INDO AMERICAN JOURNAL OF PHARMACEUTICAL RESEARCH

FATTY LIVER DISEASE IN-DEPTH ANALYSIS

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ARTICLE INFO

Article history
Received 24/11/2015
Available online
30/11/2015

Keywords
Non-Alcoholic Fatty Liver Disease (NAFLD), Steatohepatitis (NASH), SGOT, SGPT, Alcoholic Fatty Liver (AFL), Insulin Resistance.

ABSTRACT

Fatty liver disease does not generate any noticeable symptoms, but can land the person at the risk of liver inflammation which ultimately leads to jaundice, liver failure or liver cancer. NAFLD is extensively recognized as a major cause of liver related to unhealthy and death because of its possible to progress to cirrhosis and liver failure. The pathologic picture of non-alcoholic fatty liver disease, ranging from simple steatosis to steatohepatitis, advanced fibrosis, and cirrhosis, resembles that of alcohol induced liver disease, but it occur in patients who do not abuse alcohol. The several researches and their statistics manifestly show that liver disorders are one of the main death causes of illnesses. The chief reasons for damaged liver are too much eating of saturated fats, sugars, chemical additives, and consumption of alcohol. The signs existing in the liver to identify the problems and disease prevailing in the liver are dark spots just below the person's eyes, chronic fatigue, recurrent flu and colds, nausea, chills, depression, and PMS for females. Non-alcoholic steatohepatitis that is characterized by the sugar-sweetened beverages included caffeinated- and caffeine-free colas, other carbonated beverages with sugar, fruit punches, lemonade or other non-carbonated fruit drinks. It is also observed that a higher rate of prevalence of NAFLD among people who are consuming more than one sugar-sweetened beverage per day compared to people who are drinking no sugar-sweetened beverages and that sugar-sweetened beverages may be linked to NAFLD and other chronic diseases including diabetes and cardiovascular disease. If the fatty liver disease is unchecked can advance into cirrhosis which is life-threatening, afterwards characteristics of liver failure exist themselves for which there is no permanent cure except liver transplantation.

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*Please cite this article in press as **Prof. Dr. Panchumarthy Ravisankar** et al. Fatty Liver Disease in-Depth Analysis. Indo American Journal of Pharmaceutical Research.2015:5(11).*

INTRODUCTION

The liver is the largest glandular organ in the body and performs numerous vital functions to keep the body pure and out of toxins and harmful substances. The liver is located in the upper right-hand section of the abdominal cavity duly well supported and protected by the ribs. Its colour is reddish-brown and builds up with two main lobes with small huge number of lobules consisting of liver cells known as hepatocytes. Its average size is 10 .5 centimetres for men and 7 centimetres for women and its size increases with age, sex, and size and shape of the person's body. According to information of the National Centre for Biotechnology the average weight of liver of a man is 3 pounds (1400 to 1500 grams) and a women's liver average weight is 2 to 3 pounds (1200 to 1400 grams). The average width is about 21 centimetres to 22.5 centimetres and its vertical height is nearly 15 to 17.5 centimetres. The measurement of the liver from front to back portion is 10 to 12.5 centimetres and its average weight is between 1.4 kilograms to 1.5 kilograms. Knowing the average and normal size of the liver is most important for the detection of fatty infiltration. To identify the fatty infiltration, average and normal measurements of the liver is the key indication to be examined keenly. The liver is said to be abnormal if the span of liver 2 to 3 centimetres larger or smaller than the said normal measurements and values. If the liver is palpable, it clearly indicates a sign that the liver attracted with certain disease. Generally, the liver could not be dislocated since it is located behind the rib cage and each person consists of a specific "size" in relation to his body weight which is measured by volume. The volume of the liver is related to one's body's weight, which is nearly between 2 to 2.7 % in healthy people. The liver is said to be inflamed and enlarged basing on the weight and the space occupied by it in the body. While the people consists of different "average" sizes of livers there is no definite "normal" size of the liver that is to be taken as a factor to decide whether the liver is suffered with hepatomegaly (larger) or smaller than it ought to be. If the weight of the one's liver becomes over and above 5 % to 10 % due to this fat deposit, then it is termed as a fatty liver condition/fatty liver disease. Without a healthy liver, a person cannot continue to exist since it is an essential organ that supports nearly every organ in the body duly locating in the upper-right portion of the abdominal cavity under the diaphragm with four lobes. The liver receives nearly 1.5 quarts of blood every minute by the way of the hepatic artery and portal vein. The liver is a gland that secretes chemicals like bile, which is direly needed to digest fats which are broken down into small pieces so as to enable to absorb easily in the small intestine.

Fatty liver:

The demolition of old red blood cells produces waste that gives facial matter usually in brown colour. Discoloration of stool or darkened urine could signal something is wrong with the liver. Another common sign of liver problems is jaundice, the yellowing of the skin and eyes due to the build-up of bilirubin, a waste product of normally haemoglobin collapse. Because the liver performs so many vital functions it is now and then prone to disease. Due to overweight and drinking too much alcohol can damage the liver. Fatty liver [1] is a common problem seen in many urban parts of India it goes untreated till it changes into serious disease like hepatitis (jaundice). At its initial stage really harmless but it can slowly progresses to a probable slow killer. The Fatty liver disease was first named in 1980, after studying number of obese or diabetic patients having excess fat in their lives. Since then, researchers ascertained that certain fat in the liver is healthy without facing a problem. Once the amount of fat reaches 5 to 10 % of the total weight of the liver which is the clear warning of fatty liver disease, it is much more prone to damage with swelling, scarring, and liver failure. Even Hough the accurate grounds of the disease is unknown, yet there is ample evidence that eating too much or unhealthy foods like highly-processed or highly-fat containing foods devoid of required appropriate and balanced nutrition, plays a crucial function. Johns Hopkins and others prominent scientists collected information between 1994 and 1998 from 11, 371 American men and women, found out that, there seemed to be no excess risk of death up to 18 years, among the adults after starting with fatty liver disease. They clarified through a publication in the British Medical Journal in 2011 that how extensively non-alcoholic fatty liver disease defectively affects the death rates of NAFLD [2-6] patients. Mariana Lazo and her team explained that "We know that the liver is damaged by fatty liver disease as it progresses," "It may be that the body deposits fat in the liver as a kind of protective self-defence mechanism, to save the heart and other organs. But at a certain point, the liver fails, too. We may just not have discovered the point at which that happens in advanced liver disease, fat disappears from the organ, so deaths ultimately due to fatty livers may be under-recorded. Mariana Lazo cautioned that even without evidence that excess mortality is associated with fatty liver disease, having too much fat in the liver puts it at risk of damage, and should be avoided". Vaccines are available to prevent viral liver disease like hepatitis but there is no vaccine against fatty liver disease, and no drug to treat the damage caused by fatty liver. Prevention is only the key factor. Likewise, Researchers from Queen's University in Kingston, Canada, examined the relationship between belly fat either primitive or abdominal, and liver fat, with all-cause mortality and to that effect they published a paper in 2006 in the journal "Obesity", where in they explained that out of the three risk factors, only visceral fat is a major forecaster of mortality which is, correlated with a greater risk of death. Fatty liver commonly seen in overweight persons and mostly above the ages of 30 and liver problems are linked with alcohol consumption also. In such circumstances, the liver consists of excess of fat causing healthy tissues are replaced by unhealthy fats which makes the liver larger and heavier and gradually leading to formation of gall stones. General Fatty liver diseases include hepatitis infection, fatty liver disease, cancer damage [7] due to excess consumption of alcohol, the pain relievers like acetaminophen, and certain cancer drugs. Cirrhosis of the liver [8-9] occurs when the organ becomes scarred and hardened so that it cannot function properly which is caused by chronic liver disease owing to either long-term too much consumption of alcohol or due to hepatitis C infection. There is one sort of NAFLD called Non-Alcoholic Steato-Hepatitis (NASH)[10-14] where serious damage to the liver is caused by the over build up of fat in it as a result of which cirrhosis and liver failure can be occurred leading to liver cancer coupled with inflammation in the body with chronic fatty liver disease but majority of the public have never known about it. The American Journal of Clinical Nutrition publication divulged that even without weight gain, this much fructose consumption through soft drinks contain a form of HFCS that is 55 % fructose can cause liver damage. According to study published in 2013, Hepatology and fructose is closely attached to fatty liver and inflammation. Small quantity of fruits is good to eat, but excess amount can create problem.

Role of fatty liver:

The liver performs more than 300 different functions to upkeep the biochemical balance intact. Under normal conditions, the liver creates necessary nutrition for all the 50 trillion odd cells in the body. Different functions of the liver are:

- Produce bile which is necessary for proper digestion and removal of toxic by-products from the body.
- Construction of many clotting factors and proteins from amino acids which are important for every process of healing, repair and cell growth.
- It is the largest store house of many vitamins such as Vitamin A, D, K, $B_{12,}$ [15] iron and minerals. The liver also converts all the B-Complex vitamins, Nutrients in foods and supplements into their active forms and made them available for body functions.
- It has gigantic stores of energy by producing glucose from the different sugars in the diet and stores it in the form of glycogens and converts glycogens to glucose when glucose levels are low.
- It plays very important role in removing old, worn-out red blood cells from blood circulation.
- The thyroid hormone T4 is converted into its T3 in the liver.
- The liver Detoxifies and eliminates Chemicals, industrial pollutants, metabolic wastes from junk foods, drugs, insecticide residues, and alcohol.
- It produces proteins for blood plasma, resists infection by removing bacteria from the blood stream and creating immune factors, regulates blood clotting and the blood levels of amino acids duly producing cholesterol and processes haemoglobin. The prominent primary functions of the liver are cleaning the blood stream by removing toxins from the blood which helps to enrich vitamins and minerals.

Global Statistical information of fatty liver disease:

Fatty liver was first observed in 1980 by the Mayo Clinic which is known as Non-Alcoholic Fatty Liver Disease (NAFLD) and is the most common cause of nonstandard liver dysfunction particularly in the industrialized countries like USA, UK and Australia. Diffuse hepatic steatosis is commonly prevailed, affecting 25 % of the population**.** Americans consume 12 % of their total calories from fructose like beverages and foods, most of which in the form of high fructose corn syrup (HFCS) which causes fatty liver leads to serious liver damage. In the USA and Australia about $1/5^{th}$ persons out of population, consists of fatty liver disease which is associated with abdominal obesity and insulin resistance is existed in the people particularly in type 2 diabetes. The happening of fatty liver is 15 to 20 % of the general population in the USA and is more prevailed in obesity individuals, which may also occur even in children. In the USA Cirrhosis disease of liver is the 9th leading cause of death which is caused due to fatty liver disease. The reasons of fatty liver are not always obvious, yet it occurs in 14 % of adults in the United States. Data from the United States show that the prevalence of NAFLD has increased progressively during the last 25-30 years, along with the prevalence of central obesity, type 2 diabetes, and the metabolic syndrome and the reported prevalence of NAFLD is from 10 to 46 percent and based on the analysis of tissue samples from biopsy details it was revealed that prevalence of NASH is between 3 to 5 percent. Certain studies published in 2008 show that excess liver fat can affect the people with cardiovascular disease, in addition to diabetes. In fact, a 2009 study signified that approximately 70 % of people with type - 2 diabetes may have fatty liver, and that the disease might follow a more violent course for diabetic patients. In the Atlantic Provinces nearly 40 per cent of the population has fatty liver disease where prevalence of obesity rates is higher than other regions which may lead to cirrhosis, fibrosis or cancer.

