8.5: CNS Depressants

Barbiturates and benzodiazepines are examples of CNS depressants.

Barbiturates

Phenobarbital is an example of a barbiturate primarily used as a sedative and to treat seizure disorders. In high doses it can be used to induce anesthesia, and overdosage can cause death. In the 1960s and 1970s, barbiturates were used to treat anxiety and insomnia, but are no longer used for these purposes due to their serious adverse effects. Barbiturates are a Schedule IV drug under the Federal Controlled Substances Act. However, the abuse of barbiturates continues to occur with street use as a “downer” to counteract the effect of cocaine and methamphetamine.

Mechanism of Action

Barbiturates produce sedation and drowsiness by altering cerebellar function and depressing the actions of the brain and sensory cortex.

Indications for Use

Barbiturates are primarily used for sedation and seizures.

Nursing Considerations Across the Lifespan

Do not use for children less than 1 month of age. Barbiturates may harm the fetus during pregnancy. Avoid use in geriatric patients.

Adverse/Side Effects
Patients may experience CNS depression, suicidal thoughts or behaviors, GI disturbances, rashes, or some blood disorders that can be fatal. The concomitant use of alcohol or other CNS depressants may produce additive CNS depressant effects that can cause death. It can be habit forming.

**Patient Teaching & Education**

The patient should be advised to take the prescribed medication as directed. Patients who undergo prolonged therapy should not discontinue treatment abruptly as this may cause onset of seizure activity. These medications may cause drowsiness and should not be taken with alcohol or other CNS depressants. Female patients using oral contraceptives should also use non-hormonal based contraceptives during therapy.

**Overdosage**

The onset of symptoms following a toxic oral exposure to phenobarbital may not occur until several hours following ingestion. 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.

Now let’s take a closer look at the medication grid for phenobarbital in Table 8.5a. Medication grids are intended to assist students to learn key points about each medication class. Basic information related to a common generic medication in this class is outlined, including administration considerations, therapeutic effects, and side effects/adverse effects. Prototype/generic medication listed in the med grid is also hyperlinked directly to a free resource from the U.S. National Library of Medicine called Daily Med. Because information about medication is constantly changing, nurses should always consult evidence-based resources to review current recommendations before administering specific medication.

<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>Barbiturates</td>
<td>phenobarbital</td>
<td>May be administered orally, IM, or IV</td>
<td>Primarily used as an anticonvulsant</td>
<td>CNS depression; overdosage can cause death</td>
</tr>
<tr>
<td></td>
<td></td>
<td>High abuse potential</td>
<td>Also used as a sedative and may also be used as a preanesthetic agent</td>
<td>May cause suicidal thoughts or behavior</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Should not be combined with other CNS depressants</td>
<td></td>
<td>Respiratory depression</td>
</tr>
<tr>
<td></td>
<td></td>
<td>When therapy is discontinued, the dose should be tapered and not stopped abruptly</td>
<td></td>
<td>GI: Nausea and vomiting</td>
</tr>
</tbody>
</table>
Benzodiazepines

Lorazepam, a benzodiazepine with antianxiety, sedative, and anticonvulsant effects, is available for oral, intramuscular, or intravenous routes of administration. Benzodiazepines are a controlled Schedule IV substance because they have a potential for abuse and may lead to dependence.

Mechanism of Action

Benzodiazepines bind to specific GABA receptors to potentiate effects of GABA.

Indications for Use

Benzodiazepines are used for sedation, antianxiety, and anticonvulsant effects. Lorazepam injection is indicated for the treatment of status epilepticus. It may also be used in adult patients for preanesthetic medication to produce sedation (sleepiness or drowsiness), relieve anxiety, and decrease the ability to recall events related to the day of surgery. Oral lorazepam is used to treat anxiety disorders.

