



Wine's effect on the liver



Introduction

Regular light to moderate wine drinking generally does not significantly affect or change liver function. Continuous heavy or excessive wine drinking, typically for more than 10 years does, however, produce significant changes in liver function, which are related to the capacity of the liver to break down the alcohol contained in the wine as well as other foods and drugs.

The role of your liver

All of the blood leaving your gastrointestinal tract must pass through your liver before reaching the rest of your body. Your liver has many roles, such as:

- the conversion of food into substances necessary for sustaining your body's growth and function

- the manufacture and export of substances for use by the body
- the conversion of drugs into forms which are easier for the body to use
- the conversion of substances that would otherwise be poisonous to the body into forms which are easier for the body to expel.

The stages of alcohol's effects on the liver

Stage 1 Fatty liver (steatosis)

Initially, if you have regularly drunk a heavy or excessive amount of wine (or other alcoholic beverages) for a long period of time, fat deposits may develop in your liver, which will enlarge your liver. This is because alcohol prevents the recycling of fat and the breakdown of fat in the liver.



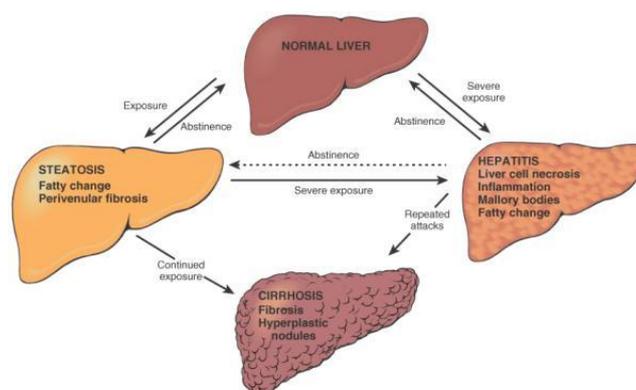
Also, the rate of the enzyme acetaldehyde dehydrogenase pathway that breaks down acetaldehyde, the first breakdown product of alcohol, is reduced and the toxic acetaldehyde accumulates and circulates in the blood stream. Liver function is decreased. Fatty liver can also occur if you are obese. Fatty liver is reversible, however, when you stop drinking or significantly reduce your drinking.

Stage 2 Alcoholic hepatitis

As you continue to regularly drink a heavy or excessive amount of alcohol, your liver may become inflamed resulting in alcoholic hepatitis which may result in liver failure and death. Alcoholic hepatitis can range from mild to severe with symptoms of jaundice (yellow skin), mental confusion caused by liver failure, fluid retention in the abdomen, bleeding varicose veins in the oesophagus, abnormal blood clotting and coma. Alcoholic hepatitis is reversible, however, when you stop drinking alcohol.

Stage 3 Liver cirrhosis

Continued drinking may then permanently scar and damage your liver resulting in liver cirrhosis. Liver cirrhosis is a build-up of scar tissue that changes the structure of the liver and blocks or decreases blood flow, causing liver cell death. It also decreases the conversion of food, drugs and poisonous substances by the liver, and reduces the manufacture and export of substances. Liver cirrhosis increases the risk of liver cancer. Liver cirrhosis can be treated but is not reversible, although if you stop drinking alcohol you may avoid progression to liver failure and/or liver cancer.



Interrelationships among stages of alcoholic liver disease

Did you know?

- Women are more susceptible to liver damage than men.
- About 20% of heavy drinkers and alcohol dependent drinkers develop fatty liver.
- About 10 to 15% of alcohol dependent drinkers develop cirrhosis.
- Experimental and epidemiological studies demonstrate consistently that heavy or excessive drinkers and alcohol dependent drinkers die from liver cirrhosis at a much higher rate than the general population.
- The five-year survival rate for people with liver cirrhosis who stop drinking is about 90%, compared with 70% who don't stop drinking.
- About 10% of people with liver cirrhosis develop liver cancer.

Risk factors

In general, the amount and pattern of wine consumed determines the risk and degree of liver damage, although the amount of wine it takes to damage the liver varies greatly among individuals, which may reflect gender,



genetic and socio-economic differences (Cichoz-Lach et al. 2006a, 2006b, 2007, Stokkeland et al. 2008). It has been suggested that binge drinking, for example, is less associated with the development of alcoholic liver cirrhosis than regular heavy or excessive wine drinking (Stokkeland et al. 2008, Hatton et al. 2009). Basically, however, the more you drink, the greater the risk of liver damage (Rehm et al. 2010).

It has been suggested that liver cirrhosis does not develop below a lifetime wine consumption of 100 kg of undiluted alcohol (Bellentani and Tiribelli 2001). This amount corresponds to an average daily intake of 30 grams of alcohol (3 standard drinks) over the time of a person's life. It has also been suggested that consuming wine with food results in a reduced risk compared to consuming wine without food. Light to moderate wine consumption is considered to be 10 to 20 grams of alcohol (1 to 2 standard drinks) daily and is not associated with liver damage.

