

EMERGENCY MEDICINE CASES



EPISODE 36:
ANTICOAGULANTS,
TRANSFUSIONS & BLEEDING
(PART 1) WITH DR. HIMMEL,
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When to Group & Screen and Cross Match

Group & Screen:

Order if there is any chance that the patient may require blood

- Group: ABO and Rh Status
- Screen: Screens patient's blood for antibodies to other antigens

Cross Match:

Order cross match if there is a 1 in 10 chance of giving blood, and ask the lab to put the blood on hold.

Uncrossmatched Blood:

Order if you need stat blood. Call the lab and communicate that you need unmatched O- or O+ blood stat.

- O+: males or females > 45 yo
- O-: females of child bearing age, or known Rh- patient.. O- blood prevents alloimmunization that could affect future pregnancies.

Indications for Transfusion

Factors to consider:

- Is there active bleeding?
- If active bleeding, how brisk is the bleeding?
- Age
- Comorbidities (i.e. CAD)
- Symptoms
- Hb level

The Landmark Transfusion Study: Transfusion Requirements in Critical Care (TRICC) Study (1999)!

- Patients randomized into restricted transfusion group, where transfused for Hb < 70 and maintained at 70-90, or liberal transfusion group, where transfused for Hb < 100 and maintained at 100-120.
- Death at 30 & 60 days similar with non-significant trend favouring restricted transfusion group.
- Subgroup analysis: younger (<55yo) and less ill patients (APACHEII score < 21) did better with fewer blood transfusions (p=.03).
- No mortality difference in cardiac disease.
- Cardiac events (pulmonary edema, MI) occurred more frequently in liberally transfused group.

Iron as an alternative to transfusions

Consider iron as an alternative to transfusion in chronic iron deficiency anemia in elderly patients or females presenting with menorrhagia and anemia.

- IV Iron
 - Indications: low MCV, low ferritin, cannot absorb po iron, Hb < 100
 - How: discuss with your local pharmacist (e.g. 510mg over 50 min), discharge with po iron.
 - Hb can increase by 50 over three weeks
- PO Iron options:
 - ferrous sulfate 325 mg with 1000mg vit C qhs
 - ferrous fumarate 325 mg with 1000mg vit C qhs
 - proferin tid if GI side effects with above choices

Red Blood Cell Transfusions

How to Give RBCs

In non-urgent, non-bleeding patients, transfuse 1 unit at a time, repeat exam to reassess the need for further units.

Duration of transfusion: slowly, up to 4 hours per transfusion.

Furosemide to prevent TACO: To prevent transfusion associated circulatory overload (TACO) consider IV furosemide **prior to the start of transfusion** in patients at high risk for TACO (see below). For patients at lower risk for TACO, po furosemide may be adequate.

Counseling Patients on the Risks of Transfusion

Emphasize the risk of fever, TACO (1/700), transfusion related acute lung injury (TRALI, 1/10,000), acute hemolytic transfusion reaction (1/40,000), sepsis (bacterial infection, 1/250,000 for RBCs), allergic reactions. De-emphasize viral infections, which are much more rare: Hep B/C (1 in 2 million), HTLV (1 in 4 million), HIV (1 in 8 million).

TACO Risk Factors

- Age > 70
- History of CHF
- Renal failure
- Positive fluid balance

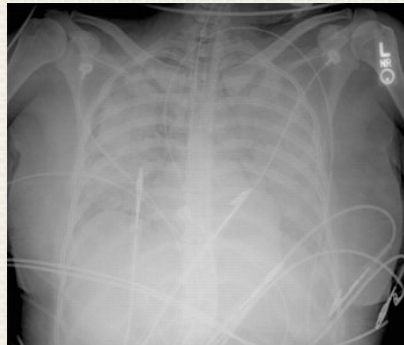
Distinguishing TACO from TRALI:

TRALI is **non-cardiogenic**

pulmonary edema, with onset within 6h of transfusion.

Findings include SOB, hypoxia, **diffuse** bilateral infiltrates on CXR. Dx clue: **TRALI does not respond to furosemide.**

Treatment: stop the transfusion, disconnect tubing, supplemental O₂, ventilatory support prn.



CXR showing diffuse bilateral infiltrates in TRALI.

