Title The Hepatitis Alphabet: A through E

Purpose

The goal of this course is to provide the reader with updated information related to the different types of hepatitis infections. It is also intended to assist the nurse in differentiating between A, B, C, D and E when treating the patient.

Objectives

1. Define the Latin word for "liver inflammation"
2. Identify symptoms of liver disease
3. Compare the differences between all five types of hepatitis.
4. List ways to prevent the hepatitis B infection
5. Explain the transmission of hepatitis D
6. Describe and compare the three major types of hepatitis

INTRODUCTION:

The general term "hepatitis" refers to inflammation of the liver caused by a virus. The infectious virus is complex. The different primary types of viruses that are responsible for this infection are the A, B and C forms. The two that are less prevalent forms are the D and E viruses. The type of hepatitis is named for the virus that causes it, as the hepatitis A virus, the hepatitis B virus, etc. Depending upon the type of virus, viral hepatitis is spread in different ways: through contaminated food or water, contact with infected blood, sexual contact with an infected person, or from mother to child during childbirth.

The Latin word for "liver inflammation" is hepatitis, but this doesn't specify the cause. The actual cause is what affects the entire course of the disease.

Each of the five types of virus cause acute, or short term, viral hepatitis. Hepatitis B, C and D viruses may also be the cause of chronic hepatitis, an infection that may be prolonged throughout the lifetime of the patient. This type of serious hepatitis can lead to liver failure, cirrhosis of the liver and liver cancer.

So far, no other viruses have been known to cause hepatitis. There are other viruses, however, that affect the liver, such as cytomegalovirus, Epstein-Barr virus (infectious mononucleosis), herpes virus, parvovirus and adenovirus.

The disease may be caused by:

1. An initial viral or bacterial infection of the liver
2. Trauma to the abdominal area of the liver
3. An injury to the liver that has been caused by a poison or toxin
4. Any autoimmune disorder: the person's own immune system cause the attack
5. An interruption in the normal blood supply of the liver, causing liver damage

Today, there is much that can be done to prevent Hepatitis A and B, especially through the

availability of safe and effective vaccines. Even though hepatitis C does not have a vaccine available, there are still ways to reduce the risk of contracting it. There are approximately 4,000,000 people in this country that are infection with hepatitis C. There are also no vaccines available for hepatitis D and E. The best protection is to reduce the exposure to the virus.

Hepatitis A and E usually resolve on their own, while hepatitis B, C and D can be chronic and serious.

THE LIVER:

The liver helps the body digest food, store energy and remove poisons. The main functions are to refine and detoxify and it is responsible for converting nutrients in our food into muscles, hormones, energy, clotting factors and immune factors. It is the largest organ in the body and is very complex. It regulates fat stores, controls how we produce and excrete cholesterol and stores specific minerals, vitamins and sugars.

The liver cells produce bile and this, in turn, helps in the digestion of food and absorption of nutrients. It assists in resisting infection and removing bacteria from the blood stream.

Some people present with specific symptoms such as:

- Nausea and vomiting
- Loss of appetite
- Diarrhea
- Dark colored urine
- Pale bowel movements
- Stomach pain
- Jaundice or yellowing of the skin and eyes
- Fatigue
- Low grade fever

But, the liver does not always exhibit symptoms. Because of this, advanced damage may occur without any prior notice and may progress rapidly to a serious condition.

Approximately 20,000 people die from chronic liver disease each year and about 360,000 are hospitalized each year with cirrhosis. Aside from alcohol, hepatitis C remains the leading cause of cirrhosis. Part of the reason for this high number, is that many people having hepatitis C do not know it until it is too late. By that time, they have transmitted it to many others. Unfortunately, the Centers for Disease Control estimates that the number of deaths from hepatitis C will continue to triple in the future.

In order to maintain a healthy liver, it is important not to drink alcohol in abundance. Specialists recommend no more than two drinks a day for men and one drink a day for women, saying that anything more than this is capable of damaging the liver. Along these same lines, Acetaminophen, found in Tylenol and other non prescription drugs, should never be taken with alcohol. This, too, can cause liver damage and once the cells become damaged, it may progress to cirrhosis.

Abnormal lab values: When testing for hepatitis, the bilirubin will probably be elevated, the albumin will probably be lower than normal values and an abnormal prothrombin time may be an indication of liver disease.

DEFINITIONS:

HAV-Ab:
Hepatitis A antibody
Anti-HBs:
Hepatitis B surface antibody
HBsAg:
Hepatitis B surface antigen
HBeAg:
Hepatitis B e-antigen
Anti-HBe:
Hepatitis B e-antibody
Anti-HBc:
Anti-hepatitis B core antigen
HBV DNA:
Hepatitis B virus (test for virus genetic material)
Anti-HCV:
Hepatitis C antibody
HCV RNA:
Hepatitis C virus (test for virus genetic material)
HCV Viral Load:
A detection and/or count of the amount of virus in the blood
HCV Genotype:
DetermineDetermines the type of Hepatitis C present (1 of 6 types)

COMPARING THE 3 MAJOR TYPES OF HEPATITIS:

Type of virus	**Hepatitis A**	**Hepatitis B**	**Hepatitis C**
Route of transmission	Fecal-oral	Infected needle or blood or by sexual contact	Infected needle or blood or by sexual contact
Incubation time for an acute infection	15 – 50 days	45 – 160 days	14 – 180 days
Onset	Sudden	Sudden or slow, unnoticed	Usually slow and unnoticed
Severity	Mild	Occasionally severe	Usually slow developing with symptoms not specific or strong
Chronic form	No	Yes	Yes
Associated with other diseases	No	Liver cancer, cirrhosis	Liver cancer, cirrhosis
Testing to diagnose and acute infection	HAV-Ab, IgM	HBsAg, Anti-HBc, Igm	Anti-HCV, HCV RNA (note – may have same results as in chronic hepatitis)
Testing to diagnose chronic infection or to monitor treatment	Non applicable	HbsAg, HBV DNA, HBeAg, anti-HBe	Anti-HCV (once) HCV RNA or viral load, HCV genotype (once)
Tests that detect previous infection	HAV-Ab, IgG	Anti-HBs, Anti-HBc total	Anti-HCV
Vaccine	Yes	Yes	No
Common treatment	No	Chronic form –	Chronic form – Interferon

		Interferon, lamivudine, adefovir	(usually with ribavirin)

HEPATITIS A:

Hepatitis A is one of several different hepatitis viruses that cause an inflammation of the liver. It is caused by the hepatitis A virus and usually lasts from a few weeks to several months. Normally, it does not lead to a chronic infection. It can affect anyone and every year there are about 80,000 new people who become infected with the hepatitis A virus (HAV). Approximately 100 Americans die each year because of it. It is the cause of 30 days of missed work and approximately $2,600 in lost wages yearly. For each specific hospitalized case, the cost can reach $2,800 and the annual cost that is associated with the disease is estimated at about $200 million in the United States. The virus starts in the stool of someone who is infected with the virus and is spread by poor hygiene and poor sanitation conditions. Though it causes temporary liver inflammation, most people recover and are not left with chronic liver issues. The National Center for Infectious Diseases recommends that routine vaccination be given to children, since it can prevent the disease.

