

## Prevention and Treatment of Liver Cancer

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### Abstract

Nowadays, the incidence of liver cancer is called Karma, and most patients are found to have advanced liver cancer, which is almost impossible to recover and treat. Although the treatment effect is not ideal, and the mortality rate is relatively high compared with other liver cancer, which not only brings a lot of burden to the family, but also causes problems for the society. This article focuses on how to prevent liver cancer, detect and treat liver cancer by different methods. In the absence of liver cancer, people can prevent liver cancer by changing their diet, exercising, getting regular check-ups or getting vaccinated. Liver cancer can be detected by imaging and other methods. Usually, the cancerous part of liver cancer can be removed by surgery and other methods, or the cancerous part can still be removed by chemotherapy, targeted therapy drugs, radiofrequency therapy and other methods, and the patient can also survive. Many drugs can also treat liver cancer and prevent the progression of the disease if the cancer spreads. This thesis aims to integrate the information on liver cancer by describing how to prevent and treat it, with the hope of reducing the prevalence and improving treatment, so as to alleviate the suffering of more patients.

### Keywords

Liver cancer; Treatment; Prevention.

### Introduction

Today, liver cancer, a malignancy of liver cells or the epithelial cells of the bile duct inside the liver, is the second leading cause of cancer-related death and the fifth most common malignancy worldwide. According to statistics, the mortality rate of liver cancer is 20.37 per 100,000 (Gallage & Suchira, 2021). Compared with other malignant tumors, liver cancer has a very high recurrence rate and a low cure rate. Liver cancer is divided into two types of primary liver cancer and secondary liver cancer, 90% of liver cancer patients are infected with liver cancer B, followed by aflatoxin, nitrosamine food. Some patients can get liver cancer from parasites, smoking, drinking, or genetics.

Ordinary people should try to prevent the occurrence of liver cancer when they have not been detected. Appropriate preventive measures are important to reduce the incidence of liver cancer. At present, the prevention methods include reducing alcohol consumption, changing dietary habits, and doing more exercise. Most people get the hepatitis B vaccine to produce antibodies in their bodies that reduce the risk of liver cancer. In the detection of liver cancer, people usually use imaging and other tests. The problem at present is that the examination is not

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very accurate and life habits are difficult for people to change.

Most of the popular treatment methods are based on surgery, such as hepatectomy or liver transplantation. Some patients choose to use chemotherapy or drug therapy, and some targeted therapy drugs are used to reduce the occurrence of liver cancer and improve the survival rate of patients (Ganesh, 2021). At present, China has also launched the use of traditional Chinese medicine treatment methods for conditioning and treatment, although it can only alleviate the disease, but it is also a breakthrough (Li & Mouduo, 2012). At present, there are limited treatment options, most of them choose to use surgical methods, and the cost of many surgical methods such as cryoablation is too high for many patients' families to afford this cost. For drug therapy, there are also fewer drugs and targets.

This article aims to find out the best ways of diagnosing, treating and preventing liver cancer, and attempt to propose new therapeutic ideas. Update treatment methods were proposed by summarizing and studying previous literature.

This article is divided into four parts. In the review section, the epidemic history of liver cancer, the factors of liver cancer, and the corresponding treatment and prevention methods are introduced. Testing for liver cancer and more treatment options are mentioned in the discussion. Finally, the existing problems as well solutions and prospects are put forward.

## Literature Review

### Epidemiology

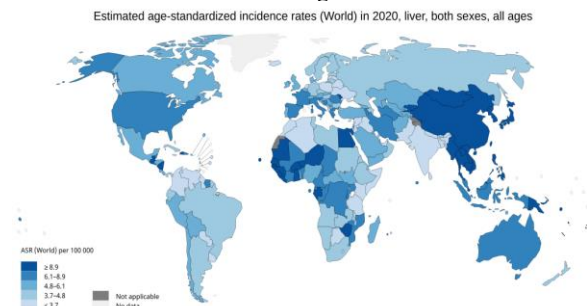
Hepatocellular carcinoma is a malignant tumor of the liver, which can be divided into primary and secondary categories. Primary hepatic malignancies originate in the epithelial or mesenchymal tissues of the liver. The latter is called sarcoma and is less common than primary liver cancer. In China, most of the liver cancer incidence areas are in the southeast coast, among which the average annual incidence of Qidong County in Jiangsu is as high as 55.63 per 100,000

people, and the mortality rate is 47.93 per 100,000 people (Gallage & Suchira, 2021).

