



Understanding Hepatitis B: A Guide for Nurses

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**AASLD and the Hepatitis B Special Interest Group
Thank the Following for Their Contribution in
Providing Peer
Review of This Slide Module:**

- **2010 AASLD Practice Guidelines Committee**
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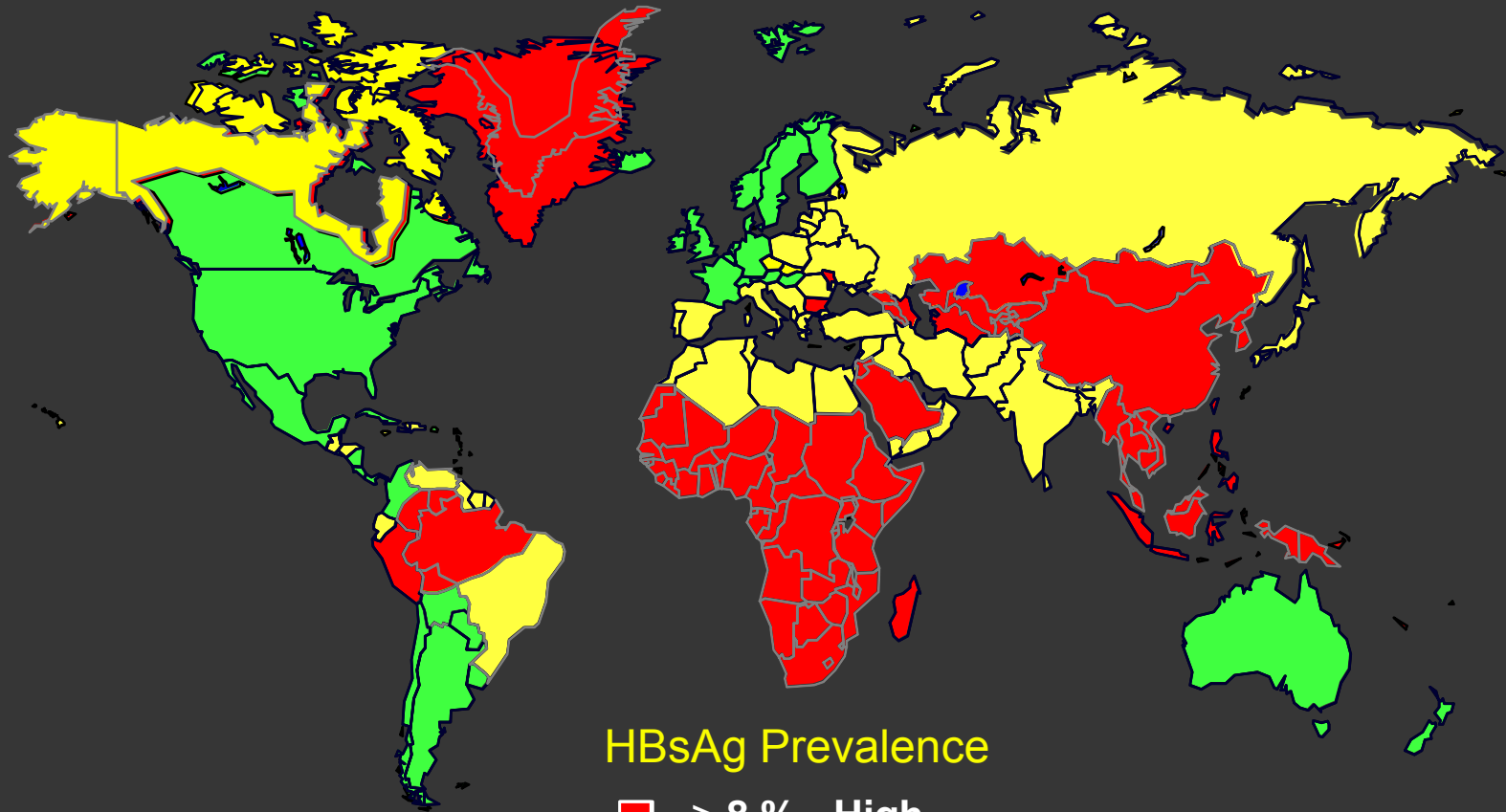
Objectives

- Provide background information on hepatitis B
- Define who and how to screen for hepatitis B and liver cancer
- Discuss hepatitis B preventive measures
- Provide practical information for patient education & counseling