About 2 in 100 people with simple fatty liver develop cirrhosis over a period of 15 to 20 years where as nearly 12 in every 100 people suffering with NASH disease leads to develop cirrhosis which is a serious disease over a period of 8 years, depending on their unusual habits and life style. The most common disease in America is NALFD (non-alcoholic fatty liver disease) or fatty liver, and is caused by consumption of 152 pounds of sugar and 146 pounds of flour in the diet which affects 90 million Americans remaining a major risk factor for diabetes, heart attacks, liver cancer and also liver failure. The NAFLD is fast increasing throughout the Western industrial world emerging as a common liver disease which turned as a most common importunate (chronic) liver disorder in western countries such as the UK. It is considered that this disease occur in about 1 in 5 adults in the UK, and 4 in 5 adults having obesity and majority of them are sufferers from simple fatty liver but not the NAFLD. Recently, non-alcoholic fatty liver disease (NAFLD) has become the main cause of chronic liver disease in the United States and other Western countries and is estimated to be more than 30 % in the general population

The incidence of non-alcoholic fatty liver disease related hepatocellular carcinoma is increasing and up to 50 % of cases may occur in the absence of cirrhosis. In the United States 75 to 100 million populations is estimated to have non-alcoholic fatty liver disease. NAFLD is currently thought to be the most common type of liver disease in both adults and adolescents in the U.S. population ranging from 25 to 30 %. The prevalence of FLD in the general population ranges from 10 % to 24 % in various countries. However, the condition is observed in up to 75 % of obese people, 35 % of whom progressing to NAFLD, despite no evidence of excessive alcohol consumption. FLD is the most common cause of abnormal liver function in the United States. "Fatty livers occur in 33 % of European-Americans, 45 % of Hispanic-Americans, and 24 % of African-Americans." In 2008 there were at least 1.46 billion adults who were overweight or obese and another 170 million children due to obese were fallen to the victim of fatty liver problem.

The incidence of NAFLD among the Indian population is estimated about 32 % or little more. A recent study by Kalra and colleagues revealed that out of Indians with Type II Diabetes Mellitus comprises NAFLD up to 56.5 %. According to the presently available data the occurrence and prevalence of non-alcoholic fatty liver estimated 15 to 32 % in India. Globally Non-Alcoholic Fatty Liver Disease (NAFLD) is a divergent hepatic condition and one of the most common causes of chronic liver diseases. In respect of the general Indian population prevalence of this disease is estimated to be around 9 to 32 %, with a higher incidence rate in the midst of obese and diabetic patients. At present, occurrence of NAFLD is estimated at about 9 % in the developing countries where as 30 % in the developed countries all over the world and NAFLD is the most common cause leading to chronic liver disease in the all industrialised world.

Inspite of lower frequency of obesity, NAFLD may be widespread in the developing world as in the case of developed countries. NAFLD is estimated to be the most common liver disease in the Western world, and it affects all racial and ethnic groups irrespective of age or sex. 2.6 % of children are affected with NAFLD but increases to 22.5 % to 52.8 % in the obese child population. It noticed that people with additional factors of metabolic syndrome may have higher incidence of NAFLD than others, the rate of increased risk being 14 %, 17 % and 38 % in those with obesity, hypertension and dyslipidemia, respectively

It is practically observed from studies that about 20 percent of the general population are suffering from NAFL and this enhances up to 80 percent in obese or diabetic people. Alcoholic and NAFL (non-alcoholic fatty liver) disease could also lead to cancer and liver cancer and occupies third leading cause of cancer-related deaths in the entire world. Approximately, 90 % of all varieties of cancers are assumed due to be the effects of environmental pollutants from food, water, and air, united with deficiencies of the defined nutrients to detox and to improve immune system in the body. In 1950, autoimmune hepatitis was first described as a disease of young women, associated with increased gamma globulin in the blood and chronic hepatitis on liver biopsy.

In March 2015 the World Health Organisation issued its maiden guidelines for the treatment of chronic hepatitis B. Vaccines are available to prevent hepatitis A and B. Hepatitis An immunity is attained in 99 to 100 % of persons by receiving the two-dose inactivated virus vaccine. Vaccines to prevent hepatitis B have been available since 1986 and have been put together at least 177 national immunization programs for children. Immunity is achieved in bigger than 95 % of children and young adults through three-dose recombinant virus vaccine.

In the United States of America, Hepatroitis C happened to be treated as common viral hepatitis unto the vaccination of Hepatitis B had been introduced in the middle of 1980. It was estimated that this disease affects 3.2 million adults in the U S and nearly 60 to 70 % of HCV-infected adults of United States are not aware of their infection. This situation has been affecting approximately 240 million people all over the globe. Hepatitis B is the most common viral hepatitis affecting as much as 10 % of the adult population in endemic areas causing approximately 780,000 deaths per year worldwide. In the specific blood tests it is identified that antinuclear antibodies (ANA) or smooth muscle antibodies (SMA) are existed at about 60 % in hepatitis patients. It is observed that more than 80 percent of affected individuals have increased gamma globulin in their blood.

According to NICE publication in 2012, it is noticed that "nearly 85 % of hepatitis B infections in newborn babies has become chronic". Cirrhosis and chronic liver disease the tenth leading cause of death for men and the twelfth for women in the United States in 2001, killing about 27,000 people each year. Globally, 57 % of cirrhosis is attributable to either hepatitis B up to 30 % or hepatitis C nearing 27 %. Alcohol consumption is another primary significant ground, in about 20 % of the cases. Approximately 3-10 % of individuals with cirrhosis develop a form of liver cancer known as hepatocellular carcinoma. Cirrhosis resulted in 1.2 million deaths in 2013, up from 0.8 million deaths in 1990 out of which alcohol caused 3, 84,000, hepatitis C caused 358,000, and hepatitis B caused 317,000 deaths. In the United States, more men die of cirrhosis than women. Recognized cirrhosis has a 10-year mortality of 34 to 66 %, principally basing on the cause of the cirrhosis. Alcohol abuse is common worldwide, at an estimated lifetime prevalence of 18 percent among adults in the United States. It was estimated that in 2010, alcohol-attributable cirrhosis was responsible for 4, 93,300 deaths which is 1 % of all deaths In the United States. In 2009 The National Institutes of Health estimated that there were more than 31,000 deaths from cirrhosis disease and that alcohol played a vital role in 48 percent out of the said deaths which comes to death rate of 4.5 deaths per 100,000 populations. Globally, 57 % of cirrhosis is attributable to either hepatitis B (30 %) or hepatitis C (27 %). Alcohol consumption is another chief cause for about 20 % of the cases in respect of Alcoholic liver disease (ALD) [16-20]. Alcoholic cirrhosis develops for 10–20 % of individuals who drink overwhelmingly for a decade or more. According to the report of NIAAA, 1993 alcoholic hepatitis [21-22] is characterized by the inflammation of hepatocytes. In between 10 % and 35 % of grave drinkers develop alcoholic hepatitis

Status of fatty liver disease in India:

In India, the prevalence of NAFLD in the general population varies from 10 % to 30 %, the lowest figures being from rural areas of West Bengal and the highest from urban population of Chennai. In the people with metabolic syndrome however, the prevalence is much higher; 15 to 80 % among obese people, 25 to 60 % in patients with dyslipidemia and 33 to 55 % in pre- diabetics and diabetics. Individuals of Asian-Indian origin are at enhanced risk of developing NAFLD as compared with those of Eastern Asian, Caucasian, black, because of higher prevalence of insulin resistance in them. NAFLD can happen at all ages including childhood, but highly prevailed in the persons between 40 to 50 years of age. Subject to certain restrictions, population as well as hospital-based studies from the West revealed that about 10 to 24 % of general population and 57 to 74 % of obese individuals may get NAFLD.

Only a few people with simple fatty liver develop stage 2 called non-alcoholic steatohepatitis (NASH). It is estimated that around 5 to 8 % of the Indian population has NASH. One third of the general population including obese and people with diabetes may build up non-alcoholic fatty liver disease, more than two thirds of people with diabetes develop non-alcoholic fatty liver disease. The risk of NASH is less than 5 % among lean persons, but much more among the obese. The corresponding rates for NASH are 3 to 4 % and 15 to 20 %, respectively in general and obesity people. It is estimated that approximately 5 - 8 % of the Indian population has NASH. 70 % of persons suffering from NASH are found to be obese. The corresponding rates for NASH are 3 to 4 % and 15 to 20 %, respectively in general and obesity people. It is estimated that approximately 5-8 % of the Indian population has NASH. 70 % of persons suffering from NASH are found to be obese. Mechanisms NASH progression [23] is shown in Figure 1.

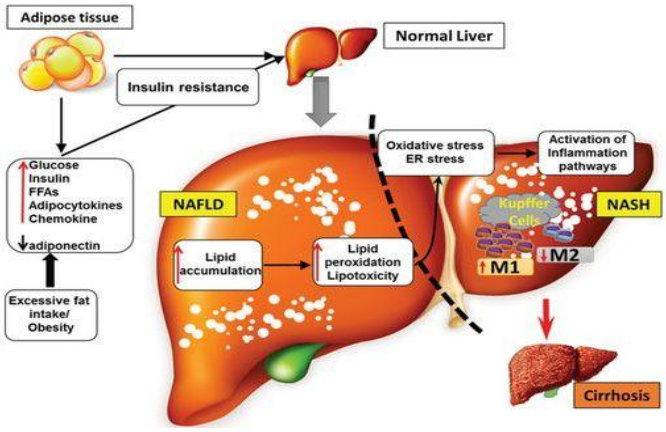

Figure 1: Development mechanisms of NASH progression.

