Hepatitis B virus (HBV) – Vaccination

Overview

The hepatitis B virus (HBV) vaccine, is a safe and highly effective vaccine for the prevention of hepatitis B and the associated complications of the disease, including chronic liver disease, cirrhosis and hepatocellular carcinoma. Vaccines are the cornerstone of a public health prevention response and are a core component of the overall HBV elimination response and they have had a significant impact on reducing the incidence of HBV infection.

Several hepatitis B vaccines are available internationally. Some of the vaccines are authorised for use in adults or children only and other vaccines also include antigens that are added for protection against other infections, such as the hepatitis A virus.

Vaccination schedules vary, but HBV vaccination is commonly provided as a series of three doses, which generates long-lasting, probably life-long, protection against hepatitis B (World Health Organization, 2015).

Vaccination schedule

The World Health Organization (WHO) have recommended universal childhood immunisation for hepatitis B since 1991, administered through a 'primary series' of three vaccinations, delivered in the first few months after birth. Vaccination can be provided at any age and should be given in accordance with the manufacturers' instructions.

Since the population at risk has a high mobility, the most pragmatic solution might be to vaccinate as quickly as possible when people visit health services. One recently licenced vaccine in Europe which may not yet be available in all countries – Heplisav B – only requires two doses over one month and has an earlier onset of protection so this may also be considered as an option.

HBV vaccination in prisons

There is evidence from across the region to indicate that the burden of HBV infection is higher among people in prison than among the general population. A recent review reported estimates of HBV infection prevalence of up to 8% from studies conducted in the European Union/European Economic Area (EU/EEA) among people in prison (Bivegete, 2023). Although HBV vaccination programmes are reported to be in place in prisons in most EU/EEA countries, vaccination is often only offered to specific groups considered to be at risk and data on vaccine coverage suggests there are gaps in programmes.

Administering doses according to the standard schedule for vaccination of adults (usually three doses given at 0, 1 and 6 months) can be particularly challenging for people in prison. For example, they may face difficulties in completing the full course if their stay is not be long enough (Van Herck, 2007). Vaccines can be administered according to an accelerated schedule (e.g. Days 0, 7 and 21, or Months 0, 1 and 2). These schedules can be used with or without a fourth dose at Month 12 (Jin, 2015).

Protection resulting from accelerated schedules

In terms of effectiveness, accelerated schedules offer quicker protection in the short term than standard schedules (Van Herck & Jin). Accelerated schedules produce anti-HBs levels higher than the standard schedule for the first month after the initial vaccine dose. However, the levels decline and have been found to be significantly lower than the standard schedule after six months, although still well above the minimum protective threshold. Yet with a fourth dose at 12 months after the accelerated schedule, antibody levels at 12 months are comparable to the standard schedule (Jin, 2015).

Serological testing

Serological testing (HBsAg/Anti-HBs/anti-HBc) before vaccination can be undertaken to identify people with existing immunity to HBV/active HBV infection who do not require vaccination.

Following a course of vaccination against hepatitis B, serological testing for anti-HBs can be used as a proxy for protection with anti-HBs levels of 10 mIU/mL or greater, shown to strongly correlate with protection against HBV. However, levels of anti-HBs do wane over time and are not always good correlates of protection as someone with low levels of antibodies several years after vaccination may still be able to mount a strong immune response that protects against hepatitis B.

Pre-vaccination testing should not be a barrier to vaccination of individuals who are potentially susceptible to HBV infection, especially when the risk of exposure to infection is high. If pre-vaccination serological testing is considered necessary, then the first dose of the vaccine could be delivered at the same time as blood is collected for serological testing. If the results show that the person has immunity/active HBV infection, then no further doses of the vaccine should be given. If serological testing is not feasible, hepatitis B vaccination should simply be provided.

Vaccination is a safe and effective prevention measure to protect vulnerable individuals against hepatitis B, reduce future disease burden, avoid the risk of large outbreaks, and contribute to health equity for people in prison.

Case study- San Vittore Prison, Milan, Italy

The prevalence of active HBV among people in prison in Milan was 33% in 1992, showing a need for treatment as well as prevention. In 1991, HBV vaccination in the first year of life was introduced in Italy. Population groups who did not receive vaccination are over-represented in San Vittore Prison. In 1992, the prison's health unit put in place a free HAV/HBV catch-up vaccination strategy for all people living or working in the prison. While systematic recording of immunisations performed in prison was only recently introduced during the COVID-19 pandemic, the introduction of a flexible schedule for HBV vaccination was helpful in increasing the proportion of fully vaccinated individuals before release, and has contributed to public health elimination goals in the region.

References

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