TRANSMISSION:

The spread of hepatitis A is primarily through food or water that has been contaminated by feces from an infected person. Anyone with poor personal hygiene may spread it, but it is usually spread in areas where there are poor sanitary conditions, such as overcrowded areas. It rarely spreads through contact with infected blood. Though it is normally spread between close contacts, infected stool may also remain in small amounts of food or on objects and may also be spread that way.

In Foodborne Hepatitis, food associated outbreaks have increased. When it is spread from a restaurant, it is usually not from the food, but from the person who was handling the food without washing his/her hands after using the restroom. There is a high concentration of the virus in the fecal matter from the infected person. And at room temperature, the virus in that fecal matter is able to survive for three to four hours on the person’s hand or even on other surfaces. Of interest is that the food handler is at less risk than the person receiving the food prepared by the food handler! Anyone not washing his/her hands is able to transmit the virus!

When contaminated stool gets into the water or food supply, the person drinking the water or eating the food has a high risk of becoming infected. The soil where the food was grown may become contaminated with human waste which may then be transmitted by water, milk, raw uncooked foods or shellfish. If someone defecates in the field and water is used to irrigate the field, the waste is in the water. Contaminated fecal matter may cause one case of hepatitis A – it may cause an outbreak, and what is not necessarily known is that it is not only uncooked foods that may be the source of transmission, but also cooked foods. This may occur if the cooking was not adequate enough to kill the virus. It may also occur if the contamination occurred after the cooking was done.

Fruits, vegetables, salad contents, chicken, fish, etc must be washed before being eaten. If they are washed with soap and water, there is little risk that they will transmit the virus. No one should eat food that has been prepared by a known hepatitis A individual. Uncooked food and tap water should not be eaten in a travel situation where hepatitis is prevalent. Most of all – it is imperative not to eat food that has been by a person who has not washed his/her hands after using a bathroom or changing a diaper!

There are certain situations in which there is a higher risk of transmitting the infection:

1. There may be fecal contamination in food or in water.
2. By having anal or oral contact, or putting something in the mouth that has been contaminated with infected feces.
3. If a food preparer is infected and does not wash his/her hands with soap and water after defecating, it can be passed on to innocent people. This becomes a higher risk when they are preparing uncooked foods.
4. When dealing with soiled diapers, it is important to recognize that fecal residue may remain on the hands of the person changing the diaper.
5. A diaper changing table, if it has not been cleaned properly or changed after being used, may also facilitate the spread of the virus.
6. Raw or partially cooked shellfish that has been contaminated with the virus can cause hepatitis A.

Who else is at risk?

1. An international traveler, especially when traveling to a developing country
2. Anyone living with or having sex with an infected person
3. Anyone living in an area where children do not receive routine vaccinations against hepatitis A. This will usually cause an outbreak.
4. If there is an outbreak, there is a high risk in a day care for the children and the employees.
5. Men who have sex with men
6. Illicit drug users

SYMPTOMS:

While children with hepatitis A do not usually exhibit symptoms, adults can become ill quite suddenly. They may experience jaundice, fatigue, nausea, vomiting, abdominal pain, dark urine, light stools and fever. The incubation period does not usually last more than thirty days, but an infected person is still able to transmit the virus as early as two weeks before the actual symptoms appear, as it takes from two to seven weeks for the virus to incubate. The highest levels of the virus are in the stool two weeks before the symptoms start and, therefore, this is the highest period of contagion. Some people develop a rash after the incubation period, and this usually occurs prior to the actual symptoms appearing. When the symptoms do appear, the amount of virus that is shed in the stools has already begun to decline. The symptoms will then disappear and a complete recovery will occur, but this usually takes place over a six to twelve month period. The virus is able to be transmitted until all of the symptoms disappear, but after ten days, the body begins to make its own antibodies and it is less likely to spread the virus after the symptoms present themselves. Between three and six months, the antibodies start to provide immunity against receiving the disease again and the person has lifelong protection. This does not prevent the person from having prolonged or relapsing symptoms that may occur over a six to nine month period. At that point, it is not possible for the person to become affected again and he/she becomes unable to transmit it to anyone else. The antibodies will also be able to be detected by blood tests.

DIAGNOSIS:

Based solely upon symptoms, the hepatitis A infection cannot be differentiated from other types of viral hepatitis. A serologic blood test must be performed in order to find IgM antibodies. Sometimes these antibodies are detectable from five to ten days before the onset of symptoms and they can persist for up to six months after the infection. The blood test is the only accurate way to diagnose the infection.

Basically, everyone is a candidate for getting the vaccination, but others who are at risk of contracting the infection are:

- Users of illegal drugs – injecting and non-injecting drug users
- Anyone who has close physical contact with people who live in areas with poor sanitary conditions
- Men who have sex with other men
- Individuals who have chronic liver disease or blood clotting disorders; usually are not at risk for acquiring hepatitis A, but is at higher risk for acquiring fulminant hepatitis
- Anyone travelling to developing countries.
- Children in populations that have repeated epidemics of hepatitis
- Restaurant workers and food handlers
- Frequent eating of raw shellfish
- Laboratory workers who handle live hepatitis A
- Child care centers, usually because of children who are still in diapers. The way that staff handles them contributes to the spread of the infection. After children are toilet trained, there is less of an occurrence.

The HAV vaccine is made from inactive hepatitis A virus (synthetic) and is highly effective in preventing the hepatitis A infection. It first became available in 1995 and has dramatically improved the transmission of the disease. The vaccine is given intramuscularly into the deltoid muscle and provides protection for about four weeks after the first injection. A second injection will give protection for up to twenty years. There is no live virus in the vaccination, as the virus is inactivated during the production. The dosages vary according to the patient's age, as do the schedules. Its' safety during pregnancy has not been determined.

PREVENTION:

Anyone older than the age of one is able to receive the hepatitis A vaccination and become immunized. The vaccine is recommended by the Centers for Disease Control and Prevention for children from twelve to twenty-three months, and for adults who are at high risk for any type of infection.

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TREATMENT:

There is no specific treatment for the hepatitis A disease, and it usually resolves on its own over several weeks or a few months with no serious after effects. Fortunately, 99% of people who have been infected will recover without any type of treatment. For short term immunity, treatment with immune globulin is given before exposure or within two weeks of exposure to the virus. If not given within that two week exposure period, it will not effectively provide protection.

SUMMARY:

Since hepatitis A can present in a very mild form, especially in children, it is very possible for someone to be unaware that they have the illness. As low as 5% of the population may recall being sick with the virus. Hepatitis A does not cause chronic liver disease, but may cause a prolonged illness for up to 6 months.

