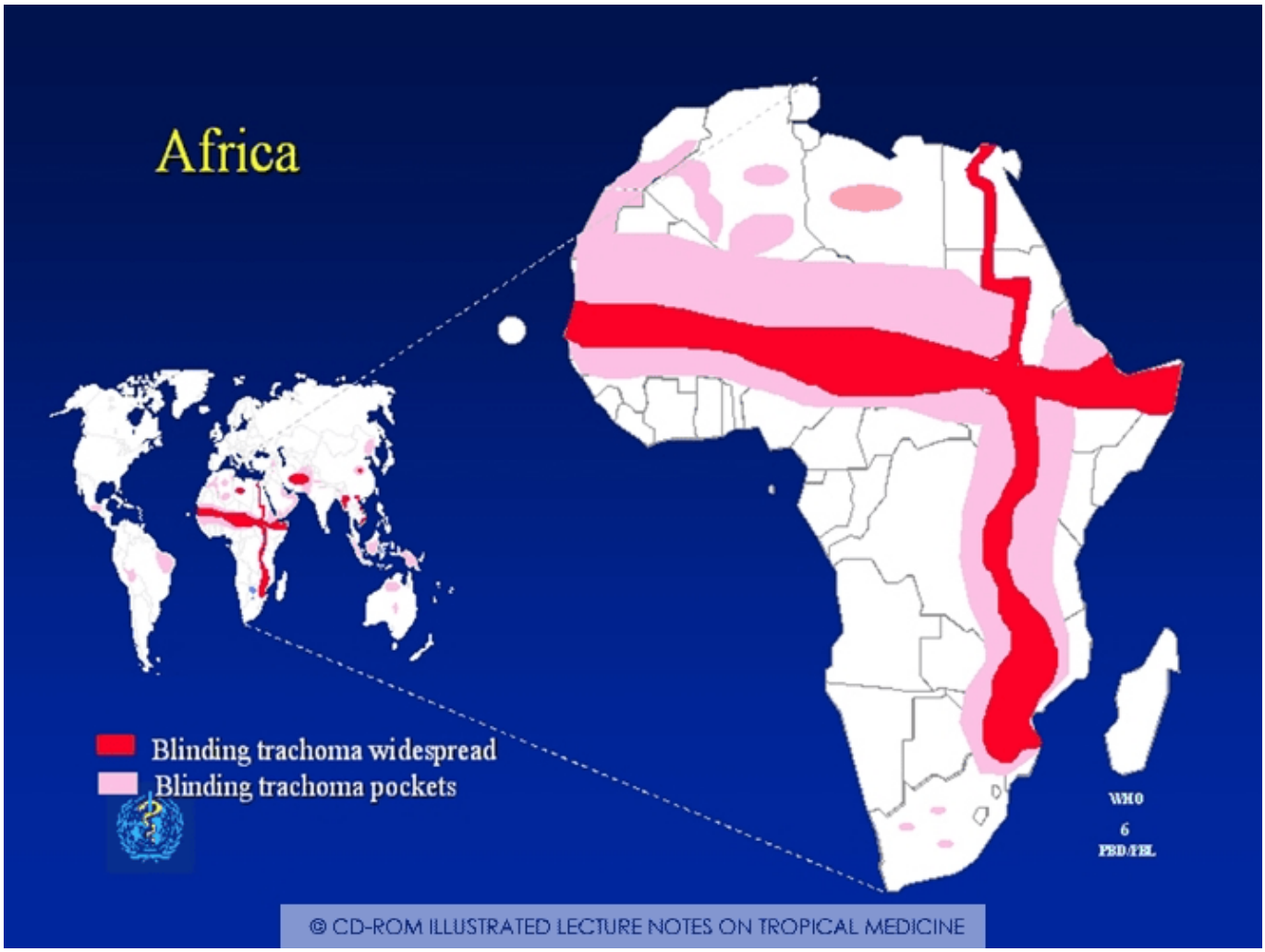
Summary

- TTrachoma: important cause of blindness
- Chronic follicular keratoconjunctivitis caused by serotype A, B, Ba and C of *Chlamydia trachomatis*
- Inflammation of the upper eyelid, followed by pannus of the cornea, entropion and trichiasis
- Treatment by tetracyclines or azithromycin
- Prevention by better hygiene, water, soap and fly control

General



Trachoma, map. Chlamydia trachomatis. Copyright WHO

The three most important diseases which lead to blindness in the tropics are onchocerciasis, vitamin A deficiency and trachoma. Other frequent causes are trauma, diabetes, leprosy, cataract, macular degeneration and chorioretinitis. The name trachoma refers to the raw appearance of the eyelid (Gr. “trachoma” = rawness). The term was first used by the Greek Pedanius Dioscorides (AD 50-70). Trachoma is a chronic form of conjunctivitis which is caused by some serotypes of *Chlamydia trachomatis.* Repeated reinfections are probably important in the ultimate pathology. The infection is characterised by progressive exacerbations and remissions, with follicular hyperplasia, corneal neovascularisation and scarring of the conjunctivae, cornea and eyelids. The disease occurs predominantly in dry areas of Africa (except for Congo), the Middle East, India and Southeast Asia. The disease is rare in the New World. The lack of water and soap for elementary hygiene plays an important role in transmission. Transmission takes place by hand-to-eye contact. Even sharing infected utensils can lead to transmission. The role of flies (*Musca* sp.) was underlined by Jones, who showed that fluorescein-labelled eye secretions can be transmitted from child-to-child by these insects.

