Epidemiology of Viral Hepatitis



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OBJECTIVES

TO KNOW THE TYPES AND CASE **DEFINITIONS OF VIRAL HEPATITS** DEFINE THE EPIDEMIOLOGY OF VIRAL HEPATITS KNOW MAIN DIAGNOSTICS METHOD HACE IDEA ABOUT PREVENTION AND VACCINATIONS

Viral Hepatitis Common Features

Early Prodromal Phase serum sickness like syndrome occurs 2-3 weeks before jaundice arthalgias, arthritis, rash, angioneurotic edema, fever

Preicteric Phase

GI symptoms

nausea, vomiting, abdominal pain, anorexia, changes in taste and smell, weight loss generalized malaise, myalgias, headache, fever

Icteric Phase

fever declines constitutional symptoms improve

Convalescent phase full recovery usually within 6 months



Viral Hepatitis Differential Features

Features	Hepatitis A	Hepatitis B	Hepatitis C	Hepatitis D	Hepatitis E
Genome type	Ss RNA	Ds DNA	Ss RNA	Ss RNA	Ss RNA
Genome size	7.5 kB	3.2 kB	9.4 kB	1.7 kB	7.5 kB
Incubation period, days (mean)	15-49 (30)	28-160 (70-80)	15-160 (50)	21-140 (35)	15-65 (42)
Fecal-oral transmission	yes	no	no	no	yes
Parenteral transmission	rare	yes	yes	yes	no
Sexual transmission	no	yes, common	yes, uncommon	yes, uncommon	no
Fulminant hepatitis	<1%	<1%	rare	2-7.5%	~1%, 30% in pregnancy
Chronic hepatitis	no	10%	85%	90% with superinfection	no

Acute Hepatitis Evaluation and Recommendations Access for viral hepatitis A, B, C, -Hep A = IgM,-Hep B =HBsAg, HBc IgM -HCV = Ab (or PCR)-Consider alcohol and drug toxicity, autoimmune hepatitis, ischemia -Consider other viruses: CMV, EBV, HSV. etc.

Hepatitis A



Picornaviridae

- Transmitted by fecal oral route, contaminated food, water, shellfish
- Most infections are sub clinical
 - Incidence peaks in fall and winter
 - 80% infected children are anicteric
 - 10-50% infected college students are anicteric
 - 30-50% adults are HAV IgG+, but only 3-5% recall prior jaundice
 - High attack rate: 70-90% exposed become infected

ACUTE HEPATITIS A CASE DEFINITION FOR SURVEILLANCE

• Clinical criteria

- An acute illness with:
 - discrete onset of symptoms (e.g. fatigue, abdominal pain, loss of appetite, intermittent nausea, vomiting), and
 - jaundice or elevated serum aminotransferase levels

Laboratory criteria

IgM antibody to hepatitis A virus (anti-HAV) positive

Case Classification

 Confirmed. A case that meets the clinical case definition and is laboratory confirmed or a case that meets the clinical case definition and occurs in a person who has an epidemiologic link with a person who has laboratory-confirmed hepatitis A (i.e., household or sexual contact with an infected person during the 15-50 days before the onset of symptoms).





The incidence of hepatitis A per 10,000 population in different Iraqi governorate



>60,000 clinical cases per year

- Incubation 15-49 days (mean 30 days)
- HAV Ag appears in liver at 1-2 weeks
- HAV then appears in bile and stool
- Fecal infectivity begins 2-3 weeks before jaundice, lasts 4-5 weeks, ends 2 weeks after peak transaminitis
- Chronic infection never occurs
 - 60% have normal LFT's at 2 months; 100% normal at 6 months

Transmission of hepatitis A virus

- HAV is spread via the fecal-oral route, personal contact, or ingestion of contaminated water/food
 - HAV is more prevalent in low socioeconomic areas in which a lack of adequate sanitation and poor hygienic practices facilitate spread of the infection

Risk factors:

- Most common is international travel
- Sexual & household contact with another person with hepatitis A
- Homosexual activity in men
- Chronic liver disease
- Foods contaminated by infected food handlers
- No identifiable risk factor

Children pose a particular problem with the spread of the disease because they often remain clinically asymptomatic and are infectious for longer periods of time than adults.

