Interacting with Medications: A Review for Special Considerations for Alcohol

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Learning Objectives

- Identify common medication interactions with alcohol use.
- Learn about the role pharmacy plays in managing alcohol medication interactions.
- Identify resources to assist in the care of patients who take medications in combination with alcohol.

The Landscape of Alcohol Use

The Burden of Binge Drinking in Wisconsin

Report Summary

- Source: 2019 report released by UW Population Health Institute

The Landscape of Alcohol Use - COVID

- Cross Sectional Survey of 832 US Adults
- More drinks and great number of days drinking
- 60% of respondents increase drinking
  - Increased stress (45.7%)
  - Increased alcohol availability (34.4%)
  - Boredom (30.1%)
- 13% of respondents decreased drinking

First Pass Metabolism

Alcohol and its Breakdown
Primarily in liver, some in stomach

Cytochrome P450 (CYP) System

The Liver

CYP2E1 - Heavy Drinkers During Consumption

CYP2E1 – DRUG
CYP2E1 – DRUG METABOLITE
CYP2E1 – DRUG LEVELS IN BODY

Aldehyde dehydrogenase (ALDH)

Aldehyde dehydrogenase (ALDH)

CYPs (in the Liver)

ALDH
- ALDH1
  - Active with high levels of acetaldehyde
- ALDH2
  - Active with lower levels of acetaldehyde
- ALDH2 deficiency occurs in 30-50% of people of Eastern Asian decent (Chinese, Japanese, Korean)
Disulfuram-Like Reaction

- Flushing, nausea, vomiting, sweating

Disulfiram (Antabuse®), metronidazole, nitrofurantoin, sulfamethoxazole, isosorbide dinitrate, nitroglycerin, glyburide

Special Considerations

- BALs increase as volume of distribution (Vd) decreases.

<table>
<thead>
<tr>
<th>Blood Alcohol Levels (BALs)</th>
<th>Men</th>
<th>Women</th>
</tr>
</thead>
<tbody>
<tr>
<td>Young</td>
<td>Old</td>
<td></td>
</tr>
<tr>
<td>Heavy</td>
<td>Lean</td>
<td></td>
</tr>
</tbody>
</table>

The Mechanism of Alcohol Interactions

- Pharmacokinetic (PK)
- Pharmacodynamic (PD)

SOME Alcohol-Medications Interactions
- Can have both PK and PD
- Common and serious
- Not all inclusive
**Acetaminophen (Tylenol®)**
- AKA paracetamol or APAP
- Extensively metabolized by the liver
  - Glucuronidation
  - Sulfation
  - CYP2E1
    - Produces reactive metabolite NAPQI
- NAPQI accumulation → acute liver injury and hepatic failure

Limit APAP to max of 4 grams per day and monitor.

**Opioids**
- Increase sedation
- Suppress cough reflex and breathing
- Lethal outcomes

Limit alcohol consumption.
Separate drinking from medication dosing.
Monitor for symptoms of sedation and respiratory depression.
Avoid operations of machinery.

**Sedatives**
- Barbiturates
  - Chronic use: increase metabolism
  - Enhances sedative and hypnotic effects
- Benzodiazepines
  - Enhances CNS effects

Limit alcohol consumption.
Separate drinking from medication dosing.
Monitor for symptoms of sedation and respiratory depression.
Avoid operations of machinery.
Warfarin (Coumadin®) and blood thinners
- Metabolized by CYP1A2, CYP3A4
- Acute drinking
  - Increase anticoagulating effects
- Chronic drinkers
  - Increased CYP activity
  - Needs higher doses to achieve anticoagulating effects

Recommend avoid alcohol.

CNS Agents
- Antidepressants
  - CNS depressant effects
  - TCAs (e.g. amitriptyline)
  - Sedation and drop in blood pressure when standing
- Anticonvulsants
  - Phenytoin (Dilantin®)
  - Chronic use increases metabolism

Limit alcohol consumption.
Monitor for treatment effectiveness and adverse effects.

Diabetes Agents
- Sulfonylureas
  - Glyburide: also can have disulfiram like reaction
  - Increased risks if patient insulin dependent

Limit alcohol consumption.
If possible, eat while consuming alcohol.
Monitor for symptoms of low blood sugars.
Antibiotics

- Increasing alcohol absorption by accelerating gastric emptying
  - e.g. erythromycin
- Increase risk of liver damage
  - e.g. isoniazid
- Disulfiram-like Reactions
  - e.g. isoniazid, metronidazole, nitrofurantoin, sulfamethoxazole

Aside from above examples, moderate alcohol consumption likely will not affect general antibiotic effectiveness.

Recommendation for Patient

How Pharmacy Can Help
“I have a beer every once in a while, that should be ok right?”

“Surely I can have one drink?”

“I don’t drink that much so it won’t be an issue”

“…”

Pharmacy Interventions

- Screening
- Education
- Support for recovery efforts
  - Adherence
  - Avoidance
- Identify and resolve drug therapy problems
  - Prescription
  - Over the Counter (OTC)

OTC Medications

- Acetaminophen (APAP, Tylenol®)
  - Watch for combination products
- Antihistamines
  - Diphenhydramine (Benadryl®)
- NSAIDs
  - Ibuprofen (Motrin®), naproxen (Aleve®)
Alcohol Content in Medications

- **85%** Tonic
- **0.5%** Elixir
- Gel
- Solution

For Alcohol Content in Medications

- Prescription
  - Check with pharmacist
- Over-the-Counter
  - Check label and inactive ingredients section
  - Look for labeling of "Alcohol Free"

OTC Medications

- Cough and Cold Medications

![NyQuil image]

13
Over the Counter Products

- Mouthwash
- Sanitizers

Resources

For Your Reference

Alcohol and Medication Interactions

Ron Weatherston, Psy.D., and David W. Craig, M.D.
For Your Reference


For Your Reference

https://drug-interactions.medicine.iu.edu/MainTable.aspx

For Your Reference

Phil D. Hamilton, John R. Hemmings
The Top 100 Drug Interactions
Comprehensive table of drugs that are substrates, inhibitors or inducers of CYP450 isozymes
$24.95
Available on Amazon
Take Home Points

- Counseling should be provided to moderate drinker to monitor for adverse effects of alcohol-medication interactions.

- Over the counter medications, particularly multiple ingredient products, can increase the risk of alcohol related incidents.

- Pharmacy can serve as a resources for both patients and providers when assessing risks of alcohol-medication interactions.

Questions? Comments?

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