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Demystified Hepatitis A: The Comprehensive Guide

Muhammad Zaid Khalil[1], Abdul Raheem[1*], Tayyab Zahid[2]

[1]Faculty of Veterinary Science, University of Agriculture Faisalabad, Pakistan
[2] Faculty of Veterinary Science, University of Veterinary and Animal Sciences, Lahore, Pakistan
*Corresponding author: **abdulraheemsaeed2@gmail.com**

ABSTRACT

Hepatitis A has the most viremic prevalence among all other forms of hepatitis. It is caused by the non-enveloped virus of the Picornaviridae family. It can be transmitted between humans and varies in prevalence in different regions. Factors like contaminated food and water, as well as crowded and unsanitary living conditions, contribute to the virus's spread. Symptoms range from no apparent signs to severe liver disease, with jaundice, fatigue, nausea, and abdominal pain being common. Young children and older adults are at higher risk of severe complications. Timely diagnosis through testing is essential for proper public health management. Prevention, especially through vaccination campaigns targeting high-risk groups, has been effective in reducing infection rates.

Introduction:

Hepatitis is a sickness that spreads in the body and affects the liver. Initially, there were two types of hepatitis known as "infectious hepatitis" and "serum hepatitis." Later, these were named Hepatitis A and Hepatitis B when the Australian antigen was found on the hepatitis B virus. Nowadays, there are several types of hepatitis, including A, B, C, D, and E. Hepatitis B and C are the main causes of long-term illness, while others lead to short-term illness.[1]

Hepatitis A was discovered in 1973, and its virus, called HAV, is a non-enveloped virus belonging to the Picornaviridae family. It is a contagious disease that affects humans and, in rare cases, can be transmitted from animals to humans. The virus is highly infectious, causing mild to severe illness, and it spreads through contaminated water, food, and contact with an infected person. It enters the body through ingestion, replicates in the liver, and can lead to various degrees of illness, even death. The incubation period is typically 15-50 days.[2]

HAV can persist in the environment and spread globally. Poor hygiene, inadequate sanitation, international travel, unsafe practices, and lack of clean food and water contribute to infection. Although immunization and health measures have reduced outbreaks, underdeveloped countries still face challenges. In highly endemic areas, people develop immunity in childhood, while in low-endemic regions, adults can get infected through exposure or risky behaviors.

HAV is generally asymptomatic in small children, and adults in developing countries may not show symptoms due to partial immunity. However, in developed countries, adults often exhibit early symptoms. Humans are more susceptible to HAV, and non-human primates have minimal circulation of the virus. HAV has been reported in captive non-human primates, such as monkeys and chimpanzees, where there is close contact with humans.[3]

Virology:

Hepatitis A virus is a tiny virus without an outer covering, and it has RNA as its genetic material. It is about 27 nanometers in size and belongs to the Hepatovirus genus and Picornaviridae family. This virus primarily infects small mammal species and is known to be resilient, capable of surviving in the environment for at least one month and at temperatures up to 85 °C. Its resistance to chlorine and heat makes it difficult to destroy through physical treatment. Hepatitis A virus is a positive-polarity, single-stranded virus with 7470-7478 nucleotides in its RNA genome. It has noncoding regions at both ends of its genome, and the 5' end is attached to a viral protein called VPg, which is crucial for RNA synthesis. The 3' end terminates with a poly (A) chain. The central coding region of the genome contains approximately 2225 nucleotides, coding for viral proteins.[4]

Hepatitis A virus has only one type globally. This means that if a person is infected with one type of virus, they are protected from getting infected again by other types, even if they are from different parts of the world. Although the virus has some genetic material differences, its outer layer structure ensures that it remains a single type. Immune globulin preparations against Hepatitis A can provide protection regardless of the geographic location.[5]

Transmission:

Hepatitis A is a virus that spreads mainly through poop getting into the mouth. It can happen when people eat or drink contaminated things, or when an infected person touches someone else. Other ways it can spread include travelling to places where the virus is common, sexual contact, especially among men having sex with men, and exposure at work or in healthcare settings. It's very rare for the virus to spread through blood transfusions because the virus doesn't stay in the blood for a long time.[6]

- **Contaminated Food and Water**

In some countries, the virus can spread when people drink water that's not clean or when food is contaminated. The virus can stick around in water and infect the things that grow in it. This includes fruits, vegetables, fish, and other foods that can become infected if they touch contaminated water during farming. Even in places where food is served to the public, if the people handling the food don't wash their hands properly or clean the dishes well, the virus can spread to a lot of people.

