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**TUBERCULOSIS**

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Epidemiology

The cause is Mycobacterium tuberculosis the main types are the human and the bovine both of which infect man. There are some other mycobacteria with similar properties they are common in many parts of the world, but do not normally cause any disease though they may cause skin sensitivity to tuberculin and varying degrees of BCG - like effects (examples are M. fortituitum and M. Kansasii).

The source of infection in a child is usually an adult or adolescent this usually means someone in the family or immediate environment. The organisms are expelled in droplets and are inhaled by the child so that most primary infections occur in the lungs. Occasionally germs are swallowed and the primary disease is in the intestinal tract, or, rarely, in the tonsil. The dose depends on the type of the disease in the adult, the amount of sputum etc., and whether he has been treated by anti-tuberculosis drugs. Childhood tuberculosis is usually not infectious (chronic pulmonary disease or cavitating disease is infectious but these forms are rare in children) It is difficult to culture the germ from children with childhood tuberculosis except by gastric lavage they do not usually expel the germ in their cough.

Primary tuberculosis of childhood means the primary complex and any local progression the complex is the focus in the lung and the draining lymph nodes in the broncho-pulmonary group. Hypersensitivity develops and the complex tends to enlarge, but eventually it is sealed off and becomes at first caseous and then calcified it may disappear completely. Rarely, the lung part of the complex continues to enlarge, the contents liquefy and empty into the bronchus. this results in a cavity and tuberculous pneumonia by bronchial spread. This is rare in childhood. The lymph node part of the complex may, in spite of partial calcification continue to enlarge and bacilli may persist for years. Lymph nodes beyond the primary ones may be affected with massive enlargement of the mediastinal

nodes This may lead to one of two results - infection of the bronchi with endobronchitis and dissemination through the bronchi, or compression of bronchi with de-aeration of segments of lung which may then become infected with non-tuberculous germs

Before hypersensitivity develops a few tubercle bacilli may escape into the bloodstream these may settle anywhere but usually die as hypersensitivity develops. Some may lie dormant and cause a flare-up years later when something alters the resistance of the child. Sometimes a large number of bacilli escape from the primary site before it is sealed off and these cause acute military tuberculosis or tuberculous meningitis. Most complications of the primary disease occur during the first year after infection the exception is the rare chronic pulmonary tuberculosis which usually does not develop much before adolescence, although this may differ in different countries

Primary tuberculosis is usually a self-limiting disease in a child living in a good environment, with good nutrition and not exposed to heavy infection. When the environment is not good, nutrition poor and exposure heavy the disease is more severe and complications common. These factors obviously affect the immunization aspect

#### Clinical aspects

Often infection with tubercle bacilli is silent there are no symptoms at all, and the tuberculous lesion heals without causing trouble. But a child who is already in poor condition from bad nutrition may suffer severely with fever, loss of weight and loss of energy. When the dose of tubercle bacilli is heavy and the child's condition poor, large numbers of tubercle bacilli can escape into the bloodstream causing tuberculous lesions in many parts of the body. This is military tuberculosis and is often fatal. Sometimes the tubercle bacilli get into the central nervous system and cause tuberculous meningitis this is

always fatal unless the child is treated with anti-tuberculosis drugs. Sometimes the tubercle bacilli enter bones and joints, often the spine, and cause osteomyelitis and arthritis which are severely crippling conditions. These bone and joint conditions are caused more often by the bovine than the human type of Mycobacterium tuberculosis they are caused by drinking infected milk from animals with tuberculosis.

#### Tuberculosis vaccine

Tuberculosis vaccine is usually called BCG (Bacillus Calmette Guerin). The vaccine consists of live tubercle bacilli, but they have been grown in special ways in the laboratory and have become weak germs. If injected into a child they do not cause tuberculosis. They grow slowly in the skin of the child producing a skin sore which heals slowly, leaving a scar. But, as they grow, the child's body reacts to them just as if they were dangerous tubercle bacilli, and so it becomes resistant to them.

The vaccine consists of a measured number of the weak germs, put into ampoules and freeze-dried. It is tested to make sure it will not give serious reactions, and that there are enough weak germs per millilitre to make sure that, when injected into the skin, the vaccine will make the body react and produce protection against any tubercle bacilli it may meet later in life (EPI Manual: Book III, Annex 1, page 5)

What is the value of tuberculosis (BCG) immunization? Protection levels as high as 80% have been claimed, but also as low as 30% (Rosenthal et al, 1961, Palmer et al, 1958). These differences may be due to differences in vaccine or in the methods of storage and use. A recent study in Hamburg was based on a 22 years survey of children. In 1954 there were 6364 infants vaccinated with BCG at birth and 9524 not vaccinated. during the 22 years study 9 vaccinated children developed tuberculosis compared with 130 in the unvaccinated, a highly significant difference (Ehregut and Stellmer, 1977). the incidence is almost 10 times higher in the unvaccinated. So tuberculosis vaccine (BCG) does prevent

tuberculosis, but results may differ in different parts of the world, depending on social conditions, standard of nutrition, dosage of infection and, of course, proper storage of vaccine.

BCG vaccine is given intradermally, into the skin, not subcutaneously. A weal is a small raised area of skin with pits on its surface like the pits on orange skin, and a weal appears if the vaccine is injected correctly into the skin. (EPI Manual, Book II, section 2, page 29). The vaccine may be given at birth or at the third month along with the first DPT injection or at entry to school or later. Much depends on local conditions and on the epidemiological situation.

#### REFERENCES

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