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View Point

Trachoma: Blinding Tropical Disease in the South East Asia Region with Research Priority

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Introduction:

Trachoma is one of the oldest infectious diseases known to mankind and is the leading infectious cause of blindness, Although, it is no longer a public health problem in most of the western world; continues to be a major cause of blindness in the developing countries, estimated to be responsible for 2.9% of blindness worldwide.[1]

Trachoma is, first and foremost, a disease of poverty. It is considered to be endemic in 55 countries. It is particularly prevalent in large regions of Africa, the Middle East, Southwestern Asia, the Indian Subcontinent, Aboriginal communities in Australia, and there are small focuses of blinding disease in Central and South America.[2] Trachomatous blindness inflicts a high financial cost and may result in the persistence of poverty, due to the lost wages of the blind and their families.[3]

The economic costs of trachoma in endemic countries are estimated at an annual productivity loss of $2.9 billion, based on loss of vision.[3] The prevalent cases of visual loss are responsible for 39 million lifetime disability- adjusted life years (DALYs). These impacts are likely to be under-estimates, as trichiasis, even without vision loss, is associated with disability.[4]

Trachoma control has a long history and is among the major disease control programs initiated by the World Health Organization (WHO), almost since its inception.[5]

The elimination of blinding trachoma, which is a complex disease, associated with poverty and deprivation, in the broadest sense, remains the “unfinished agenda” in public health.

In 1987, a simplified grading system was adopted, enabling basic health workers to identify and manage trachoma cases.[6,7,8] In 1993 the community approach to trachoma control was developed by the WHO and published in collaboration with the Edna McConnell Clark Foundation.[6,7] The 1990s heralded the introduction of the surgery, antibiotics, facial cleanliness, and environmental strategy, which was based on proven and cost-effective interventions.[6] Some of the components in the SAFE strategy were the missing links in the evolution of our earlier trachoma control efforts. In the early years of these efforts, the interventions were medical, local and sometimes systemic treatment of the active disease, and surgical treatment of the sight-threatening complications such as trichiasis. This was done generally oblivious of the behavioral and environmental determinants of the disease and its transmission and persistence in clustered communities

Although some success attended the medical interventions, they could not be sustained. As evidence of this is the persistence of pockets of blinding trachoma in a number of countries where the disease has been endemic to varying degrees and in many of whom control activities have been in place for a number of years.

Conversely, the virtual, if not total, disappearance of trachoma as a blinding disease from parts of the world where it was known to be endemic. This has happened without medical interventions but exclusively through improvement in socioeconomic parameters, which have led to the elimination of the multifactorial determinants of this blinding disease. In other instances, there has been at least a reduction in the blinding propensity of the disease. Thus, it is clear from the past lessons of our control efforts that the secret to sustainable elimination of trachoma as a blinding disease rests not on medical and surgical interventions alone, but more importantly, on addressing the behavioral and environmental aspects in high-risk populations and communities. The Prevention of Blindness program of the

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WHO established in 1996 a large partnership of Member States, Non-governmental Development Organizations, Research Institutions, Philanthropic Foundations, and Industry: the Alliance for the Global Elimination of Trachoma by 2020 (GET2020).[7] The clearly set target was endorsed by the World Health Assembly in 1998 with the resolution 51.11, calling Member States to collaborate in the WHO Alliance GET2020 to finally eliminate blindness for trachoma, implementing the SAFE strategy and using the newly available tools.[9,10]

Issues and challenges:

Antibiotics/Face-washing/Environmental change based on the current understanding of the epidemiology of trachoma and its risk factors, the WHO has recommended the use of ''SAFE'' strategy for countries implementing trachoma control programs. This multifaceted approach includes Surgery for trichiasis cases, Antibiotics to treat the community pool of infection, Face washing and Environmental change to reduce transmission. The implementation is critically important, as the temptation is strong to follow a more medically oriented model of concentration on provision of surgery and antibiotics with less attention to the hygiene and environmental components. The part of the strategy involving motivating significant behavior change on a community level is not easy and involves training and experience that is not traditionally part of an eye care worker's job. Much work remains to be done on the implementation of the strategy and the length of time each component must be place to reduce blinding trachoma so that it is no longer a public health problem. A large quantity of good-quality drugs are required to expand and sustain interventions. For scaling up SAFE programmes through an integrated approach, a number of research and monitoring questions will also need to be addressed.[11-14]

Research priorities:

There are still gaps in knowledge in disease dynamics and treatment. We still do not fully understand the epidemiology of trachoma, the relationship between transmission intensity, disease pattern, and severity of the disease and subsequent blinding complications. We still need to know more about the optimum treatment schedules using the newer macrolides and have more insights on the effect of mass treatment compared with targeted treatment, given the cost of the medication.