- **Person-to-Person**

If someone who has the virus touches a person who doesn't, the virus can spread. Children often pass the virus to their parents because they may not be as careful about cleanliness. In crowded living conditions where sanitation is not good, the virus can also spread easily. Sexual contact, especially through anal sex, is another way the virus can be transmitted, particularly in Europe and America. When people travel to areas where the virus is common, they might get infected by eating or drinking things that are not clean. On the other hand, someone who already has the virus can bring it to a place where it's not common. Getting vaccinated for Hepatitis A before traveling to a place where the virus is common is a good practice.

Clinical Signs and Symptoms:

Hepatitis A Virus (HAV) can show a wide range of symptoms, from severe liver damage to mild cases with no apparent signs. The severity of symptoms often depends on the age of the infected person. In children under 6 years old, HAV usually doesn't show any symptoms, while in adults, about 70% of cases have noticeable symptoms. There are two types of manifestations based on how long the illness lasts.

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- **Typical Manifestations**

These include symptoms during the early stages (prodromal and icteric phases) that appear about a month after exposure to the virus. The prodromal phase lasts for 5-7 days and includes nonspecific symptoms like fever, anorexia, fatigue, malaise, and vomiting in adults. However, small children usually don't show such symptoms.[7]

The icteric phase comes after the prodromal phase and is a severe stage with jaundice. In this phase, the liver undergoes inflammation due to immune attacks, leading to dysfunction and structural changes. Jaundice results in yellowing of the skin, eyes, and mucous membranes due to bilirubin accumulation. Dark urine and increased levels of liver enzymes (ALT and AST) also occur. Severe abdominal pain, diarrhea, skin rashes, and itching may also be present.

- **Atypical Manifestations**

HAV doesn't cause long-lasting infections or chronic conditions. It is a self-limited disease lasting less than two months, but 10 to 15% of patients may experience atypical complications. These complications include relapsing hepatitis, prolonged cholestasis, acute liver failure, and other non-liver-related symptoms.

Relapse may occur 2 to 6 months after the initial infection but is usually less severe. Prolonged cholestasis can last up to 6 months, causing intense itching, malabsorption, and fatigue. Fulminant hepatitis, a severe form of HAV, progresses rapidly and occurs in less than 1% of cases. It is more common in adults over 40 with existing liver issues and has a high mortality rate. A liver transplant may be the only option for survival in such cases.[8]

Diagnosing Hepatitis A:

It's challenging to clinically diagnose Hepatitis A (HAV) infection because its symptoms are similar to other types of hepatitis. However, detecting anti-HAV antibodies in the blood is quite easy due to the single serotype. By examining the patient's humoral immune response, we can differentiate HAV from other hepatitis types through serological testing. Various techniques are used to determine HAV positivity in infected patients.[9]

- **Liver Enzymes Examination**

HAV causes liver inflammation, leading to elevated levels of enzymes such as ALT, GGT, and AST. Their increased levels in the blood (5-50 times) indicate the complexity of the infection during the onset of HAV symptoms.

- **Antigen Examination**

The nucleic acid of HAV is detected through Nucleic acid testing (NAT), which includes various techniques like Southern blotting and real-time PCR. The most sensitive method for HAV-RNA detection is reverse transcription-PCR (RT-PCR).

Treatment & Prevention:

There is no specific treatment for Hepatitis A. Supportive treatment is provided, and patients usually recover on their own. Proper rest, hydration, antiemetics, and antipyretics can help manage symptoms. Hospitalization is required for fulminant hepatitis cases. Recovery typically takes 3-7 weeks.[10] Preventive measures include sanitation, self-hygiene, vaccination, proper cooking, water chlorination, and safe sex practices. Passive immunization involves administering immunoglobulin, while active immunization through vaccination is a strategic approach for preventing HAV.

Vaccination

Vaccination is a key strategy for eliminating and preventing HAV. Two vaccine forms are available: live-attenuated and inactivated. Inactivated vaccines are commonly used, requiring multiple doses for ongoing immunity. Routine vaccines and additional doses are recommended for specific populations, including travelers, those with chronic liver failure, HIV-infected individuals, and injection drug users.[11]

Conclusion:

Hepatitis A is a significant public health concern with its global prevalence and diverse clinical presentations. From contaminated food and water sources to crowded living conditions, various factors contribute to the spread of Hepatitis A, particularly in low and middle-income countries. The impact of the disease, ranging from asymptomatic cases to severe liver complications, underscores the need for increased awareness, timely diagnosis, and effective public health interventions. Continued efforts to enhance vaccination coverage, improve sanitation infrastructure, and raise awareness about hygienic practices are crucial for mitigating the burden of Hepatitis A and preventing associated complications.

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