4.4 Hepatitis B

Etiology

The hepatitis B virus (HBV) is a DNA virus, composed of a nucleocapsid core (HBcAg), surrounded by an outer lipoprotein coat containing the surface antigen (HBsAg). The distribution of subtypes varies geographically. No differences in clinical features have been related to subtypes. The third hepatitis B antigen, the “e” antigen (HBeAg), has been identified as a soluble antigen, whose sequences are a subset of those in the core antigen, but without cross-reactivity. The presence of HBeAg is known to be a marker of highly replicative and infectious state for HBV.

Case Definitions

Confirmed Case

- Hepatitis B surface antigen (HBsAg) and immunoglobulin M antibody to hepatitis B core Antigen (anti-HBc- IgM) positive in the context of a compatible clinical history or probable exposure **OR**
- Clearance of HBsAg in a person who was documented to be HBsAg positive within the last six months in the context of a compatible clinical history or probable exposure

Probable Case

- An acute clinical illness in a person who is epidemiologically linked to a confirmed case

Chronic carrier confirmed case

- HBsAg positive for more than 6 months **OR**
- Detection of HBsAg in the documented absence of anti-HBc-IgM **OR**
- Detection of HBV DNA for more than 6 months.

Unspecified confirmed case

- Does not fit the criteria for either of the above **AND**
- HBsAg positive **OR**
- Detection of HBV DNA.

Clinical Presentation

Hepatitis B virus (HBV) causes a wide spectrum of manifestations ranging from asymptomatic seroconversion, sub-acute illness with non-specific symptoms (e.g., anorexia, nausea, or malaise) or extrahepatic symptoms, and clinical hepatitis with jaundice, to fulminant fatal hepatitis.

Only a small proportion of acute hepatitis B cases may be clinically recognized. Less than 10% of children and 30–50% of adult acute cases will have icteric disease.

Hepatitis B in children is most often milder and often anicteric. In infants, this disease is typically asymptomatic.

In persons with clinical illness, the onset is usually insidious with anorexia, vague abdominal discomfort, nausea and vomiting, sometimes arthralgias and rash, often progressing to jaundice. Fever may be absent or mild. Severity ranges from unapparent cases detectable only by liver function tests to fulminating, fatal cases of acute hepatic necrosis. The case-fatality rate in hospitalized patients is about 1% and is higher in those over 40 years of age.

Following acute HBV infection, the risk of developing chronic infection varies inversely with age. Infants infected with HBV at birth will have a 90% chance of becoming chronic HBV carriers. Twenty-five per cent to 50% of children infected between one and five years of age and about 1–10% of persons infected as older children and adults will become chronic HBV carriers.

Chronic HBV infection is found in 0.5% of North American adults and in 0.1–20% of people from other parts of the world. Persons with chronic infection may or may not have a history of clinical hepatitis. About one-third have an elevated aminotransferase. Biopsy findings range from normal to chronic active hepatitis, with or without cirrhosis. The prognosis of the liver disease in such persons is variable.

Chronic HBV infection is also common in persons with immunodeficiency. An estimated 15–25% of persons with chronic HBV infection will die prematurely of either cirrhosis or hepatocellular carcinoma. HBV may be the cause of up to 80% of all cases of hepatocellular carcinoma worldwide, second only to tobacco among known human carcinogens.

Diagnosis

To confirm hepatitis B all suspected cases and contacts of hepatitis B should be tested. The specimen of choice for the diagnosis of HBV infection is blood. For confirmation on laboratory specimens go to the public health laboratory web site www.publichealthlab.ca or call 709-777-6583.

Epidemiology

Occurrence

Hepatitis B occurs worldwide and is endemic with little seasonal variation. In areas of Africa and Asia, widespread infection may occur in infancy and in childhood. In North America, infection is most common in young adults. In the United States and Canada, serologic evidence of previous infection varies depending on age and socioeconomic class. Overall, 5% of the adult population in the US has anti-HBc total and 0.5% is HBsAg positive. Among those from some areas of Asia, 10–15% may be HBsAg positive.

In developed countries, exposure to HBV may be more common in certain groups. These include injection drug users (IDUs), people with multiple sexual partners, men who have sex with men (MSM), clients and staff in institutions for the developmentally disabled, employees in hemodialysis centres and persons in certain healthcare and public safety occupations.

