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### Hepatitis B

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# Hepatitis B

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## Introduction

When one chooses a career in healthcare, they know that there is a chance of exposure to harmful diseases and germs. To better reduce the chances of contracting some of these diseases, vaccinations have become required for those with the potential to be exposed; one of these diseases is hepatitis B (HBV). While the number of acute hepatitis B infections has been decreasing, in 2016 the Centers for Disease Control (CDC) reported that there was still 1 case per 100,000 people (2019). According to the CDC, healthcare workers are some of the most at-risk individuals to contract this disease, as the virus is transmitted by "blood and blood containing body fluids" (2019). This paper will look at the disease process, pathophysiology, and implications for nurses of hepatitis B and discuss actions that can reduce the risk of transmission to healthcare workers, as well as their patients.

## Case Presentation

A 23-year-old male comes to the emergency department with complaints of abdominal pain, decreased appetite, as well as dark urine for approximately 6 weeks. The nurse notes on exam that the patients' skin and sclera have a yellow discoloration, as well as track marks noted to arms. When questioned, the patient states that he is an intravenous drug user, and that he is unsure if the needles he has been using have been clean. He is also unsure if he has been vaccinated for hepatitis in the past. Upon exam, nurse notes that the patient has tenderness on palpation to right upper quad and believes that she able to palpate the liver. Patient develops nausea and vomiting while in emergency department. Also, Patient had a bowel movement that was discolored which he reports has been going on for approximately 2 weeks. Heart sounds are within normal limits, no murmur or other irregularities noted. Lung sounds are clear in all fields. No swelling noted to extremities. Skin is yellow, warm, and clammy. Vital signs are as follows: heart rate is 103, respirations are 18, blood pressure is 123/83, oxygenation is 98 percent, and temperature is 102.1. The nurse is suspicious of Hepatitis B. The nurse must now produce a plan of care for the patient and explore possible treatment and look at prevention methods for recurring infections.

## Signs and Symptoms of Hepatitis B

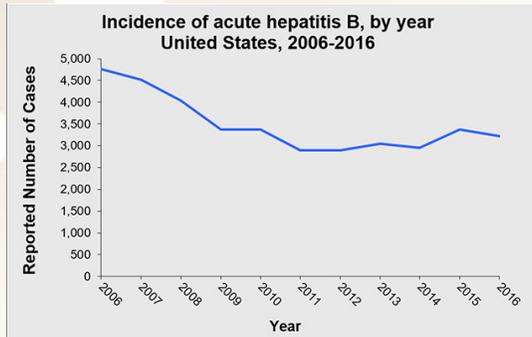
According to the Centers for Disease Control, the signs and symptoms of Hepatitis B are:

- Fever
- Fatigue
- Joint pain
- Nausea
- Vomiting
- Loss of appetite
- Abdominal Pain
- Dark urine
- Clay colored Stools
- Jaundice

They also identified the following as at-risk populations:

- Intravenous drug users
- HIV positive patients
- Men who have sex with men
- Person requiring immunosuppressive therapy
- Blood and tissue donors
- Infants born to mothers who are hepatitis B positive
- Persons with end stage renal disease
- Foreign born persons

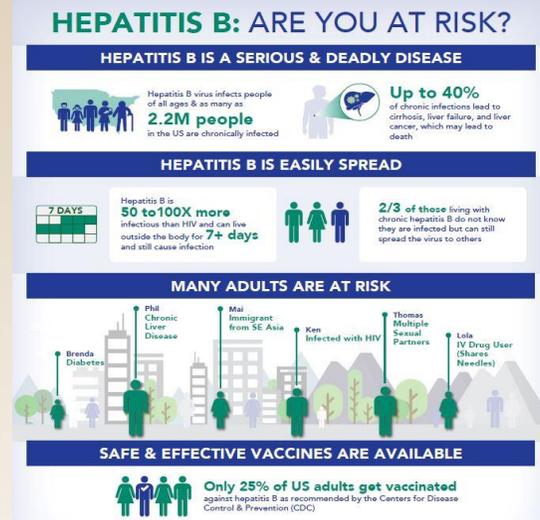
As well, those who work in healthcare may be at increased risk of contraction due to exposure to body fluids from patients who may be Hepatitis B positive. Many healthcare organizations require that employees be vaccinated for Hepatitis B or have records of previous vaccination. As well, titers to confirm immunity may be required if vaccination has not been recent.



## Underlying Pathophysiology

According to Branstetter-Hall & Felcilda-Reynaldo, hepatitis B is a virus that has its own deoxyribonucleic acid (DNA) sequence that infects the normal cells of the body, mainly the liver, and replicates the infected cells growing the virus. Many of these cells move to the liver where newly infected cells are made and can adapt. This change from producing normal liver cells to making these infected cells damages the liver. When these cells form, they also create several different antigens and antibodies that can be detected in the blood of those who are infected. The antibodies that are formed after someone is infected include IgM and several different varieties of IgG anti-HB.

