- Think you can rule out DIC from a blood smear

Back to page: DIC

- Treat the underlying cause
- Attention to fibrinogen
- Don’t overtransfuse

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Approach to thrombocytopenia

- Severe thrombocytopenia
  - Acute leukemia
  - TTP
  - ITP: primary, secondary or drug-induced
- Isolated vs other cytopenias
- Review timing, meds, comorbidities and symptoms

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ITP management

- IVIG 1g/kg qD x 2 days
- Dexamethasone 40mg qD x 4 days
    - Alternative prednisone 1mg/kg
- How to choose
    - Plt >30K & no bleeding (or surgery) → just watch
    - Plt <30K & no bleeding → dexamethasone
        - Strong contraindication to dexamethasone, use IVIG
    - Plt <30K & bleeding → both
    - Plt <10K → usually both

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Back to page: New plt 4K

- Rest of CBC normal
- Smear with rare large platelets & no clumping
- Started on IVIG & dexamethasone

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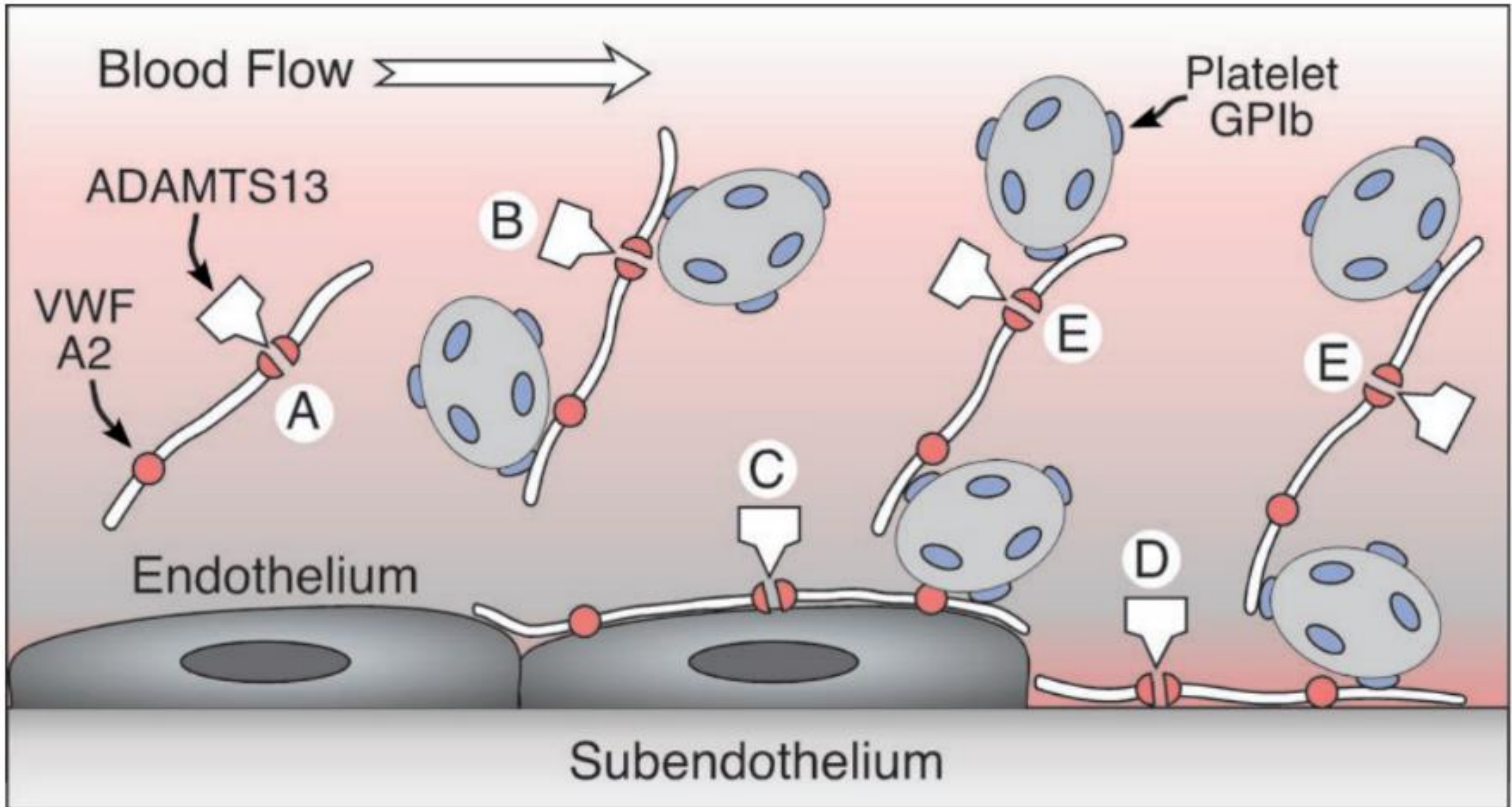
Thrombotic Thrombocytopenic Purpura