Globally, 85% of HCC patients are in countries with low or medium resources, especially in Africa or East Asia and Sahara VII (Ganesh 2021). The main reasons are the exposed environment, the water source infected by the infection, and the lack of medical and health care resources, which cannot guarantee the complete cure of HCC. The disease can occur from 2 months of age to 80 years of age, with the most common onset between 40 and 49 years of age.

The distribution of HCC varies widely around the world, with most clustered in Asia and Africa (Figure 1). So in some countries, 70% are detected and treated at a very early stage. In terms of the prognosis of liver cancer, South Korea, inland China, North America and Europe are not as advanced as Taiwan, Japan and other regions (Shen, 2012). Compared with them, the prognosis of these countries is not advanced enough to cause many patients to have repeated disease (Ganesh, 2021).

Figure 1 The distribution of liver cancer incidence in each country in 2022 was obtained from the statistics of the World Health Organization.



### Risk factor

More than 90% of HCC cases occur on the basis of chronic liver disease. HCC is the leading cause of death in patients with cirrhosis, with an annual incidence of 1-6% in these patients. In China, the major risk factors for HCC are associated with HBV infection. It is estimated that 57 million people suffer from chronic HCV infection, among which 10 to 20 percent have liver complications (Sangro & Bruno, 2021). Risk conditions also include chronic alcohol consumption, diabetes, and obesity. Hepatitis C

virus is a major cause of diabetes. Less common HCC patients are cirrhotic due to primary biliary cholangitis, haemochromatosis, and alpha-1-antitrypsin deficiency (Llovet & Josep, 2021).

### *Hepatitis virus*

The pathogens that cause viral hepatitis are collectively referred to as hepatitis viruses, and human beings have A and B non-A, non-B and D viruses. Hepatitis A virus is a micornas virus. Unlike HAV, hepatitis B virus is a DNA virus that causes viral hepatitis B disease. In China, the infection rate of hepatitis B virus is about 60-70% (Sangro & Bruno, 2021). Based on this calculation, about 93 million people in China are carrying the hepatitis B virus, of which about 30 million are infected with hepatitis B. HCV is also an RNA virus, and unlike HAV, HCV has a lipid shell (Sia & Daniela, 2016). Type D liver cancer virus is an RNA virus that requires the assistance of HBV to replicate, so the risk of simultaneous overlapping HBV and HDV infection may occur.

Most liver cancers are caused by HBV, a virus that causes cancer. When the virus is inserted into DNA, the DNA is unable to transmit cell signals and replicate them, and to regulate the genes involved (Sia & Daniela, 2016). By comparing the encoding capacity of virus genes and the number of viruses, it was found that the negative strand of HBV DNA could encode all known HBV proteins, while the HBV X protein could activate genes related to the new Ha-Ha pathway. Figure 2 shows the causes of liver cancer formation caused by HBV/HCV and other factors.

The activity of HBV is controlled by the body's immune system, which ignores the existence of the virus and maintains the state of immune tolerance, which is also an immune balance. The immune system fights against the virus, and at the same time, liver damage will be caused.

### *Aflatoxins*

Aflatoxin is defined as a Class 1 carcinogen by the Cancer Agency of WHO. It is a highly toxic substance with super toxicity, which can cause damage to human or animal liver and lead to liver cancer or death. B1 exists in mildewed corn,

cereal, peanut and other foods, and the probability of occurrence in foods in hot and humid areas is also higher. Aflatoxins are metabolites produced by *Aspergillus flavus*, *Aspergillus parasitica*.

Aflatoxin poisoning mainly affects the liver of animals, and the injured individuals vary by age, sex, and race. Studies have shown that AFT (Alpha-fetoprotein) can lead to decreased liver function and lower immunity of animals, which are vulnerable to attack by microorganisms and viruses. Disease research institutions in Asia and Africa have shown that AFT in food has a positive correlation with the carcinogenesis of liver cancer cells (Pan, 2018). Long-term intake of food or drink containing AFT will lead to the generation of various cancers and prevent protein synthesis. The virus mainly causes hepatitis, cirrhosis, liver necrosis and other symptoms, but also accompanied by loss of appetite, nausea, vomiting, and liver pain, can also directly cause liver cancer.