Most patients recover completely. Fortunately, there is an effective vaccine available for prevention of the disease.

HEPATITIS B

Hepatitis B is an inflammatory disease. It is caused by the Hepatitis B virus (HBV). It ranges in severity from a mild illness that lasts only a few weeks (the acute stage) to a serious long term illness (the chronic stage). Because it can result in liver cell damage, it can lead to liver disease or liver cancer. It can cause scarring of the liver, also called cirrhosis, and that increases the risk of liver cancer. At one time it was called serum hepatitis, but is now referred to as blood borne hepatitis.

The virus is usually able to be cleared from the bloodstream after approximately six months and then the person develops an immunity. Someone who cannot clear the virus after that time is considered to have chronic hepatitis B. If it is not treated, there is a risk of cirrhosis and/or liver cancer occurring. If liver cancer is to develop, it will usually occur many years after the initial onset of the disease.

HBV is 100 times more infectious than HIV, the virus that causes AIDS. An estimated 350,000,000 people are infected globally with HBV and approximately one million people die each year from complications. Each year, five thousand Americans die from cirrhosis and one thousand die from liver cancer due to hepatitis B infections.

Approximately 22,000 pregnant women in the United States are infected with the virus and are able to transmit it to their newborns. Luckily, the vaccine can provide immunity in over 95% of young healthy adults.

The hepatitis B virus is able to live on a dry surface for up to seven days.

TRANSMISSION:

Transmission occurs when blood from the infected person enters the body of the person who is not infected. It is found in blood and other bodily fluids, such as tears, semen, saliva, open sores, vaginal secretions, seminal fluid, urine and breast milk.

The risk is increased in the following situations:

- Sexual contact with someone infected with the virus
- By living in the same house as an infected person
- A mother who is HBV infected may transmit it to her newborn at the time of delivery regardless of whether the delivery is vaginal or via cesarean section; that is why prenatal blood tests for HBV should always be done if there is a suspicion of the virus.
- Direct or indirect blood to blood contact
- Sharing toothbrushes, razors or other personal items that have come in contact with blood
- Tatooing, body piercing or acupuncture if the needles are infected
- A blood transfusion that is contaminated with hepatitis B
- Sharing unsterile needles used for injecting drugs
- Men who have sex with men
- People who have multiple sex partners
- Immigrants and children of immigrants from areas with high rates of hepatitis B
- Healthcare workers
- Hemodialysis patients
- International travelers
- People who received a transfusion of blood or blood products before 1987

Unless the prevalence of the disease is high in a particular country, travelers are not at a higher risk of acquiring it. In order to assess the risk, it is important to check the prevalence of the infection in that particular area, look at whether or not there will be direct contact with blood, or if there is a chance of having sexual contact with someone who might be infected, and evaluate the length of the trip. The longer the period of travel, the greater the chances are of having it transmitted.

Anyone who will be traveling should be educated with pertinent information regarding the disease. They should be told of prevention measures and should be encouraged to receive the hepatitis B series prior to travel, if they did not receive it before.

SYMPTOMS:

Many people who acquire hepatitis B do not have symptoms. Even if they do, they symptoms may be very mild and appear to be similar to influenza. There may be a loss of appetite, nausea, fatigue, muscle or joint aches, a mild fever and some possible jaundice or yellow tinge to the skin. There may be some abdominal pain and/or dark brown urine.

Because there are not always symptoms and 30% of people never show any signs of having the disease, it can be passed on innocently to others and this makes it very dangerous.

Most patients recover within a six month time period, but 5-10% of those affected with hepatitis B develop chronic hepatitis. They also become carriers (someone who has had the virus in their blood for at least six months). A carrier may remain infected with the virus throughout his lifetime, even though he has no signs or symptoms of the disease.

DIAGNOSIS:

An acute hepatitis B infection is diagnosed by a simple blood test that detects the presence of hepatitis B surface antigen (HBsAg) and IgM antibody to hepatitis B core antigen (anti-HBcIgm). These antibodies develop in the blood in the early stages of infection at the time that the symptoms first appear. The following antibody variations can occur, each having a specific implication. Antibody to HBsAg (anti-HGBs): develops after active infection and serves as an indicator of immunity.

1. HBsAg: This is the hepatitis B "surface antigen" that is found in the blood of someone with the virus. If the test comes out positive, the virus is present. It indicates acute or chronic HBV. Persistence for 6 months after acute infection indicates progression to chronic HBV.
2. HBsAb: This is the "surface antibody". It gets formed in response to the virus or the vaccine. If the test is positive, it indicates that the immune system developed this protective antibody against the virus. It provides long term protection and you cannot get the virus again. Anyone who has this positive antibody cannot transmit the virus to anyone else and is not infected.
3. HBcAb: This is the "core antibody". A positive test shows that the person may have been exposed to the virus but that there is no immunity or protection for the virus.
4. Anti-HBs+: indicates individual has been vaccinated, has received immune globulin, is immune, or is an infant who has received antibodies from its mother
5. Anti-HBc+: indicates past or present infection and lasts indefinitely. It may also be detected in someone who has received immune globulin or an infant who has received antibodies from its mother
6. IgM anti-HBc+: indicates recent infection with HBV, usually within 4-6 months
7. HBeAg+: indicates active viral replication and high infectivity

- If HBsAg, HBsAb and HBcAb are negative, it indicates that the person is not immune to the virus and remains at risk for getting the infection
- If HBsAg is negative, HBsAb is positive and HBcAb is either negative or positive, it indicates that the person has been vaccinated or has recovered from a previous infection. This person cannot infect others.
- IF HBsAg is positive, HBsAb is negative and HBcAb is either negative or positive, it means that the virus is present and can be transmitted to others. It indicates the presence of acute or chronic infection.
- If HBsAg and HBsAb are negative, and HBcAb is positive, the interpretation is unclear and indicates that the blood panel should be repeated for further testing.

It takes six months' time to recover from the infection and develop immunity. If this occurs, the virus is considered to be acute. If the person continues to test positive following the six months, it is considered to be a chronic hepatitis B infection.

PREVENTION:

The best way of preventing the disease from occurring is to receive the hepatitis B vaccination. That is the best protection, and is the safest and most effective way of preventing the disease. All infants and unvaccinated children, adolescents and at risk adults should be vaccinated. For people who have not been vaccinated, reducing exposure to the virus can help prevent hepatitis B. Reducing exposure means using latex condoms, which may lower the risk of transmission, not sharing drug needles and not sharing personal items such as toothbrushes, razors or nail clippers with an infected person. The Advisory Committee on Immunization Practices recommends that all unvaccinated adults who are at risk for the virus receive the vaccination. The series is also available to all adults who want to protect themselves.

Safe and effective vaccines are able to provide protection for fifteen years and longer. Three injections over a 6-12 month period are required for full protection.