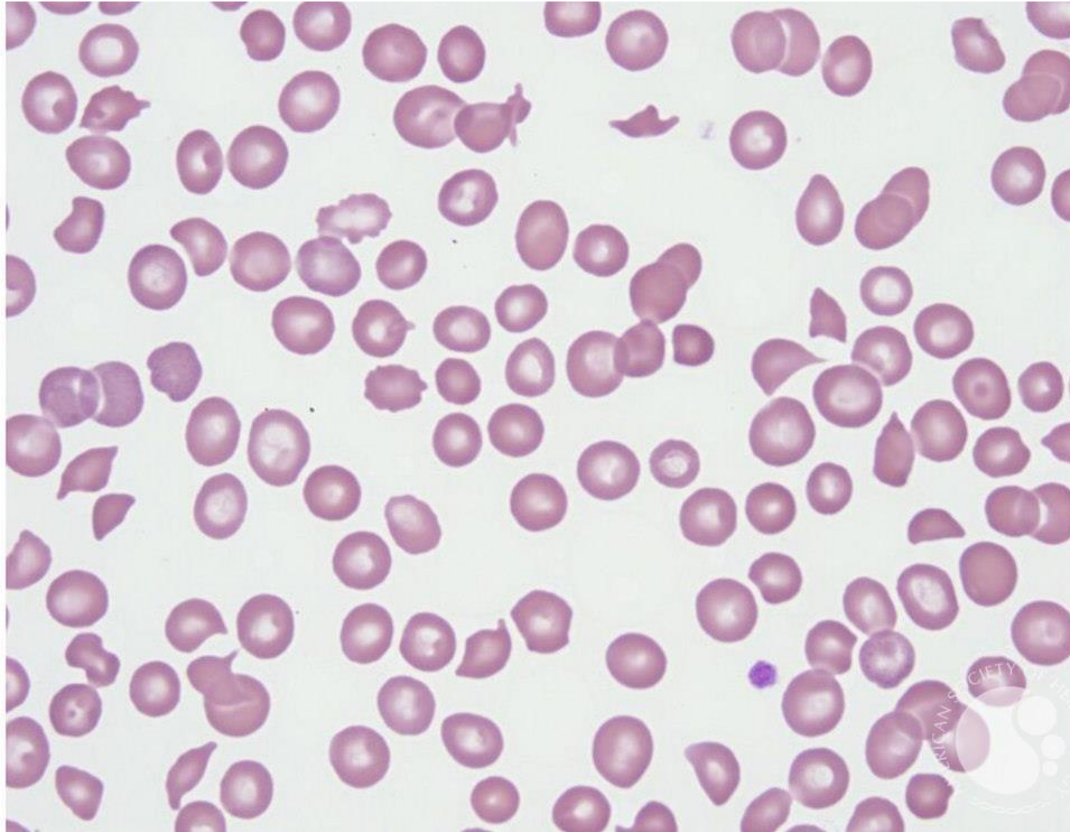


Sadler JE. A new name in thrombosis, ADAMTS13. Proc Natl Acad Sci 2002;99(18):11552–4.