The presence of liver diseases such as hepatitis B or C increases the risk of alcohol contributing to the development and progression of liver cirrhosis (Corrao et al. 1998, Ostapowicz et al 1998, 2001; Marcellin et al 2008, Stroffolini et al. 2010), as does a genetic disorder called haemochromatosis.

Wine consumption can also be a risk factor in other forms of liver disease. For example, individuals with alcoholic liver cirrhosis are at much higher risk for the development of liver cancer (Hall 1995).

Acknowledgement

This work was supported by Australia's grapegrowers and winemakers through their investment body Wine Australia, with

matching funds from the Australian Government. The AWRI is a member of the Wine Innovation Cluster.

References and further reading

Bellentani, S., and Tiribelli, C. 2001. Spectrum of liver disease in the general population: Lessons from the Dionysos study. *J. Hepatol.* 35:531–537.

Cichoz-Lach, H., Partycka, J., Nesina, I., Celinski, K., Słomka, M., Wojcierowski, J. 2006a. Genetic polymorphism of alcohol dehydrogenase 3 in alcohol liver cirrhosis and in alcohol chronic pancreatitis. *Alcohol Alcohol.* 41(1):14-17.

Cichoz-Lach, H., Partycka, J., Nesina, I., Celiński, K., Słomka, M. 2006b. The influence of genetic polymorphism of CYP2E1 on the development of alcohol liver cirrhosis *Wiad Lek.* 59(11-12):757-761.

Cichoz-Lach, H., Partycka, J., Nesina, I., Celinski, K., Słomka, M., Wojcierowski, J. 2007. Alcohol dehydrogenase and aldehyde dehydrogenase gene polymorphism in alcohol liver cirrhosis and alcohol chronic pancreatitis among Polish individuals. *Scand. J. Gastroenterol.* 42(4):493.

Corrao, G.; Zambon, A.; Torchio, P., Aricò, S., La Vecchia, C., di Orio, F. 1998. Attributable risk for symptomatic liver cirrhosis in Italy. *J. Hepatol.* 28:608–614.

Hall, P. 1995. Pathological spectrum of alcoholic liver disease. Hall, P. (ed.) *Alcoholic Liver Disease: Pathobiology and Pathogenesis.* 2nd ed. London, UK: Edward Arnold: 41–68.

Hatton, J., Burton, A., Nash, H., Munn, E., Burgoyne, L., Sheron, N. 2009. Drinking patterns, dependency and life-time drinking history in alcohol-related liver disease. *Addiction.* 104:587-592.



Mann, R.E., Anglin, L., Wilkins, K., Vingilis E.R., MacDonald, S. 1993. Mortality in a sample of convicted drinking drivers. *Addiction* 88:643-647.

Marcellin, P., Pequignot, F., Delarocque-Astagneau, E., Zarski, J.P., Ganne, N., Hillon, P., Antona, D., Bovet, M., Mechain, M., Asselah, T., Desenclos, J.C., Jougla, E. 2008. Mortality related to chronic hepatitis B and chronic hepatitis C in France: Evidence for the role of HIV coinfection and alcohol consumption. *J. Hepatol.* 48: 200-207.

Ostapowicz, G., Watson, K.J., Locarnini, S.A., Desmond, P.V. 1998. Role of alcohol in the progression of liver disease caused by hepatitis C virus infection. *Hepatol.* 27(6): 1730-1735.

Pell, S., and D'Alonzo, A. (1973) A five-year mortality study of alcoholics. *J. Occupat. Med.* 15:120-125.

Rehm, J., Taylor, B., Mohapatra, S., Irving, H., Baliunas, D., Patra, J., Roerecke, M. 2010. Alcohol as a risk factor of liver cirrhosis: a systematic review and meta-analysis. *Drug Alcohol. Rev.* 29:437-445.

Schmidt, W. and de Lint, J. 1972. Causes of death in alcoholics. *Quart. J. Stud. Alcohol* 33:171-185.

Stokkeland, K., Hilm, G., Spak, F., Franck, J., Hultcrantz, R. 2008. Different drinking patterns for women and men with alcohol dependence with and without alcoholic cirrhosis. *Alcohol Alcohol.* 43(1):39-45.

Stroffolini, T., Cotticelli, G., Medda, E., Niosi, M., Del Vecchio-Blanco, C., Addolorato, G., Petrelli, E., Salerno, M.T., Picardi, A., Bernardi, M., Almasio, P., Bellentani, S., Surace, L.A., Loguercio, C. 2010. Interaction of alcohol

intake and cofactors on the risk of cirrhosis. *Liver Int.* 30(6):867-870.

Thun, M.J.; Peto, R.; Lopez, A.D.; et al. 1997. Alcohol consumption and mortality among middle-aged and elderly U.S. adults. *New Eng. J. Med.* 337:1705-1714.

Contact

For further information, please contact:

Dr Creina Stockley

Phone 08 8313 6600 Fax 08 8313 6601

Email helpdesk@awri.com.au

Website

http://www.awri.com.au/industry_support/wine_and_health/

Address Wine Innovation Central Building,
Corner of Hartley Grove & Paratoo Rd,
Urrbrae (Adelaide), SA 5064