Preliminary studies in India revealed when used the international criteria to define overweight and obese, obesity was found in only 12–30 % of patients with NAFLD disease where as overweight and obesity was over all found in 64 %. Subsequent studies showed these frequencies to be 20 % overweight and 68 % obese. When used the Asia-Pacific criteria, Asians have a high percentage of body fat compared to white Caucasians and blacks despite having lower average BMI. For a particular percentage of body fat, BMI values of Asians including Asian Indians are 3 kg/m^2 lower than those in Caucasians. A study from Delhi demonstrated that about 66 % of men and 88 % of women of India classified as non-obese based on international cut-off according to which it has been specified that the BMI limits for overweight and obesity should be kept lower for Asian Indians. Dyslipidemia is subsisted in roughly 50 % of Indian patients with NAFLD which is a common feature. Both components of metabolic syndrome namely high triglycerides and low HDL were observed being existed in 66 % patients with NAFLD. Even though alcohol is banned in some parts of India namely Manipur and Gujarat states, but it is legally consumed in the majority of states. It is estimated that nearly 62.5 million people in India who at least occasionally drink alcohol. Unlike many western countries the consumption of alcohol in India is eyewitness to a spectacular rise between 1970 and 1995 there was an alarming hike of 106.7 % per individual in the population. India, potentially offers the third by producing 65 % of alcoholic drinks in South-East Asia. A high incidence of abdominal obesity is observed in Asians, including Asian Indians even- though their BMI is less than 25 kg/m. Asians were also intra-abdominal adipose tissue than white Caucasians, despite they have smaller waists. According to present saffola life study report released in September 2015 that in 10 Indian big cities it was identified 74 % females consists of abnormal belly and 84 % ladies have excess body mass index (IBM). Regional Director of world Health Organisation publicized on 29 - 9 - 2015 that 61 % the people lived in cities have been suffering with heart diseases and out of them majority of people are between 30 to 45 years of age.

Toxin - meaning:

Getting rid of existing possible harmful substances causing damage from various parts of the body, or from surrounding environment and from one's consumed diet is known as elimination of toxins. Toxins are basically substances which are presumed to cause physical harm or damage with serious fatal problems to the liver if consumed large amount. Even a petty quantity of a toxic substance like caffeine and alcohol increase in energy levels in the body and if they are continued in large doses it causes sleepiness. If any individual constantly consuming alcohol, caffeine or cacao beans, the blood in the body become saturated with it and levels of the damaging substance shoot-up at elevated levels resulting to death.

Main sources of toxins that affect the body are:

Car traffic, polluted air, antibiotics and drugs, detergents, cosmetics, cigarette smoking, unhealthy foods, chemical fertilisers, essentials of home furnishings, synthetic cloths, cigarette smoking, over stress, misuse of alcohol drinking, too much consumption of coffee or tea.

The liver is the prime filter of the toxins in the body is solely responsible to remove and clean the toxins and waste materials present in the bloodstream and perform the cleaning process. In addition to this the liver also does itself the detoxification function called as detoxing of the liver. Indeed, this detoxifying organ of the body is very important for human beings, as it permits to absorb nutrients from the various foods eaten by the people. The liver itself played the role of secretion and synthesis of bile which is filled with fats and cholesterol that are liable to obstruct constipation. If anybody is diagnosed with damaged liver whether it is mild or modest liver detox is direly necessary for that purpose at least seven days regimen (prescribed system of diet) is required to resume the liver to it's healthy state from damaged condition and resume work efficiently to neutralize toxic substances inside the body as well as the toxins obtained from the outside environment pollution to keep the persons alive healthy.

Other causes are toxins, certain drugs, and inborn metabolic disorders. In many cases, doctors are not exactly confident what causes fatty liver in people who aren't alcoholics. But Obesity, hyperlipidemia (high levels of fats in the blood), diabetes, genetic inheritance, rapid weight loss, side effect of certain medications, including aspirin, steroids, tamoxifen, and tetracycline are the common causes, nutritional grounds like malnutrition, total parenteral nutrition, severe weight loss, receding syndrome, gastric bypass, jejunal diverticulosis with bacterial overgrowth, drugs and toxins such as amiodarone, methotrexate, Diltiazem, expired tetracycline, highly active antiretroviral therapy, glucocorticoids, tamoxifen, environmental hepatotoxins due to mushroom poisoning.

To upkeep the liver healthy and to perform regular various different activities, it is direly needed to detoxify it at all times to keep it in perfect working condition. There are several easy ways and means to do liver detox regularly by eating fruits and vegetables which give nutrition to the liver. Other aiding foods that can be inducted in one's diet to detoxifying the liver are rice cakes, pasta and crackers, beans such as the pinto, green peas and chickpeas, and seeds from sunflower, sesame, and pumpkin. The fruits high in fibre like broccoli and its sprouts, cauliflower, garlic, onions, bell pepper, carrots and other green leafy vegetables, are also mostly useful for cleansing the liver and keeping it healthy. Usually, natural supplements containing certain precise parts of Plants and its products and herbs may be consumed to eliminate toxins but should be used carefully for a recommend period to enable the liver to function normally and to avoid further damage to it. Diet to be improved: Inactive from consuming foods which may give relief from stress or strain on the digestive systems is one sort of means to commence detoxing the liver. Refined sugar is one of the highly processed food which are devoid of healthy nutrients which can be substituted with fruit sugars is the primary thing to start with to avoid energy spikes due to eating sugar. Biscuits, ice-creams, fizzy drinks, sweets, Packaged cakes, chocolate bars, several canned drinks, canned fruits and vegetables and some food sauces are the foods which consists of full of refined sugar. Therefore eating fruits which contain natural fruit sugar known as fructose and full of necessary required vitamins gives enough energy to the body instead of menus prepared with refined sugar. Drinking fresh and clean water at least 8 glasses everyday is highly needed to enable the body to do metabolism and detox function regularly.

The skin is one of the largest organs in the body useful to eliminate toxins, through its pores. Treatment with moisturisers and cleansers drenched with colours, preservatives and chemicals applied to the skin can formulate a big difference with adverse effects. Even soaps packed with mixed perfumes never aid the health condition of the skin. Therefore protecting and treating the skin inevitably with the best available skin care natural products is exceedingly essential. One should bear in mind that dairy, wheat, gluten contains foods and products, sugar, and fried and processed foods are strictly prohibited manly by the fatty liver patients. If anybody possesses even a little bit of belly fat, or if going on to eats lots of carbohydrates, starch, and sugar contained foods, there is every impending possibility to face fatty liver disease.

Types of Fatty Liver disease:

Fatty liver has large amounts of fats known as triglycerides accumulating within the liver cells and excess accumulation such fats within the small hepatocytes swells them up and occasionally the whole liver is enlarged.

Non-alcoholic Fatty Liver:

Non-alcoholic fatty liver (NAFL) develops when the liver has difficulty breaking down fats, which causes a build-up in the liver tissue which is not related to alcohol. NAFL is diagnosed and confirmed when more than 10 percent of fat build up and exist in the liver.

Alcoholic Fatty Liver:

Alcoholic fatty liver is the earliest stage of alcohol-related liver disease with which liver is damaged by heavy drinking and unable to break down fats. If the patients abstain from alcohol, the fatty liver will be disappeared within six weeks of being alcohol-free. However, if excessive alcohol continuously consumed, cirrhosis may develop.

Non-alcoholic Steatohepatitis (NASH):

When the sufficient fat builds up, it will cause the liver to swell. If the authentic cause is not from alcohol, it's called NASH which can make worsen the liver function. Symptoms can be seen with this disease are loss of appetite, nausea, vomiting, abdominal pain, and yellowing of the skin and it is left untreated, NASH can move to advance stage of permanent scarring of the liver and ultimately failed to function partly or fully.

Acute Fatty Liver of Pregnancy:

This is a rare problem of pregnancy that can be life threatening. Symptoms include persistent nausea and vomiting, pain in the upper-right abdomen, jaundice, and general depression. Most women recovered after delivery and have no lasting effects but most common cause is alcoholism.

Symptoms of Fatty liver:

Mild Fatty liver is usually an indication. It can be found by the way during routine tests performed, yet certain people can have symptoms which are often found to be unclear.

- Fullness and heaviness in the abdomen, more in the right upper corner.
- Fatigue due to moderate hard work.
- Depression.
- Often the liver may be painful due to pressure.
- Dissatisfaction or a feeling of severe discomfort, making the person wish for rest.
- Weight loss.
- Nausea and vomiting.
- Loss of appetite.
- Mild to moderate reddish stains just below the external skin layers which grow pale on pressure.
- Accumulation of fluid in the abdomen known as ascites.
- Easy bleeds from small wound.
- Blood doesn't clot adequately soon.
- Shivers of the fingers high to moderate.
- Shaking tremors of the hands known as asteroids.
- Itching in hands and legs gradually crept throughout the body.
- Veins in legs, abdomen, get inflamed and swollen.
- Feeling of giddiness.
- Causes poor memory.
- Poor attentiveness with devoid of thoughts.
- Create mental confusion at the time of emergency which is known as encephalopathy.
- Lacking sexual desire.
- Gastrointestinal (GI) bleeding.
- Yellowish discoloration of skin termed as jaundice.
- Dark colour urine.

Causes of fatty liver disease:

- Being Overweight or obese particularly in the abdominal part.
- Poor diet- high sugar intake, high fat intake.
- Increase cholesterol levels and triglycerides in the blood.
- Suffering from metabolic syndrome.
- Diabetic for over a long period of time and taking medications for the same.

- Fatty liver (FL) is mainly associated with alcohol or metabolic syndrome such as diabetes, hypertension, obesity, dyslipidemia and also owing to many causes. In the body, the sugar turns on a fat-production element in the liver, a process known as lip genesis. Fructose actually rises up the lip genesis response. The high fructose corn syrup found in the processed foods is the single biggest cause of fatty liver**.** Frighteningly, soda is the best source of calories in the diet, which is the immense cause of fatty liver.
- Fatty liver creates a whole cascade of issues. It causes inflammation in the body which creates insulin resistance and pre-diabetes and affects the body to deposit fat not just in the liver but also all around the organs as well as in the belly.
- The hazardous belly fat caused by the sugar and starch in the diet produces even more troubles. It causes to get high quantity of triglycerides and lower the HDL, the good cholesterol. It causes the person to hike the LDL, the dangerous cholesterol elements that lead to heart attacks. The sugar turns on a fat-producing unit in the liver, a process known as lip genesis**.** The high fructose corn syrup found in the processed foods is the sole biggest cause of fatty liver**.**
- Heavy Metals: Heavy metals like lead, zinc, copper, mercury, arsenic and cadmium which are injurious for one's health and can, in excessive doses, prove to be fatal. Sources of heavy metals include fumes of car and cigarettes, industrial waste that is carried into soil and the air and sometimes drinking water.
- There are several chemicals in hair dyes, hair sprays, and make-up and skin products so that the most natural products available need to be used. Using skin products that are high in perfumes and chemicals can block the pores as the skin is a living, breathing safeguard for the entire body.
- It is manifestly observed that year-old boys who have lived on soda which contains toxic substances for years needs liver transplantation due to severe fatty liver problem.