Thinking about TMA

- Prove hemolysis before classifying it
- Prove hemolysis is TMA before classifying type
- Plasmic score ONLY if already know its TMA
- More renal failure → aHUS
- More neuro symptoms → TTP
- Pregnant? → consider HELLP

Blood smear review



https://imagebank.hematology.org/image/60307/schistocytes--triangulocytes-and-helmet-cells

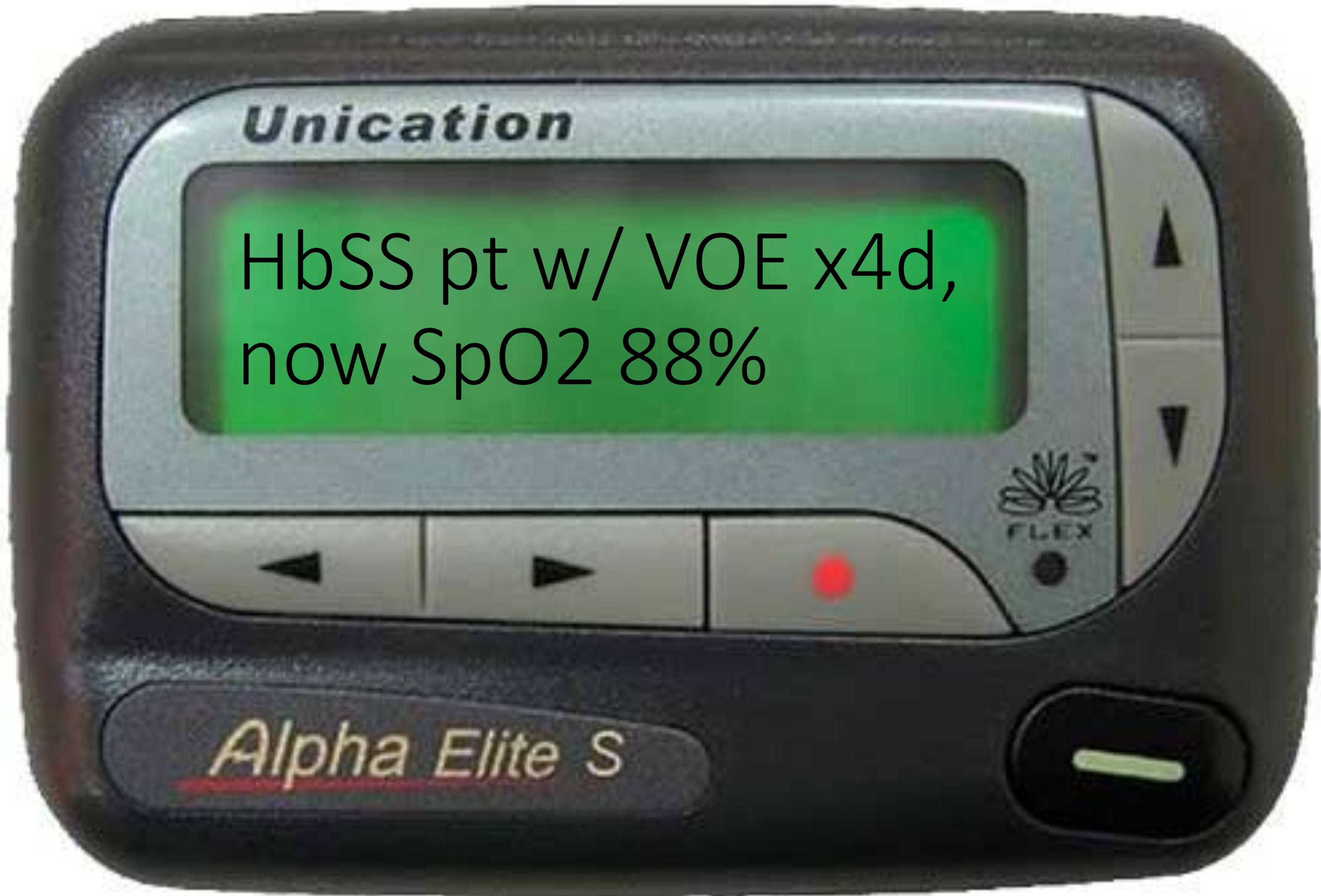
Back to page: Suspected TMA

- Prednisone 1mg/kg started
- Let's recruit the team:
  - Hematology
  - Page blood bank for STAT plasmapheresis (heme often does this)