Areas that are of high risk of acquiring the virus are: HIV testing facilities, sexually transmitted disease treatment facilities, HIV treatment facilities, any setting that provides drug abuse treatment and prevention, dialysis facilities, correctional facilities, end stage renal disease programs and all daycare facilities that take care of developmentally disabled persons.

A newborn who has been exposed to HBV at birth by an infected mother should receive the hepatitis B immune globulin plus the first dose of hepatitis B vaccine within twelve hours of birth and two additional doses of vaccine at one and six to twelve months of age.

Everyone who handles blood or blood products in their daily work should be vaccinated.

Things to do to prevent the infection:

- *Practice safe sex*
- *Don't share anything that could have an infected person's blood on it*
- *Don't share drug needles, cocaine straws or any drug paraphernalia*
- *Cover all sores and rashes and do not touch them*
- *Clean up any blood spills with a 10% solution of household bleach. Infected persons should not pre chew food for babies*
- *If exposed to hepatitis B, get an HBIG (hepatitis B immune globulin) injection within 14 days following the exposure*

TREATMENT:

Drugs that have been approved for the treatment of chronic hepatitis B include alpha interferon and peg interferon. These slow the replication of the virus in the body and also help to boost the immune system. Also being used are the antiviral drugs, such as lamivudine, adefovir dipivoxil, entecavir and telbivudine. Other drugs are being evaluated. Early treatment is the BEST treatment. The drugs do not cure the disease, but they are effective in helping to combat the virus.

Less than 50% of patients who have chronic HBV are candidates for the interferon therapy. About 40% of HBV patients who are treated with the Interferon will respond, but, some will relapse when the treatment is stopped, and overall, only about 35% of the eligible patients will show any benefit from the drug. Also, the treatments may have side effects, such as flu like symptoms, headache, nausea, vomiting, loss of appetite, depression, diarrhea, fatigue and thinning hair. Inteferon may also lower the production of white blood cells and platelets by depressing the bone marrow. Therefore, blood tests are needed to monitor blood cells, platelets and liver enzymes. The response to oral Lamivudine, given for at least one year, may be somewhat lower. Also, anyone who is chronically infected with HBV should be vaccinated against hepatitis A.

Generally, people who develop acute hepatitis B do not get treated with the antiviral drugs since the disease very often resolves on its own. Infected newborns are most likely to progress to chronic hepatitis B, but by young adulthood, many people with acute infection are able to recover spontaneously.

Regardless of whether or not medications are prescribed, it is important to avoid alcohol, drugs and herbal medications. Liver function tests need to be performed every 6-12 months.

There are two outcome possibilities:

1. An immunity to HBV may develop. 95% of adults who are infected are able to develop antibodies and recover spontaneously within six months. When they recover, they develop immunity to the virus and are not infectious to other people. Their blood tests will always test positive for the HBV antibody.
2. A chronic infection will develop. About 5% of the time, the virus will not clear the body within six months. If this happens, the person is considered to be a carrier (chronically infected). A chronically infected person may or may not show outward signs or symptoms, but the HBV virus will still remain in the blood and bodily fluids and will be able to cause infection in others.

Blood Donation:

Anyone who had or has a positive testing for hepatitis B is not able to donate blood, even if there were/are no signs or symptoms affiliated with it.

THE HEPATITIS B VACCINE:

The hepatitis B vaccine has been available since 1982. It is given in order to prevent the disease and its serious consequences. The vaccine is endorsed by the medical, scientific and public health communities as a safe and effective means of preventing disease and death. Because it prevents the disease, it also prevents possible consequences of the disease such as liver cancer. Therefore, it is looked at as an anti-cancer vaccine!

The vaccine is safe for infants, children and adults. Babies may be vaccinated at birth, children from 0-18 years should receive the vaccine, and basically people of any age who might be at risk for the disease.

A person might remain protected for at least 23 years after receiving the series. Even though surface antibody levels may decline, the immune memory continues to remain intact and so the person continues to be protected against the disease.

All individuals who live in the same household with a chronically infected person should be vaccinated. Anyone who is exposed to blood at work, through drug use or who have multiple sex partners should be vaccinated. Anyone with hepatitis C or any other chronic liver disease should be vaccinated.

Schedule of vaccine:

Three doses are given over a period of 6 months. This is to obtain long lasting immunity. The second dose is given one month after the first and the 3rd dose is given 5 months later. If the series is interrupted after the first dose, the second dose should be administered as soon as possible. The second and third doses should be separated by an interval of at least 2 months. If only the third dose is delayed, it should be given as soon as possible. The vaccine is given as an intramuscular injection.

Contraindications to the hepatitis B vaccination:

If someone has had an allergic reaction to a prior dose of hepatitis B vaccine, they should never receive any further doses. A history of hypersensitivity to ANY vaccine component means: Do not give this vaccine!!

**The vaccine contains yeast. Anyone allergic to yeast should not ever receive the vaccine!!

Any unusual illnesses that occurred after receiving the vaccine is most often related to other causes, not the vaccine. This event might happen coincidentally and should not be attributed to the vaccine.

Most reactions are merely pain at the injection site and possible slight elevated temperature.

SUMMARY:

The number of new infections continues to decline yearly. However, because of all those who presently have the disease, even though it was acquired years ago, there are almost two million deaths that still occur annually. Those who had the highest rate of the disease fell into the 20-49 year age group.

As with many vaccinations, there is always controversy. The National Vaccine Information Center states that society has to be provided with complete information about all vaccination risks and that without that knowledge, people cannot make objective decisions as to whether or not they want the vaccination or want their children to receive it.

The Vaccines for Children Program provides free hepatitis B vaccines to young people who are under the age of nineteen and who are on Medicaid, have no insurance or who have insurance that does not cover immunizations.

It is possible to eradicate hepatitis through a comprehensive vaccination program. This would mean that all newborns, children under nineteen and adults at risk would be vaccinated against HBV.

HEPATITIS C

Hepatitis C is a disease that causes inflammation of the liver. It is caused by the hepatitis C virus (HCV) and is a slow progressing disease that may take between ten and forty years before it causes serious liver damage to some people. The contagious virus is found in the blood of anyone having the disease. 80% of people affected with the virus can become chronically infected and risk serious long term clinical disease, permanent liver damage, cirrhosis, liver cancer and even death.

Approximately 170 million people or 3% of the world’s population is infected with it. Sadly, 90% of these patients who are in need of treatment are not able to receive it because they cannot afford it.

In developed countries, people who are at risk of getting the infection include recipients of previously unscreened blood, blood products and organs; healthcare workers who have percutaneous exposure from needles or sharps that have been contaminated; anyone who participates in sexual practices that are at high risk; intravenous drug users; anyone undergoing chronic hemodialysis; receiving medical or dental procedures with inadequately sterilized instruments.