Transfusion Related Graft vs. Host Disease (GVHD):

Rare, high mortality. Can damage liver, skin, mucosa, GI tract causing diarrhea. Preventable by using **irradiated** blood in at-risk immunosuppressed patients (including patients with bone marrow transplant, leukemia/lymphoma, hodgkins, immunodeficiency state, use of certain medications, sickle cell patients).

For all immunocompromised patients speak to your transfusion technologist regarding special requirements for blood (i.e. irradiated blood).

Transfusing GI Bleeds

Stable patients with a chronic GI bleed of small volume can tolerate low hemoglobins.

Upper GI bleeds are associated with **worse** outcomes when transfused liberally (see below - increased bleeding, higher mortality, increased length of stay).

NJEM (2013) Study²: patients with upper GI bleeds randomized to a restricted transfusion group (transfused for Hb < 70, goal 70-90) had better outcomes (lower mortality, less bleeding, less cardiac events, decreased need for surgery) versus the liberally transfusion group (transfused for Hb < 90, goal 90-110). Note: this study was in a highly controlled environment with rapid access to GI scopes, therefore, may not be applicable to all clinical settings.

Indications for Transfusion in CAD

American Association of Blood Bank (2012)³ recommends transfusion in CAD patients with Hb < 80 and symptomatic.

Our experts recommend maintaining NSTEMI patients with a Hb > 80, STEMI patients with a Hb > 90 and possibly higher

Managing INR

In patients with an INR that is **supratherapeutic** and are on warfarin, consider the following factors prior to adjusting dose:

- Why does the patient have a supratherapeutic INR? Diet changes, illness/infection, medication/herb interactions (antibiotics, antifungals, amiodarone, st. johns wort, ginseng, etc.)
- Is there any evidence of active bleed?
- What is the patient's risk of traumatic bleed? (e.g. is the patient prone to falls)
- Is the patient at high risk for thrombosis if INR reduced to subtherapeutic level? (mechanical valve, previous stroke with subtherapeutic INR, previous venous or arterial thrombosis)

Risk of Bleeding on Warfarin

Chronic anticoagulation is associated with 1-3% rate of major bleeds (ICH, GI bleed, spinal epidural hematoma, retroperitoneal hematoma, compartment symptoms), and a 6-10% rate of minor bleeds.

American College of Chest Physicians Antithrombotic Therapy and Prevention of Thrombosis

Recommendations⁴:

- No bleeding, INR < 10
 - o No INR reversal
 - o Warfarin dose adjustment (see below)
- No bleeding, INR > 10
 - o PO vitamin K (1-2mg)

Guidelines for Warfarin Adjustment⁵ (based on the RELY Trial):

Calculate dose on weekly basis

With a change in warfarin dose, it takes 48hours for the INR to reflect the dose.

- INR 1.5 – increase by 15%
- INR 1.5-2 – increase by 10%
- INR 3-4 – decrease by 10%
- INR 4-5 – hold 1 day or decrease by 10%
- INR 5-9 hold until INR is 2-3 or decrease by 15%
- INR > 9 consider 1-2 mg po vitamin K

Minor Bleeding INR Management Options (e.g. gums/epistaxis/dental):

- 1) Reverse INR **to therapeutic level.**
***Avoid** reversing the INR to a subtherapeutic level so that prevention of thrombosis is maintained. Give small dose of oral vitamin K (e.g. 1 mg po vitamin K).
- 2) No reversal of INR (i.e. continue same warfarin dose)

Managing elevated INR in liver disease

Remember elevated INR secondary to liver disease is treated differently than elevated INR secondary to vitamin K antagonists. Classic teaching is that a bleeding patient with INR >1.5 requires plasma. However, our experts advise caution against this, except in massively bleeding patients.

References: (click for abstract)

Hebert et al. TRICC Study. NJEM. 1999;340:1056.

Villaneuva et al. NJEM. 2013; 368(1):11-21.

AABB Guidelines. Ann Int Med. 2012;157:49-58.

American College of Chest Physicians Antithrombotic Therapy and Prevention of Thrombosis. Chest. 2012;141 (2suppl):e152S-e184s.

Van Spall et al. Circulation. 2012; 126: 2309-2316



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