  - Cushing service for dialysis-bore central line <u>w/i 3 hrs</u>
  - Notify MICU if concerned for mental status/airway
- Collect ADAMTS13 level prior to pheresis
  - Also other vital labs <u>*as indicated*</u>: APLS, complement, serologies

Don't be passive!
Push for pheresis
ASAP

Ongoing trials: supplanting PLEX

- Caplacizumab (NCT05468320)
- rADAMTS13 w/ minimal or no PLEX (NCT05714969)
  - Open here



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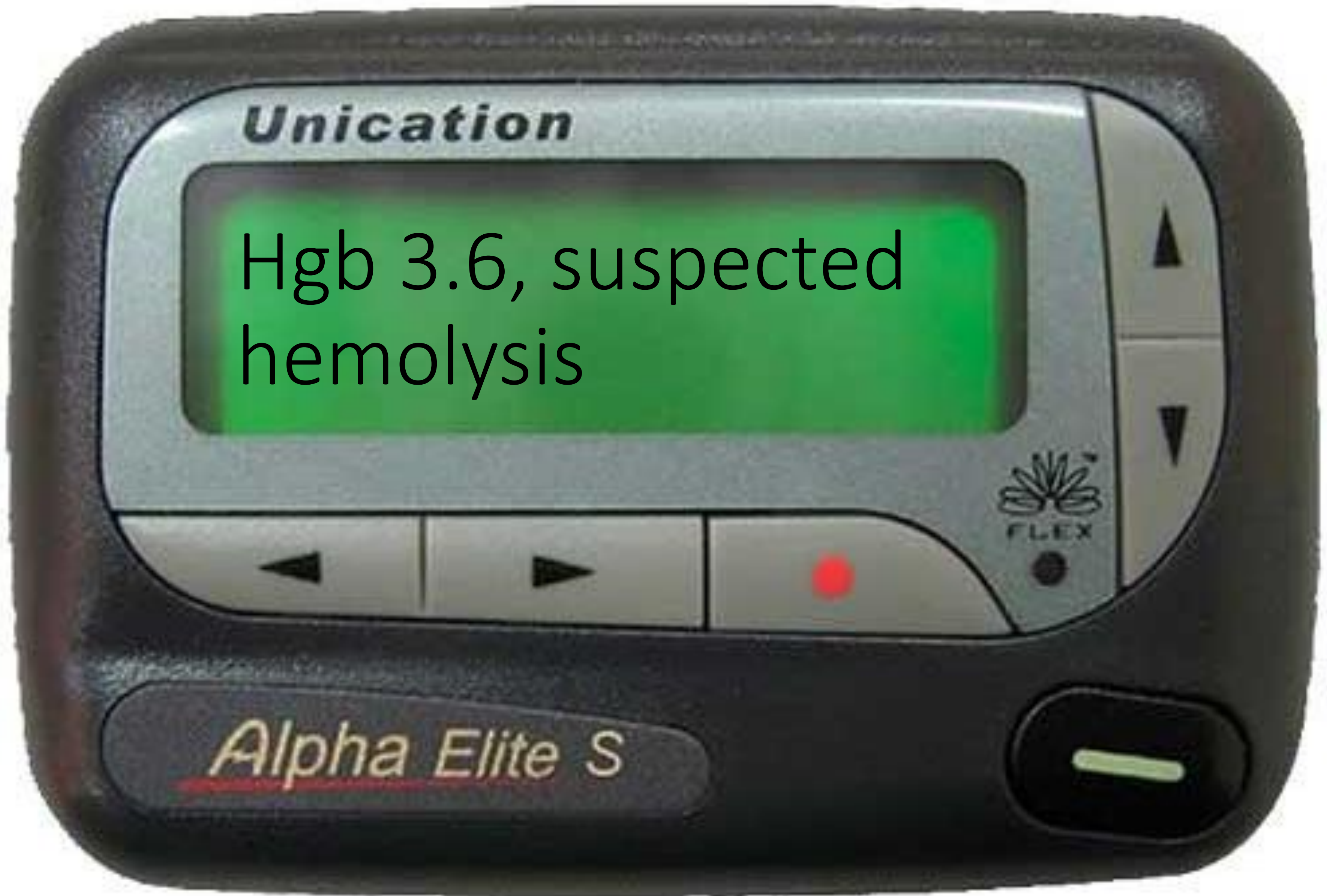
Acute Chest Syndrome