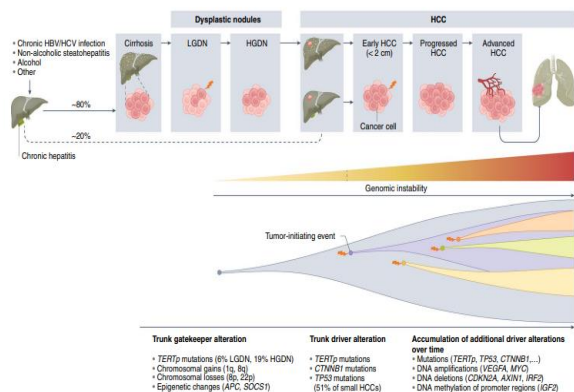
### *Alcohol*

Alcohol is one of the predisposing factors of liver cancer. Long-term excessive drinking is seriously harmful to human health. However, the homeostasis of cholic acid in human body is mainly affected by its synthesis, excretion, metabolism and hepato-intestinal circulation. Alcohol can cause cholic acid disorder by affecting the key links of cholic acid homeostasis (Chuang & Shu-Chun, 2015).

In cases of liver cancer, cholic acid homeostasis is significantly disrupted in drinkers and bile acid levels are measured by mass spectrometry in liver cancer tissues (Huang & Daniel, 2022). In hepatocellular carcinoma cells, alcohol intake causes cholic acid disorder. Through MTT and SRB experiments, through screening different concentrations of alcohol for follow-up mechanism studies, it is found that in different hepatocellular carcinoma cells, with the increase of time and concentration, the cell vitality has an inhibitory effect (Chuang & Shu-Chun, 2015). The expression of cholic acid-related genes in 37 cases of liver cancer was detected by RT-PCR, and the changes of cholic acid-related genes

were found, among which the drinkers had low expression of BSEP gene (Liu, 2018). In Figure 2, the causes of liver cancer formation caused by alcohol and other factors are shown.

Figure 2 Molecular pathogenesis of HCC: step-by-step process, genomic hits and clonal evolution (Llovat, 2022).

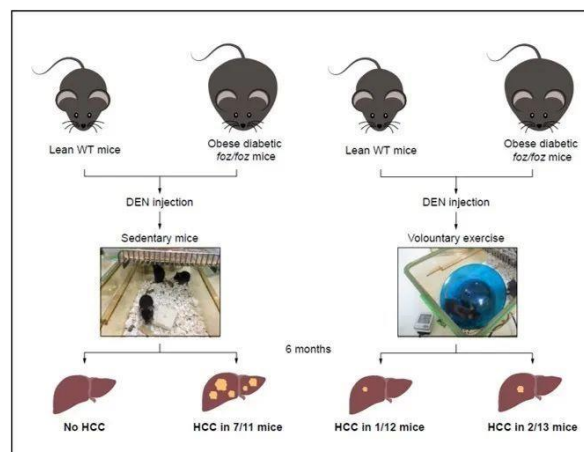


### Movement and diabetes

For example, people can do exercise such as running and jumping rope properly, reduce the risk of diabetes, and improve their liver function. The study used a mouse model of different body weights that developed type 2 diabetes due to obesity to inject low doses of carcinogens into the mice, which were divided into exercise and inactive groups. Over time, the inactive mice gained significantly more weight and were more likely to develop liver cancer. The mice that exercised were largely free of liver cancer. The study suggests that exercise, not weight, may protect against liver cancer. (He & Li, 2015)

In this study, the specific molecular mechanism was investigated, and it was found that it was mainly related to the tumor suppressor gene p53 and stress activated protein kinase JNK1 (Callegari, 2014). Activation of JNK1 has been linked to the development of liver cancer, but exercise can "turn off" this critical signal. It is an important factor regulating cell cycle inhibitor p27, which can prevent the continuous growth of mutated cells from becoming cancerous (Figure 3).

Figure 3 Mouse experiments on exercise and liver cancer (Elsevier, 2020).