- If a person has a fatty liver, he may face complications like fatty liver, high blood pressure, diabetes, heart disease, and abnormal cholesterol. Fatty liver causes inflammation in the body which creates insulin resistance and pre-diabetes, which causes the body to deposit fat not just in the liver but also all around the organs and in the belly.

Guidelines to be adopted to reverse the condition of fatty liver:

- Reduce the intake of refined carbohydrates in the diet such as white bread, white rice, pasta, biscuits, noodles, cakes, sweets, soft drinks, sweetened fruit juices and sugar and avoid breakfast cereals.
- Increase the amount of fruits and vegetables in the diet.
- Eat whole grains such as brown rice, ragi, bajra, jowar whole wheat products, oats, Pulses and legumes.
- Avoid all sorts of fried and processed foods, all junk and high fat foods.
- Avoid red meats such as mutton, beef, pork and processed meat or cured meats and opt for fat trimmed meats and white meats such as fish, chicken, turkey. Turn over to low or fat free milk products.
- Avoid alcohol.
- Avoid artificial sweeteners since they do not help in the long run.
- Utilise oils which provided monounsaturated fatty acids.
- Control diabetes with diet, medications and exercise.
- Keep the cholesterol levels in check and reduce triglycerides in the blood.
- Exercise daily to reduce weight and to keep it to commensurate with the height .Reduce the abdominal fat all times.
- Always are eating smaller meals.

Risk factors for Fatty Liver:

- Since fatty liver is the form build-up of extra fats in the liver, it can develop more weight if there exists overweight or obese.
- Consuming large quantity of alcohol can damage the liver.
- Use of over-the-counter medication in excess of the recommended doses of certain medications, such as acetaminophen, can enhance the risk of fatty liver.
- Fat gathering in the liver has been linked to insulin resistance, the most common factor of type 2 diabetes.
- Pregnancy.
- High cholesterol.
- High triglyceride levels.
- Malnutrition.
- Metabolic syndrome such as diabetes, hypertension, obesity, and dyslipidemia.

Depending on this classification, fatty liver is divided into 3 subgroups namely.

- Grade 0 denotes no fatty liver.
- Grade 1 indicates mild fatty liver,
- Grade 2 shows moderate fatty liver
- Grade 3 explains severe fatty liver.

Stages of ultrasonographic fatty liver are shown in Figure 2.

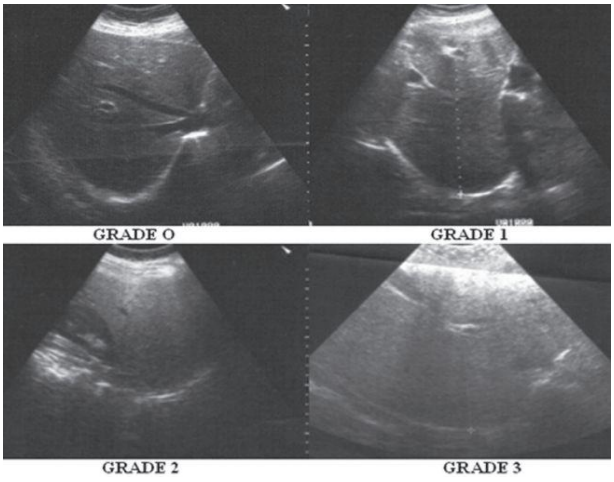

Figure 2. Ultrasonographic fatty liver stages. Grade 0 - no fatty liver, Grade 1- mild fatty liver, Grade 2 - moderate fatty liver, Grade 3 - severe fatty liver.

Stages of NAFLD:

Non-alcoholic fatty liver (NAFL) develops when the liver has complicated to split fats, which causes build-up in the liver tissue. Fatty liver occurs when fatty lipids occupy liver cells enough to exceed 5 % to 10 % of the liver's weight. NAFL is diagnosed when more than 10 percent of fat exist the liver. NAFLD occurs from the American modern diet also known as SAD which ultimately spread to all other nations. Non-alcoholic fatty liver disease (NAFLD) can lead to cirrhosis, liver cancer, and even liver failure. It is linked to metabolic syndrome or diabetes types 1 and 2, implying NAFLD is formed with excessive sugar intake than saturated fats. HFCS known as high fructose corn syrup is a major suspect cause along with trans-fatty acids contained in cheap processed oils. HFCS is found in all kinds of processed foods which is a trouble shooter for the liver since the liver is totally responsible for metabolizing all sorts of foods but the same liver is responsible for metabolizing only 20 percent of glucose consequently excess calories from glucose converted to fat remains predominantly in the liver.

NAFLD is very akin to alcoholic liver disease, but is caused by factors other than drinking too much alcohol. The four different stages in it are

Stage 1: Steatosis (simple fatty liver):

In Steatosis there exists excess fat in the liver but usually no symptoms to appear. This is where excess fat builds up in the liver cells, but is considered harmless. The patient may not aware that he has it until an ultrasound scan test is done. Usually the fatty liver disease is often not identified until a later stage is reached.

Stage 2: Non-alcoholic steatohepatitis (NASH):

Only a few people with simple fatty liver leads to develop stage 2 conditions, known as non-alcoholic steatohepatitis (NASH). It occurs if the liver becomes damaged causing to become inflamed. It is a more severe state of the condition, when the liver has become inflamed where in cells in the liver are being damaged and some liver cells died. Symptoms like pain in the top right of the abdomen may be felt at this stage. A person with NASH may have a dull or aching pain in the top right of their abdomen over the lower right side of the ribs. Routine blood tests alone do not help to identify one has simple steatosis or NASH, so special tests are needed. The risk of NASH is less than 5 % among lean persons where as the risk is much more among the obese. This disease can impair liver function. Symptoms can be seen with this disease, such as loss of appetite, nausea, vomiting, abdominal pain, and yellowing of the skin. If left untreated, NASH can progress to permanent scarring of the liver and eventually lead to liver failure.

Some common causes of NASH are: Apart from alcohol, diabetes, high blood pressure known as hypertension[24-25], high blood cholesterol, Pregnancy, glycogen storage disease, congenital disorders like wolman's disease which affects copper levels, weber-christian disease affecting nutrient absorption, galactosemia which is a disorder affecting the way milk is metabolized in the body, infections like tuberculosis and malaria.

Nutritional causes:

Severe mal-nutrition, obesity, sudden rapid weight loss, surgeries performed to reduce obesity - gastric bypass surgery, jejuno-ileal bypass, etc.

Drugs:

Corticosteroids, valproic acids which are used in epileptic patients, medications for heart ailments like irregular heartbeats and high blood pressures e.g. amiodarone; diltiazem, sedatives, tamoxifen used in treating breast cancer, methotrexate, anti-retroviral drugs (indinavir), overdose of vitamin A, in certain severe cases, amiodarone and methotexate can cause cirrhosis.

Other causes:

Toxins from food stuffs, rotten peanuts, aflatoxins are extremely toxic, mushroom poisonings, phosphorus from environment.

Stage 3: Fibrosis:

Fibrosis develops when existence of chronic inflammation in the liver results in the generation of fibrous scar tissue around the liver cells and blood vessels. This fibrous tissue replaces some of the healthy liver tissues, yet the remaining enough healthy tissues enable the liver to function normally. Even with fibrosis the liver may still be able to function normally but its ability to function will decline if fibrosis continues to develop.

Stage 4: Cirrhosis:

Cirrhosis happens when normal liver tissues are replaced by fibrosis to the extent that the structure and function of the liver is affected and can lead to liver failure [26]. This is the most rigorous stage, where groups of scar tissue and clusters of liver cells develop. The liver shrinks and becomes swelling known as cirrhosis. Cirrhosis tends to occur after the age of 50-60, following many years of liver inflammation associated with the early stages of the disease. However, this can happen much earlier in some people. The damage caused by cirrhosis is perpetual and can't be reversed. Cirrhosis progresses little by little over a period of years, slowly making the liver to stop functioning. NAFLD can also lead to primary liver cancer known as hepatocellular carcinoma then the only available treatment is liver transplantation for Cirrhosis of the liver. Cirrhosis progresses slowly, over a period of years, making the liver to stop functioning. People who have type 2 diabetes [27] are at the greater chance of developing cirrhosis of the liver due to existence of NAFLD. If this disease is detected early and treated appropriately, the later stages of NAFLD can be averted.

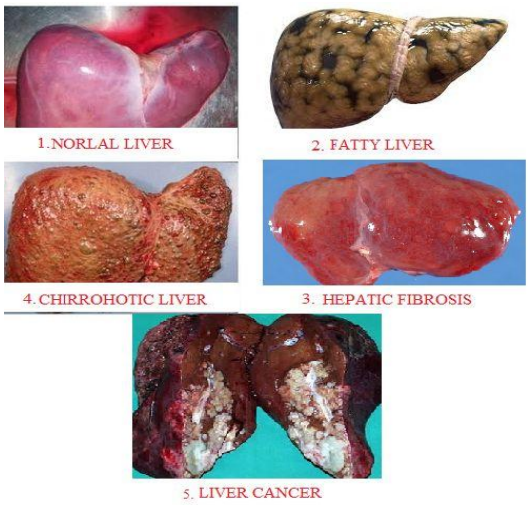

Figure 2: Normal liver, fatty liver, Chirrohothic liver, hepatic fibrosis and liver cancer.

Causes Cirrhosis and Liver Failure:

Chronic Viral infections of liver, hepatitis B or C[28] blockage of Bile duct, autoimmune liver diseases, measles virus in some cases , urinary tract infection , alcohol consumption and smoking, complications of fatty liver disease, abnormal iron or copper absorption, cystic fibrosis, accidental injury in liver. Causes of liver failure are shown in Figure 3.

Symptoms of Cirrhosis & Liver Failure:

Nausea, fatigue, loss of appetite, mental impairment, pain in the stomach and discomfort, nose or oesophagus bleeding, yellowish skin, infections, fluid collection in stomach & legs, spider veins or varicose veins, internal bleeding, liver cancer, brain damage and kidney failure.

