8.11: Antiparkinson Medications

Parkinson’s disease is believed to be related to an imbalance of dopamine and acetylcholine and a deficiency of dopamine in certain areas of the brain, so drug therapies are aimed at increasing levels of dopamine and/or antagonizing the effects of acetylcholine. Drug therapy does not cure the disease, but is used to slow the progression of symptoms. Common medications used to treat Parkinson’s disease are carbidopa/levodopa, selegiline, and amantadine. [1]

Carbidopa/Levodopa

Carbidopa/levodopa is the most common drug used to treat Parkinson’s disease and is usually started as soon as the patient becomes functionally impaired.

Mechanism of Action

Administration of dopamine is ineffective in the treatment of Parkinson’s disease because it does not cross the blood-brain barrier, but levodopa, the metabolic precursor of dopamine, does cross the blood-brain barrier and presumably is converted to dopamine in the brain. Carbidopa is combined with levodopa to help stop the breakdown of levodopa before it is able to cross the blood-brain barrier. Additionally, the incidence of levodopa-induced nausea and vomiting is less when it is combined with carbidopa.

Indications for Use

Carbidopa/levodopa is indicated for Parkinson’s disease. It is also used to treat restless leg syndrome.

Nursing Considerations Across the Lifespan
Carbidopa/Levodopa is recommended for use in patients older than age 18. It can take several weeks to see positive effects and this should be explained to patients and their caregivers.

The drug is contraindicated for use with MAOIs. All patients should be observed carefully for the development of depression with concomitant suicidal tendencies.

Patients taking carbidopa and levodopa have reported suddenly falling asleep without prior warning of sleepiness while engaged in activities of daily living (including operation of motor vehicles). Patients should be advised to exercise caution while driving or operating machines during treatment with carbidopa and levodopa.

Sporadic cases of symptoms resembling neuroleptic malignant syndrome (NMS) have been reported in association with dose reductions or withdrawal of certain antiparkinsonian agents. Therefore, patients should be observed carefully when the dosage of levodopa is reduced abruptly or discontinued.

Periodic evaluations of hepatic, hematopoietic, cardiovascular, and renal functions are recommended during extended therapy. The most common adverse effect of carbidopa/levodopa is dyskinesia, which may require dosage reduction.

Patients should be instructed to plan their meal times around medication times to improve the ability to use their utensils and to avoid diets high in protein due to decreased absorption of the medication.

**Adverse/Side Effects**

Hallucinations and psychotic-like behavior have been reported with dopaminergic medications. Patients taking dopaminergic medications may experience intense gambling urges, increased sexual urges, intense urges to spend money, binge eating, and/or other intense urges, and the inability to control these urges. These urges stopped when the dosage was decreased or the medication discontinued.

A higher risk for melanoma has been reported. Occasionally, dark red, brown, or black color may appear in saliva, urine, or sweat after ingestion of carbidopa and levodopa. Although the color appears to be clinically insignificant, garments may become discolored.\(^2\)[3][4]

**Patient Teaching & Education**

Patients should take their medications at regular intervals as directed. If gastric irritation is experienced, patients may eat food shortly after taking medications but high-protein foods may impair drug action. Medications may cause increased drowsiness, dizziness, and orthostatic changes. Patients should carefully assess their skin to monitor for new lesions and any abnormality should be reported to the healthcare provider.

Now let’s take a closer look at the medication grid for carbidopa-levodopa in Table 8.11.\(^5\)

<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>Antiparkinson</td>
<td>carbidopa/</td>
<td>Avoid high-protein</td>
<td>Slow progression of</td>
<td>Depression, suicidal</td>
</tr>
</tbody>
</table>

\(^2\)[3][4]

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<table>
<thead>
<tr>
<th>Selegiline</th>
</tr>
</thead>
</table>
| Selegiline is often used conjunction with carbidopa-levodopa when patients demonstrate a deteriorating response to this treatment. It is helpful to control symptom fluctuations.  

### Mechanism of Action

Selegiline inhibits MAO-B, blocking the breakdown of dopamine.  

### Indications for Use

Selegiline capsules are indicated as an adjunct in the management of Parkinsonian patients being treated with levodopa/carbidopa who exhibit deterioration in the quality of their response to this therapy. There is no evidence from controlled studies that selegiline has any beneficial effect in the absence of concurrent levodopa therapy.