### Prevention

#### HBV vaccine

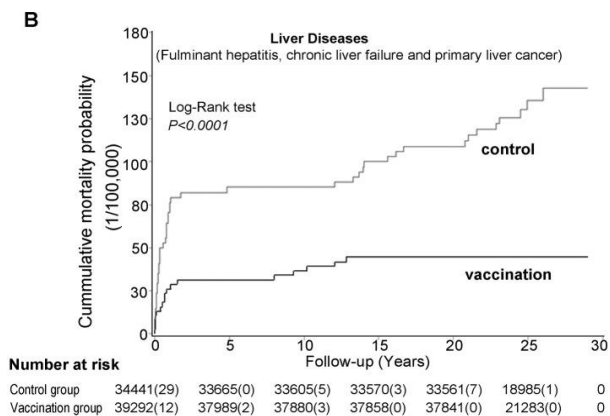
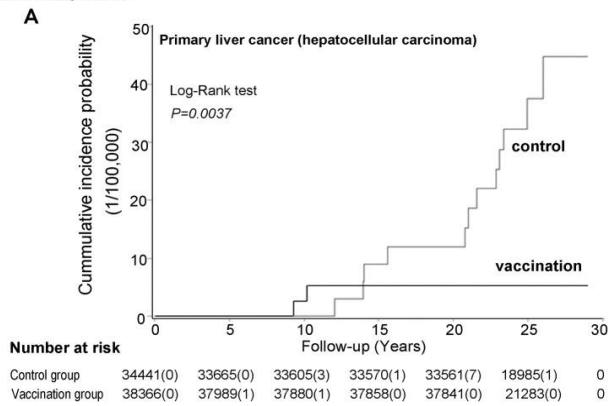
Now most people choose to vaccinate to prevent the occurrence of diseases, hepatitis B vaccine can stimulate the immune system and prevent the erosion of hepatitis B virus. Studies have shown that hepatitis B vaccine immunization at different ages has different protective effects on adult patients with chronic HBV. Neonatal vaccination has a protection rate of 75%-80% for adult HBsAg carrying and a protection rate of 70% for HBV infection-associated liver disease (Qu & Chunfeng, 2014). (Figure 4)

PLC and cirrhosis are mainly diagnosed in adults after 40 to 45 years of age, but most people are younger and have lower mortality rates (Qu & Chunfeng, 2014). Supplementary vaccination of children under 15 years of age who have not received the neonatal vaccine and live in HBV endemic areas is protective against HBV infection (Qu & Chunfeng, 2014).

A booster vaccination before 10 to 14 years of age is recommended for newborns whose mothers are HBsAg carriers after the neonatal vaccination program is completed, which reduces the risk of chronic HBsAg carrying in adulthood by 34 percent, but there is no need for booster immunization, the researchers said (Bruix & Jordi, 2015).

Figure 4 In the vaccinated and control groups (Qu, 2014).





Note. (a) the cumulative incidence of primary liver cancer and (b) the mortality from primary liver cancer are shown.

### Improve living habits

As we all know, exercise can improve the body's immunity. Studies have shown that people who exercise regularly have a lower risk of liver cancer, and exercise has been shown to prevent the development of liver cancer in mice with fatty liver disease, which is associated with obesity and type 2 diabetes.

For example, aerobic exercise such as running can convert sugars and fats in the body into lactose so as to fight cancer. Fat and sugars are the main energy to maintain human body for exercise. With the increase of exercise intensity, the cells in the body will have more aerobic respiration and more sugar metabolism, and lactose is a by-product of energy conversion.

If people want to prevent liver cancer, they also need to pay attention to diet. First of all, bean sprouts are effective in fighting cancer. Bean sprouts are formed by soya bean bubbles, and the nutrients in them are also multiplied. Carotene has antioxidant, immunomodulatory, anti-cancer and anti-aging properties, so it may also inhibit

the growth of cancer cells (Yang & Wan, 2020). Secondly, eating more onion can also effectively fight cancer, onion has a strong antioxidant energy, can effectively protect the liver from damage (Yang & Wan, 2020).

Small amounts of alcohol are also important. Alcohol is one of the most common causes of liver disease worldwide, and causes a wide range of direct liver damage, including steatosis, alcoholic hepatitis, cirrhosis and HCC (Liu, 2018).

### Treatment

#### Liver transplantation

Liver transplantation is a potentially curative treatment and the best option for patients with decompensated cirrhosis.

Before split liver transplantation, careful evaluation of liver vascular and bile duct shape and potential anatomic variation is required. During donor liver cleavage, the cleavage plane should be determined according to the middle hepatic vein to ensure normal reflux (Anwanwan & David, 2019). To improve the success rate of operation, it is necessary to prevent small liver syndrome actively. This will give more patients the chance of a cure. IRI and related complications were also avoided (Liu & Yu, 2015).

The shortage of organs remains the biggest obstacle limiting transplants, and one way to increase the supply of organs is through xenotransplantation, which involves transplanting humans with livers from other animals. From primate livers such as chimpanzees, baboons and miniature pigs, hyperacute rejection is effectively controlled by the removal of the galactosyl transferase gene in xenotransplantation (Anwanwan & David, 2019).

#### Surgical resection

Surgical resection is the treatment of choice for a small number of patients with good liver function and no underlying cirrhosis. Patients undergoing surgical resection have an increased risk of compensation for loss of liver function, so only cirrhotic patients with good compensation

are considered good candidates for surgical resection.

