

## Alcohol

The most widely available and well known alcohol is ethanol. The sedative, hypnotic, and narcotic actions of ethanol are similar to that of methanol and other alcohols and the abuse of all types can lead to addiction. Ethanol will be discussed here under the name alcohol since this is the form in which alcohol is recognized and consumed in our society.

According to the International Classification of Disease (ICD-10), up to 16g of pure alcohol per day by women and 24g for men can be consumed without consequences. For women, drinking more than 40g of pure alcohol per day or 60g for men can lead to negative health consequences. These limits are intended for healthy people with out genetic loading. When a history of alcohol addiction exists in the family, these limits should be lowered.

Alcohol's actions on the brain are purely inhibitory. The excitation that can occur after the consumption of large amounts of alcohol can be explained by the inhibition of inhibiting neurons. In the end, the sedative to narcotic symptoms are dominant. The first symptoms caused by alcohol intoxication include uncoordinated gait, followed by decreased attention, a narrowing of the field of vision, and the impairment of target-oriented movements (e.g. walking on a straight line and other tests that are often performed by police by suspected intoxication). Continuing consumption leads to symptoms such as slowed reaction time, slurred speech, uncontrolled eye movements (=Nystagmus), nausea, vomiting and uncontrolled movements and reactions. Decreased consciousness and anterograde (=future) amnesia start at about 2% blood alcohol levels. Comas can occur at 3% blood alcohol levels and at 4% respiratory centers can be shut down leading to death. Drinking alcohol regularly can lead to the development of tolerance to its effects so that increasing amounts must be consumed before symptoms of intoxication are experienced. The break down of the alcohol is performed by the liver at a constant speed of 0.15% per hour.

Chronic alcohol abuse can cause damage in the following ways: development of a fatty liver, hepatitis, liver cirrhosis, high blood pressure, tremor, cardiomyopathy (= a disorder of the heart muscles), polyneuropathia (=a disorder of the nerves), Wernicke-Encephalopathy (=damage to certain structures of the brain), depression, and/or fetal alcohol syndrome (through the consumption of alcohol during pregnancy). There is a higher prevalence of mood disorders (depression and bipolar disorder), anxiety disorders, schizophrenia, and personality disorders (border-line disorder) among alcohol dependent patients than in the general population.

Alcohol withdrawal symptoms range from tremor, nausea, irritability, and sleep disturbances to cramp attacks, raised blood pressure, and disturbances of consciousness. The most extreme incidence during withdrawal is the occurrence of Delirium Tremens, a state which can include confusion, visual hallucinations, fever, vomiting, tachycardia, dilation of the pupils, and/or death. The intensity of these symptoms increases proportional to the length of time that the patient abused alcohol.

The manner in which alcohol addiction is treated depends on several factors including age, sex, personality structure, coexisting somatic illnesses, social situation, level of intoxication, intensity of withdrawal, and coexisting psychiatric illnesses. The phase of acute withdrawal can be treated either in or out patient with medications, such as benzodiazepines and clonidin, which diminish the most prominently experienced symptoms. When necessary, low potency, typical antipsychotic medications can be given in addition. After this acute

phase, a period of massive craving sets in. To help in this phase, the following medications can be prescribed:

- 1) Naltrexon is an opioid receptor antagonist that reduces the craving for alcohol and decreases the intensity of relapses. For patients who are addicted both to alcohol and opioids, this medication will induce opioid withdrawal. Patients who are not opioid dependent hardly notice any effects from Naltrexon. In alcohol addicts, the action of endorphins are blocked which is a consequence of this dependence mechanism. Naltrexon's antagonistic action on these receptors reduces the physical dependence on alcohol.
- 2) Acamprosate acts in similar ways to alcohol and is also an antagonist on some receptors causing an inhibition of various nerve cells without other actions of its own. This medication also reduces the craving for alcohol. Unfortunately, it is not well tolerated and can cause side effects such as diarrhea, abdominal pain, nausea, and itching.
- 3) Disulfiram has no activity alone but when it is taken in combination with alcohol, it causes an intense intolerance reaction. The following symptoms can occur: redness of the head, shoulders and breast, feeling of heat, head ache, tachycardia, low blood pressure to circulatory collapse, and increased breathing. This so-called "Antabus Syndrome" begins about 30 minutes after the consumption of alcohol and last from a few hours to 14 days.