Tuberculosis in Childhood

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SUMMARY

Those physicians who deal with children have much to contribute toward case finding in tuberculosis among these patients as well as adults. The tuberculin test is the most accurate weapon at hand. Contacts other than the parents should be looked for. Symptoms, beside fever, to be noted are eye and skin complaints. In the physical examination the chest is relatively unimportant as compared to the eye, the skin, the lymphatic and skeletal systems. In the roentgenographic examination, epituberculosis and atelectasis should be differentiated. When stomach washings are necessary for the diagnosis, the tuberculin test on the guinea-pig should not be forgotten. Careful laboratory studies will clear up roentgenographic confusion.

In the treatment, removal of contact is essential, and often all that is necessary, but other factors should be considered. Of the more common complications, atelectasis, bronchiectasis, and cavitation or reinfection, may be treated surgically with all the accepted methods except thoracoplasty. Heliotherapy should not be forgotten in bone and joint tuberculosis. It is to be hoped that BCG will prove efficacious in vaccination, but published reports are not scientifically convincing. It destroys the value of the tuberculin test where used, and it should never be substituted for removal of contact as a prophylactic measure.

THE pediatrician and the general practitioner have a peculiar advantage—or had, at least until recently—in the study of tuberculosis. The pediatrician, who is the general practitioner with practice limited to a certain age group, sees tuberculosis in the full gamut from exposure through the incubation period into the primary infection, and from there into quiescence or complications, to reinfection, arrest, or death. He is more apt to see the story of tuberculosis in its entirety, although this statement was truer in the past than it will be in the future. As a result of efforts to prevent exposure the story is often being postponed until more of it is finished in the older age groups, and even the beginning is more often not seen until adult life is reached. But to all who still doubt that tuberculosis in all its manifest forms is common in children, an invitation is extended to make rounds on a tuberculosis ward for children at the San Francisco Hospital.

What has the pediatrician been able to contribute to the study of tuberculosis from his vantage point, and what does he look for and emphasize about the disease? In other words, what may he teach others?

Assume that the story begins with that test which originated in pediatric practice, the tuberculin, one of the most accurate biological tests known to medical science when properly evaluated. It has suffered much from misinterpretation by those not using it often, but it still gives much more accurate information than the Wassermann test, the sedimentation rate, or the leukocyte and differential blood counts. It might be said to be even more accurate in diagnosis than the finding of acid-fast organisms, which in some locations in the body may not be tubercle bacilli. What enthusiasm there would be for a comparable skin test for the infection of rheumatic fever!

Those who belittle the tuberculin test should remember that as infection in childhood becomes less prevalent, a negative reaction to the test becomes more significant. It is safe to say that if the test is properly made upon a patient who is not suffering or convalescing from another communicable disease and who is not already overwhelmed and moribund from obvious tuberculosis, a negative reaction will rule out tuberculous infection of any type and at any site. A "false negative" will not be seen by the average physician in a lifetime. The tuberculin must, however, be gotten into the skin by either the Mantoux or Craig test (and be given in doses up to 1 mgm., if the Mantoux test is used) before the result can be called negative. A patch test, which a school child may secretly remove soon after application and replace a few minutes before inspection, should, if the reaction is negative, be followed by intradermal testing.

Assume that in routine office or clinic practice, a tuberculin test is positive: It means, in addition to his own infection, that active tuberculous disease has at some time been in that child's environment. The test therefore becomes a potent means of case finding, and, if the child has not already been reported because of his contacts, a much more accurate means of case finding than the roentgenogram. The pediatrician becomes, if he has a suspicious mind, one of the most valuable case finders in the campaign against tuberculosis. Parents and older siblings come to mind first as a source of the disease, but those who work with children should not forget

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the school-teacher, the nurse, permanent or casual, the maid in the house, the cook, playmates, especially older children, the grandparents with the chronic cough of old age, and, in clinic practice, the midwife. Raw milk, occasionally taken as a special treat when visiting country relatives, must be remembered in certain areas.

In asking about symptoms, inquiry should be made as to bouts of unexplained fever or sores that have healed slowly and with thin but ragged scarring. Children are apt to have primary skin tuberculosis caused by being bitten or kissed by someone with active infection or by slight injuries coming into contact with infected material. Inquiry should be made about sore eyes and conjunctivitis, about nodules over the skin, and transient rashes of all sorts not readily explainable.

What may be found in the physical examination that may not be seen often in an adult? Usually nothing in the chest, although signs of fluid may be present, and in any age classical signs of infiltration or cavity may be found. The pediatrician, having popularized D'Espine's sign, has now consigned it to the limbo it deserves, and interns may now be found who are even unfamiliar with the term. Negative findings in an examination of the chest are relatively unimportant, and search should be made for active phlyctenulosis or the scarring therefrom, for erythema nodosum over shins, thighs, arms, forearms, and occasionally forehead or chin, for morbilliform or other rashes that cannot be fitted into a nomenclature. Enlarged lymph nodes must be looked for and the surface of the tonsils inspected. A search should be made for orthopedic deformities. An enlargement of the wrist or a buckle on the spine may be caused by tuberculosis, though the roentgenogram of the chest be as clear as that of a normal infant.