The total surgical outcome depends not only on the presence of portal hypertension, but also on the residual liver function, the size of segmentary resection and the volume of residual liver. In the process of technological improvement, it is found that laparoscopic resection has significantly better surgical effect than laparoscopic (Gallage & Suchira, 2021). For patients with relatively good liver function preservation, if limited hepatectomy is performed by laparoscopy and enough liver remains can be performed, then there is no liver loss compensation and long-term good survival can be achieved (Liu & Yu, 2015).

#### ***Insulin***

For liver cancer, high blood sugar and obesity may lead to liver cancer, so insulin is also a drug that can inhibit liver cancer. Hyperglycemia also has toxic effects. Under the action of reoxidative stress, it increases the accumulation of advanced glycation end products (Arcidiacono & Biagio, 2016). When glycation end products can bind to corresponding receptors, they can increase inflammation and peroxide damage by activating relevant signaling pathways. In turn, it may cause cell mutations that play a carcinogenic role (Baghy & Kornélia, 2016).

Insulin regulates cell growth and reproduction and causes cell proliferation and mutation through mitosis. Insulin is also closely related to tumor. For example, studies have confirmed that p53 protein (Arcidiacono & Biagio, 2016), the substrate of insulin receptor tyrosine kinase, may be a key regulatory factor in the occurrence and development of epithelial ovarian cancer, and its overexpression may lead to worse prognosis of patients (Baghy & Kornélia, 2016). Insulin can also promote the release of IGF-1 in the liver through up-regulation of growth hormone receptors, which can further promote the proliferation of liver cancer cells and inhibit cell apoptosis (Pinter, Matthias, and Peck-Radosavljevic, 2018).

#### ***Radio frequency ablation***

Radiofrequency ablation is a kind of tumor ablation, which is mainly described by ultrasound, CT, magnetic resonance and other imaging equipment. Under the action of microblog electromagnetic field, polar molecules such as water and protein in tumor tissues produce high-intensity vibration, causing collisions and friction between molecules, and reaching a high temperature of 60-150°C in a short time, resulting in coagulation necrosis of cells (Yu & Muxin, 2021). Normally, tumor cells will undergo necrosis at 43°C, and irreversible cell damage will occur at 49°C. Therefore, ablation needles can kill tumor cells in about 10 minutes, completely deactivating their surrounding areas, so as to achieve the purpose of eradicating tumor cells (Anwanwan & David, 2019). As the radiator can radiate the microwave within a certain range, it can effectively radiate to the fixed targeted area, avoiding damage to other important surrounding cells and organs (Gallage & Suchira, 2021).

Radiofrequency ablation is relatively low-risk and has been used in the world for a long time. This surgical method does not need to be operated, and only one needle can achieve the purpose of eliminating the tumor under the condition of tailings (Yu & Muxin, 2021). Compared with radiotherapy, radiofrequency ablation has a larger ablation range, less damage to organs, and will not cause hair loss, fatigue, anorexia and other side effects like chemotherapy (Yu & Muxin, 2021). Finally, the cost of radiofrequency ablation is low, which is affordable for ordinary residents.

#### ***Cryoablation***

Similar to radiofrequency ablation, they use temperature to kill cancer cells. These two kinds of operations are mostly used for liver cancer. At the same time, the application of cryoablation is limited. Argon gas was used to quickly reach -165°C, and helium gas could slowly reheat the temperature of the target tissue from -140°C to 20-40°C. The cells die between hot and cold (Raza & Ali, 2014).

In addition, freezing causes vasoconstriction, thrombosis microcirculation failure, blood stasis, and freeze-thaw rupture of tumor cells and induces specific and specific anti-tumor cells to produce immune antibodies. By binding antibodies, specific immune killing of tumor cells can be initiated, and the remaining tumor cells can also be eliminated (Pinter, 2018). This procedure is limited to tumors less than 5cm in diameter, or 3 to 5 tumors with a maximum diameter of less than 3cm, and no invasion of blood vessels or bile ducts near the organ (Raza & Ali, 2014).

First of all, cryoablation has the advantages of small trauma, simple operation, convenience, and clear ablation boundary. Doctors can easily judge the ablation boundary and thus greatly improve the safety. This method can not only effectively eliminate all tumor cells in the frozen area, but also preserve normal liver tissue as far as possible. There are also some disadvantages to this procedure, for example, first of all, cryoablation is time-consuming and expensive compared to microwave ablation. Secondly, the process of cryoablation consumes a lot of platelets, and it is difficult to recover after surgery, so the risk of bleeding caused by platelets should be considered.