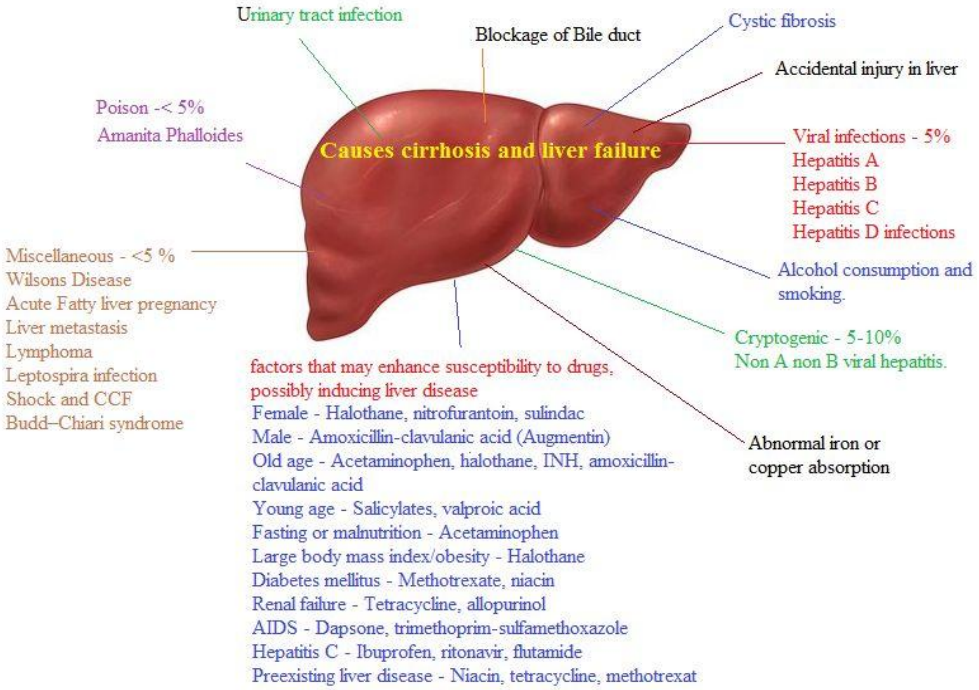

Figure 3: Causes of liver failure.

Findings of cirrhosis:

1. Thrombocytopenia :

Typically multifactorial. Due to alcoholic marrow suppression, sepsis, lack of folate, sequestering in the spleen as well as decreased thrombopoietin. This seldom results in platelet count more than 50 000/μL.

2. Aminotransferases:

- AST and ALT are moderately elevated, with AST > ALT. However, normal aminotransferases do not preclude cirrhosis.
- Alkaline phosphatise is slightly elevated but less than 2 to 3 times the upper limit of normal.
- Gamma-glutamyl transferase correlates with AP levels. Typically much higher in chronic liver disease from alcohol.
- Bilirubin levels are normal when compensated but may elevate as cirrhosis progresses.
- Albumin levels fell as the synthetic function of the liver declines with worsening cirrhosis since albumin is exclusively synthesized in the liver.
- Prothrombin time increases since the liver synthesizes clotting factors.
- Globulins increased due to shunting of bacterial antigens away from the liver to lymphoid tissue.
- Serum sodium: Hyponatremia due to inability to excrete free water resulting from high levels of ADH and aldosterone.
- Leucopoenia and neutropenia due to splenomegaly with splenic margination.
- Coagulation defects: The liver produces most of the coagulation factors and thus coagulopathy correlates with worsening liver disease.

Chronic hepatitis B:

The hepatitis B virus causes liver inflammation and injury that over several decades can lead to cirrhosis. Hepatitis D is dependent on the presence of hepatitis B and accelerates cirrhosis in co-infection. Chronic hepatitis C: Infection with the hepatitis C virus causes inflammation of the liver and a variable grade of damage to the organ. Over several decades this inflammation and grade change can lead to cirrhosis. Cirrhosis caused by hepatitis C and alcoholic liver disease are the most common reasons for liver transplantation. Autoimmune hepatitis [29] which is caused by the immunologic damage to the liver causing inflammation and eventually scarring and cirrhosis. Cirrhosis due to autoimmune hepatitis still has 10-year survival.

Primary biliary cirrhosis:

Damage of the bile ducts leading to secondary liver damage. It may be asymptomatic or complain of fatigue, pruritus, and non-jaundice skin hyper pigmentation with hepatomegaly which is more common in women.

Indian childhood cirrhosis:

It is a form of neonatal cholestasis characterised by deposition of copper in the liver. Cardiac cirrhosis **d**ue to chronic right side heart failure leads to liver congestion.

Primary sclerosing cholangitis:

PSC is a progressive cholestatic disorder existing with pruritus, steatorrhea, fat-soluble vitamin deficiencies, and metabolic bone disease. There is a strong association with inflammatory bowel disease (IBD), especially ulcerative colitis. Hereditary hemochromatosis: It usually exists with family history of cirrhosis, skin hyper pigmentation, diabetes mellitus, pseudo gout, and/or cardiomyopathy, all due to signs of overload of iron. Wilson's disease: It is autosomal recessive disorder characterized by low serum ceruloplasmin and enhanced hepatic copper content on liver biopsy, and elevated 24 hour urine copper and such condition affects 1 in 30,000 people.

Cirrhosis is diagnosed with a variety of elastography techniques. Because a cirrhotic liver is generally stiffer than a healthy one, imaging the liver's stiffness can show diagnostic information about the location and harshness of cirrhosis. Techniques used include transient elastography, acoustic radiation force impulse imaging, supersonic shear imaging and magnetic resonance elastography. When compared to biopsy, elastography can test a much larger area and is painless. It shows logical correlation with the severity of cirrhosis. Other tests performed in meticulous circumstances include abdominal CT and liver/bile duct MRI (MRCP). Gastro copy is meant for endoscopic examination of the oesophagus, stomach, and duodenum in patients with established cirrhosis to rule out the possibility of oesophageal varices. If these are found, prophylactic local therapy of sclerotherapy or banding may be applied duly commencing the beta blocker treatment. In a routine manner ultrasound is used in the evaluation of cirrhosis which clearly shows even a small and nodular liver in advanced cirrhosis along with increased echogenicity with irregular appearing areas. Some other findings of cirrhosis in imaging are an enlarged caudate lobe, widening of the liver fissures and enlargement of the spleen. An enlarged spleen (splenomegaly), which normally measures less than 11 to 12 cm in adults, indicates the symptoms of cirrhosis with portal hypertension in the right clinical setting. Ultrasound may also screened for hepatocellular carcinoma, portal hypertension, and Budd-Chiari syndrompotme by assessing flow in the hepatic vein.

Alcohol and the liver:

Drinking a large amount of alcohol, even for only a few days, can lead to a build-up of fats in the liver which is called alcoholic fatty liver disease, and it's the first stage of ARLD. It does not usually cause any symptoms until the liver has been severely damaged. When this happens, symptoms include. Feeling sick, Weight loss and loss of appetite, Yellowing of the eyes and skin indicates jaundice, Swelling in the ankles and tummy, Confusion or drowsiness, Vomiting blood or passing blood in your stools. The liver is very resilient and is capable of regenerating itself. Each time the liver filters alcohol, but some of the liver cells die. The liver can develop new cells, but prolonged alcohol misuse over many years can reduce the liver's ability to regenerate, resulting in serious damage to the liver.

There are 3 Stages of alcohol-related liver disease.

1. Alcoholic fatty liver disease:

Alcoholic liver disease [30] is a term that encompasses the liver manifestations overconsumption and continuous intake of large amounts of alcohol including fatty liver, alcoholic hepatitis, and chronic hepatitis with liver fibrosis or cirrhosis can have serious harmful effects on the liver. Although steatosis known as fatty liver will develop in any individual who consumes a large quantity of alcoholic beverages over a lengthy period of time, but this process is temporary and reversible. Alcohol-related liver disease can be decided basing on the persons alcohol abuse, laboratory or radiologic abnormalities or medical conditions connected with alcohol consumption. Blood tests and a liver biopsy are needed to diagnose liver diseases. The liver is the only organ, which is known to have the power of regeneration, even if half the organ is damaged, it still functions properly. The liver undergoes fatty changes gradually in the initial stages after which scarring of tissues occurs, and ultimately leads to cirrhosis, which is the last stage of the disease. The liver is damaged by heavy drinking and unable to break down fats and if the patient abstains from alcohol, the fatty liver will depart within six weeks becomes alcohol-free and the fat will disappear. Among chronically habituated heavy drinkers, only 15-20 % develops hepatitis or cirrhosis, which occurs successively. How alcohol damages the liver is not completely understood. 80 % of alcohol passes through the liver to be detoxified. Chronic consumption of alcohol results in the secretion of pro-inflammatory factors cause inflammation, eventually lead to fibrosis in liver cells. Acute alcoholic hepatitis is generally considered a contraindication which necessitates to undergo liver transplantation. Alcoholic cirrhosis has been the second leading sign for liver transplantation in the United States.

Recent research illustrates the pivotal role of the stellate cell, normally stores vitamin A, which causes development of cirrhosis. Damage to the hepatic parenchyma due to inflammation leads to activation of the stellate cell, which amplifies fibrosis by producing of myofibroblasts and obstructs blood flow in the circulation. Moreover it secretes TGF-β_1, which leads to a fibrotic response and increase of connective tissue. More than that it secretes TIMP 1 and 2, naturally occurring inhibitors of matrix metalloproteinase's, which prevents them from breaking down fibrotic material in the extracellular matrix. The fibrous tissue bands known as septa separate hepatocyte nodules, which eventually replace the entire liver structural design, leading to decreased blood flow throughout. The spleen becomes congested, which leads to hypersplenism and increased sequestration of platelets. Portal hypertension is responsible for most severe complications of cirrhosis.

Fatty liver disease rarely causes any symptoms but always drinking alcohol deposits fat in the liver which causes severe harmful to the health is the first stage of ARLD. Fatty liver disease is reversible if drinking alcohol is stopped for two weeks; the liver resumes its normal healthy status.

Alcoholic hepatitis:

Alcoholic hepatitis (not related to infectious hepatitis) is often the second, more serious stage of ARLD. It occurs when alcohol misuse over a longer period causes the tissues of the liver to become inflamed. The liver damage associated with mild alcoholic hepatitis is usually reversible if drinking is stopped permanently. Severe alcoholic hepatitis, however, is a serious and life-threatening ailment.

Alcoholic Cirrhosis:

Cirrhosis is the final stage of alcohol-related liver disease, which occurs when the liver becomes significantly scarred. The pathological distinctive feature of cirrhosis is the development of scar tissue that replaces normal parenchyma. This scar tissue blocks the portal flow of blood through the organ therefore disturbing normal function. Cirrhosis is generally not reversible, but stopping drinking alcohol immediately can prevent further damage and significantly life span can be increased. Especially in the later stages, people with cirrhosis experience significant symptoms such as abdominal swelling, itching, leg enema, and chronic abdominal pain which may be treated with soothing care which provide patients with relief from the symptoms, pain, and stress of a serious illness.

Complications of alcohol-related liver disease:

- Bleeding from veins in the oesophagus or stomach.
- Enlarged spleen.
- Brain disorders and coma.
- Kidney failure.
- Liver cancer.
- Complications relating to Multi-organ non-liver conditions.

