

# Vaccines in Special Populations

# Why Vaccination?

- Nietzsche- “That which does not kill us, makes us stronger”
- Kelly Clarkson- “What doesn’t kill you makes you stronger”
- Patricia Samuelson- “What does kill you, does kill you.”

# Types of Increased Risk

- Increased susceptibility to infection
- Increased susceptibility to complications

# Increased Susceptibility to Complications

- Liver disease-not more likely to get hepatitis A because you have an alpha one antitrypsin deficiency; but much more likely to get sick and die if you do.
- Phagocytic dysfunction (an immune deficiency)-not more prone to influenza. But it DOES increase the risk of bacterial superinfection-hence high priority for flu vaccine.

# Components of the Immune System

- Innate-already present, is quick, doesn't lead to memory (or at least not much)
- Adaptive-learns to recognize pathogens and react more strongly to future exposures. Takes time to develop.

# How Do Antibodies Work?

- Neutralize pathogens-bind to them, ideally even before entry to a cell

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- Facilitate opsonization-bind to a pathogen so that it can be phagocytized, pulled out of circulation, notably in the spleen

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- Activate complement to lyse the pathogen, or stimulate cell mediated immunity to destroy infected cells.

# The Problem With Encapsulation

Resistance to organisms with a polysaccharide capsule is heavily dependent on opsonization.

What organisms are especially prominent in this group?

Strep Pneumonia

Hemophilus Influenza

Neisseria Meningitidis

# Encapsulated pathogens

- Many people have either an anatomic or functional loss of spleen
- Surgically, after trauma
- Sickle cell disease
  
- They are very prone to overwhelming infection and rapid death
- Need both pneumococcal vaccines, Hib, and both meningococcal vaccines.
- (also prone to babesiosis, hep c, TB, malaria, solid tumors etc but we do what we can)

# Diabetic Patients

- High rates of pneumococcal disease
- High rates of hepatitis B
  
- Should receive PPSV 23 and hepatitis B vaccine at time of diagnosis

# Neurologic Diseases

- Neuromuscular disease
  - Increase susceptibility to pneumococcal disease
- Seizure disorders are included

# Autoimmune Disorders

- Crohn's Disease
- Rheumatoid Arthritis

Both increase the risk of pneumococcal disease substantially. That is in addition to the effect of immunosuppressive treatment.

# Alcohol Abuse

- Patients who abuse alcohol are at increased risk for
- Pneumococcal disease
- Hepatitis A and B complications

# Injection Drug Users

- Need hepatitis A and B

# HIV

- Not all are immunodeficient-best to immunize before they are
- PPSV 23
- Meningitis ACWY
- Men B?
- HPV
- Hepatitis B

# Therapeutic Immunosuppression

- Best time to immunize is before hand, i.e. before start of biologics for RA, when the organ transplant is first considered. Once immunosuppression has occurred live vaccines can't be used.
- Steroid Use-live vaccines can be dangerous, others may not take
  - Physiologic replacement is not an concern
  - Less than 20 mg a day or every other day of prednisone or equivalent is not a contraindication to live vaccines
  - 20 mg a day for less than 2 weeks-can vaccinate right after
  - More than 20 mg for more than 2 weeks-withhold for one month

# Kidney Disease

- ESRD, Nephrotic Syndrome(directly lose IgG). Considered immune deficiency state and an indication for pneumococcal conjugate vaccine.
- Need hepatitis B

# Heart Disease

- Chronic disease-need PPSV 23
- Spike in MI rate in flu season-those at risk are high priority for flu vaccine

# Lung Disease

- Current Smoker

# Pregnant

- High risk for complications of flu
- Vaccination in pregnancy key to prevent flu and pertussis in neonate

# Travel

- CDC travel site gives information for specific areas.
- Key to find out all planned activities-cavers may need rabies vaccine for example.

# Occupational

- Generally handled by employee health, needs are VERY specific.