## **Discussion**

At present, there is a lot of peace in the diagnosis and treatment of liver cancer cells. Firstly, early diagnosis of liver cancer is very difficult and requires a very complicated process, which cannot be confirmed 100%; secondly, the recurrence rate is very high, and the recurrence rate is close to 60% in the past five years (Ariff & Ben, 2009). Moreover, the expectation of personalized treatment does not match the clinical trial environment, so many ideal treatments cannot be completed.

### **Advanced diagnostic technology is the basis of the prevention and treatment of liver cancer**

#### ***Blood tests for alpha-fetoprotein and degamma-carboxythrombin***

Alpha-fetoprotein (AFP) is a commonly used clinical indicator, but its specificity and sensitivity are relatively low, so it is only used

for clinical screening. Degamma-carboxythrombin is an abnormal prothrombin, which has been found to have a high positive rate in the sera of patients with primary liver cancer. As normal Prothrombin induction by vitamin K absence II (PIVKA II) is required in the synthesis of normal prothrombin, which is deficient in DCP (Prothrombin induced by vitamin K absence II.) synthesis (Zhao, 2018). The non-carboxylated form of prothrombin can release in human blood after vitamin K deficiency or the administration of vitamin K antagonists such as warfarin (Gallage & Suchira, 2021). (Zhang, 2021). The primary test for degamma-carboxythrombin is turbulent fasting venous blood and serum isolation. Liver tissues removed during surgery from patients with primary liver cancer and cirrhosis were fixed with 10% neutral formaldehyde and wrapped in paraffin wax, sliced, dewaxed, and analyzed after staining (Zhao, 2018).

#### ***Ultrasonic detection method***

Generally speaking, gray scale ultrasound examination is the most routine and basic examination method for patients with liver cancer. On physical examination, an intrahepatic mass will be found in the liver (Bruix & Jordi, 2015). The tumor is round or oval in shape and has multiple nodules. The sound with moderate echo or irregular low echo is considered as nodular. The diameter of the tumor shape is 2-5cm, which is in the medium size (Shen, 2012).

When tumors are found in the liver, ultrasound screening can be used for diagnosis and differential diagnosis, which is very effective. If the tumor size is more than 1cm, it may be divided into the following conditions: first, it is low-echo small liver cancer, and secondly, enhanced liver cancer should be identified with hemangioma (Zhang, 2021). Liver cancer is hard, nodular echo, and sound halo.

#### ***CT scan***

For patients with liver cancer, CT examination can clearly show the size, shape, number, boundary, position of liver cancer, as well as the relationship with the intrahepatic duct, which is of great help for the further treatment and

examination of patients. Normally, all lesions less than one centimeter can be found by CT examination, which are usually more common in the right lobe, followed by the left lobe, and less common in the caudal lobe (Kumar & Pradeep, 2022).

Due to the complex pathological changes of liver cancer, the effects of plain CT scan are diversified. Generally speaking, single or multiple low-density circular nodules or masses will appear in the liver, and the lesions with capsular membrane or peripheral blur, the boundary becomes clear from blur after enhancement, and are often spherical are hepatocellular carcinoma. Some may have no envelope but grow erratically as trees (Kumar & Pradeep, 2022).

#### ***Liver biopsy***

A liver biopsy is a puncture needle that draws liver tissue for examination. This method is mainly used to detect liver cancer, hepatitis, alcoholic liver injury, fatty liver and other liver diseases. The success rate of this method is more than 95%. Liver biopsy must be performed in a hospital by a specially trained doctor. After taking on absorbent paper, and then put in 10% formaldehyde fixed, sent to the pathology department for examination. The advantage of this method is that the puncture needle stays in the liver for a short time, the procedure is easier and safer, and the patient will feel more comfortable. Liver biopsies can be applied to patients with unexplained hepatitis, liver metabolic diseases, liver transplantation, etc. Follow-up of chronic hepatitis or evaluation of efficacy, chronic rejection after liver transplantation.