Hepatitis B: The Facts

- A viral infection caused by hepatitis B virus (HBV)
- Chronic infection may lead to cirrhosis & liver cancer
- Liver damage is the result of the host's immune response to infection
- Virus can reactivate after long periods of inactivity
- Vaccine prevents infection and liver cancer
- Treatment can halt disease progression and decrease risk of cirrhosis & liver cancer
- Regular surveillance for liver cancer leads to longer term survival

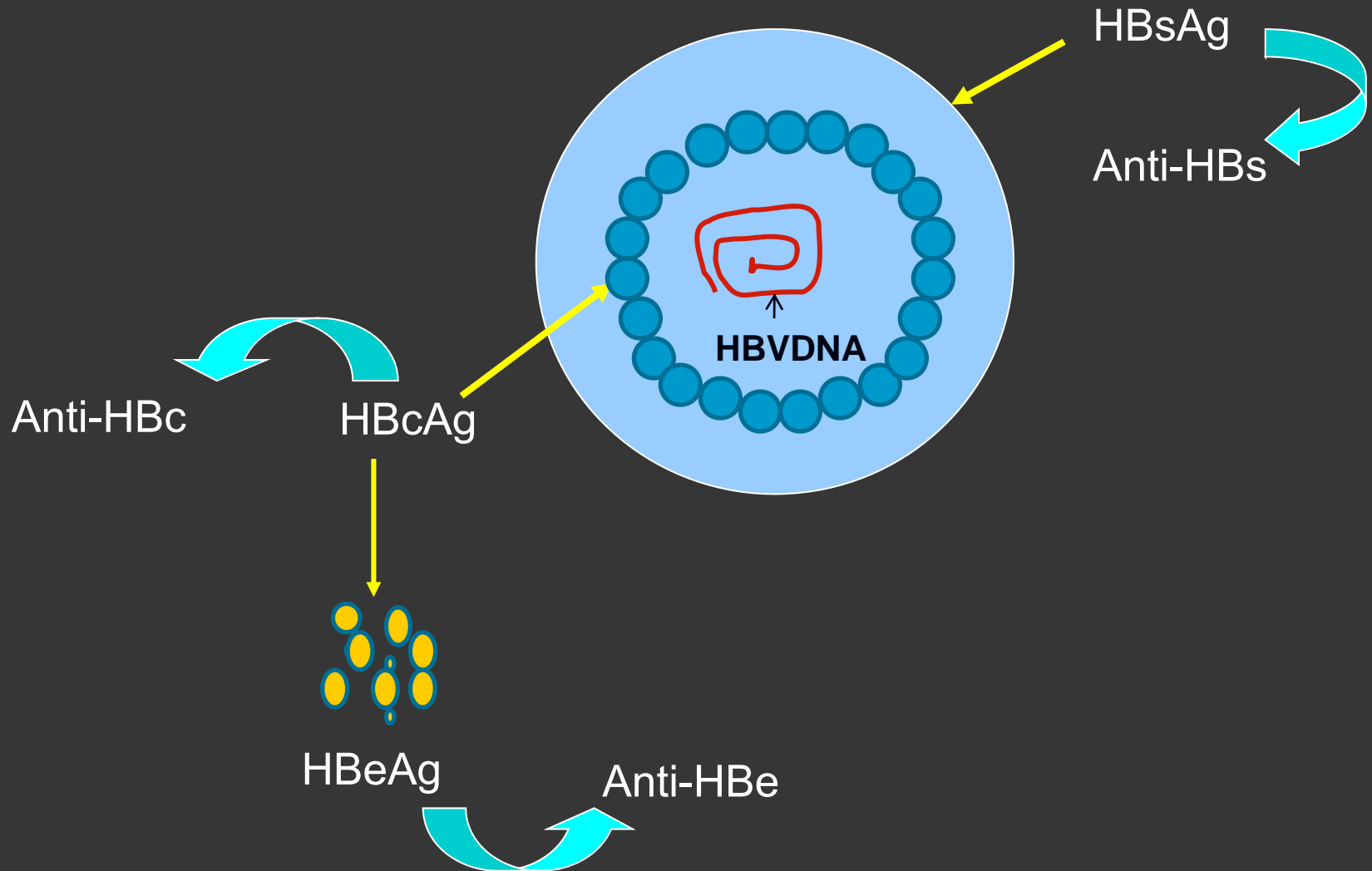
Hepatitis B is Common Worldwide



HBsAg Prevalence

- > 8 % - High
- 2-7 % - Intermediate
- < 2 % - Low

Hepatitis B Virus (HBV)



