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Pathology Newsletter
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Hepatitis B Virus (HBV)

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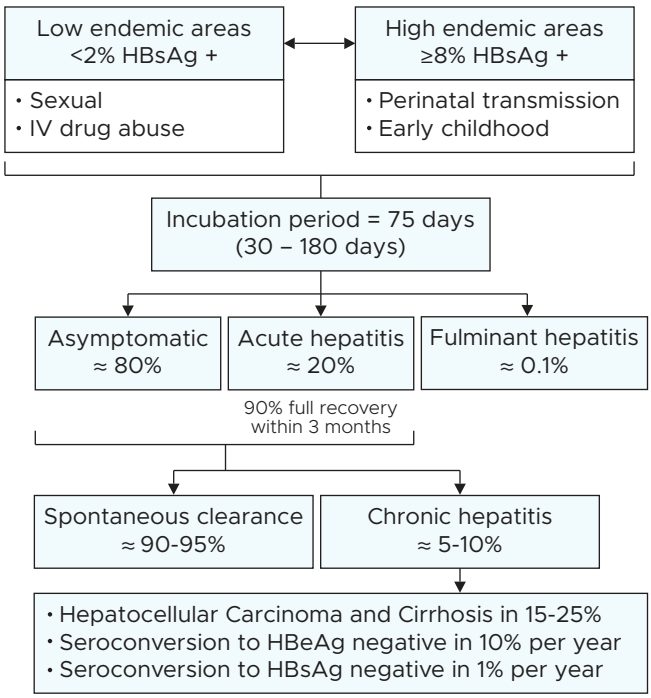
World Hepatitis Day will be held on the 28th of July.

Of the estimated 2 billion patients that have been infected with HBV worldwide, 360 million are chronically infected with 600 000 deaths annually due to liver cirrhosis or hepatocellular carcinoma.

By 2008, 177 countries had already included HBV vaccine as part of their routine infant vaccination programmes. Although 69% of the 2008 birth cohort had received 3 doses of the vaccine, administration within the first 24 hours of birth, were only managed in 27% of cases.

Despite the inclusion of HBV vaccine in our National Expanded Programme on Immunization (EPI) in 1995, the seroprevalence have been shown to increase since 2015[1].

Figure 1. Natural course of HBV and associated serological findings.



* Comorbidities include
1. HIV coinfection (estimated 4 million worldwide)
2. Alcohol consumption
3. Aflatoxin exposure

	HBsAg	Anti-HBc	Anti-HBs	Anti-HBc IgM
Susceptible	-	-	-	
Immunity due to Vaccination	-	-	+	
Requires follow-up testing**	-	+	-	
Acutely infected	+	+	-	+
Immunity due to Natural infection	-	+	+	

** Results may be due to:
1. Resolved infection
2. False positive anti-HBc
3. Low-level chronic infection
4. Resolving acute infection

A comprehensive understanding of the disease process, its progression and testing will facilitate the adequate management of patients exposed to and infected with HBV.

Clinical Course and Serological Testing

The mainstay of laboratory testing is serological assays with detection of both the antigen (surface antigen) as well as antibodies (surface, core and IgM types). In addition to this, the e-Antigen, serum-ALT level and HBV viral loads can be tested to demonstrate increased risk to the development of hepatocellular carcinoma.

Vaccines

The first HBV vaccine available was a plasma-derived product, whereby HBsAg was purified from blood products. The recombinant vaccine, developed in 1986, has now largely replaced the plasma-derived vaccines. It utilizes either yeast or mammalian cells to express the HBsAg gene using plasmids.

Vaccines are available as monovalent formulations or as part of combination vaccines including DTP, *Haemophilus influenzae* type b (Hib), Hepatitis A virus and Inactivated Poliovirus (IPV).

Post-vaccination testing is not routine advocated by WHO. However, for high-risk individuals, this may be of great value. These include individuals who are:

1. At risk of occupational exposure
2. Infants born to HBsAg-positive mothers
3. Chronic haemo-dialysis patients
4. Immunocompromised
5. Sex- or needle-sharing partners to an HBsAg positive individual

Testing should be performed 1-2 months following completion of vaccinations series, by performing anti-HBs. Levels ≥10mIU/mL are considered protective. The European Consensus Group on HBV Immunization recommends annual testing in immunocompromised patients. Levels below 10mIU/mL require revaccination using 3 doses. HIV infection is an indication for vaccination with follows up of antibody response necessary, since a suboptimal immune response is associated with immunosuppression. Patients with chronic renal failure are at increased risk of becoming infected with HBV.

Vaccination is therefore essential. Vaccines tend to be more reactogenic and specific recombinant formulations utilizing alum and lipid A rather than thiomersal can be used for these patients.

References

1. Moonsamy S, Suchard M et al. 2022. Prevalence and incidence rates of laboratory-confirmed hepatitis B infection in South Africa, 2015 to 2019. BMC Public Health.

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