#### **The detection of early diagnostic markers helps in the screening and treatment of HCC**

##### ***Markers of liver cancer***

Liver cancer has many signature substances. First of all, alpha-fetoprotein is the earliest and most effective marker for hepatocellular carcinoma. In some patients, AFP levels increased in the early stage of hepatocellular carcinoma, but decreased to normal levels later on. Sensitivity and specificity (Hytiroglou &

Prodromos, 2022). At the early stage of HCC with small mass, serum AFP was not significantly increased in 80% of patients, and the sensitivity of AFP detection was 25% and 52% in patients with mass diameter < 3 cm and > 3 cm, respectively. The main problem of AFP screening is the low positive rate in the early stage. In particular, AFP is negative in about 30% of liver patients, so AFP alone can miss these patients. In terms of specificity, AFP may also be elevated in acute and chronic viral hepatitis, cirrhosis, pregnancy and teratoma (Llovet & Josep, 2021).

Alpha-fetoprotein heteroplast -L3 (AFP-L3) is also one of the markers of liver cancer. There are three glycosylation types of AFP: AFP-L1, AFP-L2 and AFP-L3. AFP-L3 is commonly used in the triple test of pregnant women and in the screening of liver cancer in patients with chronic liver disease, and is thought to be more closely related to the clinicopathological features and poor prognosis of patients. Unlike AFP-L3, which binds strongly to LCA, AFP-L1 is associated with non-cancerous liver inflammation. (Hytiroglou & Prodromos, 2022)

#### **Developing new treatments is fundamental to reducing mortality in HCC**

##### ***Traditional Chinese Medicine***

In the treatment of liver cancer, people can not only use surgery or, in China, the use of traditional Chinese medicine treatment is also a good way. In traditional Chinese medicine, cancer is mainly caused by lack of healthy stagnation, phlegm and blood stasis for a long time. Traditional Chinese medicine (TCM) believes that diseases need to be treated to reduce pain, prolong life, prevent recurrence and metastasis, and achieve long-term coexistence of patients and tumors. Liver cancer belongs to the categories of "liver accumulation", "rascianqi", "expansion", "jaundice" etc (Han, 2018). In clinical explanations in China, it thinks that the mood is depressed, the qi is not smooth, the liver is not relaxed, so see the upper abdominal distension pain, the stomach is reduced, the moss is greasy, the pulse string is fine (Han, 2018); Qi stagnation and blood stasis, blood blockage, accumulated over time, resulting in



accumulation under the ribs, swelling, pain and discomfort, fatigue and fatigue, swarthy complexion, emaciation, greasy moss, dark purple tongue, fine and astringent pulse(Li & Mouduo, 2012); . However, in the aspect of TCM research, China still needs to continue to develop. For the time being, there are no obvious results, which can only be maintained for a short time. Exploring the way of treating liver cancer with traditional Chinese medicine has been the focus of the world's medical field, and it is also one of the hopes for a breakthrough in the treatment of liver cancer.

### Chemotherapy

Secondly, hepatic arterial embolization chemotherapy (TAE) is a non-surgical tumor treatment developed in the 1980s, which is very effective in the treatment of liver cancer, and is even recommended as the first choice of non-surgical therapy. In most treatments, iodized oil or 90 yttrium microspheres are used to embolize the tumor's distal blood supply, and then gelatine sponge is used to embolize the tumor's proximal hepatic artery, which makes it difficult to establish collateral circulation. Resulting in ischemic necrosis of tumor foci (Yuan, 2022). The main drugs commonly used in chemotherapy are CDDP80 ~, plus 100mg5Fu 1000mg mitomycin 10mg (or adriamycin (ADM) 40 ~ 60mg) (Yuan, 2022). Arterial injection was performed and distal hepatic artery embolization was performed by mixing 10mg of mitomycin (MMC) with Lipiodol. For patients with liver cancer, the effect of hepatic arterial embolization chemotherapy after repeated treatment is as good as home (Lim and Howard, 2020). The one-year survival rate of 345 patients with unresectable large liver cancer was only 11.1% after chemotherapy alone, but the one-year survival rate increased to 65.2% after hepatic artery embolization (Keane & Florence, 2015). This method is contraindicated in patients with severe hepatic decompensation, and is not suitable for patients with portal main cancer thrombolysis.

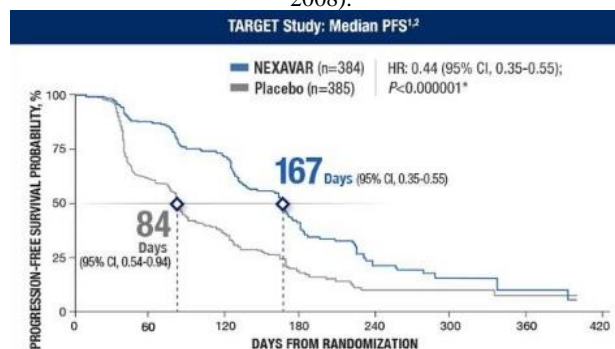
### Targeted therapy

For patients with liver cancer, targeted therapy is also a common treatment method. Targeted therapy is to design corresponding therapeutic

drugs at the cellular and molecular level for specific carcinogenic points. It could also be a protein molecule or a gene fragment inside a tumor cell. When drugs enter the body, they will deliberately select cancer-causing sites to bind to and act, causing specific death of tumor cells without affecting other cells.

