MPN versus Reactive Causes of Elevated Blood Counts

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Presenter Disclosure

• Faculty / Speaker’s name: Dr. Catherine Moltzan

• Relationships with commercial interests: None
Learning Objectives

1. To initiate the workup of a patient with an elevated hemoglobin and hematocrit, and to know when to refer to the hematologist

2. To initiate the workup of a patient with an elevated platelet count, and to know when to refer to the hematologist
Case 1

- 70 year old male with elevated hemoglobin and hematocrit noted on routine lab work
- Hb 190 g/L, Hct 0.573, WBC 8 x 10e9/L, Plt 350 x 10e9/L
- Chemistry normal except elevated LDH 2X normal
- History of hypercholesterolemia, on medication
Step 1- Repeat

- Repeat CBC in 2 to 4 weeks
- Send Jak-2 and Erythropoietin levels
Step 2- Symptoms/Signs Urgent Referral

- Hb > 200 g/L repeated
- Leukocytosis
- Thrombocytosis
- Splenomegaly
- Unexplained Recent Thrombosis
- Erythromelalgia
Step 3- Review Jak-2 Results

• If Jak-2 positive- refer to hematologist as MPN likely
• If Jak-2 negative review erythropoietin level
  – Erythropoietin level normal or high- go to Step 4
  – Erythropoietin level low- go to Step 5
Step 4- Erythropoietin Level Normal or High

• Consider secondary cause
  – Sleep apnea
  – Renal cell cancer

• If secondary cause present manage as per the cause

• If secondary cause not apparent refer to hematology
Step 5 - Erythropoietin Level Low

- Refer to hematology
Follow-Up With Hematologist

- No concerning features present; no secondary causes apparent
- Jak-2 positive; Erythropoietin level low
- Bone marrow consistent with MPN
- Treated with weekly phlebotomy to bring hematocrit less than 0.45 and ASA 81 mg daily
Case 2

- 65 year old female with a platelet count of 900 x 10^9/L
- WBC 5 x 10^9/L normal differential
- Hb 125 g/L normal indices
- History of hypertension on medication
- Otherwise well, no symptoms
- Physical exam unremarkable
Step 1- Repeat

• Bring patient back and repeat in 2 to 4 weeks
• Repeat result is the same
Step 2- Symptoms/Signs Urgent Referral

- Platelets > 1000 x 10e9/L
- Unexplained Thrombosis
- Splenomegaly
- Other Blood Film Features Suggestive of Malignancy
Step 3- Rule Out Secondary Causes

- Iron Deficiency Anemia
- Infection/Inflammation
- Malignancy
- Connective Tissue Disease
- May consider ferritin and CRP measurements here
Step 4- Hematology Consult

• Order bcr-abl and jak-2 mutations
Follow-Up With Hematologist

- Bcr-abl negative
- Jak-2 positive consistent with Jak-2 positive
- Bone marrow exam consistent with MPN and no fibrosis
- Patient started on Hydroxyurea 1000 mg daily and ASA 81 mg daily
**Thrombocytosis**

**Platelet count > 450 x 10⁹/L**
- Repeat and confirm platelet count in 2 to 4 weeks
- Repeat platelet count > 450 x 10⁹/L
- **Associated Signs/Symptoms:**
  - Platelets > 1000 x 10⁹/L
  - Unexplained thrombosis
  - Splenomegaly
  - Elevated hemoglobin or greatly elevated neutrophils
- **Are secondary causes present?**
  - Iron deficiency
  - Infection/Inflammation
  - Malignancy
- **Manage as per underlying cause**
- **Platelet count > 600 x 10⁹/L**
- Follow the platelet count as clinically indicated.
  - If platelet count rises to > 600 x 10⁹/L restart algorithm

**Order BCR-ABL and JAK-2, Refer to Hematology**
Conclusion

• Erythrocytosis and thrombocytosis can have primary and secondary causes
• Important to recognize concerning signs/symptoms that require more urgent assessment
• Important to rule out secondary causes that do not require a hematology consult
Thank you

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