ALCOHOL-MEDICATION INTERACTIONS

SOURCE: NATIONAL INSTITUTE ON ALCOHOL ABUSE AND ALCOHOLISM (NIAAA)

Many medications can interact with alcohol, leading to increased risk of illness, injury, or death. For example, it is estimated that alcohol-medication interactions may be a factor in at least 25% of all emergency room admissions. An unknown number of less serious interactions may go unrecognized or unrecorded. This information notes some of the most significant alcohol-drug interactions. (Although alcohol can interact with illicit drugs as well, the term 'drugs' is used here to refer exclusively to medications, whether prescription or non-prescription.)

How common are alcohol-drug interactions?
More than 2,800 prescription drugs are available in the United States, and physicians write 14 billion prescriptions annually: in addition, approximately 2,000 medications are available without prescription.

Approximately 70% of the adult population consumes alcohol at least occasionally, and 10% drink daily. About 60% of men and 30% of women have had one or more adverse alcohol-related life events. Together with the data on medication use, these statistics suggest that some concurrent use of alcohol and medications is inevitable.

The elderly may be especially likely to mix drugs and alcohol and are at particular risk for the adverse consequences of such combinations. Although persons age 65 and older constitute only 12% of the population, they consume 25 - 30% of all prescription medications. The elderly are more likely to suffer medication side effects compared with younger persons, and these effects tend to be more severe with advancing age. Among persons age 60 or older, I0% of those in the community - and 40% of those in nursing homes - fulfill criteria for alcohol abuse.

How alcohol and drugs interact?
To exert its desired effect, a drug generally must travel through the bloodstream to its site of action, where it produces some change in an organ or tissue. The drug's effects then diminish as it is processed (metabolized) by enzymes and eliminated from the body. Alcohol behaves similarly, traveling through the bloodstream, acting upon the brain to cause intoxication, and finally being metabolized and eliminated, principally by the liver. The extent to which an administered dose of a drug reaches its site of action may be termed its availability. Alcohol can influence the effectiveness of a drug by altering its availability. Typical alcohol-drug interactions include the following:

An acute dose of alcohol (a single drink or several drinks over several hours) may inhibit a drug's metabolism by competing with the drug for the same set of metabolizing enzymes. This interaction prolongs and enhances the drug's availability, potentially increasing the patient's risk of experiencing harmful side effects from the drug.
In contrast, chronic (long-term) a1cohol ingestion may activate drug-metabolizing enzymes, thus decreasing the drug's availability and diminishing its effects. After these enzymes have been activated, they remain so even in the absence of alcohol, affecting the metabolism of certain drugs for several weeks after cessation of drinking. Thus, a recently abstinent chronic drinker may need higher doses of medications than

those required by non-drinkers to achieve therapeutic levels of certain drugs. Enzymes activated by chronic alcohol consumption transform some drugs into toxic chemicals that can damage the liver or other organs.

Alcohol can magnify the inhibitory effects of sedative and narcotic drugs at their sites of action in the brain. To add to the complexity of these interactions, some drugs affect the metabolism of alcohol, thus altering its potential for intoxication and the adverse effects associated with alcohol consumption.

Some specific interactions

Anesthetics. Anesthetics are administered prior to surgery to render a patient unconscious and insensitive to pain. Chronic alcohol consumption increases the dose of propofol (Diprivan) required to induce loss of consciousness. Chronic alcohol consumption increases the risk of liver damage that may be caused by the anaesthetic gases enfurance (Ethrane) and halothane (Fluothane).

Antibiotics. Antibiotics are used to treat infectious diseases. In combination with acute alcohol consumption, some antibiotics may cause nausea, vomiting, headache, and possibly convulsions; among these antibiotics are furazolidone (Furoxone), griseofulvin (Grisactin and others), metronidazole (Flagyl), and the antimalarial quinacrine (Atabrine). Isoniazid and rifampin are used together to treat tuberculosis, a disease especially problematic among the elderly and among homeless alcoholics. Acute alcohol consumption decreases the availability of rifampin. In each case, the effectiveness of the medication may be reduced.

Anticoagulants. Warfarin (Coumadin) is prescribed to retard the blood's availability to clot. Acute alcohol consumption enhances warfarin's availability, increasing the patient's risk for life-threatening hemorrhages. Chronic alcohol consumption reduces warfarin's availability, lessening the patient's protection from the consequences of blood clotting disorders.

Antidepressants. Alcoholism and depression are frequently associated, leading to a high potential for alcohol-antidepressant interactions. Alcohol increases the sedative effect of tricyclic antidepressants such as amitriptyline (Elavil and others), impairing mental skills required for driving. Acute alcohol consumption increases the availability of some tricyclics, potentially increasing their sedative effects; chronic alcohol consumption appears to increase the availability of some tricyclics and to decrease the availability of others. The significance of these interactions is unclear. These chronic effects persist in recovering alcoholics.

A chemical called tyramine, found is some beers and wine, interacts with some antidepressants, such as monoamine oxidase inhibitors, to produce a dangerous rise in blood pressure. As little as one standard drink may create a risk that this interaction will occur.

