Update on Meningococcal Meningitis: New (and old) Vaccines to Protect Those at Risk

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Meningitis is a potentially deadly medical emergency that is spread by coming into contact with oral secretions of an infected person, so coughing and kissing place an individual at risk. The key to managing this life-threatening disease is prevention; available vaccinations aid in protecting individuals against organisms responsible for this disease.

In Texas, legislation is already in place to manage the more prevalent strains of meningitis. Texas Senate Bill 62 requires all college students under 22 years of age to be vaccinated against meningococcus as a condition for enrollment. Outbreaks on college campuses have become a cause for concern because meningococcal meningitis commonly impacts adolescents and young adults under 30 years of age in the United States.

Recent fatal outbreaks involving the rare but deadly Neisseria meningitidis serogroup B meningococcus strain at the University of Oregon and Providence College in Rhode Island roused public concern about the lack of a vaccine already available in other regions of the world, including Europe. Widespread concern about these outbreaks has prompted the approval of new vaccines in the U.S. that specifically target this serogroup. These newly approved vaccines could offer peace of mind for those concerned or at risk of developing serogroup B meningococcal meningitis.

Meningococcal meningitis, caused by N. meningitidis, is only one form of meningitis. Bacterial meningitis is often caused by Haemophilus influenzae type B, Streptococcus pneumoniae, and Listeria monocytogenes. H. influenzae primarily impacts younger children so infants in the United States are usually vaccinated beginning at 2 months of age. S. pneumoniae commonly affects older adults over 50 years of age and the Centers for Disease Control and Prevention (CDC) recommends that all adults 65 years or older receive the pneumococcal polysaccharide vaccine. Unfortunately, there is still no vaccine available that protects against L. monocytogenes, which occurs most frequently in neonates, immunocompromised, pregnant women and elderly and is typically due to eating food contaminated with this bacteria.

Meningitis is a medical emergency so any patient experiencing symptoms including fever, mental status change, stiff neck, vomiting, petechial rash, and headache should be transported to a hospital immediately. Empiric treatment of meningitis for patients over 1 month of age should include...
vancomycin and ceftriaxone or cefotaxime, while patients over 50 years of age should have ampicillin added to the antibiotic regimen.6

The spread of meningococcal meningitis has been greatly reduced by the implementation of vaccination procedures.1 The United States currently produces 6 meningitis vaccines which target serogroups A, B, C, W, and Y (see Table 1).1

Table 1: Meningitis Vaccines in the United States1, 5, 11

<table>
<thead>
<tr>
<th>Vaccine Name</th>
<th>Coverage</th>
<th>Recommendation</th>
<th>Dose</th>
<th>Route</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Menevo®</td>
<td>N. meningitidis serogroups A, C, Y, and W-135</td>
<td>First dose at 11-12 years, with booster dose at 16 years of age</td>
<td>0.5 mL</td>
<td>IM</td>
<td>Single dose with booster</td>
</tr>
<tr>
<td>Menactra®</td>
<td>N. meningitidis serogroups A, C, Y, and W-135</td>
<td>First dose at 11-12 years, with booster dose at 16 years of age</td>
<td>0.5 mL</td>
<td>IM</td>
<td>Single dose with booster</td>
</tr>
<tr>
<td>Menomune®</td>
<td>N. meningitidis serogroups A, C, Y, and W-135</td>
<td>Not routinely recommended; may be used in adults &gt; 55 years with no prior vaccination</td>
<td>0.5 mL</td>
<td>SQ</td>
<td>Single dose</td>
</tr>
<tr>
<td>MenHibrix®</td>
<td>N. meningitidis serogroups C and Y, H. influenzae type b, and tetanus toxoid</td>
<td>Not routinely recommended except in those infants/children with high-risk conditions and those with increased disease risk</td>
<td>0.5 mL</td>
<td>SQ</td>
<td>3 doses at 2, 4, and 6 months followed by booster between 12 and 15 months</td>
</tr>
</tbody>
</table>
Historically, only four vaccines have been available for preventing meningitis.1 Menveo® and Menactra® are meningococcal conjugate vaccines (MenACWY) that cover serogroups A, C, Y, and W. Menveo® is FDA-approved for use in persons 2 months to 55 years of age.11 Menactra® is indicated for use in persons 9 months to 55 years of age.1, 11 For routine vaccination, the first MenACWY dose should be administered to children 11-12 years of age, and a booster dose should be administered at 16 years of age.1, 11 Booster doses should be given every 5 years for people with increased risk for infection, including frequent travelers to areas where meningitis outbreaks occur commonly, people with asplenia, or those with persistent complement deficiency.1, 11 Menomune® is a meningococcal polysaccharide vaccine (MPSV4), which also covers serogroups A, C, Y and W, and is FDA-approved for use in persons 2 years of age and older.1, 11 It is the only meningococcal vaccine recommended by the CDC in adults older than 55 years who have not previously been vaccinated with MenACWY and require vaccination.1, 11 MenHibrix®, a combination conjugate vaccine that covers serogroups C and Y, H. influenzae type B, and tetanus toxoid (HibMenCY), is typically administered as a 3-dose series to infants. The first dose may be administered as early as 6 weeks of age and the fourth dose can be given as late as 18 months of age.1, 6, 11, 12

Recently, the FDA approved two breakthrough vaccines for preventing of N. meningitidis serogroup B: Trumenba® and Bexsero®,.3, 5 Trumenba®, approved in October 2014, targets both subfamilies of factor H binding protein found in serogroup B strains of N. meningitidis and is administered as a 3-dose series spaced over 6 months.5, 11 Bexsero®, approved in January 2015, is a 2- or 3-dose series depending on age which works by introducing adhesion and surface antigens from N. meningitidis.5, 11 The CDC Advisory Committee on Immunization Practices (ACIP) reviewed both of these vaccines (Bexsero® and Trumenba®) and ruled to recommend their use in patients aged 10-25 years at increased risk of contracting the disease, including asplenic patients and microbiologists, as well as patients in the midst of confirmed meningitis outbreaks.3 Currently, there is no routine recommendation for serogroup B meningococcal vaccines in any population, including college students and military personnel.3, 5 The first large scale use of these vaccines is ongoing to protect those at high risk due to the current outbreak in the Northwest, with aims to begin vaccinating thousands of college students in an outbreak that has already claimed one life.4

Meningococcal meningitis is a life-threatening disease that can be prevented by vaccinating those at risk and, for those infected, should be treated immediately after symptom onset.
References


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