A hook to the liver and...to the sex

Eduardo Fernández-Martínez

Centro de Investigación en Biología de la Reproducción (CIBIOR), Área Académica de Medicina, Instituto de Ciencias de la Salud, Universidad Autónoma del Estado de Hidalgo. Pachuca, Hidalgo, México.

Abstract
People have heard about hepatic diseases, others less fortunate suffer from them; their causes may be gallbladder stones, hepatitis, alcoholism, etc. When such diseases become chronic but without medical treatment they may turn into cirrhosis. Cirrhosis is the last phase of chronic liver diseases altering the whole liver architecture and function with pronounced fibrosis. Cirrhotic patients may be beyond recovery and the prognosis is disheartening. Liver is the largest organ in the human body, it is important since stores and metabolizes carbohydrates, proteins, vitamins, and fat; indeed, fat requires to be dissolved by the bile acids. Bile acids along with bilirubins constitute the bile produced by liver; if normal bile flow is stopped (cholestasis) their constituents will pass into blood causing jaundice. Also, liver metabolizes drugs and alcohol; in fact, alcohol metabolism generates toxic derivatives that provoke liver injury. Liver is related to sexual health: first, liver damage by alcoholism in men induces testicular dysfunction, low testosterone levels, sexual impotence and infertility. Second, chronic self-medication in women or the intake of high doses of oral contraceptives without medical observation may worsen a previous liver disease, as the case of alcoholic women whom are prone to worse hepatic infections. It is imperative to advice that alcohol abuse must be controlled to avoid not only hepatic damage but also an injury to sexual health; in addition, the oral contraceptives intake by women shall be under strict medical surveillance along with prior hepatic check. Therefore, people may drink a toast and women should take the pill, but responsibly, so they will keep away from a hook to the liver and...to the sex.

Key words: Alcohol; Cholestasis; Cirrhosis; Contraceptives; Liver; Testicles.

Introduction
People have heard about liver diseases (hepatopathies) and other less fortunate suffer from them, as is the case of a patient with hepatitis whom must rest and eat a diet rich in carbohydrates, or the woman that complains of a pain due to gallbladder stones (cholelithiasis), and, in the worst case, someone whom did not receive opportune medical care for treating these illnesses or a chronic alcoholic person whom may be later a cirrhotic patient. Cirrhosis is the final stage caused by many chronic diseases, wherein the normal architecture and function have been lost in a high extent along with pronounced fibrosis; besides, in such a phase the patient may be beyond recovery and the clinical prognosis is quite disheartening. In fact, cirrhosis and other chronic liver diseases are the second cause of mortality in the men and women economically productive population in Mexico. Liver is the biggest inner organ, located in the right side of the human body and it is very important since this is the “biochemical laboratory” because the carbohydrates, the main source of energy, are stored and processed in the liver, also, diverse proteins are degraded and produced in this organ, even some which are required to decompose food, others that constitute cells or those necessary for coagulation in blood; in addition, liver is a reservoir of vitamins and fat. In this respect, fat could not be absorbed by the body if the liver did not produce the “natural detergent” to dissolve and to use it; that detergent is bile acids that together with bilirubins constitute the bile. When bile flow is blocked into hepatic conducts the bile acids and bilirubins pass into the blood causing “cholestasis”, that stains
the skin yellow (jaundice) and provokes itching (pruritus). Another function of the liver is to transform and metabolize toxic or foreign agents, included drugs, which come into the body by diverse ways, the most common by oral intake; in particular the case of alcohol, the excessive and chronic drinking may lead to cirrhosis, because the liver cannot metabolize a great amount of alcohol so fast, in addition to its toxic metabolites to eliminate them or turning them into innocuous. So far the functions and importance of liver have been pointed out, therefore, two cases deserve to be commented regarding the narrow relationship between the liver and the reproductive health; firstly, the chronic liver damage and alcoholic cirrhosis may affect the testicles, and second, the uncontrolled oral contraceptives intake may impair the liver.

Testicular damage as consequence of chronic liver injury and alcoholic cirrhosis.

