Tuberculosis

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Tuberculosis is an infectious disease caused by organisms of the *Mycobacterium tuberculosis* complex. In 2006, 9.2 million people worldwide acquired tuberculosis, 1.5 million people died from tuberculosis, and an additional 200 000 people died from human immunodeficiency virus (HIV)-associated tuberculosis.[1] Tuberculosis is important because of this global burden of disease and the emerging risk of multi-drug resistant tuberculosis, often in association with HIV infection in developing countries.[1]

Transmission and disease

Tuberculosis is spread via the airborne route.[2] The infectious dose is very low. It is thought that an untreated person with infectious tuberculosis can transmit the infection to 10–15 people each year.[2] In most people with the infection, the organism remains latent (inactive) within the body. A person who has latent tuberculosis infection is not infectious to others and does not have symptoms of disease. Around 5% of people with latent infection progress to active disease within 1–2 years after infection. For a person with tuberculosis infection, the overall risk of progression to tuberculosis disease is around 10% over a lifetime.[2]

People with impaired immunity are more likely to progress to active disease. HIV infection, malnutrition, being at the extremes of age, drug and alcohol abuse, certain medical conditions (e.g. kidney disease, diabetes, cancer) and immunosuppressive drugs all increase the risk of progression to active disease.[2]

In Australia, approximately 60% of people with active tuberculosis have pulmonary tuberculosis (tuberculosis in the lungs), the main infectious form of the disease.[3] Pulmonary tuberculosis generally presents with a cough (sometimes blood-stained), fever, night sweats, weight loss and tiredness.[2] A person is most infectious if the tuberculosis bacteria can be seen on a sputum smear. Tuberculosis can also involve other organs of the body, such as the lymph nodes, meninges, kidneys and joints. These forms of tuberculosis are generally not infectious. Rarely, tuberculosis can produce disseminated disease.

Treatment

Treatment for tuberculosis is administered for at least 6 months. Commonly, four oral drugs (isoniazid, rifampicin, pyrazinamide and ethambutol) are administered for at least the first 2 months, with isoniazid and rifampicin continued for at least 4 more months. This treatment, known as 'directly observed treatment, short-course', or DOTS, is one of the pillars of tuberculosis control, and involves patients taking their medications in the presence of a healthcare worker.[1] Management of tuberculosis requires patient education, the provision of appropriate antibiotic therapy and follow-up.

Prevention

All tuberculosis infections, and subsequent disease, are caused by exposure to people with infectious tuberculosis who have not been treated. The two key elements of prevention are:

1) early detection and effective treatment of people with active tuberculosis disease; and
2) detection of people with latent tuberculosis infection who are at greatest risk of progression to active disease: those who have recently acquired the infection and those with impaired immunity. These people can be treated with isoniazid to reduce their risk of developing active disease.[2]

Global burden of disease

Twenty-two high burden countries account for 80% of the global burden of disease, with particularly high numbers of cases in China, India, Indonesia, South Africa, the Russian Federation and Vietnam.[1] In 1991, the World Health Assembly recognised tuberculosis as a major global health problem due to the rising incidence of the disease. The incidence of tuberculosis may have peaked in 2003, but the prevalence of co-infection with tuberculosis and HIV, particularly in sub-Saharan Africa, poses a particular challenge to tuberculosis control.[1,4]

A further challenge is the problem of multi-drug resistant tuberculosis (MDR-TB), which is resistant to at least isoniazid and rifampicin, and extensively drug resistant tuberculosis (XDR-TB), which is additionally resistant to other important, second-line drugs.[1] MDR-TB requires treatment for at least 2 years with oral and injectable drugs that are more expensive, more toxic and less effective than standard drugs. XDR-TB is very difficult to treat and may be impossible to cure, and therefore has a high mortality rate.

In 2008, the World Health Organization estimated that 4.6% of all cases of tuberculosis were MDR-TB.[1] MDR-TB was

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found in every country surveyed, particularly in China and the former Soviet Union. It is estimated that there are now 500 000 cases of MDR-TB each year. In the same survey, XDR-TB was found in 45 countries, and is thought to account for between 4 and 24% of MDR-TB.[1]

Tuberculosis in Australia

Note that within NSW Health, the term 'Aboriginal' is generally used in preference to 'Aboriginal and Torres Strait Islander', in recognition that Aboriginal people are the original inhabitants of NSW.

In Australia, the annual incidence rate of tuberculosis has been below 6 per 100 000 population since 1985.[3] The incidence rate in Aboriginal Australians in 2006 was seven times the rate in non-Aboriginal Australians. Although rates of tuberculosis in Aboriginal Australians have been falling, the Northern Territory, with the highest proportion of Aboriginal people, has the highest rates of tuberculosis in the country.[3] Approximately 80% of Australian cases occur in people born overseas, with the top five countries of origin in 2005 being India, Vietnam, the Philippines, China and Indonesia.[3] Unlike many other countries, co-infection with tuberculosis and HIV remains uncommon in Australia.[3] In 2006, 2.4% of Australian cases were found to be MDR-TB.[5] One case of XDR-TB was identified in 2004.[5]

Summary

Globally, tuberculosis is responsible for a large burden of disease. The incidence of tuberculosis may have peaked, but drug-resistant forms of the disease are an emerging concern. Tuberculosis has been well controlled in Australia for the last two decades, with the highest risk now occurring in people born overseas, especially recent migrants. The effectiveness of overseas control programs, and of screening programs prior to migration, will have a major impact on Australian rates of tuberculosis in the future.

References

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