PRIMARY TUBERCULOSIS OF THE MIDDLE-EAR.*

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There is probably no disease to-day more widely discussed, not only by the physician, but by the laity as well, than the "Great White Plague." For many years it has claimed the attention of some of our greatest scientists. Koch's discovery of the tubercle bacillus in 1882 was of unprecedented value to the profession; and since that time, particularly during the last decade, marked advancement has been made in the knowledge of tuberculosis. While clinical research continues, efforts are exerted to utilize each progressive step for the enlightenment and benefit of mankind. While some theories have been so conclusively proved by experimentation and application that they have become of universal practical value in diagnosing cases and for the treatment and prevention of tubercular infection, there are still many questions open to discussion. Concerning these, we must accept the opinion of the majority until more extensive investigation and time shall prove or disprove them.

Before proceeding to the subject of primary tubercular infection of the middle-ear, which is the purpose of this article, let us take a brief survey of the present tubercular situation as it is presented to us by recent scientific workers and by personal study and observation.

There has been much disputation as to whether the human and bovine tubercle bacilli differ or are identical. Theobald Smith claimed to have found "many distinct differences." Koch¹ believed the difference to be one of type, rather than species, the position now taken by all who support a differentiation between the two groups. Koch further stated his belief that this difference is sufficient to influence the combating of the disease. Others² believe in the unity of the human and bovine bacilli, maintaining that, while there are marked differences in cultural growth and virulence between the two "so-called types," these types vary within themselves in the same way, to such an extent, that the difference in the groups overlaps, making it impossible to consider the one group as an entity distinct from the other. The English Royal Commission³ confirms this instability of type and concludes that the gap between the two types is not a wide one, while Whitla⁴ states that the conclusion of

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the "great majority of recent workers is that the human and bovine types of bacilli are identical."

Whatever the decision in this regard, there is now a general agreement upon one point,—the danger to man of infection from both types of bacilli. The English Royal Commission, in their report of 1911, state as follows: "We have investigated many instances of fatal tuberculosis in the human subject in which the disease was undoubtedly caused by a bacillus of the bovine type, and nothing else. We have compared the lesions from such cases with those obtained from parallel cases of fatal tuberculosis in which the human tubercle bacillus alone was discovered. Except for the difference in the type of bacillus found in them, these two groups of cases presented similar features; the clinical histories of the cases were alike, the cases all terminated fatally, and the lesions examined after death were found to be anatomically indistinguishable." To quote Professor Ravenel:⁶ "Laboratory investigations have shown beyond question that bovine tuberculosis is transmissible to human beings and that the lesions produced do not differ in any way from those caused by human bacilli."

Considering these facts, is it then worth while to pause to discuss the much agitated question of the possibility of the human bacillus affecting cattle? It is interesting, and perhaps valuable, to know that the resistance of bovines is so great that the feebly virulent human bacilli can ordinarily have but little effect upon bovine tissue. This, however, seems not the salient point in the matter. When we observe the destructive inroads made by the bovine bacilli in the human being, does not the question of bovine susceptibility shrink into insignificance?

Again, in view of these facts, whatever its source,—water, milk, milk products, or ordinary dirt—the infection of mankind by bovine tubercle bacilli should receive our careful attention. Though the extent of danger is still in doubt, if we adhere to von Behring's⁸ theory of latent infection, if we incline toward a growing conviction, that, after all, the one type may be transformed into the other after long-continued residence in a particular host with all conditions requisite and favorable to such transformation, or if we advocate the popular theory⁷ that the surgical forms of tuberculosis are due to bovine bacilli, which may also produce miliary tuberculosis; in any case, we cannot but be convinced of the perils of bovine bacilli to mankind. We do not, as some accuse, "minimize" the danger of infection by human bacilli by emphasizing the work of the bovine type. We merely hold that the latter infection has a significance which may not be generally appreciated.

It is universally recognized that age is an important factor in the infection of tuberculosis. The disease is considered pre-eminently one of childhood. The physical conditions, environments, and food of the child render it practically impossible for children to escape the inception and harboring of the bacillus. Though its presence is not always immediately evident, the seed is sown and awaits only the opportune moment, favorable soil conditions and lowered resistance to begin its destructive activity. The prevention of implantation is one of the means of eradicating the tubercular evil. .