TRANSMISSION:

About one in ten people who become infected with the virus have not had an identifiable exposure to hepatitis C. Many are not aware that they have the disease and the only way to know definitely is to have a blood test performed.

The virus is spread when the blood from an infected person enters the body of a person who is not infected. Therefore, it is transmitted basically by direct contact with human blood. Some of the risk factors are as follows:

- Sharing needles
- Healthcare workers who receive a needle stick or sharp exposure have a 2% risk of acquiring the disease if the needle has been contaminated with HCV positive blood
- From an infected mother to her child at the time of delivery although this is only about 5%
- Anyone who received a transfusion before July 1992 from a donor whose blood was infected with the virus (this is rare today due to the testing that is being done).
- By being on a dialysis machine that had someone's blood on it
- By sharing razors or toothbrushes with someone infected with HCV
- Getting a tattoo with tools that have not been sterilized
- Intravenous (IV) drug users – even if the IV use was in the past
- Having multiple sex partners or having sex with partners who have other sexually transmitted diseases

Any source of blood or blood product appears to be capable of carrying and transmitting the virus and because of this, the virus is highly transmissible to anyone who does any of the above practices. Even acupuncture or body piercing can spread the disease. But those that are at highest risk will be the IV drug abusers, those who share contaminated needles and any person who is involved with any type of drug abuse. Among frequent drug users, 50-80% are infected within the first 12 months of beginning injecting.

Those who partake in hugging, kissing, sneezing, breast feeding, sharing eating utensils or casual contact are not at risk. There is no evidence that it is spread by having oral sex, but although it is not a usual occurrence, it can be spread by regular sexual activity.

SYMPTOMS:

Ironically, almost 80% of those infected with the virus do not exhibit symptoms and continue to lead normal lives. Some may have very mild symptoms and not even know they have the virus. Their symptoms may be mild and flu-like and may consist of nausea, fatigue, loss of appetite, fever, headaches and abdominal pain. Although jaundice can sometimes occur along with dark urine, many people do not get it.

What happens?

The incubation period is approximately 2 to 26 weeks. Liver enzyme tests may range from being elevated to being normal for weeks to as long as a year, but since the virus is in the blood, it may be causing liver cell damage and can be transmitted to others. When the hepatitis progresses, the liver is unable to secrete chemicals and so they build up in the blood. This may cause foul breath, or a bitter taste in the mouth.

75% to 85% of people having hepatitis C do not recover completely and are more likely to have the long term effects of the disease. They may become lifelong carriers of the virus. It normally takes approximately 20 years for the progression to lead to the chronic stage. At that point, the person may go into liver failure. If cirrhosis has occurred, abdominal swelling may be present. Primary liver cancer may also develop from the virus and may occur up to 30 years after the

initial infection.

What does the virus do?

In order to cause the disease, the virus attaches itself to the liver cells and thereby infects them. There are 8 specific steps needed in order to make this happen:

- The virus attaches itself to the liver cell. The hepatitis C virus uses specific proteins that attach to a structure on the surface of the liver cell.
- The protein core of the virus is able to penetrate the plasma membrane and then enter the cell. The lipid coat fuses to the plasma membrane. The membrane engulfs the virus – and the virus is now inside the cell.
- Viral RNA is released in the cell by the dissolving of the protein coat.
- The viral RNA then begins producing materials that are necessary for a viral reproduction. Normal functions of the cell are broken down in order to conserve energy for the production of more viral material.
- The viral RNA is then capable of creating new viral RNA. It is copied hundred or thousands of times in order to make new genetic material. Some of the new RNA then contains mutations.
- The viral RNA produces building blocks for a protective protein coat. The Ribosomes create these proteins which are then released.
- This forms capsomers which are attracted to each other in order to fit together. These capsomeres form a shell and this encapsulates the virus's RNA. This completed particle is what's known as a nucleocapsid.
- Then, the viruses travel inside of the plasma membrane which encircles the virus and releases it. The virus is provided with a protective lip coat and uses this to attach to another liver cell. This process continues until the cell is unable to continue it any longer.

Each virus that is not destroyed the immune system is able to produce thousands of offspring. This continued cycle is the cause of major damage to the liver because millions of cells become destroyed.

DIAGNOSIS:

The virus is easily detected by a blood test that detects the antibodies in the blood. Since this is not usually a routine blood test performed by physicians, people must request it. If the initial test result is positive, confirmation is needed from a second test. Liver enzymes also need to be measured. The antibodies (anti-HCV) may not show up in the first four weeks of the infection, but are usually identified as early as five to eight weeks after the initial exposure. HCV-RNA and RT-PCR tests are able to determine the presence of HCV in as little as one to two weeks. Following the initial episode, the liver enzyme levels remain elevated for approximately six months.

A liver biopsy is able to identify the type, degree of damage and severity of the disease. An elevated ALT and AST level will reveal an ongoing damage in the liver.

Tests used for diagnosing hepatitis C:

Hepatitis C virus antibody (anti-HCV)	Indicates past or present infection but does not differentiate between acute, chronic or resolved infection.
EIA (enzyme immunoassay)	All positive EIA results should be verified with a supplemental assay

HCV RNA (hepatitis C virus ribonucleic acid)	
Qualitative tests	
Reverse transcriptase polymerase chain reaction (RT-PCR) amplification of HCV RNA by in-house or commercial assays (e.g. Amplicor HCV	Detect present of circulating HCV RNA Monitor patients on antiviral therapy
Quantitative tests	
RT-PCR amplification of HCV RNA by in-house or commercial assays (e.g. Amplicor HCV Monitor	Determine concentration of HCV RNA
Branched chain DNA & (bDNA) assays (e.g. Quantiplex HCV RNA assay)	Might be useful for assessing the likelihood of response to antiviral
Genotype	
Several methodologies available (e.g. hybridization sequencing)	Group isolates of HCV based on genetic differences into 6 genotypes and .90 subtypes With new therapies, length of treatment might vary based on genotype
Serotype	
EIA based on immunoreactivity to synthetic Peptides (e.g. Murex HCV Serotyping 1-6 Assay	No clinical utility

TREATMENT:

Unfortunately, there still is no vaccine able to prevent hepatitis C. If someone has received vaccinations for hepatitis A and B, they will not be protected against hepatitis C. It is important, however, for someone having hepatitis C to receive the A and B vaccines.

Preventive measures such as risking the exposure to the virus are the most important in the line of defense against HCV and they are the same as for HBV. There is a vast variation in the types of genotypes associated with hepatitis C. There are six genotypes and there are 15 subtypes. Each genotype may differ in the biological effects regarding mutation rates, type and severity of the liver damage, replication and detection/treatment options. Because of this, the virus undergoes mutations. This makes the development of a vaccine very difficult.

- Anyone who has HCV should not drink alcohol as it accelerates the liver damage.
- A new physician or dentist must be notified before treating.

If acute hepatitis C does not resolve on its own within a two to three month time frame, drug treatment is usually recommended.