As previously stated, titers can be drawn to check levels of immunity from HBV and these titers look at the antibody IgG Anti-HB to see if levels are high enough to indicate immunity. There are also four stages of HBV, which include the immune tolerant phase, immune active phase, inactive carrier phase, and the reactivation phase. Many times, patients do not know that they have the virus and do not seek care until they have reached the immune active phase. In this phase, the immune system realizes that it has been compromised and starts to combat the infection at the expense of the liver. This is the phase that can cause the most serious complications, such as cancer and cirrhosis (2017).



<http://www.nfid.org/hepatitis-b-toolkit>

## Significance of underlying pathophysiology

As described before, HBV attacks the healthy cells of the liver causing damage that can be short or long term. To help combat these effects, there has been research into the use of antivirals for those diagnosed with HBV. The thought behind this process is that the use of antivirals could stop or limit the spread of the infection. These medications and ideas on how and who they may work for is better described in the works of Branstetter-Hall & Felcilda-Reynaldo. They discuss the various different types antiviral drugs used to treat chronic HBV. These medications are classified as nucleoside reverse transcriptase inhibitors (NRTIs) or nonnucleoside reverse transcriptase inhibitors (NNRTIs) (2017).

There is also a series of vaccinations that may be given to those at risk. These vaccines work the same as many other vaccines in which the body is introduced to small amounts of the antibodies from a virus, so that if the body is exposed to these antibodies in the future, they have the ability to recognize them and start the process of fighting off the infection before it can spread. However, as evidenced by the works of Cloherty, Holzmayer, Kuhns, and McNamara, even with these vaccines there are chances of breakthrough infection. In their work, they studied two samples that were found to be breakthrough infections of HBV. In these breakthrough samples, there is a differing sequence of events described by the authors as "Vaccine breakthrough infections differ from typical acute HBV infection where the order of appearance of viral markers in the peripheral blood follows a consistent pattern with hepatitis B viral DNA (HBV DNA) followed by HBsAg, hepatitis B e antigen (HBeAg), and antibody to hepatitis B core antigen (anti-HBc). Resolution of infection in typical acute infection is marked by loss of serum HBsAg and HBV DNA and the appearance of anti-HBs. In contrast, during breakthrough infections, HBV DNA becomes detectable in vaccinated individuals who have protective levels of anti-HBs" (2019). In the works by Avileli, Basireddy, Beldono, & Gundela, they found that increased age, smoking, and increase body mass index can all lead to decreased effectiveness of the vaccines for HBV (2018).

## Implications for Nursing Care

In terms of caring for patients, there needs to be education on HBV available to patients and families, so that there is not a spread of the virus in the household or among sexual partners. The nurse would also want to make sure that the patient is aware that they will need to follow up with a specialist to monitor liver enzymes, as well as hepatitis panels. In terms of prevention, nurses need to educate all patients on the need to have the vaccine series and to keep up to date on all shots. Nurses would also need to educate on precautions for those diagnosed with HBV on liver protection protocols, such as limited use alcohol, as well as limited use of Tylenol and other medications that can cause damage to the already injured liver.

One would also want to educate the patient on what type of medications they will be going home with. According to the Mayo Clinic website, these can include medications such as the antivirals that were discussed prior and the over the counter options that they may utilize. Depending on the acuity of the infection, the recommendation may be to just rest, increase fluids, and make sure that the patient is eating a healthy nutritious diet (2019).

As nurses caring for those who have been diagnosed with HBV, we have to take extra precautions. These include donning personal protective equipment when there is a possibility of being exposed to bodily fluids of those patients who may be infected. Another precaution to consider is to stay up to date on shots, as well as making sure that titers are drawn to verify that there has not been a breakthrough infection. As well, in the rare case that a healthcare worker is infected with HBV, they will need to follow similar precautions as patients. According to Enfield, Lewis, & Sifri, they will need to use standard precautions when coming in contact with patients. They also state that there is no governing body of healthcare that prohibits the practice of workers who are HBV positive (2015).

## References

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## Conclusion

In conclusion, due to the disease process, there are many different aspects that need to be addressed for the patient. The patient in the scenario would need to have labs and CT scans to rule out other abdominal issues or differential diagnosis. After a hepatitis panel is ran, and if it comes back positive, there will need to be a decision whether this episode is acute or chronic, and then from there the plan of care can be developed. As stated by Abara, Harris, McMahon, Qaseem, & Schillie, the patient will need to be set up with not just counseling for the HBV, but also possible rehab for the intravenous drug use if the patient is wanting these services (2017). If the patient is not interested in possible rehab, they will need to be educated on the use of clean needles and reducing the spread of the disease. The patient will need to discuss the use of antivirals and the compliance with them. He will need to be educated that because of the HBV, he is at increased risk for other liver related issues, such as cirrhosis and cancer. He will need to follow up with a specialist to monitor his liver enzymes in the future, as well as make sure that the hepatitis does not recur.

## Additional Sources

- <http://www.nfid.org/idinfor/hepb>
- <https://familydoctor.org/condition/hepatitis-b/>
- <https://www.mayoclinic.org/diseases-conditions/hepatitis-b/symptoms-causes/syc-20366802>
- <https://www.hepb.org/>
- <https://www.who.int/news-room/fact-sheets/detail/hepatitis-b>