We must, then, consider first the question of tuberculosis and the susceptible child. Though much is being attempted to better existing conditions, yet more should be done. We fail to see how civic governments can consider it unnecessary to improve the public milk supply in the face of such statements as the following made by the English Royal Commission:⁸ "A very considerable amount of disease and loss of life, especially among the young, must be attributed to the consumption of cow's milk containing tubercle bacilli."

It has been fully demonstrated that certain tissues of the human body exhibit a greater susceptibility for the tubercle bacilli than others. The lungs offer the best example of these, and, in consequence, are most frequently primarily infected. On the other hand, some tissues are so rarely invaded that many believe that their infection as a primary condition never occurs. To this latter class belongs the middle-ear. Although Milligan,⁹ after years of observation concludes that primary tubercular infection of this organ is a comparatively common condition, he meets with little support and much contradiction of opinion, some experienced otologists even maintaining that the infection is never primary, being always secondary to the disease elsewhere, usually with a pulmonary focus. While few assume this extreme position, yet the general consensus of opinion inclines toward the rarity of the condition, which is not surprising when we consider the limited number of cases reported and the great difficulties in eliminating early or latent tubercular infection.

Until the year 1903, according to Goldstein,¹⁰ but three cases of primary infection of the ear had been reported. To these he added four. Recently others have been presented, and, although there may be doubt as to some of these being primary, the remaining unquestionable ones give sufficient proof of the existence of a primary infection of the middle-ear. Until it can be proved that some one part of the human system is immune to the invasion of the tubercle

bacillus, the possibility of this conditions cannot be authoritatively contradicted.

The following case which I have to report appeals to me as one of special interest in view of the extreme youth of the patient.

G. W.; English; aged 11 months; female. According to the parents, the child appeared to have a severe cold at the age of one month. Both nose and eyes discharged for a couple of days, which was followed by a discharge from the left ear. The family physician treated the ear for some time by syringing, but no improvement resulted. February, 1910, she was brought to my clinic at the Post-Graduate Hospital by the mother. Examination revealed a profuse fetid purulent discharge from the left ear. The lining of the external auditory meatus was red and irritated. The tympanic membrane was absent. The probe revealed necrotic bone. The examination of the throat showed enlargement of the pharyngeal tonsil, which seemed to interfere with nasal breathing. This was removed. In all other respects the child appeared perfectly healthy. The treatment applied consisted of ordinary cleansing and Politzeration until April. No improvement resulting, a smear was taken and submitted to Professor Zeit of the Northwestern University for examination. He reported the presence of tubercle bacilli in the discharge. Owing to the child's youth, it was impossible to determine the exact condition of the hearing, but it appeared little impaired. The cervical glands were not enlarged and there was no tenderness nor swelling over the mastoid process.

April 29, 1910: The radical mastoid operation was performed, only remnants of the malleus and incus remained. A mass of granulation-tissue virtually buried the stapes, the granulations extending into the antrum. All were carefully curetted away with the exception of those around the stapes. The post-auricular wound was dressed open. Owing to the rapid growth of immense, flabby granulations, healing was protracted and many curettements were necessary.

June 2, 1910: The post-auricular wound had healed and the meatus was dry. About the middle of May, the right ear was found to be discharging. Professor Zeit reported a pneumococci infection, but no tubercle bacilli. This ear was soon well.

October, 1910: The child was suffering from a cold, and both ears were discharging after being dry for four months. No tubercle bacilli were discovered, and the response was negative to both the Moro and von Pirquet tuberculin tests.

October, 1911: The last report of the case came at this time. Both ears were dry and, according to the mother, the child was in general good health. Up to the time I first saw her, this child had never been given cow's milk or artificial food of any description. She did not appear to suffer pain in her ear, while she was so noticeably good-natured that callers were impelled to remark about the attribute.