In the evaluation of a case record, roentgenograms of the chest usually come next in sequence. Often the trilogy of primary focus, lymphangitis and lymphadenopathy may be seen, and occasionally thickened pleura. Mention will be made of only the shadows commonly called the epituberculous lesion. Of these there are two types. One is the true epituberculous lesion of allergic reaction with tubercle in the center and edema or cellular elements surrounding it. The other resembles this only in roentgenographic shadow, as it is a collapse due to pressure of a node on a bronchus. It is the more serious lesion of the two, as it may lead to bronchiectasis, and often does. In addition, all types of shadows seen in adults may be seen in infants and children and with the same significance.

Next comes the search for the tubercle bacillus. Stomach washing is now almost routine in all cases of tuberculosis, sometimes during the course of the disease, even in adults. Points to be emphasized here are that the contents should be taken early in the morning before the patient arises and before the aroma of food may empty the stomach. The contents, if acid, should be inoculated into a guinea-pig at once, but otherwise neutralized if three-day pooling is to be done. If the guinea-pig is given a tuberculin test on the day of inoculation and the reaction is negative, it may be tested again on the eighth day. If the stomach washings contained tubercle bacilli, the reaction to the second test will be positive in 95 per cent of cases. This simple test, not as widely used as it deserves to be, will save about a month's time in gathering the information sought.

Of the numerous diseases simulating tuberculosis in childhood, chronic sinusitis with its accompanying bronchitis, coccidioidomycosis, pneumonias, (lobar, bronchial, and Loeffler's), and cystic fibrosis of the pancreas are the ones commonly confused with it. Atelectasis either separately or as part of the disease may complicate the picture. Usually, the confusion is only roentgenographic, as careful history and laboratory examinations will differentiate these from tuberculosis. There are some rarer diseases to be kept in mind, such as Monilia infections, rheumatic lung involvement, tumors and cysts, histoplasmosis, toxoplasmosis, lung abscess and sarcoidosis.

The most important item in the treatment of tuberculosis in childhood is not controversial. It is the complete and absolute removal from contact, and the item need not be elaborated, except to say that it is the ideal of both active and prophylactic treatment.

There is a tendency to minimize the importance of, or to abolish altogether, rest in bed in the treatment of the primary infection. It is, indeed, usually a self-limited infectious disease, but not always. The same may be said of measles, yet nobody would think of advising that children with measles remain ambulant while febrile. The author advises rest in bed during the primary infection as long as there are symptoms attributable to it, while any organisms are found in secretions or body fluids, and until the sedimentation rate has returned to normal. If it be an error to advise this, it is an error on the safe side.

Attention to the diet is especially important in tuberculous children because of the growth factor which is not present in adults. Special attention should be paid to adequate protein, vitamin, and mineral salt intake to replenish the loss by disease, as well as to supply the needs for normal growth.

Of the complications of childhood infection one of the more common and more important is atelectasis from pressure of enlarged lymph nodes, or a bronchial lesion and subsequent bronchiectasis. Wallgren called attention to this 20 years ago, but it has not received much attention in the literature. In the author's experience, bronchiectasis in children, if unilateral and especially if apical, is more apt to be due to tuberculosis than to any other cause. Exudative tuberculosis, with pleural fluid, or cavitation is seen at all ages in younger patients, and is common in later childhood. The study of these

types in children called attention to the frequency of basilar tuberculosis at all ages, and led to the demise of the belief that basilar shadows were less apt to be caused by tuberculosis than by something else.

The treatment of bronchiectasis due to tuberculosis and of cavitation is primarily surgical. Children of all ages stand operation well. In pneumothorax, space fillings, pneumoperitoneum, lobectomy or pneumonectomy, childhood is no contraindication. With the exception of thoracoplasty, which is deforming in children, surgical procedures are withstood as well as, if not better than, by adults. Because adolescents may be uncooperative about rest, they are best treated under supervision in sanatoria. A complete plan of treatment should be outlined, and complications anticipated.

Bone and joint tuberculosis should be treated by the orthopedist and pediatrician together. Nearly all patients will be benefited by heliotherapy properly applied, and when usable it considerably hastens the cure. It is a much neglected form of treatment, but the evidence of the benefits is overwhelming.

The treatment of the miliary and meningitic forms by streptomycin has given the very first ray of hope in these forms of the disease; for the first time in history, cures have been reported.

No general discussion of tuberculosis in childhood would be complete without at least a mention of BCG as a means of prophylaxis. It is hoped of course that the optimistic claims for this product will be substantiated. After a quarter century of use of the vaccine, its effectiveness is still controversial, due mostly to the carelessly controlled projects both in Europe and America. In the only reported carefully scientifically controlled series,[1] with alternate cases as controls, no appreciable difference between the two groups was noted. Some of the other studies may have been controlled in this way, but the published reports have not so stated. In reports on the use of BCG the control methods should be exactly stated and the method of selection of controls elaborated upon. The use of BCG almost completely destroys the value of the tuberculin test in case finding, as its use is usually confined to the heavily infected groups where case finding is most important. BCG vaccination should never be considered a substitute for removal of contact.

REFERENCE

1. Levine and Sachett, Am. Rev. Tuberc., 53:517, 1946.