Hepatitis A Prevention

General prevention

 Water chlorination
 Boil water 20 minutes
 Wash hands
 Avoid contaminated food

HAV Immunoglobulin

- Can prevent 85-95% infections if given within two weeks of exposure Indicated in:
- -Household and sexual contacts
- -Day care contacts
- -Prison contacts
- Common source outbreaks

HAV Vaccine



- 90-98% successful with one injection, 100% with two injections
- Protection begins after 1-2 weeks, may last 20 years
- -Give to all of the above
- -Travelers to endemic areas
- –Homosexuals, IV drug abusers
- -Persons with HCV and HBV
- -Military

Hepatitis B

Acute Hepatitis B Case Definition

Clinical Description

- An acute illness with a discrete onset of any sign or symptom* consistent with acute viral hepatitis (e.g., fever, headache, malaise, anorexia, nausea, vomiting, diarrhea, and abdominal pain), and either a) jaundice, or b) elevated serum alanine aminotransferase (ALT) levels > 100 IU/L.
- *a documented negative hepatitis B antigen (HBsAg) laboratory test result within 6 months prior to a positive test (either HBsAg, hepatitis B "e" antigen (HBeAg), or hepatitis B virus nucleic acid testing (HBV NAT) including genotype) result does not require an acute clinical presentation to meet the surveillance case definition.

Laboratory Criteria

- HBsAg positive, AND
- Immunoglobulin M (IgM) antibody to hepatitis B core antigen (IgM anti-HBc) positive (if done)
- AND patient not known to have chronic hepatitis B



Cabinet for Health and Family Services

Chronic Hepatitis B :

Case Definition

Clinical Evidence

No symptoms are required. Persons with chronic HBV infection may have no evidence of liver disease or may have a spectrum of disease ranging from chronic hepatitis to cirrhosis or liver cancer.

Laboratory Criteria for Diagnosis

IgM antibodies to hepatitis B core antigen (IgM anti-HBc) negative AND a positive result on one of the following tests: hepatitis B surface antigen (HBsAg), hepatitis B e antigen (HBeAg), or hepatitis B virus (HBV) DNA

OR

HBsAg positive or HBV DNA positive or HBeAg positive two times at least 6 months apart (Any combination of these tests performed 6 months apart is acceptable

Case Classification

Confirmed: a case that meets either of the above laboratory criteria for diagnosis *Probable*: a person with a single HBsAg positive or HBV DNA positive or HBeAg positive lab result and does not meet the case definition for acute hepatitis B.

Source: CDC and Prevention. CSTE Position Statement Number: 10-ID-10.



Epidemiology - Worldwide 2 billion people have markers of infection 400 million have chronic infection (5%) 1.25 million chronic infections (50% Asian) 200 thousand acute infections per year 250 deaths/year from fulminant HBV 4000 deaths/year from chronic HBV 800 deaths/year from HBV related hepatomas

Hepatitis **B**

90% cases are self-limited with spontaneous resolution
 >50% are anicteric
 10% become chronic
 <1% are fulminant (10% if "E Ag mutant")

-3-5% have HBV markers

Surface Ag appears 1-12 weeks after exposure

- -Clinical hepatitis and Core IgM occur 4 weeks after Surface antigen
- -HBe Ag indicates period of infectivity
- -HBs Ab indicates resolving infection
- Rare "window period" occurs when Surface Ag disappears and before Surface Ab appears so HBc Ab will be positive

Extrahepatic manifestations -Arthralgias and rash (25%) -Angioneurotic edema, polyarteritis nodosa, mononeuritis, membranoproliferative GN, arthritis, Raynaud's phenomena, Type II mixed essential cryroglobulinemia, Guillan Barre Syndrome, pancreatitis, pericarditis

