8.6: CNS Stimulants

Methylphenidate is an example of a CNS stimulant that is often used to treat ADHD. CNS stimulants are Schedule II controlled substances and have a high potential for abuse and dependence.

Mechanism of Action

Methylphenidate stimulates the brain and acts similar to amphetamines. Methylphenidate is thought to block the reuptake of norepinephrine and dopamine into the presynaptic neuron.

Indications for Use

Methylphenidate is used for ADHD.

Nursing Considerations Across the Lifespan

Methylphenidate is typically prescribed to patients over the age of 6. It should be avoided in patients with known structural cardiac abnormalities, cardiomyopathy, serious heart rhythm arrhythmias, or coronary artery disease. Blood pressure and heart rate should be monitored in all patients.

CNS stimulants have been associated with weight loss and slowing of growth rate in pediatric patients. It increases the risk of peripheral vasculopathy, such as Raynaud’s phenomenon, with signs and symptoms of fingers or toes feeling numb, cool, painful, and/or changing color from pale, to blue, to red.

Methylphenidate is contraindicated in patients using a monoamine oxidase inhibitor (MAOI), or use of an MAOI within the preceding 14 days. If paradoxical worsening of symptoms or other adverse reactions occur, the dosage should be reduced, or if necessary, discontinued.
Administer methylphenidate hydrochloride extended-release capsules orally once daily in the morning. Extended-release capsules should not be crushed, chewed, or divided. Monitor for signs of abuse and dependence while on therapy.

Adverse/Side Effects

Serious cardiovascular events have occurred with sudden death reported in association with CNS-stimulant treatment in pediatric patients with structural cardiac abnormalities or other serious heart problems. Sudden death, stroke, and myocardial infarction have also been reported in adults with CNS-stimulant treatment at recommended doses. Methylphenidate may cause increased blood pressure and increased heart rate. Use of stimulants may cause psychotic or manic symptoms in patients with no prior history and may cause priapism (painful or prolonged penile erections). The most common adverse reactions (greater than 5% incidence) were headache, insomnia, upper abdominal pain, decreased appetite, and anorexia. Alcohol should be avoided because it may cause a rapid release of the drug in extended-release formulations.

Overdose

If overdose occurs, consult with a Certified Poison Control Center (1-800-222-1222) or go to www.poisonhelp.org/help for the latest recommendations.

Patient Teaching & Education

There are several important topics to provide patients and/or parents of minor children.

Controlled Substance Status/High Potential for Abuse and Dependence: Advise patients that methylphenidate is a controlled substance, and it can be abused and lead to dependence. Instruct patients that they should not give methylphenidate to anyone else. Advise patients to store methylphenidate in a safe place, preferably locked, to prevent abuse. Advise patients to comply with laws and regulations on drug disposal. Advise patients to dispose of remaining, unused, or expired methylphenidate by a medicine take-back program if available.

Serious Cardiovascular Risks: Advise patients that there is a potential serious cardiovascular risk, including sudden death, myocardial infarction, stroke, and hypertension. Instruct patients to contact a healthcare provider immediately if they develop symptoms such as exertional chest pain or unexplained syncope.

Blood Pressure and Heart Rate Increases: Instruct patients that methylphenidate hydrochloride extended-release capsules can cause elevations of their blood pressure and pulse rate.

Psychiatric Risks: Advise patients that methylphenidate can cause psychotic or manic symptoms, even in patients without prior history of psychotic symptoms or mania.

Priapism: Advise patients of the possibility of painful or prolonged penile erections and to seek immediate medical attention if this occurs.

Circulation Problems in Fingers and Toes: Instruct patients beginning treatment with methylphenidate about the risk of peripheral vasculopathy and associated signs and symptoms: fingers or toes may feel numb, cool, painful, and/or may change color from pale, to blue, to red. Instruct patients to report to their physician any new numbness, pain, skin color change, or associated signs and symptoms.
change, or sensitivity to temperature in fingers or toes or any signs of unexplained wounds appearing on fingers or toes.

**Suppression of Growth:** Advise parents that methylphenidate may cause slowing of growth and weight loss.

**Alcohol Effect:** Advise patients to avoid alcohol while taking extended-release capsules. [1]

Now let’s take a closer look at the medication grid for methylphenidate in Table 8.6. [2]

Table 8.6 Methylphenidate Medication Grid

<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>CNS Stimulant</td>
<td>methylphenidate</td>
<td>Black Box Warning: High abuse potential</td>
<td>Increases mental focus and attention in patients with ADHD</td>
<td>Immediately report signs and symptoms of abuse, cardiac or peripheral vascular complications, and priapism</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Patients should avoid alcohol</td>
<td></td>
<td>Report mania or psychotic episodes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Monitor BP and HR</td>
<td></td>
<td>Common side effects: headache, insomnia, upper abdominal pain, decreased appetite, and anorexia</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Monitor growth and weight in children</td>
<td></td>
<td>Gynecomastia</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Monitor for signs of abuse</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Contraindicated with MAOIs or use of an MAOI within the preceding 14 days</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Critical Thinking Activity 8.6**

A 12-year-old male child has been diagnosed with ADHD after his parents and teachers became concerned with his inability to concentrate and his poor impulse control in the classroom. The physician has prescribed methylphenidate (Ritalin).

What topics should the nurse reinforce while educating the child and his parents about this medication?

Note: Answers to the Critical Thinking activities can be found in the “Answer Key” sections at the end of the book.

1. This work is a derivative of Daily Med by U.S. National Library of Medicine in the public domain.
2. This work is a derivative of Daily Med by U.S. National Library of Medicine in the public domain.