Risk factors involved in the ALD:

- Consumption of 60-80 g per day (about 75 to 100 mL/day) for 20 years or more in men, or 20 g/day (about 25 mL/day) for women significantly increases the risk of hepatitis and fibrosis by 7 to 47 %.
- Drinking outside of meal times increases up to 3 times the risk of alcoholic liver disease.
- Women are twice as vulnerable to alcohol-related liver disease, and may develop alcoholic liver disease with shorter durations and doses of continual consumption. The lesser amount of alcohol dehydrogenise secreted in the gut, higher proportion of body fat in the women, and changes in fat absorption due to the menstrual cycle.
- Genetic factors influence both to alcoholism and to alcoholic liver disease. Both monozygotic twins are more likely to be alcoholics and to develop liver cirrhosis than both dizygotic twins.
- Mainly, vitamin A and E deficiencies can worsen alcohol-induced liver damage by preventing regeneration of hepatocytes.

Diet in alcoholic liver disease:

The dietary recommendations are purely depend on the stage of the disease. The diet should be protein and calories rich so that the regeneration process is quicker. In advanced cirrhosis, it is advisable intake of foods that are moderate or low in proteins. In alcoholic liver disease, the person often has severe nutritional deficiency and malnourishment so that it is very essential to provide all the vitamins, nutrients, and minerals for fast recovery and to prevent the harmful effects of alcohol on the metabolism. When the organ is affected, the amount of bile produced by the liver is not sufficient enough for the digestion of a high fat diet. Alcohol interferes with fatty acid metabolism, which leads to fat deposition in the liver. Hence, a low fat diet, rich in omega-3 fatty acids and less triglycerides, can decrease the severity of this disease.

People with alcoholic liver diseases get tired very without difficulty as their scarred liver has less or no space for glycogen storage; hence, small and frequent meals are required to replenish the glycogen reserves. The end stages like fibrosis and cirrhosis tend to be irreversible, but can improve with abstinence of alcohol for a longer duration of time, thereby life span can be prolonged. At present there is no specific medical treatment for ALD. The main treatment is to stop drinking at least for the rest of the life which may prevent further damage to the liver and can allow the liver to repair itself in early stages of disease. Life-threatening complications like internal (variceal) bleeding, a build-up of toxins in the brain (encephalopathy), fluid accumulation in the abdomen (ascites) with associated kidney failure and also liver cancer likely to occur. Foods to be eaten while on a liver-disease diet: A liver-disease diet provides the right amount of calories, nutrients, and liquids and help the patient's liver to work better and prevent other health problems. Eating a variety of foods each day is inevitable to help the liver work as well as possible, and to keep a healthy weight. Eat several small meals throughout the day instead of large meals and ensure enough calories and the right amount of protein each day as per the advice of dietitian. Many people who suffer from liver disease might have problems with digestion and if fat is consumed by them, it cannot be broken down resulting loss of bowel movements. If such problem persists eat less fat or special type of fat that is absorbed more easily by the body. Liver disease may cause blood sugar levels to be too high or too low in some people. Eating fixed amount of carbohydrates at each and every meal can keep the blood sugar levels in control.

Giving absolute rest from foods which may relieve stress and strain on the digestive systems is one way to commence detoxing the liver. Substituting refined sugar for fruit sugars to be started as the refined sugar can cause energy spikes and crashes. Rich refined sugar foods include packaged cakes, biscuits, sweets, ice-creams, fizzy drinks, chocolate bars, sweets, many canned drinks, canned fruits and vegetables and certain food sauces. Eating fruits constitute natural fruit sugar called fructose and rich vitamins provide enough energy to the body. The fatty liver diet should be 80 % to 100 % organic raw (living foods) diet like organic fruits, vegetables that are green, yellow, orange, red and purple, sprouted grains, legumes, seeds, nuts and as well as fermented foods and drinks. Fermented foods contain living microbes of bacteria which helps to digest and assimilate nutrients and support the overall health of the immune system. Seafood meat is ok including cod, salmon, trout, pickerel, mackerel, tuna, shark, but should be kept to low or completely eliminated from the diet. The liver cleanses diet helps to

- Increased vitality.
- Lessen disease symptoms.
- Improve liver function.
- Gives the liver rest to heal.
- Weight loss.
- Eliminate skin problems.

Dietary regime tips for successful liver cleanse and good liver health:

- Eat liver aid snacks like carrot sticks, fresh apple slices or a similar snack. Drink plenty of water to flush out the toxins from the liver.
- Eat high fibber diet which acts as a cleaner for the digestive system and enable the feeling of fullness. A low fat diet with plenty of olive oil will help heal the fatty liver.
- Add plenty of fruit, vegetables, nuts, and seeds. Add lean animal protein like chicken and fish. Add good oils like olive oil, macadamia nut oil, avocados, and fish oil which contain good fats provide anti-inflammatory, and they assist to repair the liver.
- Proper prescribed exercises enhance the metabolism which can improve insulin resistance and reduce fatty liver.
- Herbs like Milk Thistle, Live-52, lipoic Acid, a powerful antioxidant, and N-Acetyl-l-Cysteine, B vitamins and magnesium will help the liver to repair and heal.
- Eat detoxifying liver-repairing super foods like broccoli, Kale, collards, cabbage, Brussels sprouts, broccoli, arugula, radish all wonderful foods that help repair and heal the liver from fat. Garlic and onions, also, are full of sulfur, are great detoxifier.
- Stick on to skimmed milk, whole grain toast with a bit of non-hydrogenated margarine, oats or oat cereal and fresh citrus juices. Have fresh fruit such as a banana or grapefruit. Snacks such as Salt-free nuts, carrot sticks, celery with natural peanut butter, fresh fruit, are mostly preferable. Eating both in moderation and in smaller serving sizes give some relief to the liver and help to reduce weight of the body.
- Eat more vegetables, protein and the right fats. Raw vegetables and fruits are the most powerful liver healing foods and help to cleanse and repair the liver, so that it can trap and remove more fat and toxins from the bloodstream. Eat enough of vegetables in the form of cooked and raw salads and fresh fruits.
- Protein is important because it helps to keep the blood sugar level stable, helps with weight loss from the abdomen and reduces hunger and cravings. Good sources of protein include eggs, poultry, seafood, meat, nuts, seeds, legumes and plain or Greek yogurt and cheeses.
- Healthy fats are found in olive oil, oily fish, coconut oil, flaxseeds, hemp seeds, chia seeds and raw nuts and seeds.
- Raw vegetable juices should be consumed 2 to 3 times a week and 250 mL to 300 mL (8 to 10 ounces) is adequate which should be comprised of 90 to 95 percent vegetables, with the remainder consists of fruits if desired to improve the flavour. Citrus fruits are the healthiest for the liver**.**
- Eliminate completely all that high fructose corn syrup from the diet without any exception. Vitamins and C both antioxidants may help to promote liver health. In a 2005 study, scientists discovered that taking supplements of vitamins E and C aid to lower the levels of enzymes that are elevated in the fatty liver disease. A traditional remedy for liver problems, milk thistle an herbal medicine may boost the production of enzymes that help the liver to eliminate toxins. Drinking lemon juice mixes in water or lemon tea once a day which stimulates the liver's bile production to help push toxins out and prevents from forming gallstones and promotes digestion and liver function in the movement of gastric juices. Drinking at least 4 litres of fresh clean water every day which allow the liver to filter out more toxins and residue, letting it work faster and increasing the energy level. Green tea is rich in catechins, a type of plant antioxidant that boosts liver function and helps reduce fat storage in the liver.
- Grapefruit is rich in vitamin C and antioxidants, both of which promote healthy liver cleanse. It boosts detoxification enzymes in the liver and has flavonoid compound known as naringenin which causes the liver to burn fat rather than store it.
- Walnuts have high levels of l-argentine (an amino acid) glutathione, and omega-3 fatty acids which help to cleanse the liver of disease causing ammonia.
- Certain vegetables contain nutrients like beta carotene that stimulate liver cells and protect the liver from toxins. Dark, leafy greens like spinach encourage cell growth and stimulate the liver, while beets protect bile ducts in the liver from toxin damage. Greens that promote liver health include dandelion greens, bitter gourd, arugula, mustard greens, chicory and spinach.
- Garlic has sulphur-containing compounds that activate liver enzymes that work to flush out any toxins that might be in the system. Allicin and selenium, two nutrients in the garlic protect the liver from damages caused by toxins. And also aid in the detoxification process.
- Adding turmeric to the diet boosts the liver’s ability to produce bile, a key part of the liver-cleansing process. It has also been known to help regenerate damaged liver cells.
- Alcohol and caffeine are the major culprits that deposit toxins in the liver and keep away from proper functioning of the liver. Clean the liver by reducing intake of alcohol and caffeinated beverages.
- Magnesium promotes bile production, which in turn promotes the cleansing of the liver. Magnesium supplements increase liver health. Another way to get magnesium is by dissolving a tablespoon of Epsom salt in warm water and drinking this mixture once or twice a month. Epsom salt contains a high amount of magnesium.
- Consider anti-stress activities like yoga and meditation since the Stressful situations release hormones and endorphins in the bloodstream, which, in turn, deposit toxins in the liver. So eliminate stress in any areas of the body duly practicing anti-stress activities like yoga and meditation which yield optimum results.
- Exercises can help to maintain a healthy body weight, which in turn lowers the risk of fatty liver disease and also improves the function of liver enzymes.
- Eating liver cleansing foods is the best way to prepare for the liver flush to keep health and longevity.

List of foods to eat in the liver cleansing diet:

Fruits and vegetables:

Fresh raw vegetable juice, soon after completion of exercise shall be taken. Drink fresh juice every day during the course of the liver cleansing diet. Freezer juice should be drunk after it defrosting to avoid damage of antioxidants and enzymes. Seasonal fresh fruits and well dried fruit should be eaten according to suitability of the system of the body.

Vegetables:

Vegetables containing phytochemicals such as carrots, red radish, kale, pumpkins, beets, vegetables, garlic, onions, leeks, horseradish, cabbage, brussels sprouts, broccoli, cauliflower and bell peppers. Dark green colour vegetables and grasses such as alfalfa, wheat grass, raw vegetables and fruit, scrupulously dark green leafy vegetables, ripped oranges and red-colour fruits and at least 40 % of vegetables diet along with food every day.

Unsweetened cereals:

Gluten free whole wheat, brown rice or wild rice, buckwheat, rye, stone ground, rice, corn, herb and olive, walnut, gluten free bread whole grain pasta spelt, kamet, or buckwheat, Whole wheat or gluten-free flour.

Proteins:

Legumes such as beans, peas, lentils including soy products such as tofu, soy bean burgers, soymilk, yogurt, sprouted legumes, seeds and nuts including coconut cream, sprouted seeds and fresh nuts should be eaten.

Fats:

Omega-6 essential fatty acids including sunflower seeds and oil, cold pressed sesame, safflower, cotton, corn and corn oil, leafy greens, soybeans, raw nuts, legumes.