HBV is Infectious

- HBV is present in body fluids
 - Blood: highest concentration
 - Semen, vaginal fluid: lower concentration
 - Saliva, urine, sweat, breast milk: transmission not documented
- HBV is not in stool
- Can survive outside the body for up to 7 days
- Transmission risk from needlestick injury
 - HBV 30%, HCV 3%, HIV 0.3%

Routes of HBV Transmission

- **Perinatal**
 - Infected mother to infant during delivery
- **Sexual**
 - Unprotected sex with an infected person
- **Percutaneous**
 - Sharing contaminated equipments for injection drugs, tattoos, acupuncture, body piercing
 - Sharing contaminated razors, toothbrushes
 - Needle stick injuries
- **Close person-to-person contact**
 - Open cuts and wounds among children
 - Intrafamilial

Who Should Be Screened For Hepatitis B?

- Pregnant women
- Persons from countries where hepatitis B is $> 2\%$
- Persons with parents from areas where hepatitis B $> 8\%$
- Infants of infected (HBsAg+) mothers
- Sexual, household contacts & family of infected persons
- Persons with behavioral exposures to HBV
 - Injection drug use, history of STI, multiple sexual partners
- Persons at risk of exposure to blood or needlestick injury
 - Health care workers, hemodialysis patients
- Men who have sex with men
- HIV or Hepatitis C infected persons
- Persons with elevated ALT of an unknown etiology

Immunosuppressed Individuals Should Also Be Screened

- Persons receiving
 - Chemotherapy
 - Organ transplant
 - Allogeneic bone marrow transplant
 - Anti-B cell therapy (Rituximab), Anti-TNF α therapy (Infliximab, Etanercept), > 2 weeks of corticosteroids

Hepatitis B Serology

HBsAg (Hepatitis B surface antigen)	<ul style="list-style-type: none">▪ Virus surface protein▪ Positive indicates infection
Anti-HBs (Antibody to surface antigen)	<ul style="list-style-type: none">▪ Antibody produced in response to infection or vaccination▪ Positive indicates immunity
Anti-HBc (Total antibody to core antigen)	<ul style="list-style-type: none">▪ Antibody to viral core protein▪ Positive indicates past or ongoing infection, persists for life
IgM Anti-HBc (IgM class of antibody to core antigen)	<ul style="list-style-type: none">▪ Early phase immunoglobulin to core protein▪ Positive during acute infection or acute flares of chronic infection
HBeAg (Hepatitis B e antigen)	<ul style="list-style-type: none">▪ Virus protein secreted during active viral reproduction
Anti-HBe (Antibody to e antigen)	<ul style="list-style-type: none">▪ Antibody produced when HBeAg is no longer detected▪ Associated with lower level or even non-detectable HBV DNA

HBV Serologic Profile

HBsAg	Anti-HBc	Anti-HBs	Significance
+	+	-	Infected. Chronic if HBsAg positive > 6 months
-	-	+	Immune from vaccination
-	-	-	Never infected. Vaccinate those at risk.
-	+	-	(1) Remote resolved infection (2) May be a false-positive especially in patients with low risk of exposure (3) Rarely, low level chronic infection with small amount of HBV DNA in blood
-	+	+	Resolved infection. HBV reactivation can rarely occur with prolonged and/or severe immune suppression



Other Blood Tests For Hepatitis B

- **HBV DNA (Viral Load)**
 - Direct measurement of viral reproduction
 - Higher the number, more likely virus transmission
 - HBV titre does not correlate with disease severity
 - $< 2,000$ IU/ml = inactive infection
- **Liver enzymes (AST, ALT)**
 - Reflect liver inflammation
- **Liver function tests (Bilirubin, albumin, INR)**
 - Abnormal with severe liver injury



Hepatitis B Immunoprophylaxis

	Hepatitis B Immune Globulin (HBIG)	Hepatitis B Vaccine
Type of immunity	Passive – provide immediate antibody protection	Active – antibody protection produced by host immune system
Composition	Anti-HBs	Recombinant attenuated HBsAg
Duration of protection	Few months	> 20 years
Administration	IM single dose	IM 3 doses at 0, 1, 6 mos
Side Effects	Uncommon	Mild pain at injection site
Recommended use	Post exposure prophylaxis: infants of hep B+ve mother, needlestick injury, post liver transplant	Persons at risk for HBV exposure

