The Cytopenias: Anemia, Leukopenia, and Thrombocytopenia

Presented by:
Manisha Nanda, D.O.
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Pre-Test

• 35 year-old female with PMHx of hypothyroidism, well-controlled, presents for routine follow-up and is noted to have a platelet count of 60K. Repeat lab confirms a platelet count of 59K.

• She has no complaints, no physical abnormalities and no family history consistent with malignancy.

• B12/Folate, HIV, HCV are negative.
The most likely diagnosis is:

<table>
<thead>
<tr>
<th>Percentage</th>
<th>Diagnosis</th>
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<tr>
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Cytopenias

- “Deficiency of cellular elements in the blood”
- Anemia $\rightarrow$ reduction in red blood cells
- Leukopenia $\rightarrow$ reduction in white blood cells
- Thrombocytopenia $\rightarrow$ decrease in number of platelets
ANEMIA
A day in the life of an RBC...

• Erythropoiesis takes place in the bone marrow under the influence of various cytokines and hormones
• Average lifespan of RBC is ~100 days
• Under steady state → production keeps up with loss
  – ~1% of RBCs are removed from the circulation a day = ~1% of circulating RBCs are reticulocytes
Approach

Kinetic
- Decreased production
- Increased destruction
- Loss

Morphology
- Microcytic
- Normocytic
- Macrocytic
Inherited hemolytic anemias
Acquired hemolytic anemias
Lack of nutrients
Bone marrow disorders
Bone marrow suppression
Lack of trophic hormones
Chronic inflammation

DESTRUCTION

LOSS
• Obvious
• Occult
• Induced

PRODUCTION
LEUKOPENIA
A day in the life of a WBC...

• Produced in the bone marrow
• Contains a spectrum of leukocytes that circulate in the blood stream with various lifespans
• Majority of white count comes from neutrophils so can have associated neutropenia with leukopenia
Decreased production:
- Infections
- Drug-induced
- Nutritional deficiencies
- Immune disorders
- Bone marrow disorders

Increased destruction:
- Infections
- Drug-induced
- Immune disorders
- Hypersplenism

Distribution:
- Infections
- Hypersplenism
THROMBOCYTOPENIA
A day in the life of a platelet...

- Produced in the bone marrow from megakaryocytes by cytoplasmic shedding
- Each megakaryocyte can produce about 1-5K platelets
- Survive in circulation ~8-10 days
- Removed by monocyte-macrophage system
- 1/3 of total mass are found in spleen
DESTRUCTION

- ITP and SLE
- Drugs
- Alloimmune destruction
- DIC
- TTP
- Infection
- HIV
- Physical

OTHERS

- Distributional
- Pseudo

PRODUCTION

- Viral infections
- HIV
- Chemo/XRT
- EtOH
- B12/Folate
- Congenital
- Marrow infiltration
ITP

Necessary Evaluation

• Absence of constitutional symptoms
• Absence of physical exam findings
• Isolated thrombocytopenia with a normal smear

Other Guidelines

• All should undergo testing for HCV and HIV
• Insufficient evidence to support ordering anti-platelet Ab, TPO levels
• Any patient not fitting the necessary evaluation should have a bone marrow biopsy

2011 Practice Guidelines from ASH
Post-Test

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- Malabsorption: 20%
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If future questions arise, can contact:
(937)558-3500 (office #)
manisha.nanda@khnetwork.org

QUESTIONS