DPC SUMMIT

Giving Iron, Taking Blood: In Office Procedures for Hematology

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Learning Objectives

1. Identify intravenous iron products and protocols for safe administration in outpatient settings.
2. Discuss safety concerns, adverse effects of IV iron, and treatment for iron overload.
3. Review equipment, protocols, and complications related to therapeutic phlebotomy.

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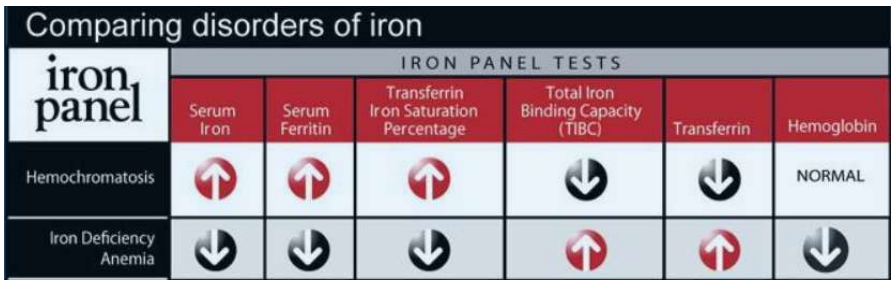
Giving Iron: Too little

- Classic iron deficiency
  - Low Hgb/Hct, MCV, ferritin
  - High TIBC, RDW



Parameter	Iron deficiency anemia
MCV	↓
RDW	↑
RBCs	↓
Peripheral smear	Microcytosis, hypochromia
Serum iron studies	↓ Iron & ferritin ↑ TIBC
Response to iron supplementation	↑ Hemoglobin
Hemoglobin electrophoresis	Normal

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Iron Deficiency is a Symptom not a Disease

- Don't forget to find and address the cause of the symptom
- Don't just treat the symptom

Reasons to choose IV route

- PO Intolerance
  - Consider dosing adjustments and stool softeners
- Inadequate PO absorption
  - Consider liquids and dietary sources
  - Avoid tannins, utilize iron cookware etc.
- Outpaced consumption
  - Dialysis patients, patients on Epo
- Control
- Expediency
  - Upcoming delivery or surgery
  - Would PRBC be better?

Things to Consider

- Consent
- Cost of equipment/overhead
- Protocol
- Emergency Protocols

Consent

1. I have been informed and I understand the nature of the infusion/injection and why it is recommended
2. I have been informed and I understand the risks inherent to the infusion of any intravenous or injected medication including, but not limited to; allergic reaction, nausea, unusual taste, fainting. I also acknowledge the risks of IV insertion to include; pain with IV insertion, bleeding with IV insertion, leakage of medication into the area around the IV which can lead to pain/staining/damage to the surrounding tissues
3. I realize that if I have an allergic reaction, Emergency Medical Services (EMS, 9-1-1) will be contacted and I am responsible for any further bills generated by EMS response, transport or subsequent ER/hospital evaluation or care. This is for my own safety and I cannot refuse to have EMS, 9-1-1 called in the event of an emergency. I can elect to have this medication ordered for administration at a local hospital system instead, if I so desire.
4. I give my permission to have emergency medications administered in the event of an allergic reaction.

Overhead costs to account for

- Time to administer and supervise the infusion
  - Staff salaries
- The actual drug cost (100mg 5mL vials $30-60, 1000mg $300-400)
- IV access equipment ($5-15)
- Saline for dilution/flush
- Sharps disposal

Iron Sucrose (Venofer)

- Rarely associated with anaphylaxis, which has made it preferred over older preparations
- (10%) may have a transient metallic taste in their mouth, nausea, muscle cramps and hot flashes (pharmacologic not allergic)
- **(As many as 10-30%)** will experience transient hypotension, dizziness, and feeling very tired. This appears to be more common with higher doses and more rapid administration

Iron Sucrose (Venofer) Administration

Consent, allergy history, baseline vital signs

FDA approved max dose is 400mg

- Option 1: Infusion of 300-500 mg Iron Sucrose in NS 250 mL administered over three (3) hours; may repeat as needed in 3-7 days to reach 1 gm. The lower dose to be better tolerated.
- Option 2: Slow injection of 200 mg in NS 100 mL administered over 20-30 minutes; may repeat every other day to reach target.
- Option 3: 100-200 mg, undiluted, slow intravenous injection over 2 to 5 minutes