In our conclusion that this was a simple case of primary tuberculosis of the middle-ear, we considered the following: the child's youth at the period of onset of the disease; its continuous general good health; the absence of tubercular infection elsewhere, as proved by the negative tuberculin tests after the radical mastoid operation; and the ultimate satisfactory condition of the ear.

As to the source of the disease, little need be said, although the child, to the best of our knowledge, was given no cow's milk or artificial food. The ignorance and carelessness of the laity afford ample opportunities for infection. The theory of predisposition and inherited tendencies was not regarded here, as there had been no instance of tuberculosis in the family and the parents of the child were in perfect health. The case being a surgical one, suggests a bacillus of the bovine type and the attack a result of dirt infection.

While there are many possible avenues for the inception of the disease, the features of the case eliminated all but two, the Eustachian tube and the external auditory canal, with the probabilities in favor of the former.

The examination of the ear discharges determined the nature and localization of the disease and the radical operation was performed in time to arrest its destructiveness. In support of this operation, which is often criticized, we maintain that if any operation is advisable, it should be of a radical nature, especially when the disease is localized. Surgeons have regretted its omission when further developments showed that its timely performance might have prevented a fatal termination of the disease.

Despite the constant advice to be ever upon the alert for the first indications of the tubercular disease, some of us fail to recognize the infection in its incipient stage. If the physician and bacteriologist would more frequently co-operate, there would be fewer disappointing results. While this reference is but an added stroke to the well-worn nail, its insertion may be of benefit to some co-worker.

Let us not slumber while the foe invades; then become pessimistic, but "take arms against a sea of troubles, and by opposing, end them."

BIBLIOGRAPHY.

1. ROBERT KOCH, at the International Congress on Tuberculosis. *Brit. Med. Jour.*, Oct. 17, 1908. Vol. 2., p. 1190.
 2. AMONG, at the International Congress on Tuberculosis. *Brit. Med. Jour.*, Oct. 17, 1908. Vol. 2, p. 1190.
 3. English Royal Commission: Final Report on Tuberculosis. *Brit. Med. Jour.*, July 15, 1911. Vol. 2, p. 122.
 4. SIR WILLIAM WHITE: The Etiology of Pulmonary Tuberculosis. *Brit. Med. Jour.*, July 11, 1908. Vol. 2, p. 63.
 5. MAZYCK P. RAVENEL: Transmission of Bovine Tuberculosis to Human Beings. *Jour. A. M. A.*, Dec. 18, 1909. Vol 53, p. 2115.
 6. E VON BEHRING: "Ueber Lungenschwindsuchtentstehung und Tuberkulosebekaempfung." *Deut. Med. Wchnschr.*, Vol. 29, p. 689.
 7. NATHAN RAW: Human and Bovine Tuberculosis. *Brit. Med Jour.* 1908. Vol. 2, p. 1083.
 8. English Royal Commission on Human and Animal Tuberculosis. Second Interim Report. *Brit. Med. Jour.*, Feb. 9, 1907. Vol. 1, p. 326.
 9. WILLIAM MILLIGAN: Sixth International Otological Congress. Transactions of Sixth Internat. Cong., 1900, p. 34.
 10. M. A. GOLDSTEIN: Primary Tuberculosis of the Ear, followed by Mastoiditis. Reported four cases. *Jour. of Laryngology, Rhinology and Otology*, March, 1903, vol. 18, p. 113.
- 15 East Washington Street.

Surgery of the Thymus Gland. PARKER, *Am. Jour. Dis. of Child.*, Feb., 1913.

A very instructive paper written on a subject of which little has been known and of particular interest to the laryngologist. Many sudden deaths have been caused by an enlarged thymus producing obstruction to the trachea. Frequently this is the sole factor responsible for the compression, but at times enlarged tracheo-bronchial glands or spasm of the glottis are contributing factors in producing fatal results. Compression of the trachea is shown at autopsy by the presence of flattened trachea, associated with enlarged thymus and revealed intra-vitam by the bronchoscope, showing narrowing lumen of the trachea. The three most important symptoms are permanent dyspnea, recurring suffocation attacks and stridor; all three of these frequently occur together. Treatment is essentially surgical.

HALSTED.