Percutaneous and permucosal exposure to blood or serous fluids are associated with occupationally acquired HBV infections. Surgeons, dentists, oral surgeons, pathologists, operating room and emergency room staff and clinical laboratory workers who handle blood are at highest risk of exposure, however, the majority should be immune to infection if they have received hepatitis B vaccine.

In NL chronic cases are the most common type identified with acute cases rarely identified.

Reservoir

Humans

Transmission

Hepatitis B virus is transmitted through percutaneous or mucosal contact with infectious biological fluids. Transmission of HBV occurs through close contact with infectious bodily fluids, including through sharing of injection drug equipment (such as needles), sexual contact, and from mothers who are acute cases or carriers to their newborns. The risk of transfusion-related HBV is extremely low because all blood and blood products are tested. Saliva is considered infectious in bite wounds with broken skin involving the inoculation of saliva, or when it is visibly tainted with blood. Almost one-third of people with HBV infection have no identified risk factors.

Body substances capable of transmitting HBV include: blood and blood products; saliva (although no outbreaks of HBV infection due to saliva alone have been documented); cerebrospinal fluid; peritoneal, pleural, pericardial and synovial fluid; amniotic fluid; semen and vaginal secretion; any other body fluid containing blood; and unfixed tissues and organs. Transmission from breast milk is unlikely. Feces, nasal secretions, sputum, sweat, tears, urine and vomitus are not implicated unless they are visibly contaminated with blood.

Incubation period

The incubation period is 45 to 180 days, with an average of 60 to 90 days.

Communicability

Communicability can occur while HBsAg is present in blood and is highest during the acute phase of illness. Persons in the “window period” and those rare persons who are concurrently HBsAg and anti-HBs positive should be considered infectious. In the latter case, if HBsAg disappears and anti-HBs remains, persons can be considered non-infectious. The presence of “e” antigen or high levels of viral DNA indicate high virus

titres and higher infectivity, while the presence of “e” antibody and low levels of viral DNA indicate reduced infectivity.

Control Measures

Management of Case

Investigations

- Contact the physician, if possible, before contacting the client to determine:
  - acute or chronic infection,
  - reason for the test,
  - possible source,
  - client symptoms,
  - any past negative test
  - relevant laboratory results e.g., Liver Function Tests, and
  - if testing of relevant contacts has occurred.
- Assess risk factors for acquisition of hepatitis B infection
- Determine hepatitis B immunization history
- If female, determine pregnancy status
- Identify household and other intimate/sexual contacts of the case for potential blood and/or body fluid exposure (significant contacts)
- For acute cases, this should include all current significant contacts as well as those in the previous six months
- For chronic carriers, include current contacts as well as those within the last six months. This trace-back period may be extended back if any known illness signs or symptoms indicate seroconversion, if know risk taking behaviors are reported or if previous negative tests are identified.

Treatment

- Public health personnel should contact physicians to make them aware of the usual public health follow-up
- Provide education about the modes of transmission for the purpose of reducing infection risk to others

- Promote a healthy lifestyle to minimize liver damage e.g., avoid intake of alcohol and hepatotoxic drugs, eating a well-balanced diet, and having regular medical checkups
- Provide information about community support agencies

Medical follow-up for acute cases

- Acute cases should be tested for both HBsAg and anti-HBs six months (but can be as soon as three months) after detection to assess whether a chronic carrier state has developed

- If the person is in the "**window period**" at six months, the individual should be retested at six-month intervals to determine if they have developed anti-HBs while HBsAg remains negative
- Pregnant women should be tested more frequently if they will deliver before the six-month interval to establish whether or not prophylaxis of the newborn will be required (i.e., HBIG and hepatitis B vaccine)
- Referral for specialized care (i.e., hepatologist)

Medical follow-up for chronic carriers

- Chronic carrier management should be done in consultation with a specialist.
- Further testing may be required to determine extent of liver involvement.
- Details concerning treatment should be obtained in consultation with a hepatologist.

Immunization

Cases who are eligible should be immunized with hepatitis B vaccine according to the NL Immunization Manual schedule:
http://www.health.gov.nl.ca/health/publichealth/cdc/immunizations.html.

Exclusion

No isolation or exclusion is required for cases of hepatitis.

Management of Contacts

Definition of contact

A contact is someone who has been exposed or potentially exposed to the blood and/or body fluids of an infected case.

