How do I approach and work up a patient with pancytopenia?

Catherine Moltzan MD FRCPC
Department of Medical Oncology & Haematology, CancerCare Manitoba
Dept. Internal Medicine, Section of Hematology/Medical Oncology, University of Manitoba
Disclosures

1. Received funding from Novartis Feb 2014 for Leadership seminar - no pharmaceutical treatments discussed here
Objectives

1. Define pancytopenia
2. Identify some causes of pancytopenia
3. Identify situations where urgent referral to the hematologist is necessary
Which of the following is not true in patients with pancytopenia?

a. Bone marrow examination is always necessary

b. Alcohol can be a contributing cause

c. Megaloblastic anemia can be a cause

d. Hypothyroidism can be a cause
Dear Doctor, Re: Patient X

<table>
<thead>
<tr>
<th>TEST NAME</th>
<th>VALUE</th>
<th>UNITS</th>
<th>REFERENCE RANGES</th>
<th>ABNORMALITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>WBC</td>
<td>1.2</td>
<td>x 10 9/L</td>
<td>4.5 - 11.0</td>
<td>L</td>
</tr>
<tr>
<td>RBC</td>
<td>4.36</td>
<td>x 10 12/L</td>
<td>4.4 - 5.9</td>
<td>L</td>
</tr>
<tr>
<td>HGB</td>
<td>106</td>
<td>g/L</td>
<td>140 - 180</td>
<td>L</td>
</tr>
<tr>
<td>HCT</td>
<td>0.325</td>
<td>L/L</td>
<td>0.40 - 0.52</td>
<td>L</td>
</tr>
<tr>
<td>MCV</td>
<td>96.7</td>
<td>fl</td>
<td>80 - 98</td>
<td></td>
</tr>
<tr>
<td>MCH</td>
<td>31.5</td>
<td>pg</td>
<td>26 - 34</td>
<td></td>
</tr>
<tr>
<td>MCHC</td>
<td>326</td>
<td>g/L</td>
<td>320 - 385</td>
<td></td>
</tr>
<tr>
<td>SEDIMENTATION RATE</td>
<td>65</td>
<td>mm/hr</td>
<td>Ped: 0-10, Adult: 0-15H</td>
<td></td>
</tr>
<tr>
<td>SEGMENTED NEUTROPHILS</td>
<td>6</td>
<td>%</td>
<td>34 - 68</td>
<td>L</td>
</tr>
<tr>
<td>BAND NEUTROPHILS</td>
<td>3</td>
<td>%</td>
<td>0 - 6</td>
<td></td>
</tr>
<tr>
<td>LYMPHOCYTES</td>
<td>69</td>
<td>%</td>
<td>22 - 52</td>
<td>H</td>
</tr>
<tr>
<td>MONOCYTES</td>
<td>9</td>
<td>%</td>
<td>1 - 4</td>
<td>H</td>
</tr>
<tr>
<td>EOSINOPHILS</td>
<td>1</td>
<td>%</td>
<td>0 - 1</td>
<td></td>
</tr>
<tr>
<td>BASOPHILS</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MORPHOLOGY01</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MORPHOLOGY02</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ABS. NEUTROPHIL COUNT</td>
<td>0.07</td>
<td>x 10 9/L</td>
<td>1.8 - 5.4</td>
<td>L</td>
</tr>
<tr>
<td>PLATELET COUNT</td>
<td>107</td>
<td>x 10 9/L</td>
<td>140 - 440</td>
<td>L</td>
</tr>
</tbody>
</table>

Essentially normal

Platelets appear slightly decreased

---

Sending App: LABSTREAM3 Sending Facility: UNICITY LABS ST. BONIFACE
Receiving App: MEDIFILES Receiving Facility: ST. BONIFACE CLINIC
Time Stamp: Nov 18, 2013 14:35
Disk file:

***** Legend *****
N = Normal;
H = High Value;
L = Low Value
- = Not Specified;
* = Abnormal Alpha;
P=Complete;

CancerCare Manitoba
Pancytopenia

• Definition: Two or three cell lines abnormal (WBC, Hb, Platelets)

• Almost always a bone marrow production problem
  – Malignancy, fibrosis, dysplasia, aplastic anemia

• Exceptions: cirrhosis, paroxysmal nocturnal hemoglobinuria, connective tissue disease
Pancytopenia

• If abnormalities are mild- repeat bloodwork before evaluating further
• If MCV elevated ensure that a blood smear is looked at and a Vitamin B12 level done to rule out megaloblastic anemia
• If the counts are done in a patient with known cancer on chemotherapy then it is likely expected with the treatment, although consult with the oncologist as required
Pancytopenia

- Urgent referral if ANC less than 1.0 x 10e9/L, Hb less than 70 g/L and/or platelet count less than 50 x 10 e9/L send consult and order more bloodwork concurrently
- Emergent referral if the above and ANC less than 0.5 and/or platelet count less than 20- page the hematologist on-call
- Emergent referral if blast cells or schistocytes seen on the peripheral blood film
Work-up of PANCYTOPENIA

Multiple Cytopenias

Blood Smear

Abnormal Cells Present?

Anc <1.5 x 10^9/L?

Likely reactive / non-neoplastic due to drugs, critical illness, infections, connective tissue disease

- Detailed History & Physical with particular attention to rule out ETOH / Cirrhosis
- Referral to CCMB Hematology if persistent / symptomatic cytopena

If Blasts, NRBC, Dyplasia or Immature WBC or Abnormal WBC

URGENT Referral to CCMB Hematology (fax) for Suspected Heme Malignancy, Dysplasia or AA

EMERGENT REFERRAL for Suspected TTP or HUS
Page Hematologist On-Call
StB: 204-237-2053 / HSC: 204-787-2071

If Schistocytes

If blasts or schistocytes seen on the blood film

EMERGENT REFERRAL
Page Hematologist On-Call
StB: 204-237-2053 / HSC: 204-787-2071

Required for the following:
- ANC <0.5 x 10^9/L
- Platelets <20 x 10^9/L
- Symptomatic anemia in the absence of bleeding or iron deficiency (usually Hb <70g/L)
- Blasts or schistocytes seen on the blood film

CancerCare Manitoba
Pathways are subject to clinical judgment and actual practice patterns may not always follow the proposed steps in this pathway.

Feb. 6, 2015: @Hematology DSG FINAL (Moltzan)
Pancytopenia – Work Up

- CBC and differential, retic count, blood film
- INR, Vitamin B12 level
- HIV, Hepatitis B and C serology
- Liver enzyme panel, bilirubin, Renal function
- ANA, Rheumatoid factor
- Direct antiglobulin test
If urgent referral is NOT required

- Review history- drugs, autoimmune disease, infectious risks, fevers, night sweats, unexplained weight loss, alcohol/liver disease, hypothyroidism, symptoms related to counts
- Review physical exam- lymphadenopathy, splenomegaly, petechiae, stigmata of liver disease, signs of connective tissue disease
Drugs causing pancytopenia

- Note that most drugs will not cause severe pancytopenia and consult should not be delayed.
- Some drugs known to cause pancytopenia
  - Anti-neoplastic drugs (expected effect)
  - Anti-convulsants
  - Anti-thyroid drugs
Take Home Messages

- A patient with marked pancytopenia should be referred to the hematologist without delay
  - Include history and physical assessment, list of medications, and all bloodwork
  - Can use algorithm to help determine timing of when to consult the hematologist
Questions?

Catherine Moltzan

cmoltzan1@cancercare.mb.ca