5.14: Xanthine Derivatives

Theophylline is a xanthine derivative.

**Mechanism of Action**

Theophylline relaxes bronchial smooth muscle by inhibition of the enzyme phosphodiesterase and suppresses airway responsiveness to stimuli that cause bronchoconstriction.

**Indications for Use**

Theophylline is used for the long-term management of persistent asthma that is unresponsive to beta agonists or inhaled corticosteroids.

**Adverse/Side Effects**

Theophylline can cause nausea, vomiting, CNS stimulation, nervousness, and insomnia.\(^1\)

**Patient Teaching & Education**

Patients should be sure to take medications as prescribed at appropriate intervals. They should avoid irritants and drink fluids to help thin secretions. Patients will need serum blood levels tested every six to twelve months.\(^2\)

Now let’s take a closer look at the medication grid on theophylline in Table 5.14.\(^3\)\(^4\)\(^5\)
<table>
<thead>
<tr>
<th>Class/Subclass</th>
<th>Prototype/Generic</th>
<th>Administration Considerations</th>
<th>Therapeutic Effects</th>
<th>Adverse/Side Effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Xanthine</td>
<td>theophylline</td>
<td>Avoid caffeine</td>
<td>Long-term treatment of chronic asthma and COPD unresponsive to other treatment</td>
<td>GI: Nausea, vomiting</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Requires evaluation of therapeutic blood level to prevent toxicity</td>
<td></td>
<td>CNS stimulation</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Nervousness and insomnia</td>
</tr>
</tbody>
</table>

2. uCentral from Unbound Medicine. [https://www.unboundmedicine.com/ucentral](https://www.unboundmedicine.com/ucentral)
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