Coxiella burnetii

Coxiella burnetii is a tiny gram-negative coccobacillus, staining well according to Giemsa. *C. burnetii* is the only species of the genus *Coxiella* and is the causative agent of Q-fever. Due to its low infectious dose and good resistance to drying, Coxiella can be used as a biological weapon.

Morphology

- highly pleiomorphic, small coccobacillus
- the wall is formed similarly to G minus bacteria

Physiology

- intracellular parasites, multiplying only in the phagolysosome of living cells
- multiplies in cells, during the cycle large and small forms alternate and at the same time spore-like formations are formed, which, however, differ in their structure from spores of gram-positive bacteria (described by Czechoslovak authors)

Cultivation

- multiplies at low pH phagolysosome of cells
- grows on common media and yolk sac of chicken embryos
- we prove it by special staining in infected cells

Laboratory diagnostics

- isolation is very dangerous for laboratory workers, and therefore it is performed only in specialized workplaces (VÚ SAV Bratislava, rickettsia department)
- usually, the diagnosis of Q-fever is performed serologically (immunofluorescence, binding Complement, PCR)

Antigens and toxicity

- occurrence in a single antigenic type, but there are alternating two phases:
  - Phase I - virulent strains after fresh isolation
  - II. phase - loss of surface polysaccharides during repeated cultures

Pathogenesis

- the infectious dose is very low, a single cell is enough
- the first infected cell is mostly alveolar macrophages after its decay blood get *Coxiellу* into many organs, and therefore the disease does not only occur in the lungs
- antibodies against the first phase cause *Coxiell* to disappear from the bloodstream
- cellular immunity is necessary for healing, it fails in a few percent of the infected and the infection then becomes chronic

Epidemiology

- in nature, the source of the infection are various animals (cattle, goats, sheep, ticks), which excrete Coxielly milk, urine, faeces
- the largest amount of *Coxiell* is found in placentas
- transmission is most often carried out by inhalation of contaminated dust, less often when ingested or processed contaminated products, very rarely transmission by a tick is possible.

Disease

- in about half of the cases, the infection is inapparent, therefore the number of registered diseases is not high
- in other cases it causes an acute infection with an incubation period of 20 days, which is called Q-fever (*query* = question, because at first etiology was uncertain), it is a typical occupational zoonosis
- Q fever is manifested as a disease similar to influenza, atypical pneumonia (without cough and no expectoration), very rarely as granulomatous hepatitis, splenomegaly
- the chronic form is culture-negative endocarditis

Treatment

- the acute form of Q fever is treated with doxycycline or macrolides

- the chronic form must be treated for at least 18 months with a combination of doxycycline and hydrochloroquine (basifies the content of lysosomes)

Links

Related articles

- Gram stain
- Q fever

External links

- Q-fever (Czech wikipedia)

References

- VOTAVA, Miroslav – BROUKAL, Zdeněk. *Lékařská mikrobiologie pro zubní lékaře.* 1. edition edition. 2007. ISBN 978-80-86850-03-0.
- BEDNÁŘ, Marek – SOUČEK, Andrej – FRAŇKOVÁ, Věra. *Lékařská mikrobiologie : Bakteriologie, virologie, parazitologie.* 1. edition. 1999. ISBN 8023802976.