Sonifenil (Docomax) is a multi-target, multi-kinase inhibitor for the treatment of liver cancer that can directly inhibit tumor growth by inhibiting RAF/MEK/ERK signaling pathways (Bruix & Jordi, 2015). The cardiovascular formation of tumors blocked by inhibition indirectly inhibits the growth of tumor cells, which has been approved as the first-line drug for the treatment of primary liver cancer (Nature Reviews Drug Discovery, 2018). However, the effect of Sonifenil is not rational, the drug resistance is short and the side effects are relatively large. Currently, it can only treat inoperable advanced liver cancer cells and inoperable or distant liver cancer cells. Common adverse reactions will be hand and foot skin reaction, some people will have diarrhea, weight loss, fatigue and so on. The average survival time of liver cancer patients is about 2.8 months (Dawkins, 2018). (Figure 5)

Figure 5 Survival time with sonifenil versus control (Llovet, 2008).



Ledaitini is also a first-line targeted drug for liver cancer in patients with advanced liver cancer who have not previously received systemic therapy (EISAI & MERCK, 2015). Its targets include VEGFR1/2/3, PDGFR- $\alpha$ , FGFR1/2/3/4, KIT, RET. Both Lovastinib and solafenb are antiangiogenic, but the targeted action is more concentrated, more inhibitory and has fewer side effects (Llovet et al, 2008). In addition, the treatment of Levaratinib against hepatitis B

(HBV) is significantly better than Solafenib. In China, hepatitis B cases are about 90%, and Levaratinib is more suitable for liver cancer patients in China Llovet, Josep, and Bruix, 2008). Currently, this drug is suitable for thyroid cancer and advanced liver cancer cells. The adverse effects in most people include hypertension, palmar-foot redness syndrome, loss of appetite, and albuminuria.

### Conclusion

Liver cancer is the most prevalent cancer in the world. Liver cancer is mainly divided into two types, primary liver cancer and metastatic liver cancer. There are a number of possible causes of liver cancer including hepatitis B, hepatitis C, cirrhosis, alcoholic liver cancer, siderosis, or infection with other carcinogens such as aflatoxin. Liver cancer can be screened by blood tests, medical imaging, biopsy and other methods, among which the tumor markers, alpha-fetoprotein (AFP) can be used for high-risk population screening, combined with ultrasound can often find early liver cancer, gamma glutamyl transpeptidase (GGT) can also detect liver cancer. After liver cancer is confirmed, surgery is mainly performed, mainly surgical resection (but this operation is not suitable for patients with cirrhosis), resection of the cancerous part of the liver, and drug injection, local heating, and low temperature freezing. Or some targeted therapy drugs and combination therapy, such as lenvatinib, bavituximab, sorafenib and other drugs for treatment. Insulin and traditional Chinese medicine also play a role in the treatment of liver cancer, which can be alleviated by regulating and injecting drugs. In terms of self-prevention, patients with liver cancer should maintain a good state of mind, overcome psychological difficulties, quit smoking and drinking, and have a balanced diet. And need a lot of rest and exercise can't misuse drugs. People who do not have liver cancer should pay attention to diet, exercise more, eat less expired food, and do not contact food containing aflatoxin. And smoke less and drink less, and keep a positive attitude. At present, the problem of liver cancer is that the cancer and rapid expansion of the patient is close to the advanced stage, and the recurrence rate through

treatment is high, and the need for repeated surgery is high. At the same time, the cost of surgery is high, and many families are unable to provide these funds for surgery, so the mortality rate increases. For liver cancer, in the future, experts will develop more novel treatment methods, which are applicable to most diseases. With the continuous progress of science and technology, liver transplantation can be performed using animal livers, and the surgical methods are also constantly improving. I believe that more advanced and cheaper methods will be developed to treat liver cancer in the future, but it may take some time. For example, 3D models can be used to study liver cancer and simulate the lesion and spread of cancer cells. People need more time to solve the problem of treatment, but people have the ability to do it in the near future. In the future, more advanced equipment will be developed to treat liver cancer, and the mortality and morbidity of liver cancer will be reduced

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