Rapid Development of Extreme Leukemoid Reaction Following Amlodipine Overdose

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Background
- Leukemoid reactions (LRs) are rare and poorly understood systemic hematologic responses that can be caused by certain drugs
- LRs are associated with high mortality
- Few cases of drug-induced extreme LRs (WBC counts exceeding 100,000/μL) have been reported
- We present a case of amlodipine overdose, leading to LR, and progressing to extreme LR, resulting in fatal ARDS

Case Report
- 37-year-old man presented after intentional overdose on amlodipine
- Two hours after ingestion, WBC count was 39,100/μL
- He became hypotensive and comatose with vasodilatory shock consistent with calcium channel blocker poisoning
- He was intubated and started on vasopressor support with norepinephrine and transferred to a tertiary care facility
- WBC increased to 81,200/μL at eight hours
- WBC count continued to rise to 137,400/μL at fourteen hours
- ARDS ensued leading to cardiopulmonary arrest and death seventeen hours post ingestion

Table 1: Peripheral blood smears and manual WBC differential

<table>
<thead>
<tr>
<th>WBC (x10⁹/μL)</th>
<th>2 hrs</th>
<th>8 hrs</th>
<th>14 hrs</th>
</tr>
</thead>
<tbody>
<tr>
<td>WBC morphology</td>
<td>Normal</td>
<td>Toxic vacuolization</td>
<td>Normal</td>
</tr>
<tr>
<td>Neutrophils (%)</td>
<td>55</td>
<td>66</td>
<td>54</td>
</tr>
<tr>
<td>Bands (%)</td>
<td>3</td>
<td>13</td>
<td>19</td>
</tr>
<tr>
<td>Lymphocytes (%)</td>
<td>30</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Monocytes (%)</td>
<td>1</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>Eosinophils (%)</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Basophils (%)</td>
<td>6</td>
<td>7</td>
<td>1</td>
</tr>
<tr>
<td>Promyelocytes (%)</td>
<td>0</td>
<td>0</td>
<td>7</td>
</tr>
<tr>
<td>Myelocytes (%)</td>
<td>2</td>
<td>1</td>
<td>11</td>
</tr>
<tr>
<td>Metamyelocytes (%)</td>
<td>3</td>
<td>7</td>
<td>4</td>
</tr>
<tr>
<td>Blast forms</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Results
- Peripheral blood smear revealed neutrophilic predominance with immature granulocyte precursors and no blasts
- WBCs showed vacuolization, indicating a nonmalignant reaction to a toxic state
- Previous WBC counts were normal and there was no known history of malignancy
- GC/MS (urine) drug screen revealed presence of alprazolam, acetaminophen, caffeine, doxylamine, sertraline and amlodipine metabolite

Discussion
- No previous cases of LR resulting from CCBs have been reported
- Aspiration, pneumonitis, or shock itself would be unlikely to cause this degree of leukocytosis, and blood cultures were negative.
- CCB toxicity causes hypotension and vasoplegic shock contributing to systemic inflammatory response, which may lead to LR
- Leukostasis or cytokine storm may have contributed to ARDS and mortality

Conclusion
- This report describes a unique case of extreme LR following fatal amlodipine overdose, with clinical toxicity most consistent with CCB poisoning
- Death resulted from ARDS rather than hemodynamic collapse