

MENINGITIS

Streptococcus pneumoniae and Haemophilus influenzae in paediatric meningitis patients at Goroka General Hospital: serotype distribution and antimicrobial susceptibility in the pre-vaccine era.

Greenhill AR, et al BMC Infect Dis 2016; 15:485

- **What population was studied?**
 - Children aged < 15 years admitted to Goroka General Hospital between 1996 and 2005, who had suspected meningitis and had a CSF specimen taken by lumbar puncture.
- **In what proportion of children with meningitis was a pathogen identified on CSF?**
 - The rate of overall culture positivity was $480 / 1884 = 25.5\%$. In 377 CSF specimens a meningitis pathogen was isolated (20%), and in a further 108 CSF samples an organism considered to be a contaminant was isolated.
- **How many serotypes of Streptococcus pneumoniae are included in the Pneumococcal Conjugate Vaccine, and how many serotypes exist?**
 - There are 13 serotypes of Streptococcus pneumoniae included in the Pneumococcal Conjugate vaccine: 1, 3, 4, 5, 6A, 6B, 7F, 9V, 14, 18C, 19A, 19F, 23F
 - There are 90 identified serotypes but 23 are responsible in 90% of pneumococcal invasive disease
- **What proportion of pneumococcal isolates from CSF will be covered by the currently used PCV in PNG?**
 - 45.5% of pneumococcal isolated causing meningitis will be covered by the currently used 13 valent PCV in PNG
 - 44.1% would be covered by PCV 10 (another type of pneumococcal vaccine trailed in PNG which is linked to a non-typable Haemophilus protein)
- **What common serotypes are left out of the PCV that cause meningitis in PNG?**
 - 2, 8, 12, 18A, 19B, 24, 46, accounting for more than 40% of pneumococcal isolates.
- **What proportion of Haemophilus influenzae during the 1996-2005 era were resistant to chloramphenicol?**
 - 31.5%, with a rise in resistance between 1996-2000 (26%) and 2001-2005 (41%). A recent study in Madang showed all 14 Hib isolates from CSF to be resistant.
- **What proportion of S. pneumoniae isolates were resistant to penicillin?**
 - 21.5%, which is similar to the proportion of penicillin resistant isolates in a previous study in Goroka 1989-1992. So there is evidence of less of a rise in pneumococcal resistance than in Hib resistance.

VIRUSES CAUSING MODERATE AND SEVERE PNEUMONIA

Role of Human Metapneumovirus, Influenza A and Respiratory Syncytial Virus in causing WHO-defined severe pneumonia in children in a developing country

Asad Ali, et al. Public Library of Science (PLOS) 2013; 8:e74756

- **What population was studied?**
 - Children 6 weeks to 2 years' old with WHO-defined severe pneumonia presenting to a public hospital in Karachi. They had cough or difficult breathing with tachypnoea and chest indrawing.
- **How were respiratory viruses identified?**
 - Throat swab was obtained then viral testing was done using real time RT-PCR.
 - The RT-PCR were performed using primers and probes for HMPV, RSV and influenza A. For influenza A positive samples, further testing was done for the H1N1 strain.
- **What proportion of children with WHO-defined severe pneumonia (PNG classification of moderate or severe pneumonia) had respiratory viruses isolated?**
 - 36% (61 children out of 169 with WHO-defined severe pneumonia)
- **What were the proportions of children with severe pneumonia who had Human Metapneumovirus (HMPV), Influenza A and RSV**
 - HMPV – 14.2% (24/169)
 - Influenza A – 5.3% (9/169)
 - RSV – 17.8% (30/169)
- **What proportion of children with RSV had chest x-ray changes of pneumonia?**
 - 20% (6/30). This was higher than for HMPV and influenza.
- **What was the relationship of RSV and other viruses to weather and seasons?**
 - RSV epidemics generally occur during the winter and spring months but there is considerable variation
 - In the study, RSV infection was year round with peaks from July to September, perhaps due to heavy rainfall
 - HMPV seasonality not well-defined; some studies point towards it being more prominent in winter season
 - In the study, HMPV infection were higher in the lowest temperatures from December to February
 - Influenza A infection peaked in the months with lower temperatures in Karachi, during January and February
- **What are the limitations of this study, and what are the considerations in applying the study results in PNG?**
 - The study was conducted for 11 months only; seasonal pattern of respiratory viruses may vary yearly and this would require surveillance over some years to establish the seasonality of different respiratory viruses reliably.
 - The study did not try to elicit bacterial aetiology of severe pneumonia in the subjects studied. All children in the study were treated with antibiotics so there is a chance that some of these patients may have had a viral-bacterial co-infection that may benefit from antibiotics
 - The seasonal pattern in PNG may be different to that of Pakistan and this should be considered if applying the study results in PNG
 - This study shows clearly that respiratory viruses can play a role in severe pneumonia. With the increased use of Hib and PCV the proportion of children with moderate pneumonia having acute viral bronchiolitis will be higher than in the pre-vaccine era.

- **What are the implications for antibiotic prescribing?**
 - **There may be a group of children with moderate pneumonia or clinical bronchiolitis who are well with no danger signs and no hypoxaemia who do not need treatment with antibiotics. The study results also support the guideline that selected children with moderate pneumonia can be treated on an outpatient basis, if appropriate safeguards are in place.**
 - **That chest x-ray changes of consolidation can also occur in viral lower respiratory tract infections, so just finding some x-ray changes is not in itself an indication for antibiotics.**