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ReachMD
www.reachmd.com
info@reachmd.com
(866) 423-7849

A Guide to Hepatitis B Vaccination

Dr. Buch:
Welcome to *GI Insights* on ReachMD. I'm your host, Dr. Peter Buch, and joining me today is Dr. Ira Jacobson, who is the lead author of an Evidence-Based Practical Guide to Vaccination for Hepatitis B Virus, which was published in the *Journal of Clinical Gastroenterology.* In July 2022. Dr. Jacobson is Director of Hepatology and Professor of Medicine at NYU Langone Health and NYU Grossman School of Medicine. Welcome to the program, Dr. Jacobson.

Dr. Jacobson:
A pleasure to be with you.

Dr. Buch:
To get us started, Dr. Jacobson, what are the challenges in hepatitis B vaccination?

Dr. Jacobson:
Well, the challenges are that hepatitis B vaccinations are one type of vaccination amongst many that people need or are advised to have at some period in their lives. And hepatitis B vaccine doesn't get quite as much play as, to take the most dramatic example from recent times, COVID vaccination for kind of obvious reasons. But there are many other vaccines that are required of children or even adults, or at least strongly advised. And there's a perception, I think, in many quarters, that most people aren't at risk of hepatitis B the way we're all at risk of pneumonia as we get older, or shingles, as we get older, or all the things that children can get that are critical that they be vaccinated against.

But actually, there's been an expansive process recently from the CDC, the Centers for Disease Control, which has broadened the population of people who should get hepatitis B vaccine. And again, we're fighting against the tide a little bit because we're so used to the recommendations being limited to selected so-called high-risk populations.

Dr. Buch:
So what are the current recommendations for Hepatitis B screening and vaccination in the United States?

Dr. Jacobson:
The CDC in 2022, following a vote that I believe was unanimous from its Advisory Committee for Immunization Practices, a very famous group over the last couple of generations, called the ACIP, that give recommendations to CDC, announced that their new recommendation for hepatitis B vaccination is that all adults in the United States aged 19 to 59 should get a course of vaccination for hepatitis B, which is either two or three injections depending on which vaccine you get, with no questions asked about the numerous risk factors that used to qualify who should get hepatitis B vaccine. They further said that even in adults 60 years of age and beyond those adults, A, should certainly still be vaccinated if they have risk factors, and if they've never been vaccinated before, and B, that the vaccine should be given to any older adult who wants to get vaccinated once they're informed about the option. That's it in a nutshell.

Now, we just mentioned that adults 60 and beyond with risk factors should definitely still be vaccinated and given the option even if they don't have risk factors. And the risk factor issue gets back to what the recommendations had always been before this year, which is that widespread immunization of people against hepatitis B should be focused on high-risk populations. And I'll give you just a few of them because it's a pretty long list and anybody can look up the CDC website and look at that. But some of the most obvious ones are, for example, sexual partners of people with chronic hepatitis B who are or might be contagious, and men who have sex with men, and current or recent I.V. drug users, household contacts of hepatitis B, infected people, healthcare workers who have high-risk exposures because of the nature of their work hemodialysis patients, and international travelers to endemic countries.

Dr. Buch:
And I think just as a reminder to our audience can you tell us a little bit about a patient who has one liver disease requiring additional vaccinations?

Dr. Jacobson:
Yes, I'm so glad you brought that up. This too doesn't get the play that it should or the application in practice. And yes, it's become a standard recommendation, actually, for some years now, that to avoid adding insult to injury in the form of either hepatitis A, in fact, and we're talking more about hepatitis B today, of course, but hepatitis A or hepatitis B vaccine should, if neither had been received before, should be administered to anybody with a chronic liver disease even of a nonviral nature. Again, the concept being to avoid being at risk of a superimposed liver injury.

Dr. Buch:
Now switching gears, what should we know about vaccination in specific circumstances like pregnancy, the neonatal period, and the pediatric population?

Dr. Jacobson:
Well, the most important thing to know about pregnancy is that there has been a mandate for years now in the United States and any other countries that all pregnant women should be screened for chronic hepatitis B even if the risk if the population in the particular area that the person is being seen in is relatively low in prevalence. And even if the woman has no risk factors, there should be universal screening of pregnant women. And that's because the stakes are very high. If you do have a woman who is pregnant and has chronic hepatitis B virus infection and transmits the virus to the baby, which can occur all too frequently, particularly in patients who have what we call a high viral load, chronic infection will almost always ensue. That infant will be infected for life. It's not like adults who develop chronic infection only, and I say only in quotes, but two to five percent of the time, if they get infected with hepatitis B. And the consequences for the infant could, in the future, be life threatening in the form of high risks of cirrhosis and/or liver cancer, which is why hepatitis B takes such a terrible toll around the world, particularly in populations where it's transmitted in an endemic fashion, meaning usually from mother to infant, or at least early household contact in early childhood to infants, but particularly maternal to infant.

So we have essentially universally effective vaccination for infants nowadays. Infants actually have extremely high response rates to the vaccine, or at least healthy infants who aren't premature or weigh less than 2,000 grams, and there are some recommendations about waiting till premature kids are a month old, and then vaccinating them because the immune response is more mature. And they'll have a more long-lasting response. But every infant who's born to an infected mother, even if premature and weighing less than the usual requisite amount should be immunized if the mother has hepatitis B.

