Approach to Thrombocytosis

Medicine Review Course 8/7/2017
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Overview

• What is normal platelet count?
• Causes of thrombocytosis
• Consequences of thrombocytosis
Overview

• What is normal platelet count?
• Causes of thrombocytosis
• Consequences of thrombocytosis
Normal, plt 285 x 10⁹/L (150 – 400)
Determining a reference range

Frequency

Reference Range

-2 SD 2.5%  Median/ Mode 2.5% +2 SD

Value
Platelet count in a normal person

Reactive cause
### Eg of thrombocytosis (Normal variant)

<table>
<thead>
<tr>
<th></th>
<th>3/3/15</th>
<th>24/11/15</th>
<th>15/3/16</th>
<th>15/4/16</th>
<th>30/9/16</th>
</tr>
</thead>
<tbody>
<tr>
<td>WBC</td>
<td>10.0</td>
<td>11.9</td>
<td>11.5</td>
<td>9.8</td>
<td>11.1</td>
</tr>
<tr>
<td>Hb</td>
<td>11.7</td>
<td>12.4</td>
<td>12.3</td>
<td>12.2</td>
<td>11.2</td>
</tr>
<tr>
<td>Platelet</td>
<td>399</td>
<td>386</td>
<td>438</td>
<td>373</td>
<td>393</td>
</tr>
</tbody>
</table>
Overview

• What is normal platelet count?

• **Causes of thrombocytosis**

• Consequences of thrombocytosis
Causes of thrombocytosis

2-yr review of pts referred for thrombocytosis

N=175

- Non MPN: 23.4%
- MPN confirmed: 33.7%
- MPN unconfirmed: 25.7%
- Unclear: 14.9%
- MDS/ MPN: 2.3%
Causes of thrombocytosis

- Non-MPN: 23.4%
- MPs confirmed: 33.7%
- MPs unconfirmed: 25.7%
- MDS/MPN: 2.3%
- Unclear: 14.9%

N=175

Most patients’ platelet counts subsequently normalised with observation.

2nd biggest group had high-normal platelet count/just outside normal range but < 450 x 10^9/L
Causes of thrombocytosis

N=175

- MPN confirmed: 33.7%
- MPN unconfirmed: 25.7%
- Unclear: 14.9%
- Non MPN: 23.4%
- MDS/MPN: 2.3%

- ET: 41%
- PV: 41%
- MF: 12%
- CML: 5%
What are MPNs?

- A group of diseases characterized by the increased production of one or more of these 3 cell types:
  - Red Blood Cells
  - White Blood Cells (Granulocytic)
    - Neutrophils
    - Eosinophils
    - Basophils
  - Platelets
What are MPNs?

- Red blood cells
- Platelets
- White blood cells

- Polycythemia Vera (PV)
- Essential Thrombocythemia (ET)
- Primary Myelofibrosis (MF)

- CML
- CNL
- CEL
- MPN-U
How are MPNs Diagnosed?

Mutational subtypes in ET and MF

- **ET**
  - JAK2: 62.6%
  - CalR: 23.6%
  - Mpl: 10.1%
  - TN: 3.8%

- **MF**
  - JAK2: 64.7%
  - CalR: 22.7%
  - Mpl: 8.6%
  - TN: 4.1%

References:
- Blood. 2014;124:1062-106
- Blood. 2014;123:1544-1551
Causes of thrombocytosis

2-yr review of pts referred for thrombocytosis

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• What is normal platelet count?
• Causes of thrombocytosis

**Consequences of thrombocytosis**
Consequences (1)

50 year old female, health screen.
Blood investigations

Hb 13.6 g/dL  (11-15)
Platelets 937 x 10^9/L  (170-420)
WBC 8.1 x 10^9/L  (3.6-9.3)
Sodium 143 mmol/L  (134-144)
Potassium 6.3 mmol/L  (3.5-5.0)
Creatinine 70 μmol/L  (40-85)
Consequences (1)
Consequences (1) - pseudohyperkalemia

<table>
<thead>
<tr>
<th>Clinical settings</th>
<th>Dk (mmol/L)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thrombocytosis (n=129)</td>
<td>0.82 (0.01-1.90)*</td>
</tr>
<tr>
<td>Leucocytosis (n=29)</td>
<td>0.22 (0.01-0.76)†</td>
</tr>
<tr>
<td>Erythrocytosis (n=95)</td>
<td>0.39 (0.02-0.73)‡</td>
</tr>
<tr>
<td>Mixed type disorders (n=182)</td>
<td>0.82 (0.00-2.61)δ</td>
</tr>
<tr>
<td>Controls (n=30)</td>
<td>0.27 (0.02-0.42)¶</td>
</tr>
</tbody>
</table>

Serum K$^+$ 5.6 mmol/L (3.5-5.0)
Plasma K$^+$ 3.9 mmol/L

Consequences (2) - Bleeding and thrombosis

Extreme thrombocytosis > 1000 x 10⁹/L
Bleeding/ vaso-occlusive phenomenon

- > 50% of MPN patients
- 4% of RT patients


Management

- Check for PT/ aPTT/ vWF
- Cytoreduction/ plateletpheresis
Summary

• Normal platelet count?
  Hereditary component/ variation
  Implications to relationship with normal

• Causes of thrombocytosis
  Reactive thrombocytosis
  Myeloproliferative neoplasm

• Consequences
  Pseudo-hyperkalemia
  Bleeding and thrombosis
THANK YOU