Antidiabetic medications. Oral hypoglycemic drugs are prescribed to help lower blood sugar levels in some patients with diabetes. Acute alcohol consumption prolongs, and chronic alcohol consumption

decreases, the availability of tolbutamide (Orinase).

Alcohol also interacts with some drugs of this class to produce symptoms of nausea and headache such as those described for metronidazole (an antibiotic).

Antihistamines. Drugs such as diphenhydramine (Benadryl and others) are available without prescription to treat allergic symptoms and insomnia. Alcohol may intensify the sedation caused by some antihistamines. These drugs may cause excessive dizziness and sedation in older persons; the effects of combining alcohol and antihistamines may therefore be especially significant in this population.

Antipsychotic medications. Drugs such as chlorpromazine (Thorazine) are used to diminish psychotic symptoms such as delusions and hallucinations. Acute alcohol consumption increases the sedative effect of these drugs, resulting in impaired coordination and potentially fatal breathing difficulties. The combination of chronic alcohol ingestion and antipsychotic drugs may result in liver damage.

Antiseizure medications. These drugs are prescribed mainly to treat epilepsy. Acute alcohol consumption increases the availability of phenytion (Dilantin) and the risk of drug-related side effects. Chronic drinking may decrease phenytoin availability, significantly reducing the patient's protection against epileptic seizures, even during a period of abstinence.

Antiulcer medications. The commonly prescribed antiulcer medications cimetidine (Tagamet) and ranitidine (Zantac) increase the availability of a low dose of alcohol under some circumstances. The clinical significance of this finding is uncertain since other studies have questioned such interaction at higher doses of alcohol.

Cardiovascular medications. This class of drugs includes a wide variety of medications prescribed to treat ailments of the heart and circulatory system. Acute alcohol consumption interacts with some of these drugs to cause dizziness or fainting upon standing up. These drugs include nitroglycerin, used to treat angina, and reserpine, methyldopa (AJdomet), hydralazine (Apresoline and others), and guanethidine (Ismelin and others), used to treat high blood pressure. Chronic consumption decreases the availability of propranolol (Jnderal), used to treat high blood pressure, potentially reducing its therapeutic effect.

Narcotic pain relievers. These drugs are prescribed for moderate to severe pain. They include the opiates morphine, codeine, propoxyphene (Darvon), and meperidine (Demerol). The combination of opiates and alcohol enhances the sedative effect of both substances, increasing the risk of death from overdose. A single dose of alcohol can increase the availability of propoxyphene, potentially increasing its sedative side effects.

Non-narcotic pain relievers. Aspirin and similar non-prescription pain relievers are most used by the elderly. Some of these drugs cause stomach bleeding and inhibit blood from clotting; alcohol can exacerbate these effects. Older persons who mix alcoholic beverages with large doses of aspirin to self-medicate for pain are therefore at particularly high risk for episodes of gastric

bleeding. In addition, aspirin may increase the availability of alcohol, heightening the effects of a given dose of alcohol.

Chronic alcohol ingestion activates enzymes that transform acetaminophen (Tylenol and others) into chemicals that can cause liver damage, even when acetaminophen is used in standard therapeutic amounts. These effects may occur with as little as 2.6 grams of acetaminophen in persons consuming widely varying amounts of alcohol.

Sedatives and hypnotics ('sleeping pills'). Benzodiazepines such as diazepam (Valium) are generally prescribed to treat anxiety and insomnia. Because of their greater safety margin, they have largely replaced the barbiturates, now used mostly in the emergency treatment of convulsions.

Doses of benzodiazepines that are excessively sedating may cause severe drowsiness in the presence of alcohol, increasing the risk of household and automotive accidents. This may be especially true in older people, who demonstrate an increased response to these drugs. Low doses of flurazepam (Dalmane) interact with low doses of alcohol to impair driving ability, even when alcohol is ingested the morning after taking Dalmane. Since alcoholics often suffer from anxiety and insomnia, and since many of them take morning drinks, this interaction may be dangerous.

The benzodiazepine lorazepam (Ativan) is being increasingly used for its antianxiety and sedative effects. The combination of alcohol and lorazepam may result in depressed heart and breathing functions; therefore, lorazepam should not be administered to intoxicated patients.

Acute alcohol consumption increases the availability of barbiturates, prolonging their sedative effect. Chronic alcohol consumption decreases barbiturate availability through enzyme activation. In addition, acute or chronic alcohol consumption enhances the sedative effect of barbiturates at their site of action in the brain, sometimes leading to coma or fatal respiratory depression.

Alcohol-Medication Interactions - A Commentary by NIAAA Director, Enoch Gordis, MD

Individuals who drink alcoholic beverages should be aware that simultaneous use of alcohol and medications - both prescribed and over the counter - has the potential to cause problems. For example, even very small doses of alcohol probably should not be used with antihistamines and other medications with sedative effects. Individuals who drink larger amounts of alcohol may run into problems when commonly used medications (e.g., acetaminophen) are taken at the same time or even shortly after drinking has stopped Elderly individuals should be especially careful of these potential problems due to their generally greater reliance on multiple medications and age-related changes in physiology.