Chronic Hepatitis B Persistent HBs Ag, HBe Ag, PCR=DNA > 6 months Risk of chronicity is dependent on host age and immune status -90% perinatal infection -30% childhood infection age < 6 years -5% adult acute infection -30% with HIV co-infection

Prognosis is dependent on HBV stage -Immune tolerant: – HBs Ag +, HBe Ag +, DNA +, ALT=GPT normal Prognosis good, hepatoma risk is **OW** -Integrated state: HBs Ag +, HBe Ag neg, PCR=DNA neg, ALT usually normal Prognosis good, hepatoma risk low

-Chronic active hepatitis: HBs Ag +, HBe Ag +, PCR=DNA +, ALT >2x normal 20% develop cirrhosis in 5 years ■10% per year lose E Ag 1% per year lose S Ag Increased risk of hepatoma 500 x

Hepatitis B Prevention

Modify risk factors

- Eliminate high risk behavior; specialy for STI
- Incidence of acute HBV has decreased by 40% . over 15 years
- Screen pregnant mothers for HBs Ag
 - HBIG + HBV vaccination at birth prevents 80-90% perinatal transmission

Hepatitis B Immune Globulin

Indicated for :

 Perinatal exposure
 Needle stick exposure
 Sexual, mucosal or percutaneous exposures

HBV Vaccination

Indications:

- -Perinatal exposure
- Persons with sexual, mucosal, percutaneous exposures
- -Persons with HCV or IV drug abuse
- -Homosexuals
- -Health care workers
- -Hemodialysis
- -Universal vaccination for children

2		Infant Hepatitis B Vaccine Schedules For infants < 1 year of age			
Vá	accine	Dose 1 "Birth Dose"	Dose 2	Dose 3	Dose 4
3-dos Engerit	se vaccine series Brand names: x-B, Recombivax HB	Within 24 hours of birth	1 month after dose 1	6 months after dose 1	
4-dose combination vaccine series (pentavalent or hexavalent) Brand names: Vaxelis, Pediarix		Within 24 hours of birth (Hepatitis B vaccine)	6 weeks of age (Combination vaccine)	14 weeks of age (Combination vaccine)	6 months of age (Combination vaccine)
Key	Sector of the			5)	

Children and Adult Hepatitis B Vaccine Schedules For children ≥ 1 and adults					
Vaccine		Dose 1	Dose 2	Dose 3	
* *	3-dose vaccine series Brand names: Engerix-B, Recombivax HB, Twinrix (hepatitis A and B)	Now	1 month after dose 1	6 months after dose 1	
•	2-dose vaccine series Adults ≥ 18 Years Brand name: Heplisav-B	Now	1 month after dose 1		
Key	Honovalent hepatitis B vac (protection against hepatitis)	ccine B only)	 = Approved for adult = Approved for childr 	s en	

Infants Born to Mothers who Have Hepatitis B: Hepatitis B Vaccine Schedules

Vaccine Schedules for Infants Born to Mothers who have Hepatitis B For infants < 1 year of age				
Vaccine	Dose 1 "Birth Dose"	Dose 2	Dose 3	Dose 4
3-dose vaccine series U.S. brand names: Engerix-B, Recombivax HB Brands may vary outside the U.S.	Within 24 hours of birth (Hepatitis B vaccine + HBIG (if available)	1 month after dose 1	6 months after dose 1	
4-dose combination vaccine series (pentavalent or hexavalent) Brand names : Vaxelis, Pediarix	Within 24 hours of birth (Hepatitis B vaccine + HBIG (if available)	6 weeks of age (Combination vaccine)	14 weeks of age (Combination vaccine)	24 weeks of age (Combination vaccine)
Key // For the patitis B (protection against hepatitis)	raccine 💋 = Hepatitis is B only) (HBIG)	B Immunoglobulin	Combination vacci hepatitis B + other di	ne (protection against seases)





HBsAg Anti-HBs Anti-HBc

Susceptible	Negative	Negative	Negative
Vaccinated	Negative	Positive	Negative
Past Infection	Negative	Positive	Positive
Acute Infection	Positive	Negative	lgM Positive
Chronic Infection	Positive	Negative	lgG Positive