Case 1

A 23 year-old woman with documented HBsAg positivity (HBV DNA 10^6 IU/ml) had a normal pregnancy and delivered a healthy baby. To prevent perinatal HBV transmission from mother to neonate, how would you provide vaccination to the baby

Options:

- A. Give 1st dose of HBV vaccine alone < 12 hrs of birth
- B. Give 1st dose of HBV vaccine + HBIG < 12 hrs of birth
- C. Give 1st dose of HBV vaccine + HBIG > 24 hrs of birth

Case 1: Option A

Baby receives 1st dose vaccine alone < 12 hrs of birth

1. Newborn is healthy at birth with Apgar score of 9
2. Baby receives 1st dose HBV vaccine < 12 hrs of birth but no hepatitis B immune globulin is given
3. Outcome: At 12 months, the newborn tests positive for HBsAg.
4. Mother advised to have child see pediatrician

Case 1: Option A

Baby receives 1st dose vaccine alone < 12 hrs of birth

- Vaccine alone, without HBIG will prevent 70-95% of perinatal HBV infection
- Not an optimal immunization strategy
 - No immediate protective antibody provided to infant
 - Vaccine takes time to work

Case 1: Option B



Baby receives 1st dose vaccine + HBIG < 12 hrs of birth

1. Newborn is healthy at birth, Apgar 9
2. Baby receives 1st dose HBV vaccine plus HBIG < 12 hrs of birth
3. Outcome: At 12 months, the newborn tests positive for 1000 mIU/ml of anti-HBs and negative for both HBsAg and anti-HBc .
4. Mother advised that child has had an excellent response to combined prophylaxis



Case 1: Option B

Baby received 1st dose vaccine + HBIG < 12 hrs of birth

- Meta-analysis¹: HBIG + vaccine is superior to vaccine alone in reducing HBV infection in newborns
- Recommendation by ACIP²
 - HBIG + 1st dose vaccine within 12 hrs of birth
 - 2nd dose vaccine @ 1 mos
 - 3rd dose vaccine @ 6 mos
 - Check HBsAg, anti-HBs at age 9 -18 mos

Case 1: Option C

Baby received 1st dose vaccine + HBIG > 24 hrs of birth

1. Newborn is healthy at birth with Apgar score of 9
2. Baby receives 1st dose HBV vaccine one week after birth and hepatitis B immune globulin is given same day
3. Outcome: At 12 months, the newborn tests positive for anti-HBc and anti-HBs but negative for HBsAg.
4. Mother advised that child has most likely had a transient infection.