Omega-3 fatty acids:

These are essential fatty acids including fresh fish from cold, deep oceans; rainbow trout; bass; linseed oil; shrimp; oysters; leafy greens; soy beans; walnuts; wheat germ; wheat sprouts; fresh sea vegetables**.** Cold-pressed virgin olive oil and Cold-pressed sesame oil Unsweetened soy, almond.

Condiments:

Dry mustard powder**,** Soy sauce, Honey**,** Spices**,** Baking soda and Apple cider vinegar can be taken to the extent of need.

Sweets:

Always consume fresh raw fruits, clean dried fruits. If the metabolism is slow-moving, limit to raw fruits and raw juices for breakfast. Always take a raw vegetable salad at dinner to improve digestion. Drink at least 10 glasses of clean and fresh water every day. Don't drink large amounts of fluid with meals. Nutritional guidelines for NASH. Table 1 shows the proposed nutritional guidelines for NASH.

Table 1: Proposed nutritional guidelines for NASH.

Weight loss	10 % of initial body weight over six months. Maintenance of weight loss. Bariatric surgery when individuals qualify.
Calorie intake	1,200 to 1,500 daily. Energy deficit of 500 kcal/day based on Mifflin-St Jeor formula.
Total fat	≤ 35 % of total calories.
Mono unsaturated fatty acids	15 % to 25 % of total calories.
Poly unsaturated fatty acids	5 % to 10 % of total calories.Omega-3 fatty acids.
Saturated fatty acids	7 % to 10 % of total calories.
Carbohydrate	50 % of total calories. > 50 % carbohydrate sources from whole grains. Avoid high-fructose corn syrup. Added sugars < 10 % of total calories.
Protein	15 % of total calories. Lean and vegetable protein.
Antioxidants	None
Physical activity	≥ 150 minutes/week at moderate intensity or ≥ 75 minutes/week at vigorous intensity. Cardiovascular exercise five times weekly. Resistance training two or more times weekly. Decrease time spent.

Foods to be avoided or reduced:

Depending on the category of liver disease and other health problems foods to be discarded are

- There is dire need to curtail the amount of salt in the diet as it causes to hold liquids leading to swelling in the body so that totally avoid high sodium containing foods like, bacon, sausage, and deli meats, Packaged snack foods like potato chips and pretzels, soy, barbecue, and teriyaki sauces, soups, canned vegetables and vegetable juice, frozen dinners, and table salt.
- If there is any swelling in the body, liquid taking to be reduced to the possible extent.
- Abstain from all fatty meats from the diet while adopting a liver flushing diet and while doing for liver gallbladder flush.
- Keep away from all deep fried foods, sugar, alcohol junk food, foods with preservatives, hormones, muffins, cookies, donuts, artificial flavours, smoking, coffee, etc.
- Eat apples, apple juice and or apple cider vinegar since apples contain malic acid an active ingredient that can breakdown and dissolve liver stones and gallstones.
- A high intake of carbohydrate rich foods more than body's requirement can support fatty liver, as the liver converts any excess amount of carbohydrate into fat. Yet, foods that shall be restricted are cakes, pastry, donuts, biscuits, fries, chips, pretzel breads, pasta, rice, breakfast cereals, any other snack foods available in shops containing salt and recooked oils and any food prepared with flour.

Confirmation of diagnosis:

The following are the Normal range levels of blood counts. Based on these counts various categories of liver diseases are diagnosed and conformed,

- Cholesterol - mg/dL (125 - 200).
- Triglycerides - mg/dL (40 – 150).
- HDL cholesterol (high density lipoprotein i.e., good cholesterol) - mg/dL (30 – 70).
- LDL cholesterol (low density lipoprotein i.e., bad cholesterol) - mg/dL (80 – 130).
- VLDL cholesterol (very low density lipoprotein) - mg/dL (5 – 40).
- TC/ HDL (total cholesterol/ high density lipoprotein) – (3 - 5).
- LDL/HDL ratio - (1.5 - 3.5).
- Bilirubin total – (mg/dL < 1.2).
- Bilirubin directs – (mg/dL < 0.3).
- Bilirubin indirect - mg/dL (0.1 - 1.0).
- SGOT (Serum Glutamic Oxalocetic Transaminase (SGOT) or AST - u/l i.e., units/ Litre) (6 - 38).
- SGPT- (serum glutamic pyruvic transaminase (SGPT) or ALT - u/l (8 – 45).
- Alkaline phosphatase - u/l. (53 - 141).
- Total protein - gm/dL (6.0 - 8.0).
- Albumin - serum -gm/dL (3.7 - 4.50).
- Globulin - serum -gm/dL (2.3 - 3.5).
- A/G (albumin to globulin ratio) - (3:1).

(< Indicates less than and > denotes higher than).

- Unusual levels of liver enzymes in the blood evidently show a proper understanding of the genuine cause of fatty liver.
- Tissue examination with biopsy is the only widely accepted test to distinguish NASH from other forms of liver disease. This test also provides close observation for usefulness treatment properly as the liver biopsy confirms the quantity of unwarranted fat in the liver.
- Ultrasound (Ultrasonography): A painless, non-invasive test, which can be able to identify precisely the stage of fatty liver. The liver size can be measured and this test can be valuable in grading the stage of improvement. Ultrasound is routinely used in the evaluation of cirrhosis. It can show even a small and nodular liver in advanced cirrhosis along with increased echogenicity with irregular areas.
- Computed Tomography scan (CT scan): non-invasive. Measures internal organs accurately and in detail with X-rays.
- MRI: Also non-invasive. In this radio waves are used in a magnetic field to scan the structures of internal organs.
- Blood tests (serology) are usually used to detect accurately viral hepatitis A, B, C and herpes viruses like EBV or CMV, rubella, and autoimmune related diseases.

Hypothyroidism is more prevalent in NASH patients which would be identified and determined with the TSH Albumin– somewhat low, globulin usually elevated, cholesterol usually elevated, total bilirubin elevated, Alkaline phosphatise elevated, transaminase elevated, prothrombin possibly prolonged, other findings may include anaemia, leucocytosis, raised white blood cells count, albuminuria, hyperglycemia or hypoglycemia, and deficiency of iron, folic acid, and vitamin B_{12}.

SGOT and SGPT count in blood:

Liver function tests are one of the important blood tests that are performed on a regular basis to assess the function of the liver or injury caused to the liver. With these tests liver damage is detected initially by performing a simple blood test that decides the level of various liver enzymes present in the blood. Two aminotransferases namely the alanine aminotransferase (ALT or SGPT) and aspartate amino transferase (AST or SGOT) a major constituent of the liver cells are the most widely used liver enzymes for proper test and checking that are sensitive to abnormalities in liver. If these liver cells get spoiled or injured, these enzymes ooze into the blood stream, raising their blood levels as a result blood levels of SGOT and SGPT signifies liver disease or injury.

SGOT is by and large present in a number of tissues such as heart, liver, kidney, brain and muscles. It is released into the blood stream whenever any of these tissues gets damaged. If blood AST level is increased due to muscle injury and heart attacks. Therefore it is not definite indicator of liver tissue damage as it can be raised in other conditions except liver damage.

B h Management:

The treatment of fatty liver depends on its grounds, and, in general, treating the causes will reverse the process of steatosis if executed at an early stage. Two well known causes of fatty liver disease are too much consumption of alcohol and a continued diet of foods with high proportion calories obtained from lipids. Treatment for non-alcoholic fatty liver disease include lifestyle changes l weight loss, exercise, fat free diet, medications, supplements like antioxidants, omega -3- fatty acids, surgery, and liver transplant.

Almost 2/3^{rds} of people with type -2 diabetes may have fatty liver, and that the disease might follow a more aggressive course for diabetes patients. It is not yet clear what causes the non-alcoholic form of fatty liver disease, but several associations examined that most of the people who develop non-alcoholic fatty liver disease are obese or have type 2 diabetes or insulin resistance. No pharmacological treatment has so far been approved as on 2015 for this disease. Various intensive studies proposed that diet, exercise, and antiglycemic drugs abstain of alcohol may modify the course of the disease.

While many treatments appear to improve biochemical indicators such as alanine transaminase levels, most of them have not been shown to reverse histological abnormalities or reduce clinical end points. Nutritional counselling: Proper changes diet has shown significant histological improvement. Specifically, avoiding food containing high-fructose corn syrup and trans-fats is quite essential.

Gradual weight loss may improve the process in obese patients where as quick loss may worsen NAFLD. Walking or some form of aerobic exercise at least 30 – 45 minutes daily is most helpful. At the Annual Meeting of the American Association on Liver Diseases (AASLD) presented a recent meta-analysis according to which that weight-loss surgery leads to improvement and or resolution of NASH in about 80 % of patients. In certain studies insulin sensitizers like metformin and thiazolidinediones have shown effectiveness. Ursodeoxycholic acid and lipid-lowering drugs have little benefit. Statins improves in liver biochemistry and histology in patients with NAFLD for which studies were carried out on a relatively small group of patients. Statins have also been suggested for utilizing in treating dyslipidemia for patients with NAFLD.

The two basic conditions under which fatty change, also known as steatosis. Excess of fat is brought to the liver beyond its capacity to metabolize which is called fatty infiltration. The liver cell is damaged so that it cannot metabolize the normal or increased quantities of fat brought to it called as fatty degeneration. Conditions of excess fat: Hyperlipidemia. Includes Diabetes mellitus, obesity, congenital hyperlipidemia.

Protein-calorie malnutrition also known as Kwashiorkor implies lack of proteins in the diet or eating of proteins of poor quality or intake of disproportionate protein quantity. The lack of protein leads to the deficiency of amino acids that are needed by the liver for the conversion of fat to phospholipids, lipoproteins and to carry fat or cholesterol from the cells by apoproteins. Similar fatty change appears in the liver cells in the presence of toxins or poisons that prevent protein synthesis, such agents like CCI, tetracycline, phosphorus**.** Drugs and chemicals lead to fatty change by interfering with enzyme activity in the liver cell. Aspirin used for the children to relive from fever has been held responsible for the fatty change. Anoxic or hypoxic conditions like severe anaemia and congestive cardiac failure are usually accompanied by fatty change. Want for oxygen prevents the oxidation of the FFA. Since the hypoxia is felt most in the central zones of the lobules consequently the fatty change is also optimum in the central zones. In diabetes mellitus and obesity a person there is gross excess of fat coming to the liver and accumulates in the cells.

Treatment of fatty liver:

Treatment of fatty liver is essentially helpful to rectify the fundamental conditions or eradicating its entire causes. For instance, when fatty liver occurs from parenterals nutrition, decreasing the rate of carbohydrate combination may correct the disease. In alcoholic fatty liver, abstinence from alcohol and proper suggested diet can begin to correct liver ailment within 4 to 8 weeks which requires complete instruction to the patient.

