Anemia in Adolescents
A Clinical Approach
Objectives

• Discuss a practical approach to detect, diagnose, treat and prevent anemia in adolescents

• Outline management of nutritional anemia
Definitions

Reduced oxygen carrying capacity of blood due to:

- Reduced RBC number or mass
- Reduced Hemoglobin

Hemoglobin (Hb) cutoffs:

Adolescent female
- 12-18 yrs: <12 gm %
- Pregnant: <11 gm %

Adolescent male
- 12-14 yrs: <12 gm %
- 15-18 yrs: <13 gm %
Case

Sanjana, 14 yrs, presents with a history of falling grades and mood swings since 2 months

Can this be anemia?
What can be the causes for anemia in this teen?
History Taking

Symptoms of anemia: Depends on severity/onset

Home: Family h/o blood transfusion, anemia, gender bias
Education: Fall in performance, peer influences
Eating: Dietary recall, junk food, green leafy vegetables, meats, body image, fads
Activities: Athlete, fatigue
Drugs: Cotrimoxazole, alcohol, analgesics, chronic disease
Suicide/Depression: Mood swings
Sexuality: Menorrhagia, pregnancy, abortions, contraception, HIV
Safety: Driving when fatigued
HEEADSSS In Sanjana’s case

**Chief Complaints:** Fatigue, poor memory/recall, failed in Maths, mood swings with anger outbursts.

**Eating:** Fussy eater, vegetarian, on a diet for weight loss! Drank tea with her noodles lunch at canteen everyday

**Sexuality:** She has irregular menses with occasional heavy bleeding in some cycles.
Effects Of Untreated Anemia

- Cognitive – learning difficulties
- Work productivity – fatigue
- Maternal deaths – 20 to 40% in India
- LBW/Preterm
- Irritability/fatigue/mood swings
- Life threatening - CCF

Anemia has intergenerational effects on health
Rapid Fire Questions...

- Are adolescent boys also at risk for anemia?
- Can well nourished adolescents have anemia?
- If iron intake is adequate, but there is Iron deficiency anemia, what could be the cause?
- What are other nutritional deficiencies causing anemia?
Nutritional Anemia

- Iron
- Folic acid
- Vit. B12
- Others: Protein, Zinc, Copper, Vit. C

Deficiency of any of these will lead to nutritional anemia
Examination – Head To Toe

- Pallor – severity
- Nails, tongue, conjunctiva, knuckle pigmentation (B12)
- Jaundice - Hemolytic
- Hemolytic facies – Chronic hemolytic state
- Bleeding manifestation – low platelets, coagulation disorders
- Liver /spleen enlargement - leukemia
- Lymphadenopathy – chronic infections, leukemia
- Pregnancy
- Goiter
- Recurrent infections
Common Manifestations of Anemia

- Loss of Papillae
- Pale & Bald Tongue
- Platynychia
- Hyperpigmented Knuckles
Investigations
Directed by history and examination

• Complete blood count, Peripheral smear, RBC indices will usually confirm anemia and possible etiology.

Based on clinical features
• Reticulocyte count
• RDW
• S. Ferritin, TIBC, Mentzer Index
• Urine, stool examination
• Thyroid function tests, folate, B12 levels
• Coagulation profile
• Bone marrow examination
PS Examination

Normocytic Normochromic

Microcytic Hypochromic – IDA

Microcytic Hypochromic

Thalassemia (Target cells)

Macroovalocytic – Megaloblastic anemia
Laboratory Diagnosis IDA

• Screening tests:
  RBC compartment
  – Hb, PS, RBC Indices, RDW

• Confirmatory tests:
  Plasma/storage compartment
  – S.Iron, TIBC, Transferrin Saturation
  – S.Ferritin, B M iron staining
Microcytic, Hypochromic Anemia
Differential diagnosis

MCV < 80μ³, MCH < 29 pg., MCHC < 32%

- IDA - Commonest
- Hemoglobinopathies - thallasemia
- Anemia of chronic infections - JIA
- Sideroblastic Anemia
- Lead poisoning
Management

- Iron therapy
- Nutritional Advice
- Deworming
- Treat causal factors: Eating disorder, menorrhagia
- Ensure adherence: Motivational interview
- Parental/family counselling & support
Iron Therapeutic Test
Response To Iron Supplementation

- 3-5mg/kg/day of elemental iron, 2 doses. Ferrous Sulphate/ Ferrous Fumarate. Add folic acid and B12
- Hb and Retic count at end of week
- Hb remains same. Retic response starts by 3-5 days, peaks at 7 days
- Repeat Hb at 1 month shows a rise. At 3 months normal Hb levels
- No response in thalassemia minor or anemia of chronic infection
- **Continue iron for another 3 months after Hb normal to replenish stores**
- Give weekly prophylaxis to prevent Anemia
Additional Advice for Sahana

• Deworming with Albendazole 400 mg 6 monthly
• Iron rich diet
• Menstrual calendar and additional Fe supplements if menorrhagia persists
• If poor response, reexamine, reinvestigate and refer for second line diagnostics
Prevention

Weekly Iron Folic acid Supplementation (WIFS)
National Health Program 2012, escalated 2016

• Weekly Iron 100 mg and Folic Acid 500mcg to adolescent
• Both boys and girls
• 52 weeks a year, 6th to 12th Std
• In schools every Monday. Out of school at Anganwadi
• Biannual de-worming (Albendazole 400mg) six monthly
• Information and counseling for dietary intake and for prevention of worm infestation.
Treatment of Megaloblastic Anemia

- For B12 and folic acid deficiency anemia
  1000 microgram of B12 orally daily for 14 days followed by 500 microgram weekly for 1 month, then monthly for 6-12 months.
- Folic acid is given 5 mg/day
- Pernicious anemia: monthly injection of Vit.B12
- Diet of milk (300 ml/day), curd, egg, meat.
- Deworming
Key Messages

• Anemia is very common in adolescents
• High index of suspicion
• Annual hemoglobin screening
• Ill effects are individual and intergenerational
• Treat, prevent and follow-up for 1-2 yrs as it is a chronic condition. Repeat Hb to monitor
• If failed response to Iron, revise diagnosis
• Prevention: Weekly Iron FA Supplementation, Iron rich diet, Deworming
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