Immunoprophylaxis

Contacts should be appropriately vaccinated based on their prior immunization status.

Chemoprophylaxis

- Infants born to hepatitis B infected mothers should be given hepatitis B vaccine as well as hepatitis B immune globulin (HBIG) immediately after delivery
- Children less than one year in the same household of an acute or a chronic carrier should also be given HBIG
- All sexual and household contacts of acute cases of hepatitis B or of chronic carriers should be vaccinated with hepatitis B vaccine. A single dose of HBIG (0.06ml/kg) should be given for sexual contacts of the HBV infected individual if it can be administered within 14 days of last exposure.
- Post exposure prophylaxis (HBIG and vaccine) maybe indicated for contact with blood such as occurs as a result of a needle-stick injury

Exclusion

No isolation of contacts is required.

Management of Outbreaks

An outbreak management team should be established to address infection prevention and control measures.

Education and Prevention Measures

- Immunization is the most effective preventive measure against hepatitis B
- Immunization for HAV, if non-immune, should be offered to all cases
- Immunization for HBV, if non-immune, should be offered to all contacts
- A hepatitis B school-based immunization program has been offered since 1995 in NL. All people born in 1986 and after have been offered the vaccine. An immunization program for high risk individuals is provided and can be found at http://www.health.gov.nl.ca/health/publichealth/cdc/im_section5.pdf
- Risk factors for hepatitis B infection include:
    - Birth in a region with high rate of endemic hepatitis B infection
    - Infant of a HBsAg positive mother
    - Sexual/household contacts of a person who is HBsAg positive
    - Men who have sex with men (MSM)
    - Unprotected sexual intercourse with new or multiple partners
    - Injection/inhalation drug use with sharing of supplies.
    - Occupations that have potential exposure to blood/body fluids
    - Children/workers in child care centers in which there is a child/worker with acute hepatitis B infection or a carrier for hepatitis B
    - Residents/staff of institutions for those with developmental delays
    - Inmates/staff of correctional facilities
    - Immunocompromised persons
    - Those requiring frequent blood transfusions or undergoing dialysis.
- Harm reduction, education and counseling are critical in prevention strategies. Individuals identified at high risk for exposure to HBV should be counseled on:
    - Avoiding sharing drug needles or other drug paraphernalia including “works” for injection or bills or straws
    - Avoiding unsanitary tattoo and body piercing methods
    - Avoiding sharing personal items such as toothbrushes, razors, nail clippers, and medical devices such as glucometers that may be contaminated with blood
- Persons with known risk behavior(s) should be offered HIV and other STBBI testing and counseling
- Review and monitor prevention practices at time of diagnostic testing for HBV
- Identify barriers to prevention practices and the means to overcome them
- All donations of blood, tissues and organs are tested for HBV; only donations tested negative are used
- Infection Control Routine Practices should be in place in healthcare facilities to

prevent exposure of health care workers to blood and body fluids

- Fact sheets are available at http://www.phac-aspc.gc.ca/hcai-iamss/bbp-pts/hepatitis/hep_b-eng.php and http://www.health.gov.nl.ca/health/publichealth/cdc/Protect_your_child_against_hepatitis_B.pdf and http://www.health.gov.nl.ca/health/publichealth/cdc/diabetes_care_february_2010.pdf

Reporting Requirements and Procedures

- The laboratory (hospital or public health laboratories) report case/s to the attending physician, the Chief Medical Officer of Health and the Medical Officers of Health (MOH)
- MOH office will notify, as required, local physicians, nurse practitioners, environmental health officers, community health nurses, communicable disease control nurses (CDCNs) and infection control practitioners (ICP), in the particular region, as required, for follow-up and case investigation
- The CDCN in collaboration with the physician or nurse practitioner (if necessary) will collect case details
- The CDCN will enter the case details into the electronic reporting system and utilize the Canadian Network for Public Health Intelligence (CNPHI) tool for alerts and/or outbreak summaries

Provincial Disease Control

- Reports the aggregate case data to Public Health Agency of Canada
- Provides an analysis of the case/s with reports in the Quarterly Communicable Disease Report (CDR), also posted on the Public Health website http://www.health.gov.nl.ca/health/publichealth/cdc/informationandsurveillance.html
- Coordinates the response if an outbreak occurs across RHAs

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