As mentioned above, hepatic cirrhosis is the second to fourth cause of death in Mexico and reaches the fifth place in the world; the alcoholism is one of the main causal agents, besides, this affects the economically productive population that also is of reproductive age. In Mexico, the Hidalgo’s State possesses the highest rate of mortality due to alcoholic cirrhosis, in addition, is the second state consumer of “pulque”, an ancient alcoholic beverage. There is a close correlation between excessive pulque intake and the alcoholic cirrhosis, compared that with other alcoholic beverages, although the continuous abuse of drinking beer is likely a risk factor too. The hypogonadism is one interesting consequence of chronic liver damage as well as the alcoholic cirrhosis in male, this is characterized by the reduction of size and function of testicles, low levels of testosterone (hormone which provokes the masculine characteristics and participates in spermatozoa production), inhibition of libido (lack of sexual desire), impotence (difficulty to get an erection and to have a sexual intercourse), and infertility (disabled to conceive). It is also known that during chronic liver damage there exists a dysfunction in the hypothalamus-hypophysis-gonads axis; it means a dysfunction of the brain glandular zone that controls the testicles function and the production of new spermatozoa with the required quality to conceive. Besides, alcoholism causes necrosis (cellular death) and fibrosis (excessive collagen production as internal scars) in testicles as well as an imbalance in the immunity system that leads to an increase in penis and testicle infections and also to the chronic testicular inflammation. It is very well known that male patients with chronic liver diseases have a higher rate of erectile dysfunction (ED); in addition, alcohol-dependent men commonly suffer from ED and men with ED are frequently chronic alcohol addicts. Thus, there is a strong correlation among liver damage, ED and low testosterone levels. One may think that only alcoholic or cirrhotic men would suffer from some hypogonadism effects, however it is wrong, experiments performed in rats and humans have evidenced that the acute administration of some milliliters of alcohol (1.5-2.5 g/kg as dose) are enough to significantly lower testosterone concentration, even to 50%, in blood; in fact, an undesired erectile dysfunction may be suddenly appear with 60 up to 120 mL of alcohol intake (4 to 7 average drinks, 15 mL of alcohol each one, in a male weighing 75 kg). In addition, a significant decrease in plasma testosterone concentration during a hangover period 12-20 hours after the ingestion of 1.5 g/kg of alcohol has been shown in men; moreover, the plasma testosterone concentrations are lowest in subjects who have the most severe hangover, and require longer time to ejaculate if they are able to do so.1-12

Liver damage by chronic high doses and self-medication with oral contraceptives.

Oral contraceptives (OC) are drugs widely consumed around world as well as in Mexico. Formulation of OC is often the mixture of two compounds, one estrogen and one progestin (Fig. 1). During 70’s decade there were diverse clinical reports regarding either the estrogen or the progestin were suspicious of causing liver damage and cancer in women consuming them chronically and uninterruptedly or in doses not controlled by a physician. It is worthy to notice that OC are not recommended when any antecedent of liver illness exists, even more, OC are contraindicated in patients with viral hepatitis.
(B or C), gallbladder diseases, or in alcoholic women; hence, it is known that OC increase the liver damage begun by those diseases, which are risk factors for a later cirrhosis.\textsuperscript{1-12}

![Ethinylestradiol](image1.png)

![Levonorgestrel](image2.png)

Figure 1. Examples of an estrogen and a progestin, constituents of many combined oral contraceptives.

It is very important to mention that deleterious effects elicited by OC depend on the dose, thus, to a higher dose then higher jeopardy for hepatic injury; nevertheless, the current doses in OC are much lower than those administered in 70’s decade, as well as modern doses are the minimal amount to provide reliable contraception (97-99\% of efficacy). Unfortunately many women take OC in high doses without the adequate medical surveillance by a gynecologist; therefore, the OC self-medication in women whom do not know they perhaps suffer from a silent hepatic disease may worsen their preceding condition to future cirrhosis.\textsuperscript{1-12} Various animal experiments have demonstrated that OC or its constituents when administered by long time and in high doses may worsen the liver damage, cause cholestasis, and augment the toxic effect of infections in alcoholism. Other reports point out that some ethnic groups show genetic predisposition towards developing cholestasis by the OC intake. There are diverse deleterious mechanisms through OC induce the liver injury: a) diminishing cholesterol solubility in bile then increasing gallbladder stones, b) inhibiting bile canalicular membrane transporters in hepatocytes provoking cholestasis, c) impairing hepatic membrane integrity, and d) enhancing oxidative stress with the consequent peroxidation of membranes and DNA damage. Undoubtedly, OC also bring along several benefits to reproductive health, the most important is to avoid undesired pregnancies (their noncontraceptive health benefits are, among others, improvements in dysmenorrhea, anemia, acne, etc.), but women taking OC must be under medical advice and to be sure they do not undergo any previous liver disease. Furthermore, contraceptive transdermal patches are a new method very appreciated by many women for its once-a-week convenience, but some versions contain higher doses of estrogens and progestins than OC; thus, the potential for excess hormonal exposure raises concerns about the risks of adverse effects (cholestasis and liver damage of course, among many others).\textsuperscript{1-12}

Conclusions.

Nobody prohibits men from enjoying wine, beer, pulque, etc., neither that women do not use the “pill” while this is a very secure contraceptive method, on the contrary, it is urgent to keep the reproductive health but without neglecting the hepatic health or vice versa; that can be accomplished through responsibility and medical guidance. To be informed is a right, so the medical information concerning reproductive and hepatic health should be accessible from the big cities to marginalized little towns. Indeed, it is much better to be responsible and informed on time than receiving a hook to the liver and…to the sex.

Conflict of interest statement

The author declares that there are no conflicts of interest.

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**Corresponding author**

Laboratorio de Química Medicinal y Farmacología, Centro de Investigación en Biología de la Reproducción (CIBIOR), Área Académica de Medicina del Instituto de Ciencias de la Salud, Universidad Autónoma del Estado de Hidalgo. Address: Eliseo Ramírez Ulloa 400, Col. Doctores, Pachuca, Hgo. 42090, MEXICO.
Telephone: +52-77-1717-2000 Ext. 2368 Fax: +52-77-1717-2000 Ext. 2368 E-mail: efernan@uaeh.edu.mx