Case 1: Option C

Baby received 1st dose vaccine + HBIG > 24 hrs of birth

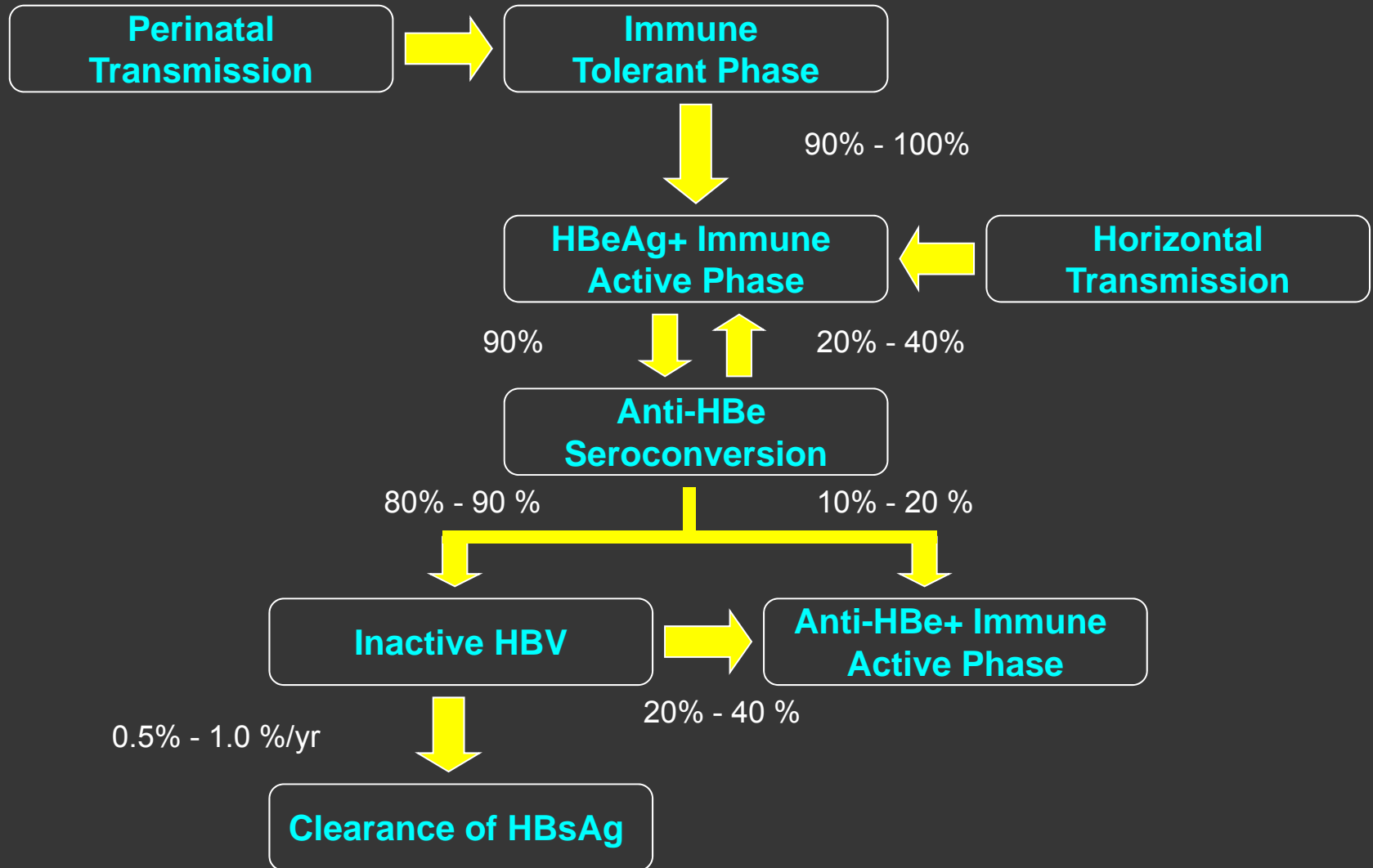
- Immune prophylaxis given > 24 hrs of birth is not a recommended strategy
- Delaying immune prophylaxis > 12 hrs the only factor related to HBsAg +ve in infant ¹
- Delivery suite, not first well-baby visit, is the best setting to provide immunization

Risk of Developing Chronic Infection

Age of Initial Infection	Risk of Developing Chronic Infection
Neonates & infants	90 %
Children 1 – 5 yrs old	25 – 30 %
Older children, adolescents, adults	6 – 10 %

Risk of chronic infection higher in immune suppressed individuals including those on hemodialysis or with HIV infection

Natural Progression of HBV Infection





Signs and Symptoms of Cirrhosis

- None until end stage of disease
- Large spleen on ultrasound
- Easy bruising (low platelet counts)

When disease progresses:

- Bleeding esophageal varices (GI hemorrhage)
- Encephalopathy (confusion)
- Ascites (fluid accumulation in abdomen)
- Impaired coagulation (↑ INR)

HBV Treatment

- **Goals of long-term treatment**
 - Prevent disease progression & liver failure
 - Prevent recurrence of infection after liver transplant
 - Reverse liver failure
 - Prolong survival
- **Goals of prophylactic treatment**
 - Prevent virus reactivation

Two Types of HBV Drugs in 2010

	Interferon Injections	Oral Antivirals
Drug names	Standard interferon, Pegylated interferon	Lamivudine, Adefovir, Telbivudine, Entecavir, Tenofovir
Antiviral activity	Immune modulatory effect	Direct anti-virus effect
Treatment duration	Finite duration, mostly 48 weeks	Years, possibly lifelong
Side effects	Frequent, mostly tolerable	Infrequent
HBsAg loss	1 – 3 % after 1 yr	0 - 3 % after 1 year
Drug resistance	None	0 – 25 % after 1 yr
Virus reactivation after stopping	Uncommon	Frequent if given for a year or two only