Cultural issues:

People's knowledge and perceptions about trachoma, how and when to do deal with it, and where to seek treatment, are important and not always fully understood. We need to know through sociology- and medical anthropology" based studies what happens at the community level, how health-seeking behavior develops, and the outcomes of health education in children and in adults pertaining to blinding trachoma prevention.

1. Improving the Personal Hygiene and environmental changes:

In general, poor hygienic conditions favor the transmission of C. trachomatis through contact with ocular and other secretions.[14] Several studies have been carried out to identify the specific components of hygienic conditions associated with a lower risk of active trachoma.

The ocular and nasal secretions of pre-schoolchildren in trachoma areas are clearly a potential source of infection.[15,16] Improving facial cleanliness may decrease the likelihood of transmission from these secretions.

Focus of research:

a. Ascertaining the frequency and improving facial cleanliness, personal hygiene and environmental sanitation among schoolchildren and the community.
b. Motivating community efforts to reduce transmission through hygiene or reduction of other routes.
c. Environmental control of flies, from a public health perspective, should be encouraged.
d. The idea of 'self-help' in the prevention of disease through community mobilization and partnerships.
e. Review and assessment of the current coverage of SAFE strategy and suggestions for improving the strategy at community level.

2. Increase efficacy and integration of Surgery:

What are the risk factors for recurrence after trichiasis surgery, and how can we improve the surgical technique? These issues are critical for the performance of trachoma control programs. Although the current surgical technique is easy and effective, the rate of recurrence is relatively high.

Focus on Research:

1. Development of newer surgical technique and efficacy of existing procedure in prevention of CO or visual loss is to be evaluated.
2. Integration of mutiprocedure surgical intervention for effective treatment of tracheasis and prevent recurrence.
3. Proper training by an ophthalmologist, an eye nurse or medical assistant can be developed for successfully performed trichiasis surgery using the tarsal rotation technique in makeshift theatres in the local communities.
4. In areas in which trachoma is endemic and very few ophthalmologists are available, ophthalmic nurses or

medical assistants are trained to perform trichiasis surgery.

5. Prevention of ongoing exposure to infection which is a factor in both the development of trichiasis and recurrence following surgery.
6. Improved compliance by overcoming the barriers of perceived cost, and lack of accessibility to the health facilities [17,18].
7. The introduction of surgery at the village level, as opposed to requiring patients to present at a hospital or health center, should reduce these barriers and increase uptake.[19]
8. Offering surgical services need to be certain of gender equity in access and receipt of surgery. Gender-specific barriers to surgery, such as lack of child care, have been documented.[17]
9. Procedures, which can be carried out under field conditions, should be studied compared toproven surgeries using clinical trial methodology.

3. Monitoring drug efficacy and early detection of drug resistance:

Antibiotic treatment of either whole communities or selected groups considered at high risk is the current recommendation, and once yearly treatment has been shown to be effective in reducing the infectious burden from 2 to 12 months post-treatment, with evidence of re-emergence in some settings.[20,21]

The use of antibiotics for trachoma control is intended to reduce the community pool of infection. Although, it is argued that trachoma disappeared in the United States prior to antibiotics and thus they are not a necessary component, the disappearance of trachoma took many years and coincided with massive socioeconomic development, a boon that is unlikely to occur for trachoma-endemic communities.

Focus of research:

1. The absolute safety of Azithromycin (under Federal Food and Drug Administration Class B) during pregnancy needs to be confirmed by further studies.
2. The possibility of fostering azithromycin resistant micro-organisms in mass treatment programs may need to be evaluated.
3. Involve the community members in distributing azithromycin.
4. Approaches to research on cost-effectiveness of various strategies for delivery of the antibiotic component have been assessed.