So again, all pregnant women should be tested for hepatitis B so that infection can be identified and properly dealt with to prevent transmission. We do recommend, in fact, universal immunization of infants in the neonatal period before they leave the hospital, and if born to an infected mother, immediately after birth.

Dr. Buch:
Thank you. And what are the current available vaccines, and how do they differ?

Dr. Jacobson:
There are four that are approved in the United States. In principle, they all rely on the same idea. The vaccines consist of purified synthetically made, not plasma derived anymore like in the early 1980s, preparations of hepatitis B surface antigen, the coat protein, that forms kind of a wall around the hepatitis B viral particle. Just like the COVID vaccine consists of recombinant-derived or mRNA-derived preparations of the spike protein, which is the surface protein of that virus. The idea is that if you administer the surface protein of a virus minus any live virus which is called an inactive type of vaccine that you induce immune response to the surface protein. And having developed antibodies after a proper course of vaccination, the person is exposed to whatever virus you're talking about, the antibodies that they've already formed immediately come into play, buy into the surface of the virus, and make it impossible for the virus to enter the cells that it would love to enter to cause all the havoc that viruses can cause.

So all the vaccines, all four of those approved in the United States rely on that principle; however, they're derived by different technologies. So, the earliest recombinant or synthetic vaccines were derived from yeast cells. And those two vaccines have been the standard for many, many years. And they're called Engerix-B or Recombivax. One is given at a 20-microgram dose, the other 10 micrograms, but they work very, very similarly in terms of efficacy.

And exquisite safety, by the way, which is a point I'd like to get into our discussion today that characterizes hepatitis B vaccines in general. Recently, we have the approval of a new vaccine, which was derived from mammalian cells, specifically Chinese hamster ovary cells, again, by recombinant technology. And that's also a preparation of the surface protein of the virus at a dose of 10 micrograms.

And the difference between that one and the two previous ones, is in what's called the adjuvant, which is something they add to the vaccine to help stimulate the person's immune response. So the adjuvant for the first two vaccines, the older ones, is alum. And the one in this new one called Heplisav is actually an immune-stimulating agent called a toll-like receptor. And that presumably helps to turn on an even more active immune response once the patient is exposed to the viral protein.

And then there's a brand new one that was just approved a few months ago called PreHevbrio. And that is called a triple antigen vaccine. It too is derived from yeast cells. And it consists of three different versions of the surface protein of the virus to which I've already alluded. Because the virus actually has three different size proteins, all part of that surface protein complex, but three different sizes called small, medium, and large. And that is thought to stimulate a somewhat more robust immune response, perhaps particularly in older people.

Dr. Buch:
For those just tuning in, you're listening to *GI Insights* on ReachMD. I'm Dr. Peter Buch, and I'm speaking with Dr. Ira Jacobson about hepatitis B vaccination. So how should we approach healthcare workers who are vaccine nonresponders?

Dr. Jacobson:
It depends on the nature of the work that the healthcare worker does. So you know, we have low-risk personnel who really have nothing to do with blood samples or drawing specimens or handling specimens or maybe even having nothing to do with interfacing with patients at all. And those are low-risk patients. It's never wrong to offer another course of vaccine. We do know that about 50 to 70% of people who don't respond to a first course of vaccine, will respond to a second one even if you give the same vaccine all over again. And that's been done for many, many years for nonresponders in whom we really need to ensure protection. For our high-risk health care workers, we think it's critical to offer a second course of vaccine.

Dr. Buch:
To end our discussion, Dr. Jacobson, would you like to leave our audience with any final thoughts?

Dr. Jacobson:
One point that is worth mentioning that comes up all the time in practice is whether patients should get a booster many years after they've gotten the vaccine. And we don't routinely recommend that. It turns out that if you get vaccinated, particularly in younger age groups most people have a very nice response to the vaccine. And we know that the antibody levels wear off, perhaps in as many as 25% of patients after a few years. But we know from extensive studies, both scientifically looking at the immunology of response in people who may not have had surface antibody anymore from prior vaccination, or from actual clinical outcomes study where we ask ourselves, how many people get sick from hepatitis B, if they're exposed after getting vaccination? The answer is it's very rare. So we don't routinely give boosters.

They are highly recommended, however, in dialysis patients, to get back to that vulnerable population, whose antibody levels must be checked every year. And if they fall below 10, what are called milli-international units per milliliter, or MIU per mil they should get a booster. And that's quite standard. And it's generally thought, though not as extensively studied, that other immunocompromised populations as well would probably benefit from booster doses. But again, there's no universal agreement or specific guideline about that.

The thing I'd like to emphasize over and over again is that increased awareness is the key to reducing morbidity and mortality rates from this very serious viral infection in the future. We all need to bring it into our practices at a much more conscious level than I think we sometimes do. Vaccine is exquisitely safe. And so I think awareness is the key.

Dr. Buch:
This has certainly been an informative discussion on hepatitis B vaccination. I want to thank my guest, Dr. Ira Jacobson, for sharing his insights. Dr. Jacobson, it was a pleasure speaking with you today.

Dr. Jacobson:
Mine too. Thank you so much for having me.

Dr. Buch:
For ReachMD, I'm Dr. Peter Buch. To access this and other episodes in this series, visit reachmd.com/giinsights, where you can be part of the knowledge. Thanks for listening and see you next time.