Provision of Special care and support to the patient:

Suggest counselling for the alcoholic patient and provide affective support for his family to be accomplished. Diabetic patients must be thought about appropriate care about the use of insulin injections, diet, and exercise and ensure to attend group classes whenever necessary, to encourage for proper treatment and medical supervision to record any changes occurred in his health. Patients with obese should be warned against fad diets, and convince them to attend regularly to medical checkups whose weight beyond 20 % than their normal weight. Convince them to attend to diet group programmes and group exercise activities and medication programs to regulate and accustom to balanced eating habits. To get rid of from malnutrition, essentially protein deficiency the patient should ensure to follow the dietary changes as suggested by the dietician. The patient should make known that fatty liver is reversible only if he should confine to the therapeutic program assigned to him otherwise, he will have to face perpetual incurable liver damage and for advanced patients with non-alcoholic steatohepatitis (NASH), as there are no currently available apt therapies. Medications and other treatment options: Several drugs have been studied in the treatment of NASH. There is no substantial evidence that any drug is effective in slowing the progression of NASH disease.

Vitamin D deficiency is associated with non-alcoholic fatty liver disease. Although there is no reason to think that this deficiency contributes to non-alcoholic fatty liver disease, vitamin D levels should be measured in patients with non-alcoholic fatty liver disease and treat them with vitamin D if they found deficient of it. It is important that Multi Vitamins, Mineral supplements and antioxidants that support the liver detox should be taken till the deficiency is fulfilled.

Fatty liver, weight loss, and exercise:

Since the serious complications of non-alcoholic fatty liver disease are primarily seen in patients with NASH but there are no clear effective treatments for these patients. Weight loss and exercise are the most trust worthy treatments for non-alcoholic fatty liver disease. Less than 10 % decrease in weight may be enough to set right the existing condition of the disease. Vigorous exercise reduces liver fat as well as reduces the inflammation of NASH. Recently the professors of Kolarado University in America revealed that the benefits derived from walking can be achieved by consuming 500 mg of vitamin C supplements daily, or diet or fruit juice containing vitamin C.

Insulin sensitizers:

Metformin (Glucophage) is a drug used for treating diabetes which enhances the insulin sensitivity of cells, duly counteracting the insulin resistance that accompanies non-alcoholic fatty liver disease and the metabolic syndrome. It has been studied but, no clarity forthcoming to cure the liver injury associated with NASH.

Pioglitazone (Actos) and rosiglitazone (Avandia):

These drugs are also utilised for treating diabetes since they increase insulin sensitivity. There has been seen a reduction in liver fat and symptoms of liver ` injury [31] with the use of both drugs, and pioglitazone may reduce the scarring occurred due to the inflammation of NASH. Two problems that take place with this treatment are weight gain and increase in heart attacks with rosiglitazone. Pioglitazone may be used to treat NASH however; its long-standing success and safety have not been well-established.

Antioxidants:

Vitamin E has been studied in NASH because of its general effects against inflammation. It has been shown to reduce liver fat and inflammation and possible occurrence of fibrosis [32], but its long-term use and safety have not been well-studied. Moreover, treatment of patients with vitamin E who do not have NASH is associated with a higher deaths but it can be used for treating NASH, selectively but not in all patient. It is also important that patients should aware of its possible risk factors**.**

Pentoxifylline:

Despite Pentoxifylline (Trental) treatment for NASH patients yield with certain encouraging results, there is no adequate experience or knowledge of its effectiveness and safety to propose treatment beyond research studies.

Omega-3-fatty acids:

Short studies have shown some benefits with omega-3-fatty acids in reducing liver fat in non-alcoholic fatty liver disease, and intensive studies are in progress in large groups of persons, omega-3-fatty acids were demonstrate to reduce cardiovascular events such as heart attacks and overall mortality thus omega-3-fatty acids may be appropriate treatment for patients with non-alcoholic fatty liver disease and the metabolic syndrome as these patients prone to cardiovascular disease and death.

Lipid-lowering drugs:

Lipid-lowering drugs, specifically the statins and ezetimibe (Zetia), have been used to treat the abnormal rise of blood lipids associated with the metabolic syndrome. Although there is evidence of beneficial effects of these drugs on the liver in NSLD there is no enough experience to recommend them in patients with non-alcoholic fatty liver disease.

Ursodeoxycholic Acid:

Ursodeoxycholic Acid helps to melt gallstones made of cholesterol if the stones are smaller than 20 mm and floatable. It works by reducing the amount of cholesterol in the gallbladder and after the gallstones have been successfully dissolved the course should be carried on for another four months .This medicine should be taken with or immediately after food but simultaneous use of antacids should be avoided at the same time.

Hepa- merz:

This tablet is intended for all liver diseases [33] such as severe liver impairment and at the last stage of cirrhosis. It consists of two endogenous amino acids and L- ornithine and L-asparate is a citric acid which liberate energy and helps to regenerate liver damaged cells. It works for detoxification process and lowers of increased levels of ammonia in the blood which is a common problem in liver diseases and improves insulin and growth of hormones. Dosage is 1 to 2 tablets to be taken three times daily or 5 mL once daily with one glass of water with meal or after meal. Some of the drugs names in India are leotard, Analiv, Livtop, Longliv, Lormet, orniliv, Trisoliv in tablet form.

Sorbiline (Sorbitol solution):

It is sweet flavoured liquid suggested for treating liver dysfunction and to improve digestive metabolism of the body. It also used in gallbladder and pancreatic disorders, constipation and dyspepsia. For liver dysfunction two spoons in diluted water before lunch or dinner to be taken. For constipation 2 to 3 spoons depending on the severity of problem diluted in water early in the morning in empty stomach.

Liv. 52 DS (herbal) tablets:

The vigorous antioxidant property of Liv. 52 DS tablets works as detoxifying agent and counteracts the different types of toxins and poisonous substances present in water, food, air and medications. This herbal medicine regulates the hepatic enzyme levels, improve absorption and augment the functional effectiveness of the liver and development of liver cell restoration. It restores the functional efficiency of the liver by protecting the hepatic parenchyma and supporting hepatocellular regeneration. It is useful in the treatment of viral hepatitis, alcoholic liver disease, pre-cirrhotic conditions and early cirrhosis, anorexia, loss of appetite and liver damage due to radiation therapy, liver disorders including fatty acid associated with protein-energy malnutrition and cures jaundice and loss of appetite during pregnancy. In pre-cirrhotic circumstances, Live. 52 DS stops the development of the disease and inhibits further liver injury. For the purpose of daily health Liv. 52 DS tablets improve appetite, the digestion and assimilation procedure and encourage weight gain. The suggested daily dosage for maintenance of healthy liver is 1 tablet twice a day with a full glass of water, preferably before food. The perfect dose to recover appetite is two Liv. 52 DS tablets twice daily with one glass of water 30 minutes before food.

Milk Thistle:

It is also known as Silybum marianum or Holy Thistle, has been used since 2,000 years to support healthy liver and gall bladder function. The plant named as such as its leaves contain milky white fluid. It is believed that the active ingredient in Milk Thistle known as Silymarin, with antioxidant properties and may help protect liver cells from damage by environmental toxins and support overall liver health.

Fibre Primvital an herbal drug:

Drinking Fibre Prim vital, a herbal produce consists of enough fibre devoid of side effects with a glass of lukewarm water twice a day before meals after letting the seeds swelling a bit which helped the patient to pick up the colon health and aids to eliminate constipation. This natural drug is blended with Plantago psyllium and Plantago ovata has as many as 68 g of fibre per 100 g of the product and enable to remove internal waste from the digestive system and detoxifies the colon from toxins, heavy metals and other toxic substances doing harm to the large intestine.

Homeopathy treatment:

The homeopathic drugs work at immunological level, and have established its usefulness in the treatment of an extensive range of viral infections. It is believed that with the suitable drugs commensurate with the disease of Hepatitis B is controlled; the development of cirrhosis is well kept under check duly getting symptomatic relief. To the possible extent it also assists to push back the complications of Hepatitis B, cirrhosis and liver cancer. It is in vogue among people that homeopathic treatment kept disease under proper control and help to improve general health condition without any side-effects. It is getting popularity now days. The condition may reverse and even go away by weight loss if the patient is overweight or obese or with good control of diabetes if the cause is diabetes.

Surgery:

Bariatric surgery:

It is a surgery of the gastrointestinal tract and other different types of bariatric surgeries. Since obesity is believed to be an important factor in the non-alcoholic fatty liver disease and loss of weight has been shown to have beneficial effects on this disease. Bariatric surgery has been considered as a potential treatment for non-alcoholic fatty liver disease which causes in loss of weight. It is reported the effects of bariatric surgery on non-alcoholic fatty liver disease and has made obvious that fat and inflammation decrease, and progression to severe fibrosis is arrested. It is not recommended that bariatric surgery should be used to treat NASH instead; patients may be selected for other sorts of surgery.

Liver transplantation:

Once a liver has become cirrhotic and if developed complications cannot be controlled or when the liver ceases functioning, liver transplantation is essential by replacing the diseased liver with a transplanted liver. It is found that NASH recurs frequently in the transplanted liver and then progresses to cirrhosis, presumably due to obesity and diabetes. It is observed that Survival from liver transplantation [34] has been improving over 1990s, and the survival rate depends on the whole on the harshness of disease and other medical problems of the patient.

CONCLUSION

Diet in modern days contain high processed foods, hydrogenated vegetable oils, especially sugar and carbohydrates have caused an epidemic of fatty liver disease and obesity. Exposure to excess alcohol, cigarettes and toxic chemicals also overloads the liver causing liver dysfunction. Alcoholic liver damage is seen among the productive age group people with high morbidity and mortality is connected with the matter of huge economic loss to the entire world and left the society with unending grief. Even though most people with NAFLD do not develop serious liver disease but it has become very common in recent years due to epidemic in obesity, NAFLD has become a common cause of cirrhosis. There needs to be more awareness of liver disease so that patients can be treated early to prevent, liver failure [35] and cirrhosis (liver cancer). There are no successful forms of treatment available to cure the diseases. However, new developments in the therapeutic world and changed nutritional approaches have shown the way to better strategies in the management of this condition. However, there is every need for further prospective and cooperative studies and extensive investigations. A lot has been done regarding the epidemiology, pathogenesis, diagnosis and treatment [36] of patients with NAFLD. It is thus very important that specialist physicians and voluntary organisations should conduct awareness camps among people to check for its presence in diabetics and obese persons facing other features of metabolic syndrome. Preventive programs should be launched through public awareness camps and seminars to encourage people to adopt healthy life. To avoid recurring of fatty liver complications, the disease needs an attention as soon as the patient is diagnosed, irrespective of its stage whether it is mild or at any other stage. If the liver is properly protected duly keeping healthy, it ever safe guards the health of the body.

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