### Nursing Considerations Across the Lifespan

Large doses of selegiline may inhibit MAO-A that promotes metabolism of tyramine in the GI tract, which can cause a hypertensive crisis.

### Adverse/Side Effects

Side effects are dose dependent, with larger doses posing a hypertensive crisis risk if there is consumption of food or beverages with tyramine.

### Patient Teaching & Education

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Patients should be advised to avoid foods high in tyramine. Additionally, medications may cause increased drowsiness, dizziness, and orthostatic changes. If patients experience abnormal behaviors such as hallucination, sexual urges, gambling, etc., this should be reported promptly to the healthcare provider.

Now let’s take a closer look at the medication grid for selegiline in Table 8.11b.\[^8\]

### Table 8:11b Selegiline 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>Antiparkinson agent, MAO Type B Inhibitor</td>
<td>selegiline</td>
<td>Avoid food with tyramine if on a large dose (above 10mg/day)</td>
<td>Minimize progression of Parkinson’s disease symptoms</td>
<td>Higher doses increase risk for hypertensive crisis</td>
</tr>
</tbody>
</table>

**Amantadine**

Amantadine is used in early stages of Parkinson’s disease but can be effective in moderate or advanced stages in reducing tremor and muscle rigidity.\[^9\]

**Mechanism of Action**

The exact mechanism of action is unknown. Amantadine is an antiviral drug that acts on dopamine receptors.\[^10\]

**Indications for Use**

Amantadine is used for Parkinson’s disease, medication-induced extrapyramidal symptoms, and influenza A.

**Nursing Considerations Across the Lifespan**

Use cautiously with renal impairment. This drug may cause suicidal ideation and should not be stopped abruptly or can cause Parkinsonian crisis. Neuroleptic Malignant Syndrome (NMS) has been reported in association with dose reduction or withdrawal of amantadine therapy.

**Adverse/Side Effects**

Suicide ideation, congestive heart failure, and peripheral edema can occur. This drug can cause intense gambling urges, increased sexual urges, intense urges to spend money uncontrollably, and other intense urges with an inability to control them. There is an increased risk of melanoma.

Adverse reactions reported most frequently are nausea, dizziness (lightheadedness), and insomnia. This drug can also cause anticholinergic side effects, impaired thinking, and orthostatic hypotension.\[^11\]

**Patient Teaching & Education**

Patients should take medications as directed and ensure they do not skip or double doses. Medications may cause
drowsiness, dizziness, and orthostatic blood pressure changes. Patients should avoid using this medication with OTC cold medications or alcoholic beverages. If patients, family, or caregivers note worsening depression or suicidality, this should be reported immediately to the healthcare provider.

Now let’s take a closer look at the medication grid for amantadine in Table 8.11c.\textsuperscript{[12]}

<table>
<thead>
<tr>
<th>Class</th>
<th>Prototype/Generic</th>
<th>Administration Considerations</th>
<th>Therapeutic Effects</th>
<th>Adverse/Side Effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anti-Parkinson Agent, Antiviral</td>
<td>amantadine</td>
<td>Monitor renal function</td>
<td>Improve Parkinson’s disease symptoms</td>
<td>Increased suicidal ideation and urges</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Monitor mental state</td>
<td></td>
<td>Congestive heart failure and peripheral edema</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Assess blood pressure</td>
<td></td>
<td>Neuromalignant syndrome (NMS) when dosage decreased</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Orthostatic hypotension</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Nausea, dizziness, and insomnia</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Anticholinergic side effects</td>
</tr>
</tbody>
</table>

Critical Thinking Activity 8.11

A 76-year-old patient in a long-term care center has developed a shuffling gait with a stooped posture, along with a hand tremor at rest. The nurse practitioner prescribed carbidopa/levodopa.

1. The nurse knows that Parkinson’s disease is related to dopamine, but dopamine can’t cross the blood-brain barrier. How will carbidopa/levodopa assist with dopamine levels?
2. The patient states, “I am looking forward to spending next weekend with my grandson. He even said he would let me drive his new Mustang!” What teaching should the nurse provide the patient and his grandson (with the patient’s permission) regarding the new medication and his weekend plans?
3. The nurse reads that the most common side effect of carbidopa-levodopa is dyskinesia. What is dyskinesia? If it occurs, what is the likely treatment?

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

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