Nursing Considerations Across the Lifespan

Benzodiazepines may cause fetal harm when administered to pregnant women. Children and the elderly are more likely to experience paradoxical reactions to benzodiazepines such as tremors, agitation, or visual hallucinations. Elderly or debilitated patients may be more susceptible to the sedative and respiratory depressive effects of lorazepam. Therefore, these patients should be monitored frequently and have their dosage adjusted carefully according to patient response; the initial dosage should not exceed 2 mg. Dosage for patients with severe hepatic insufficiency should be adjusted carefully according to patient response.

Adverse/Side Effects

A Black Box Warning states that concomitant use of benzodiazepines and opioids may result in profound sedation, respiratory depression, coma, and death.

The most important risk associated with the intravenous use of lorazepam injection is respiratory depression. Accordingly, airway patency must be assured and respiration monitored closely. Ventilatory support should be given as required. The additive central nervous system effects of other drugs, such as phenothiazines, narcotic analgesics, barbiturates, antidepressants, scopolamine, and monoamine-oxidase inhibitors should be considered when these other drugs are used concomitantly with, or during the period of recovery from, lorazepam injection. Sedation, drowsiness, respiratory depression (dose dependant), hypotension, and unsteadiness may occur with oral dosages as well. The use of benzodiazepines may lead to physical and psychological dependence. Abrupt termination of treatment may be accompanied by withdrawal symptoms. Benzodiazepines should be prescribed for short periods only (e.g., 2 to 4 weeks). Extension of the treatment period should not take place without reevaluation of the need for continued therapy.

Overdosage

Overdosage of benzodiazepines is usually manifested by varying degrees of central nervous system depression, ranging from drowsiness to coma. Treatment of overdosage is mainly supportive until the drug is eliminated from the
body. Vital signs and fluid balance should be carefully monitored in conjunction with close observation of the patient. An adequate airway should be maintained and assisted respiration used as needed. The benzodiazepine antagonist flumazenil may be used in hospitalized patients in the management of benzodiazepine overdose. There is a risk of seizure in association with flumazenil treatment, particularly in long-term benzodiazepine users. 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

Patients who receive lorazepam should be cautioned that driving a motor vehicle, operating machinery, or engaging in hazardous or other activities requiring attention and coordination should be delayed for 24 to 48 hours following administration or until the effects of the drug, such as drowsiness, have subsided. Patients should be advised that getting out of bed unassisted may result in falling and potential injury if undertaken within 8 hours of receiving lorazepam. Alcoholic beverages should not be consumed for at least 24 to 48 hours after receiving lorazepam injectable due to the additive effects on central nervous system depression seen with benzodiazepines in general. Elderly patients should be instructed that lorazepam injection may make them very sleepy for a period longer than 6 to 8 hours following surgery.

Now let’s take a closer look at the medication grid for lorazepam in Table 8.5b.

Table 8.5b Lorazepam 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>Benzodiazepines</td>
<td>lorazepam</td>
<td>Black Box Warning: Concomitant use of benzodiazepines and opioids may result in profound sedation, respiratory depression, coma, and death</td>
<td>To relieve anxiety, reduce seizure activity, or as a preanesthetic</td>
<td>Oversedation and drowsiness</td>
</tr>
<tr>
<td></td>
<td></td>
<td>May cause fetal harm in pregnant women</td>
<td></td>
<td>Respiratory depression</td>
</tr>
<tr>
<td></td>
<td></td>
<td>May cause paradoxical effect in children</td>
<td></td>
<td>Unsteadiness and fall risk</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Use cautiously in elderly and with those with liver dysfunction</td>
<td></td>
<td>Overdoseage can cause coma and death</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Flumazenil used for overdose</td>
</tr>
</tbody>
</table>

Critical Thinking Activity 8.5
A patient who has been experiencing panic attacks is prescribed lorazepam. Upon further discussion with the patient, the nurse discovers that the patient is planning to go on a cruise with her husband next week and plans to use a scopolamine patch to control the nausea. The patient states, "I can’t wait to relax on the cruise ship and have a margarita as we leave port!"

What important patient education should the nurse provide to the patient about the new prescription for lorazepam?

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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