Treatment is normally recommended if the ALT levels remain elevated, if there is detectable HCV RNA or if after undergoing a liver biopsy, the results show a moderate degree of inflammation. If a patient has continued ALT elevations, but no severe changes, observation and biopsy within 3-5 years is an alternative to being treated with interferon immediately. If a patient has continued normal ALT values, treatment is not recommended

There are three types of interferon, plus a combination of interferon and ribavirin used to treat the disease. Treatment usually consists of a combination therapy of pegylated interferon and ribavirin. Interferon is generally used alone when ribaviron is contraindicated in the patient.

Ribavirin does not work if it is used alone.

Interferon has to be given by an injection. It may cause side effects such as flu-like symptoms, headaches, fever, fatigue, nausea, vomiting, loss of appetite and thinning of hair.

Ribavirin given orally and can cause side effects such as depression, severe anemia and birth defects in women who are pregnant. Anyone planning to become pregnant is not a candidate for ribavirin. No one should become pregnant until at least six months after the treatment has ended. Another side effect of ribavirin is that it may interfere with the production of red blood cells and platelets by depressing the bone marrow. Patients need to be monitored often.

About fifty to sixty percent of patients respond immediately to treatment; however, up to forty percent have a sustained response.

Research still continues regarding the length of time for the treatment, when it should begin and the actual effectiveness.

About one half of all liver transplants in American are done for end-stage hepatitis C. Unfortunately, the transplanted liver may be re-infected by the virus and the patient may require a second transplant.

Besides medical treatment, a normal life should try to be attained. A well balanced diet, exercise and a positive attitude are important. Depressing or overwhelming tasks should be avoided and rest is important. Anything that will be physically exhausting should be performed in the morning, the time that energy level is at its peak.

SUMMARY:

With proper treatment, about twenty to thirty percent of patients with hepatitis C are able to become virus free if treated properly. Between seventy to eighty percent of the infections that are reported yearly become classified as chronic disease. This refers to infections that are not able to be cleared within six months after the acute infection occurs. Within the chronically infected group, twenty five percent may develop liver failure, although this may take up to thirty or forty years to happen. Cirrhosis slows the blood flow through the liver and causes increased pressure in the vein that carries blood from the stomach and the intestines to the liver. As a result of this, varicose veins may develop in the stomach and the esophagus. Without warning, these large veins are able to break and cause someone to vomit blood or have black, tarry stools. An estimated 8,000 to 10,000 deaths occur each rear that result from complications of the virus.

Sadly, there is a social stigma associated with the disease that very often affects the patient's emotional status. People may fear catching the disease and this may cause more stress on an already overworked liver. It is important that society is educated on the risk factors and means of transmission so that people with this virus are not alienated.

FACTS:

- Approximately five out of every one hundred infants who are born to HCV infected women will become infected
- The virus can be transmitted to the newborn regardless of whether it is a vaginal or cesarean delivery. Following the delivery, the infant should be tested in order to see if HCV is prevalent
- Hepatitis C infection is able to survive on an environmental surface at room temperature

for up to four days.
- The virus not spread by casual contact.
- Healthcare workers who have HCV should not be restricted from taking care of patients, as the risk of transmission to patients or co-workers is very low. As with all healthcare workers, strict aseptic and standard precautions should be used at all times, as well as the use of protective barriers and special care in disposing needles.

The treatments for hepatitis C are uncomfortable and painful, but since the infection continues for a substantial period of time, a long life can be expected if they receive proper treatment. Many can recover completely!

HAND HYGIENE IS ALWAYS THE FOREMOST MEANS OF PROTECTION!!!!!!

HEPATITIS D

Hepatitis D is a viral infection of the liver that is only acquired if someone already has an active hepatitis B infection. Especially in chronic hepatitis B infection, the virus is linked directly to it. It is not common in the United States.

Hepatitis D is able to cause a more severe acute disease than a hepatitis B infection alone. The severity of the diseases together can result in death.

When hepatitis D is acquired and hepatitis B infection already exists, chronic liver diseases with cirrhosis are more likely to occur than with an HBV infection alone.

TRANSMISSION:

The virus is spread by having contact with infected blood in a very similar mode as to how the hepatitis B virus is spread:

- It is passed most often through sharing IV drug needles with an infected person.
- Anyone who receives clotting factor concentrates may also be at a higher risk.
- Transmitting the virus from mother to child during birth is not common.
- Anyone living with or having sex with a person infected with Hepatitis is at high risk.
- Anyone who received a transfusion of blood or blood products before 1987

Many people who have HBV and HDV may not develop symptoms, but, when present, the symptoms are most similar to those having the hepatitis B virus. Anyone having both HBV and HDV are more inclined to develop sudden, severe symptoms that are called fulminant hepatitis.

Anyone infected with both HBV and HDV become a higher risk for developing serious complications that are associated with chronic liver disease. They may become chronically infected and may continue to be contagious from time to time for the rest of their lives.

DIAGNOSIS:

The hepatitis D virus can be tested through blood tests that identify the HDV antigen or antibodies. A positive test for anti-HDV in a patient who has acute hepatitis B indicates HBV/HDV co-infection. A patient who has chronic hepatitis B and a positive HDV test are super-infected.

PREVENTION/TREATMENT:

There is no vaccine for hepatitis D, but people who are not yet infected with hepatitis B should receive the hepatitis B vaccine in order to prevent hepatitis D. A vaccination against HBV will prevent HDV.

Other preventative measures include the same measures as for hepatitis B:

- Avoid exposure to infected blood
- Avoid exposure to contaminated needles
- Avoid exposure to an infected person's personal items, such as toothbrushes, razors and nail clippers

Chronic hepatitis D is usually treated with pegylated interferon. Interferon alfa-2b treatments may be beneficial to a small number of patients. The physician will make a decision based on the care needs of the patient, the medical history and the condition of the liver.

Most people who have acute viral hepatitis experience a self-limiting illness and they recover completely. There is no accepted therapy, restriction on diet or activity.

SUMMARY:

When someone has a partner, it is important to discuss how hepatitis D is passed. Though it is rarely sexually transmitted, using latex condoms the corrective way every time for vaginal, oral and anal sex greatly reduces the risk of passing or getting an STD, like hepatitis B. Hepatitis B makes it possible to get hepatitis D.

Being with someone who is injecting drugs will put the other person at high risk. This is an important issue. Also, if anyone IS injecting drugs, it is vital that needles, syringes, cotton, water, spoons, pots or any other drug paraphernalia ARE NOT SHARED. They should be cleaned with water and bleach in order to reduce the risk.

GET VACCINATED AGAINST HEPATITIS B. THIS WILL PROVIDE PROTECTION AGAINST HDV SINCE THE HEPATITIS B VIRUS MUST BE PRESENT IN ORDER FOR HDV INFECTION TO OCCUR.