Chlamydia trachomatis

Chlamydiae are very small bacteria which have to live intracellularly. They were originally considered to be viruses, but it is now known that they contain both DNA and RNA and are structurally related to Gram-negative bacteria. Several species are known in the genus Chlamydia: *C. psittaci*, the pathogen of psittacosis; *C. pneumoniae* (old name TWAR), which provokes atypical pneumonia; and *C. trachomatis*, which has many serotypes. Serotypes A, B, Ba, and C cause trachoma. Serotypes D to K cause inclusion conjunctivitis in the newborn (“paratrachoma”), Reiter’s syndrome, non-gonococcal urethritis, epididymitis, cervicitis and P.I.D. (pelvic inflammatory disease). Neonatal conjunctivitis and pneumonia can be caused in the newborn by these bacteria. Serotypes L_1 and L_2 cause the sexually-transmitted disease lymphogranuloma venereum. L_3 causes pneumonia in mice. *C. trachomatis* is considered to be responsible for 20% of the pharyngitis symptoms in adults.

Clinical aspects

After an incubation period of approximately 7 days, four different clinical stages can be distinguished. These stages overlap. Reinfection can occur and makes the classification

rather artificial.

Stage 1: there is bilateral redness of the conjunctivae. Photophobia, eyelid oedema and lacrimation follow. Small (2-3 mm) lymphoid follicles develop on the tarsal conjunctivae which increase in size over the course of one month. The inner side of especially the upper eyelid then becomes granular. This follicular-papular hypertrophy stage can last from several months to years.

Stage 2: After several months small blood vessels begin to grow into the uppermost part of the cornea. This process starts in the upper limbus of the cornea. The combination of blood vessels and infiltrate is known as a pannus. The mucus-producing cells in the conjunctiva are destroyed, leading to “dry eye” (sicca syndrome). Corneal ulcerations can occur. If left untreated the cornea becomes cloudy with functional blindness as the ultimate result. In rare cases the corneal neovascularisation regresses without treatment.

Stage 3: Linear scarring appears in the tarsal conjunctiva. Follicles are replaced by small white lines. The conjunctiva becomes smooth, white and avascular. The conjunctiva of the lower eyelid may take on a milky appearance. The craters of the ruptured follicles are lined with epithelium and form a series of lacunae in the limbus, known as Herbert’s pits. The pannus regresses.

Stage 4: In this stage there is no longer any active infection. The scar tissue contracts and deforms the upper eyelid so that entropion follows. Due to the turning inward of the eyelid, the eyelashes scratch the cornea (trichiasis) and cause mechanical trauma. Bacterial superinfection can occur. The epithelium of the cornea becomes dull and thickened, which is made even worse by chronic exposure to dust and sand. This promotes further neovascularisation.

Diagnosis

In most endemic areas trachoma will be a clinical diagnosis. Chlamydia trachomatis can be cultured but the infrastructure for this is beyond the capabilities of most hospitals. PCR is more sensitive than culture. In the early stages small basophilic cytoplasmic inclusions can be seen with Giemsa staining in scrapings of the tarsal conjunctival epithelium. In clinical

practice it is not necessary to provide formal proof of infection. Trachoma has to be distinguished from chronic allergic conjunctivitis. This is not always easy but eosinophilia and milky flat-topped papillae are present whereas basophilic inclusions are not found. Under field conditions the diagnosis of trachoma is likely to be correct if at least two of the following criteria are present:

1. Follicles on the upper palpebral conjunctiva in the mid-tarsal region
2. Linear scars of the tarsal conjunctiva (Arlt's syndrome)
3. Active keratitis
4. Follicles in the limbus or their sequelae (Herbert's pits)
5. Pannus in the upper third of the cornea.

Treatment

The treatment used to rely on the administration of tetracycline eye ointment or taking doxycycline 100 mg bid for 4 weeks (erythromycin for children). Currently the treatment of choice is a single administration of azithromycin (Zitromax®), which greatly simplifies treatment. At present WHO recommends annual mass azithromycin treatment for 3 years in communities in which the prevalence of "trachomatous inflammation – follicular" in children between 1 and 9 years of age is 10% or more. However the presence of clinical trachomatous follicular inflammation disappears more slowly than the implied by PCR results of conjunctival swabs. Further field-based study of estimating the prevalence of active infection is needed. Deformities of the eyelid, such as entropion or trichiasis have to be treated surgically. Reinfection can occur and further treatment forms part of a control programme.

Inclusion conjunctivitis (serotype D-K), a sexually transmitted disease has to be treated in the child and the mother as well as her sexual partners. It is important to make people aware of the fact that removing eyelashes which face inwards may bring some temporary relief, but that it can make the situation worse. The eyelashes grow back and the short stubby hairs scratch the cornea resulting in still more damage.

Trachoma is disappearing in many parts of the World even in the absence of specific control programs, probably due to the high background of antimicrobial drug use for other reasons.