4. Integrated multi-intervention package Integration into primary health care.

A comprehensive pro-poor strategy should be formulated to integrate programmes for the control or elimination of some tropical diseases using existing guidelines.[1] Such integration efforts are particularly relevant in the Region as these diseases exhibit a high degree of geographical overlap. It is needed to identify ways to expand the deployment of the strategy in all countries and in all areas where blinding trachoma is still a public health problem. This problem is strictly related to the lack of awareness of many decision-makers and their lack of support to the elimination activities. Resources available to date, human and financial, are not of adequate proportion for the final elimination of this cause of blindness.

Focus of research

1. Operational research on alternative strategies for implementation of the SAFE strategy, with appropriate evaluation, is critically important for the cost-effective implementation of trachoma control programs.
2. Further research in chlamydial genomics and proteomics are needed to identify likely gene products that may be reasonable vaccine candidates. Major research efforts are also needed in the development of effective delivery systems for such vaccines. Strategies for vaccine programs must also be considered, as the target group for sexually transmitted Chlamydia is different than the target group for trachoma, which begins in infancy.
3. Operational research should be conducted, along with efficient monitoring and evaluation of integrated efforts. Developing and testing integrated data management systems is another priority.
4. Mapping the co-endemicity of other diseases with Trachoma can provide further information for integrating programmes.
6. Detection, monitoring and prevention of drug resistance:

Focus of research:

1. It is becoming increasingly clear that sub-sets of the population are at greater risk of intense trachoma, and the immune response clearly features in those who appear to develop persistent disease compared to those who clear infection. Further work is indicated to determine host factors that predict persistence and drive scarring and trichiasis in these communities.
2. Carry out research and develop sensitive tools for monitoring and early detection of drug resistance.
3. Develop standardized protocols, and reliable and valid in vivo and in vitro tests to confirm suspected drug resistance in humans under the conditions prevailing in developing countries.
4. Develop treatment strategies to achieve the maximum reduction in morbidity, reduce drug selection pressure and delay the possible occurrence of drug resistance.

5. Future directions:

Basic and applied research into chlamydial ocular infection, and trachoma, is essential for the elimination of blinding trachoma as a public health problem.. Future research in trachoma should provide knowledge that contributes to the prevention, treatment, and control of this blinding disease.

The gauntlet has been laid down by the WHO-elimination of blinding trachoma by the Year 2020. The field of trachoma control has been energized by the recent large-scale donation program of azithromycin, and the formation of the alliance to foster progress in the implementation of the SAFE strategy in member countries. General consensus holds that the SAFE strategy is a safe bet for success, but diligence in implementation of the full strategy, and ongoing research to provide data on the most effective trachoma control program, will be necessary to assure victory over this preventable cause of blindness.[22,23]

It will also entail a significant infusion of addition political, technical, and financial support. However, without the need to eradicate an organism, threats to the success of elimination of blinding trachoma are more modest. A consensus on standardized programme structure and strategy will facilitate the effective expansion of trachoma control programmes to trachoma-endemic areas so that the aim of eliminating blinding trachoma by 2020 can be achieved.[24, 25]

Conflict of Interest: None

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Picture Quiz (Answer)

Form history, patients having features of raised intracranial pressure. On fundoscopic examination revealed features of papilloedema in right eye as evidence by blurring of optic disc margins (figure 1). In the left eye features of primary optic atrophy as evidence by pale colour optic disc with sharply demarked optic disc margins and vessels count reduced to 5 to 6 in number (figure 2). MRI of the brain revealed a meningioma in his left frontal lobe. These rare fundoscopic findings are called “Foster Kennedy Syndrome”.

This is a rare neurological sign first described in 1911 by Robert Foster Kennedy.[1] It consists of; a) Unilateral, ipsilateral optic atrophy, produced by direct pressure on the optic nerve, b) Contralateral papilloedema secondary to raised intracranial pressure (ICP), c) Central scotoma, d) Anosmia.[1,2] It is most commonly caused by a tumour on the inferior surface of the frontal lobe most likely Meningioma.[2]

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