HEPATITIS E

Hepatitis E is also known as Enteric non-A, non-B viral hepatitis. It is a serious liver disease caused by infection. It is rare in the United States, but is generally found in geographical areas that lack clean water and sanitation. It is not generally common or typical in countries or areas that have clean drinking water and adequate environmental sanitation. Usually, people who are diagnosed as having hepatitis E have become infected during travels to or stays in geographical area that lack clean water or sanitation.

Hepatitis E is endemic in many developing countries and may cause substantial morbidity. It has a predilection for older men in whom it causes morbidity and mortality. The disease has a poor prognosis in the context of pre-existing chronic liver disease and may be misdiagnosed as a drug induced liver injury. It is uncertain as to the source and route of the infection, but it might be a porcine zoonosis. Any patient with unexplained hepatitis should be tested for hepatitis E, regardless of their age or travel history.

TRANSMISSION:

It is spread through food or water that has been contaminated by feces from an infected person. It is uncommon in the United States. People most like at risk are the following:

- International travelers, particularly those who travel to developing countries
- People who live in areas where hepatitis E outbreaks are common
- People who live with or have sex with an infected person

It is not sexually transmitted. It can be transmitted by ingestion of fecal matter, even in microscopic amounts. This is usually through contaminated water sources and a lack of sanitation. Where there is an outbreak, it is usually associated with a contaminated water supply in countries that have poor sanitation.

SYMPTOMS:

The symptoms resemble those of hepatitis A:

- Low grade fever
- General malaise or feeling of ill health
- Anorexia or lack of appetite
- Nausea
- Abdominal discomfort
- Dark colored urine
- Jaundice

DIAGNOSIS:

There are no specific blood tests available to detect the HEV antigen or antibody. There are diagnostic tests available in research laboratories.

The testing for anti-HEV is usually reserved for returning travelers from the developing countries in the world where hepatitis is present but where other hepatitis viruses are not able to be detected.

PREVENTION:

There is no treatment for HEV. There is no U.S. Food and Drug Administration approved vaccine. The only means of prevention is to reduce the risk of exposure to the virus. This means avoiding contaminated food and tap water when traveling internationally and practicing good hygiene and sanitation.

It is usually a self limited illness and runs a defined, limited course. The patient usually recovers completely over several weeks to months. Hospitalization should be considered if someone is severely ill in order to receive the proper care. There are no restrictions on diet or activity.

SUMMARY:

Outbreaks have occurred in Asia, Africa and Mexico as well as in other geographical areas lacking a clean water source. When travelling to geographical areas where the water supply is doubtful:

- Avoid drinking the water unless it is sealed bottled water
- Avoid using local ice
- Avoid uncooked shellfish
- Avoid uncooked fruits or vegetables that are not peeled or prepared by the traveler

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GENERAL DIAGNOSTICS REGARDING HEPATITIS A THROUGH E

Liver Panel:

A liver panel that is also known as a liver (hepatic) function test or LFG is used to detect, evaluate and monitor liver disease or damage. It usually consists of seven tests that are run at the same time on a blood sample. These are:

- Alanine aminotransferase (ALT) – an enzyme that is mainly found in the liver; it is the best test to detect hepatitis
- Alkaline phosphatase (ALP) – an enzyme that is related to the bile ducts; it is often increased when they are blocked
- Aspartate aminotransferase (AST) – an enzyme found in the liver and a few other places, particularly the heart and other muscles in the body
- Bilirubin – two different tests of bilirubin often used together (especially if a person has jaundice): total bilirubin measures all the bilirubin in the blood; direct bilirubin measures a form that is conjugated or combined with another compound in the liver
- Albumin – measures the main protein made by the liver and tells whether or not the liver is making an adequate amount of this protein
- Total Protein – measures albumin and all other proteins in blood, including antibodies made to help fight off infections

Other tests that could be requested along with the liver panel are gamma-glutamyl transferee (GGT), lactic acid dehydrogenase (LDH) and prothrombin time (PT).

One or all of these tests are usually ordered when there are suspicious symptoms of a liver condition. The symptoms include:

1. jaundice
2. dark urine or light colored bowel movements
3. nausea, vomiting and/or diarrhea
4. loss of appetite
5. vomiting of blood
6. bloody or black bowel movements
7. swelling or pain in the abdomen
8. unusual weight change
9. fatigue or loss of stamina

These may also be ordered if someone has a family history of liver disease, excessive alcohol intake, has been exposed to a hepatitis virus or is taking a drug that can cause liver damage.

Initial testing normally includes a group of 14 tests that are called the Comprehensive Metabolic Panel (CMP). Most of the tests that are found in the liver panel are included in the CMP, except the direct bilirubin. If liver disease is detected by a CMP blood test, it may be monitored over time with follow up liver panels.

Liver Biopsy:

If tests suggest that the liver is not working properly, a small piece of tissue will be examined from the liver for signs of damage or disease. A needle removes the tissue from the liver. Looking at the liver tissue is the best way to determine if the liver is healthy, and if not, what is causing the damage.

The procedure is done at the hospital since it is considered minor surgery:

The patient lies on a hospital bed on his/her back, with the right hand above the head. The physician will mark the outline of the liver and inject it with a local anesthetic to numb the area. A small incision is made on the right side near the rib cage, and the biopsy needle is then inserted in order to retrieve a sample of the liver tissue. An ultrasound image may also be used to help guide the needle to a specific area.

The patient must lie very still so that the lung or gallbladder do not become nicked, since they are close to the liver. The patient will hold his/her breath for five to ten seconds while the needle is put in the liver. There may be pressure and a dull pain. The procedure takes approximately twenty minutes.

There are two other types of liver biopsy available:

Laparoscopic biopsy: a laparoscope is inserted through an incision in the abdomen. The laparoscope sends images of the liver to a monitor. By watching the monitor, instruments are used in the laparoscope that remove tissue samples from one or more parts of the liver. This type of biopsy is used when tissue samples are required from specific parts of the liver.

Transvenous biopsy: a tube called a catheter is inserted into a vein in the neck and guided to the liver. The physician puts the biopsy needle into the catheter and then into the liver. This procedure is used when patients have blood clotting problems or fluid in the abdomen.

Recovery:

Following the biopsy procedure, a bandage is placed over the incision. The patient lies on the right side, pressed against a towel for one to two hours. Vital signs and level of pain are monitored by the nurse.

- The patient is not allowed to drive after having a sedative and will require transportation home
- The patient must go directly home and remain in bed for eight to twelve hours
- Exertion must be avoided for the next week so that the incision and liver can heal
- There will be soreness at the incision site and possibly pain in the right shoulder. The pain is caused by irritation of the diaphragm muscle and usually disappears within a few hours or days
- Tylenol is the drug of choice. Aspirin or ibuprofen cannot be taken for the first week after surgery as they decrease blood clotting which is crucial for healing.

