Trachoma

Background

In tropical countries, it is estimated that 25 million people are blind from preventable causes and of those, trachoma is the most important, contributing to approximately 4% of global blindness.[1] Trachoma is a very common chronic conjunctival infection caused by Chlamydia trachomatis, which is transmitted by flies or through close personal contact. (Note that the organism involved is C. trachomatis serotype A-C; C. trachomatis serotypes D-K are associated with genital infections and only occasionally cause a chronic follicular conjunctivitis that is clinically indistinguishable from trachoma[2]).

Other causes of preventable blindness include:

- **Xerophthalmia**, due to lack of vitamin A in the diet.
- **Onchocerciasis**, or river blindness, an infection of the skin by filarial larvae that may also affect the conjunctiva of the eye.

Epidemiology

- Trachoma is the second most common cause of blindness in the world and the most common infective cause. The World Health Organisation (WHO) is aiming to eliminate trachoma as a blinding disease by 2020.[1, 3]
- It was once endemic in most countries but now is confined to Africa, Asia, the Middle East and Aboriginal communities in Australia, as shown on the WHO map.[4]
- There are an estimated 84 million people affected worldwide with 8 million visually impaired and 3.4 million blind.[5]
- There is no racial predilection, only a predilection for poverty and poor personal hygiene.
- Women are affected 2 to 4 times as often as men but pre-school children of both genders are equally affected.
- In hyperendemic areas active disease is most common in pre-school children with prevalence rates as high as 60-90%, most commonly aged 3-5 years old.[6]
- Where community prevalence decreases to around 20%, active disease is clearly seen to cluster in families.[2]
- It is currently responsible for more than 3% of the world's blindness but the number keeps changing due to the effect of socio-economic development and current control programmes for this disease.

Pathophysiology

Transmission is mostly between children and the women who care for them (disease of the crèche); this accounts for the higher prevalence in women. Blindness does not ensue until middle age: repeated episodes of infection cause chronic follicular conjunctival inflammation (active trachoma), leading on to the cicatricial stage of tarsal conjunctival scarring, entropion, trichiasis (in-turning of the eyelashes) which leads to corneal scarring and opacity.

There are various stages of the disease that are described below; the references in this section link to pictures provided by the WHO:
Follicular trachoma (Grade TF) produces active follicles on the upper tarsal conjunctiva. This phase of the disease is relatively asymptomatic.

Inflammatory trachoma (Grade TI) causes thickening of the upper tarsal conjunctiva, which obscures more than half of the normal tarsal vessels and can produce significant conjunctival scarring and blindness.

Trachomatous scarring (Grade TS) produces easily visible scarring in the upper tarsal conjunctiva. Although this may not cause direct symptoms *per se*,

Trichiasis (Grade TT) is when eyelashes touch the globe causing fibrosis and corneal opacification. Some vision can be restored with successful correction of trichiasis.

Corneal opacity (Grade CO) is defined as one that is easily visible and obscures at least part of the pupillary margin.

Diagnosis

Laboratory tests are not used in endemic areas where the clinical appearance is enough.

Cell culture used to be the standard test but has been superseded by newer tests. In other areas, polymerase chain reaction (PCR) and ligase chain reaction (LCR) have high sensitivity and specificity.

Another new test is direct fluorescein-labeled monoclonal antibody (DFA) and enzyme immunoassay (EIA) of conjunctival smears.

Giemsa cytology (the finding of intracytoplasmic inclusions) is technically demanding, has a high specificity but low sensitivity.

Management and prevention

The World Health Organisation (WHO) has implemented a policy of prevention known by the mnemonic SAFE:

Surgery for trichiasis
Antibiotics, especially azithromycin to eradicate infection
Facial cleansing and attention to hygiene
Environmental improvement

To turn to each:

Eyelid surgery can prevent corneal scarring and blindness. As an interim to prevent entropion, double-sided sticking plaster has been used to good effect.

Oral azithromycin (1 gm po or 20 mg/kg in children, stat then repeated every 6-12 months) is the antibiotic of choice and if a child is infected the whole family should be treated. Topical tetracycline and polymyxin is as effective as oral azithromycin. The latter is a shorter course and associated with fewer side-effects (which are mild) but is more expensive (although large donation programmes are in place). Even a single dose of azithromycin causes a marked fall in prevalence and intensity of the disease in a mass programme and it was sustained for 2 years. A single dose of azithromycin is as effective as 6 weeks of topical tetracycline. Topical antibiotics are less useful long-term as *C. trachomatis* occurs in the oropharynx and patients may re-infect themselves. Mass treatment programmes of entire communities may be necessary where the prevalence in 1-9 year old children exceeds 10% but this has to be balanced with the possibility of antimicrobial resistance (not a problem to date).

Community-based health promotion about facial cleansing and hygiene reduces the risk and severity of trachoma. Do not let flies walk over children’s eyes.

Environmental health involves personal hygiene as well as clean water and safe sewage disposal along with a reduction in flies.

This SAFE approach has been shown to be successful in a number of countries. Researchers have highlighted the need to focus management on children in order to tackle the problem in its early stages.

Prognosis
Appropriate treatment of early disease gives an excellent prognosis. Severe disease may be stabilised but vision may not improve. Re-infection worsens the prognosis.

Further reading & references
2. Solomon AW, Ringland Taylor H; eMedicine: Trachoma (September 2007)
4. World map showing distribution of Trachoma, World Health Organization, 2005
5. Fact sheet. Trachoma; World Health Organization
6. World Health Organisation; Trachoma grade TF
7. World Health Organisation; Trachoma grade TF + TI
8. World Health Organisation; Trachoma grade TS
9. World Health Organisation; Trachoma grade TT
10. World Health Organisation; Trachoma grade CO

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