

NEW VACCINES PNEUMOCOCCAL VACCINE

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Outline

- Strategic Area II in GIVS
- Epidemiology
- Microbiology
- Immunology
- Spectrum of clinical disease
- Pneumococcal vaccines
- Efficacy
- Pneumococcal vaccine in HIV infection

Epidemiology

- Streptococcus pneumoniae otherwise known as pneumococcus is a major cause of common upper respiratory tract infections & life threatening invasive infections in children, adolescents & adults
- South African estimates: 350 per 100 000 < 1year, 70-100 per 100 000 < 5 years

Microbiology & Immunology

- Encapsulated gram positive coccus
- High levels of penicillin resistance
- Enveloped by 1 of \pm 90 distinct polysaccharide capsules
- Serotypes 6B, 14, 23 (70% of Ix); serotypes vary with age, site of Ix, geographic areas & time
- Polysaccharide capsule major virulence factor (enables resistance to phagocytosis)

Microbiology & Immunology cont

- Serotypes causing common Ixs in childhood not same as adults
- Serotype specific anticapsular antibodies are protective
- Pneumococci cleared by antibody mediated, complement-dependent phagocytosis & killing

Spectrum of disease

- Colonisation
commonly & asymptotically colonise
nasopharynx (reservoir for invasive Ix)
prevalence of colonisation > in infants than
older children & > in children than adults
- Local disease (URTI)
pneumococcus leading bacterial cause of
sinusitis & acute otitis media

Spectrum of disease cont

- Invasive infection
pneumonia, meningitis, septicaemia,
peritonitis, septic arthritis, osteomyelitis
- In developing communities bacteria are
responsible for $\pm 65\%$ of pneumonia cases
(pneumococcus & H infl. commonest)
- With Hib immunisation pneumococcus
now commonest cause of bact meningitis

Development of pneumococcal vaccine

- Pneumococcal polysaccharide vaccine (PPV) 1977 1st PPV licensed in USA
Problems: Infants < 9 months showed limited or no response
Response also limited < 2 years
Poor response to the commonest subtypes
Revaccination with 2nd dose no significant improvement

Polysaccharide pneumococcal vaccine Cont

- Efficacy of PPV
 1. No effect on otitis media & LRTI in < 2yrs
 2. Some effect on LRTI 2-4yrs

Polysaccharide pneumococcal vaccine Cont

- Indications for PPV
 1. Children 2years & older with
 - Asplenia
 - Chronic pulmonary/CVS disease
 - Nephrotic syndrome
 2. Revaccinate after 3-5yrs for those at highest risk (Asplenia & NS)

Conjugate pneumococcal vaccine (CPV)

- Use capsular polysaccharide that has been covalently bound to 1 of several protein carriers; e.g. tetanus toxoid, non toxic mutant diphtheria toxic
- Similar technique to Hib vaccine

Safety & immunogenicity of CPV

- Safe in adults & children
- Primary target infants
- Good antibody response in infants
- Good antibody response in children 2-13yrs who didn't respond well to PPV
- Induced antibodies in infants have good opsonic activity

Conjugate pneumococcal vaccine (CPV) cont

- Effect on nasopharyngeal colonisation
 - Significant reduction in colonisation by vaccine serotypes, but ↑ in nonvaccine types; ? No significant ↑ in invasive dx

Conjugate pneumococcal vaccine (CPV) cont

- CPV available in SA
 1. Prevenar: each 0.5ml contains 2 μ g of saccharide for serotypes 4, 9V, 14, 18C, 19F & 23 & 4 μ g of serotype 6B & 20 μ g of CRM carrier protein (diphtheria)
 2. Indicated for 6 weeks to 9 years (imi)
 3. 3 doses (6, 10, 14wks), if 7-11 months- 2 doses & booster after 1yr, 12-23 months- 2 doses, >24mnths single dose

Adverse reactions

- Local reaction
- Fever
- ↓ appetite
- Irritability
- Drowsiness
- Seizures (rare)
- Urticaria (uncommon)
- Angioedema (very rare)

Efficacy of PCV

- Overall efficacy of 93% against invasive dx
- 35% ↓ in radiographically confirmed pneumonia
- Efficacy in the absence of booster dose 83%
- Long term protection (ff up after 6yrs) against invasive dx – 73%
- ↓ in Human metapneumovirus Ix

Pneumococcal vaccine in HIV infection

- Risk for invasive pneumococcal disease (IPD) is 40X greater in HIV-infected children
- HIV-infected children account for $\pm 75\%$ of all cases of IPD in SA
- Efficacy in absence of booster 65%

THANK YOU

- ENKOSI
- NDIYABULELA
- KE A LEBOGA
- NGIYABONGA
- DANK U WEL
- BAIE DANKIE
- HA KHENSA