Importance of streptococcal infections and their prevention

- streptococcal infections are among the most common bacterial infections
- a large group of clinically diverse diseases
- microorganisms are obligately pathogenic, facultatively pathogenic and saprophytic
- we classify streptococci according to the degree of hemolysis – α-hemolytic (complete hemolysis on agar) and β-hemolytic (marginal hemolysis), according to serological differentiation of capsular antigen C into groups A-F. A and B are the most important.

Group A streptococcal infections

- are the cause of 90% of streptococcal infections
- toxins – erythrogenic toxin, streptolysin O and S (hemolysis, toxic to myocardial fibers and hepatocytes), streptokinase (fibrinolysis), hyaluronidase (invasive factor of streptococci), etc.
- Ig are formed against streptococci – some them can be used in diagnostics – ASLO (antistreptolysin O) – they decrease in a few weeks after the infection
- cause various diseases – infections of skin, mucous membranes, prolonged seropurulent rhinitis in young children, scarlatina, impetigo, tonsillopharyngitis

Complications of sore throat and scarlatina

- submandibular node colicvation, retrotonsillar, paratonsillar abscess, otitis, mastoitis, sinusitis
- rarer – bacteremia, metastatic foci – purulent arthritis, endocarditis, meningitis, brain abscess, osteomyelitis
- without therapy – risk of late complications – rheumatic fever or glomerulonephritis

Rheumatic fever

You can find more information on the page *Rheumatic fever*.

- most often after group A streptococcus infection, 1-4 weeks after infection (about 3% infected)
- the course of the original infection may be inapparent
- acute immunological multisystemic inflammation
- often affects the heart – chronic changes in the valves
- main manifestations – migrating polyarthritis, carditis, subcutaneous nodules, erythema marginatum, and Sydenham's chorea – Saint Vitus' dance, chorea minor (neurological disorder – unconscious untargeted rapid movements)
- side effects – non-specific – fever, joint pain, increased CRP…
- diagnosis – Jones criteria – history of streptococcal infection, presence of at least two manifest major or minor symptoms
- pathogenesis – hypersensitivity reactions, Ig against M-protein of streptococci cross-react with glycoproteins of the heart muscle, joints, etc.
- relapses

Complications of skin infections with streptococcus

- rarely septic complications or glomerulonephritis
- rheumatic fever is rare
- acute glomerulonephritis

Group B streptococcal infections

- are conditionally pathogenic, we distinguish types Ia, Ib, Ic, II, and III
- asymptomatic carriers are common – in the nasopharynx, vagina, and rectum
- in the vagina of 5–30% of women, more often with intrauterine contraception
- transmission to the fetus can occur ascendantly with premature amniotic fluid outflow
  - in labor routes, there is a higher risk in prolonged and instrumental births
  - 60% of newborns of infected mothers colonize, 1-2% become ill (information from Havlík's Infectology from 1990)
  - horizontal transmission – nosocomial – from another mother, child, staff
- premature babies are at 15× times higher risk

Clinical picture

- we distinguish two forms – early and late
- early form – manifests by the 5th day of life (usually between 20 and 48 hours)

    - the beginning is sudden
    - the child vomits, is cyanotic, often hypotonic, has tachycardia and respiratory disorders
    - respiratory insufficiency with pneumonia dominates the clinical picture
    - septic condition
- late form – begins between day 7 and month 4, manifests as purulent meningitis
    - about symptoms – tachycardia, tachypnoea, may be cramps, apnoe breaks
    - the pulsating fontanelle is a very late symptom, we can't wait for it
    - with symptoms of sepsis – lumbar puncture
- laboratory for sepsis – newborns have leukocytosis physiologically (even a shift to the left), but during sepsis they can also go into leukopenia (usually unfavorable)
    - we can evaluate IT (immature total) – the ratio of immature neutrophils to all - if the value is above 0.2 we consider sepsis
    - CRP is arising late, we can't wait for it to start rising
    - thrombocytosis – a sign that they are recovering from sepsis
    - blood culture, swabs from everywhere, urine cultivation

Prevention of group B streptococcal infections

- a culture test from the lower third of the vagina should be performed between weeks 35 and 37
- the samples are then placed in the transport medium and sent to the laboratory, the result should be available in 48 hours
- it is not expedient to treat a woman with a positive result immediately with antibiotics, as the vagina may be repopulated soon after the end of therapy (up to 70% of women)
- the possibility of serious illness of the newborn will be reduced the most if antibiotics are given at the time of birth
- the first-line ATB is penicillin or ampicillin, given at least 4 hours before birth, the neonatal streptococcal population is usually low so as the risk of infection
    - 4 doses should be achieved (so according to the frequency of administration we must start well in advance)
- if the mother is allergic to penicillin or ampicillin, clindamycin or cephalosporins can be administered
- it is important to report information about the result of the culture examination or its absence to the pediatrician who takes care of the newborn, who will decide on the procedure of monitoring the newborn after birth
- newborns of infected mothers require increased monitoring, even if the mother is properly treated during delivery, it is recommended to monitor the newborn's respiratory function for 48 hours after birth, it is not safe to release the newborn home earlier than 72 hours after birth

Links

Source

- BENEŠ, Jiří. *Studijní materiály* [online]. ©2008. [cit. 13.8.2013]. <http://www.jirben.wz.cz>.