Case 2

A 48 year-old HBeAg-positive Chinese man with chronic hepatitis B and cirrhosis has been on telbivudine for 3 years and has had complete suppression of his HBV DNA to non-detectable. He also has had persistently normal ALT. The most recent HBV DNA however became detectable at 3000 IU/ml, ALT remained normal. You suspect virus breakthrough is likely related to:

Options

- A. Development of drug resistance or....
- B. Non-adherence to treatment

Option A: Drug Resistance

- Drug resistance occurs when the antiviral drugs can no longer efficiently suppress the virus
- Risk of resistance is partly related to the potency of the drug
- If resistance testing not available, confirm by repeating HBVDNA in 1 month if patient is taking medication
- Rescue therapy with different drug needed if resistance confirmed

Antiviral Agent	Risk of resistance
Lamivudine	~ 20 % at 1 yr ~ 70 % at 5 yr
Adefovir	0 % at 1 yr 29 % at 5 yr
Telbivudine	8 % to 25% at 2 yr
Entecavir	1.5 % at 3 yr
Tenofovir	0 % at 3 yr

Option B: Non-adherence To Treatment

- Up to 40% patients on antivirals are non-adherent
- Must assess issues that prevent treatment adherence
 - Lost drug insurance coverage, concern about side effects
 - Lapses during vacation, personal expense, “drug fatigue”
- If non-adherent is confirmed
 - Re-emphasize importance of compliance
 - Restart antiviral medication
 - Repeat HBVDNA in one month: level should be significantly lower over prior value than when non-compliance identified



Counseling Patients with Chronic Hepatitis B

- Prevent transmission
 - Ensure family/ household/ sexual contacts screened & vaccinated
 - Do not share toothbrushes, razors
 - Cover open cuts & scratches
 - Clean blood spills with bleach
 - Inform healthcare providers of hepatitis B status

Counseling Patients with Chronic Hepatitis B

- Live normally
 - No food restriction or special diet required
 - No activity restrictions
 - No need to separate food, eating utensils from others
 - No need to isolate from others
 - Hugging and kissing will not transmit HBV
 - Tylenol for pain or fever is safe if taken <2 g/day
 - Limit alcohol to 2-3 drinks per week if no cirrhosis



Counseling Patients with Chronic Hepatitis B

- Prevent disease progression/ reactivation
 - Monitoring of liver enzymes q6-12 months
 - Notify hepatologist if require immuno-suppressive therapy: may need prophylaxis treatment
 - If on antiviral therapy, adhere to daily dosing, regular lab work and follow-up visits



Counseling Patients with Chronic Hepatitis B

- Prevent hepatocellular carcinoma (HCC)
 - Q6-12m ultrasound surveillance*
 - Asian men \geq 40 yrs, Asian women \geq 50 yrs
 - African national $>$ 20 yrs
 - Any age with cirrhosis
 - Any age with family history of HCC

Counseling Patients with Cirrhosis

- Most have no symptoms until liver function deteriorates: need regular follow-up with specialist
- Activity can be as tolerated
- Avoid heavy lifting (Valsalva maneuver)
- Avoid alcohol & hepatotoxic herbs
- Treat all infections promptly



Counseling Patients with Cirrhosis

- **Avoid certain drugs**
 - Aspirin: may enhance bleeding
 - NSAIDs: risk of bleeding, edema
 - Aspirin, NSAIDs, Aminoglycosides: risk of kidney impairment
 - ACE inhibitors: risk of fluid retention
 - Sleeping pills, narcotics: may cause confusion

Counseling Patients with Cirrhosis

- Inform specialist of surgeries that require general anesthesia: higher surgical risk
- Aware of symptoms of liver failure: black stools, confusion, abdominal swelling
- Follow a low sodium diet in advanced cirrhosis: avoid fluid retention
- 6-12 monthly ultrasound for HCC screening: treating cancers when small improves prognosis
- Upper endoscopy screening: assess high grade portal hypertension

Best Nursing Practice Recommendations

- All nurses should be aware that hepatitis B can be serious, is common, and is underdiagnosed because usually it is asymptomatic until advanced.
- All nurses should promote HBV screening in high risk individuals (e.g., from regions of the world with increased prevalence) and should refer HBsAg +ve patients to physicians for further assessment.
- Patient education and counseling should aim for prevention of virus transmission, disease progression, HCC, and treatment failure due to non-adherence.