Iron Dextran (Infed) Administration

- 1000mg of iron dextran (InFed) in 250mL NS
- Test dose
  - withdraw 10 mL from the bag, 5-min IV push.
  - 15-min observation period
- Infuse the remainder of the volume over 60 minutes
- Adverse reaction
  - infusion was stopped
  - patient was observed for 1 hour
  - infusion was restarted at 100 mL/hr

Be aware

- Iron Dextran (INFed) has a black box warning
- The maximum FDA approved dose is 100mg
- The incidence of anaphylaxis is LOW but higher than Iron Sucrose (Venofer)
- There is established precedence for using this protocol and published, peer reviewed, papers

Emergency Measures

Because anaphylaxis is so rare, there is no specific EBM protocol or guideline

- Stop injection/infusion
- Reassurance
- Vital signs, monitor
- Epinephrine IM or Epipen
- May resume infusion at slower rates if mild/moderate reactions resolve
- Fluids for HOTN

CAUTION
Increased risk and severity of reactions

- Prior adverse reaction to IV iron
- Fast iron infusion rate
- History of severe atopy
- History of systemic mastocytosis

(It has been suggested that anxiety of clinician giving IV drugs increases the risk)

Taking Blood: Too much

- Too much iron
  - Hereditary Hemochromatosis
- Too many cells
  - Polycythemia Vera

Hereditary Hemochromatosis

- HFE Testing ($150-200)
  - MAKE SURE YOU READ THE REPORT. A positive result is not equivalent to HH
  - 10% of HOMOzygous CY282 actually develop iron overload clinically
    - Women, as low as 1%-35% with aggressive workup
    - Men as low as 28%-60% with aggressive workup
  - There are rare variants that aren't included in standard test
- If family already has HFE testing, ferritin and sat may be considered adequate ($5)
- High ferritin without evidence of iron overload (normal TSAT or no evidence of iron deposition on MRI or liver bx)

Again, for those in the back

- Phlebotomy IS NOT indicated, REGARDLESS of *HFE* genotype
  - asymptomatic
  - ferritin levels <500 ng/mL
  - no tissue iron on MRI
- Lack of iron on MRI or liver biopsy indicates that tissue iron has not accumulated.
- MANY with an *HFE* variant (even C282Y) will NEVER develop iron overload. There is no reason to do phlebotomy unnecessarily

Primary Polycythemia Vera

- JAK2V617 with reflex, serum epo level
  - Primary vs Secondary
- Low risk PCV
  - Less than or equal to 60yo
  - NO history of thrombosis
- CAD and thrombosis risk factor control
  - BP, statin, ASA

Therapeutic phlebotomy

- Purpose is to reduce iron stores
  - Excessive iron due to hereditary hemochromatosis
  - Primary Polycythemia

Things to Consider

- Consent
- Cost of equipment/overhead
- Protocol
- Emergency Protocols

Overhead costs to account for

- Time to perform procedure
  - Staff salaries
- The equipment costs ($8-15)
- Sharps
- Waste disposal

Procedure/Protocol

- Advise patient to hydrate well prior
- May need ASA
- Tourniquet or blood pressure cuff
- 16 or 18G needle with tubing and bag
- Venipuncture, ideally in the AC vein or other large vein and tape in place
- Remove 400-600cc, as tolerated, and dispose of BIOHAZARD
- May need to give additional PO or IV fluids
- Alternatively, you can use large syringes. 8-9, 60 cc syringes, is about 500 mL unit of blood.

Hemachromatosis Treatment Protocols

- Goal is ferritin of <50 (30-100)
- Typically start once weekly
  - Can do more up front or can do less for tolerance or scheduling considerations
  - Can do lower volumes if poorly tolerated
  - Recheck the ferritin every 1-3 months to reasses
  - Decrease frequency as goal is approached and then go to prn
- Average patient requires removal of 30-50 units to deplete iron excesses

Polycythemia Vera Treatment Protocols

- Goal is HCT< 42-45%
- Typically start with 0.5-2 Units per week
- 1 Unit of blood decreases HCT by 3%
- Long term you are inducing iron deficiency in order to maintain control of the RBC production
- GUARD against iron repletion!!!!!
- Don’t forget iron deficiency causes RLS, hair thinning, etc and thrombocytosis in some people

References and Resources

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- https://www.healthcare.uiowa.edu/path_handbook/Appendix/BloodCenter/therap_phleb_guidelines.html

Live Content Slide

When playing as a slideshow, this slide will display live content

Social Q&A for Iron Management: IV Iron Replacement and Therapeutic Phlebotomy

QUESTIONS?

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