Liver biopsy, like any surgery, has risks. The lung or gallbladder could be punctured. There could be resultant infection, bleeding or pain; however, these complications are rare.

****Information is always available from the following:**

American Liver Foundation. Telephone: 1-800-465-4837 or at e-mail:

info@liverfoundation.org. On the internet it is: www.liverfoundation.org

Centers for Disease Control and Prevention Division of Viral Hepatitis. Telephone: 1—800-CDC-INFO (232-4636) or at e-mail: cdcinfo@cdc.gov. On the internet it is: www.cdc.gov/hepatitis

Hepatitis Foundation International. Telephone: 1-800-891-0707 or at e-mail: hifi@comcast.net. On the internet it is: www.hepatitisfoundation.org

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References

1. Your Guide to Hepatitis B. GlaxoSmithKline. 2001 Soah, S; Martin, P. Tests for Acute and Chronic Viral Hepatitis. Vol 107. No. 2, February, 2000. Postgraduate Medicine.
2. CDC, Epidemiology and Prevention of Vaccine Preventable Diseases. The Pink Book, 6th ed. January, 2000: 207-229
3. http://www.cdc.gov/mmwr/preview/mmwrhtml/00055154.htm. Accessed 1/02/009
4. Dolan M, Tindall J. The hepatitis C handbook. 1999. North Atlantic Books
5. http://www.epidemic.org/theFacts/hepatitisC/livingWithHepatitis.html. Accessed 1/02/09
6. Burce C, Montacarelli L. The First Grade hepatitis C - Essential guide for the newly diagnosed. 2002. Marlowe and Company
7. http://www.cdc.gov/ncidod/diseases/hepatitis/c/hepcprev.htm. Accessed 1/8/09.
8. http://www.labtestsonline.org/understanding/analytes/liver_panel/glance.html. Accessed 12/30/08
9. Centers for Disease Control and Prevention (2004). Hepatitis A Fact Sheet. Available online: http://www.cdc.gov/ncidod/diseases/hepatitis/a.fact.htm. Accessed 1/5/09
10. Centers for Disease Control and Prevention. Recommended adult immunization schedule – United states 2009. MMWR 2008; 57(53).
11. Weinbaum D, Williams I. Recommendations for Identification and Public Health Management of Persons with Chronic hepatitis B virus infection. MMWR 9/19/08/ 57 (RR08);1-20

Course Exam

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1. The 5 types of viruses that are responsible for the hepatitis infection are A, B, C, D and E.

   ◯ True ◯ False

2. Hepatitis B, C and D viruses may be the cause of chronic hepatitis.

   ◯ True ◯ False

3. There are no other viruses than affect the liver.

   ◯ True ◯ False

4. The hepatitis infection may be caused by a viral or bacterial infection.

   ◯ True ◯ False

5. A person's own autoimmune system is not able to cause the attack.

   ◯ True ◯ False

6. Hepatitis A is not able to resolve on its own.

   ○ True ○ False

7. The liver helps the body digest food, store energy and remove poisons.

   ○ True ○ False

8. With liver infection, there may be nausea, vomiting and diarrhea.

   ○ True ○ False

9. Advanced damage will not occur if there have been no symptoms.

   ○ True ○ False

10. Aside from alcohol, hepatitis C is the leading cause of cirrhosis.

    ○ True ○ False

11. Specialists recommend no more than 2 drinks a day for men.

    ○ True ○ False

12. Specialists recommend no more than 3 drinks a day for women.

    ○ True ○ False

13. The route of transmission for hepatitis A is fecal-oral.

    ○ True ○ False

14. The route of transmission for hepatitis B is by contaminated food.

    ○ True ○ False

15. Hepatitis A can last from several months to several years.

    ○ True ○ False

16. The National Center for Infectious Diseases recommends that a routine Hepatitis A vaccination is given to children.

    ○ True ○ False

17. There is a higher risk of transmitting hepatitis A if there is fecal contamination in food or water.

    ○ True ○ False

18. An international traveler would not be at risk of getting hepatitis A.

    ○ True ○ False

19. Children with hepatitis A are usually violently ill.

    ○ True ○ False

20. The highest levels of the hepatitis A virus are in the stools two weeks before the symptoms start.

    ○ True ○ False

21. The hepatitis A infection cannot be differentiated from other types of hepatitis based solely upon symptoms.

    ○ True ○ False

22. Hepatitis B is a severe infection and can result in liver cell damage.

    ○ True ○ False

23. Hepatitis B virus is usually cleared from the bloodstream after approximately six months.

    ○ True ○ False

24. The hepatitis B virus is able to live on a dry surface for up to one month.

    ○ True ○ False

25. Transmission of the hepatitis B infection occurs when blood from the infected person enters the body of the person who is not infected.

    ○ True ○ False

26. The risk of the hepatitis B virus being transmitted is increased by people who have multiple sex partners.

    ○ True ○ False

27. Many people who acquire hepatitis B do not exhibit symptoms.

    ○ True ○ False

28. An acute hepatitis B infection cannot be diagnosed by a simple blood test.

    ○ True ○ False

29. HBsAg is the hepatitis B surface antibody.

    ○ True ○ False

30. The hepatitis B vaccine has been available since 1982.

    ○ True ○ False

31. Hepatitis C is a slow progressing disease that may take between ten and forty years before it causes serious liver damage.

    ○ True ○ False

32. About one in ten people who become infected with the virus have not had an identifiable exposure to hepatitis C.

    ○ True ○ False

33. In hepatitis C, those who partake in casual contact are not at risk.

    ○ True ○ False

34. The hepatitis C incubation period is approximately two to twenty-six weeks.

    ○ True ○ False

35. There will be a vaccine available for hepatitis C in 2010.

True False

36. About five out of every one hundred infants born to HCV infected women will become infected.

True False

37. The risk of healthcare workers transmitting hepatitis C to patients is very low as long as strict aseptic and standard precautions are used.

True False

38. Hepatitis D can only be acquired if someone already has hepatitis C.

True False

39. There is a vaccine for hepatitis D.

True False

40. Chronic hepatitis D is usually treated with pegylated interferon.

True False

41. Most people who have acute viral hepatitis experience a self limiting illness and recover completely.

True False

42. Hepatitis E is also known as Enteric A-B viral hepatitis.

True False

43. The symptoms of hepatitis E resemble those of hepatitis A.

True False

44. The symptoms of hepatitis E include anorexia.

True False

45. Hepatitis E is spread through contaminated food or water.

True False

46. There is a pending vaccination for hepatitis E.

True False

47. Alanine aminotransferase is an enzyme that is related to the bile ducts.

True False

48. Initial testing for liver disease includes a group of 14 tests called the Comprehensive Metabolic Panel.

True False

49. There are two types of liver biopsies.

True False

50. After a liver biopsy, exertion must be avoided for at least a week.

○ True ○ False

51. Food associated outbreaks have increased.

○ True ○ False