Group B streptococci and other Neonatal infections

Akademisk avhandling

Som för avläggande av medicine doktorsexamen i medicinsk vetenskap vid Göteborgs Universitet kommer att offentligt försvaras i föreläsningssal 1, Drottning Silvias barn och ungdomssjukhus, Göteborg, fredagen den 12 oktober 2007 kl 13.00

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Avhandlingen baseras på följande delarbeten

I Persson E, Trollfors B, Lind Brandberg L, Tessin I (2002) *Septicaemia and meningitis in neonates and during early infancy in the Göteborg area of Sweden*. Acta Paediatr; 91: 1087-1092

II Persson E, Berg S, Trollfors B, Larsson P, Ek E, Backhaus E, Claesson B, Jonsson L, Rådberg G, Ripa T, Johansson S (2004**)** *Serotypes and clinical manifestations of invasive group B streptococcal infections in western Sweden*. Clin Microbiol Infect; 10: 791-796

III Persson E, Berg S, Bevanger L, Bergh K, Valsö-Lyng R, Trollfors B (2007) *Characterization of invasive group B streptococci (GBS) based on demonstration of surface proteins and of genes encoding surface proteins.* Accepted for publication; Clin Microbiol Infect

IV Persson E, Berg S, Bevanger L, Bergh K, Valsö-Lyng R, Trollfors B (2007) *Antimicrobial susceptibility of invasive group B streptococcal isolates.* Submitted

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Abstract

The main objectives of this thesis were to estimate the incidence and etiology of invasive infections in neonates and to characterize invasive strains of group B streptococci from a defined geographic area.

All infants aged 0-120 days with a bacterial or fungal isolate from blood or CSF in the defined area were identified. Invasive GBS isolates from neonates and adults were collected from normally sterile sites. All relevant clinical information was available for all patients. The GBS isolates were characterized by coagglutination with type specific antisera for serotypes Ia, Ib and II-VIII. Indirect whole cell based fluorescent antibody test was used for typing of the surface proteins, alpha c protein, beta c protein and rib. Multiplex and specific PCR were used for genotyping of the surface protein encoding genes, *bca, bac, epsilon/alp1, rib, alp2* and *alp3*. All strains were tested with E-test against 12 antibiotics.

The incidence of invasive infections day 0-27 was found to be 3.7/1 000 live births with aerobic Gram-negative rods, GBS and *Staphylococcus aureus* dominating. The incidence of very late onset infections was 20 times higher in preterm than in term neonates. The total incidence of CoNS infections was 1.1/1 000 live births. The most common serotypes in neonates were serotypes III (60 %), V (22 %) and Ia (10 %) and from adults V (42 %) and III (25 %). Surface proteins were detected in 51 %. The genes were identified alone or in combinations in 99 % of the strains. Both surface proteins and encoding genes were significantly related to certain serotypes. Two GBS strains were resistant to penicillin G. Intermediate susceptibility to erythromycin and clindamycin increased over the study period.

The incidence of invasive neonatal infections increased but the case fatality rate decreased compared to a preceding study from the same area. CoNS are important pathogens in preterm neonates. Serotype V had doubled its frequency in both neonates and adults. Demonstration of serotypes, genotypes and surface proteins in GBS strains are useful in epidemiological studies and in formulation of vaccines and should continuously be followed. No genotype or surface protein was so common that it could be a GBS vaccine candidate alone. Penicillin remains the drug of choice for GBS in the investigated geographic area.

Key words: Neonatal infections, sepsis, incidence, Group B streptococcus, serotype, epidemiology, genotype, surface protein, antibiotic susceptibility

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