- Technical definition: radiodensity on imaging + fever and/or respiratory symptoms
- Underlying pathology: fat emboli, pneumonia or intrapulmonary VOE
- Fear: hypoxemia death spiral
  - Rapidly progressive ACS mortality 6%
- Reality: not every pna is really ACS
  - Non-rapidly progressive ACR mortality 0%
- Oxygenation is the focus

Chaturvedi S, Ghafuri DL, Glassberg J, et al. Rapidly progressive acute chest syndrome in individuals with sickle cell anemia: a distinct acute chest syndrome phenotype. Am J Hematol 2016; 91:1185.

ACS Management

- Everybody gets antibiotics: usually CAP coverage
- Bronchodilators IF WHEEZING
- Watch oxygenation like a hawk → don't leave to residents' discretion
- Oxygenation worsening (even a little) → wake attg
- Simple vs exchange transfusion
  - Goal: HbS <30%
  - Viscosity constraint: Hgb ≤ 10 g/dL (aka Hct ≤ 30%)
  - Trauma surgery for line, if exchanging



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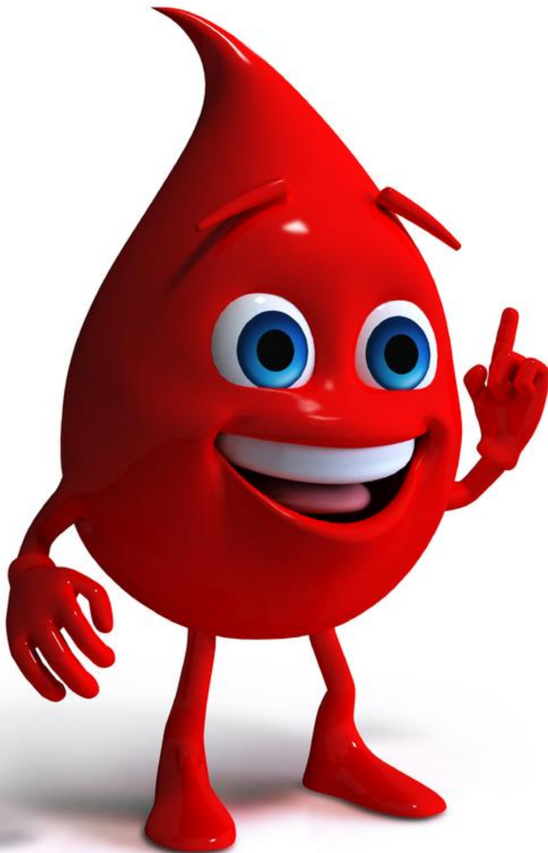
Brisk hemolysis

- Autoimmune vs medication vs TMA vs infectious
- REGARDLESS: transfuse if needed!!!!!!!!!!
- Smear review for ruling in/out causes
- Work up:
  - Hemolysis markers
  - Direct antiglobulin test
  - +/- ADAMTS13
  - +/- parasite smear, babesiosis PCR, malaria PCR
  - AND NOTHING ELSE on first draws

A Note on Transfusion



https://pixy.org/4620110/

- Blood bank = friend
  - Tell them the urgency
- Plasma dilution
- Elution of autoantibody with own RBCs
  - Can then phenotype RBCs for matching units
- Blood warmer if concern for cold agglutinins

Questions?