MEDICAL TREATMENT OF LARYNGEAL TUBERCULOSIS WITH SPECIAL REFERENCE TO THE USE OF FORMALIN.*

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"Tuberculosis is one of the most frequent diseases of the larynx. It is usually fatal. Very few cases recover."

"Occasionally a case recovers; nearly all die."

These two statements emanating from two eminent laryngologists, the first twelve years ago, the other of recent date epitomizes the old and new prognosis as commonly held and demonstrates with what hopelessness the physician takes up the gauntlet of battle.

Are these statements justifiable today and has a decade of effort warranted nothing more than a mere transposition of words?

In no other disease is a statistical report of so little value for we are dealing not with a process of standard or even fairly equable conditions but with one where each is a law unto itself, yet when we contrast the percentage of recoveries given by Bosworth in 1893—less and 1%—with those quoted by Solly in 1904, computed for Colorado, we see that progress has been real and substantial and that this wide-spread pessimism is illogical.

He says: "Taking the results in laryngeal cases without considering the ultimate fate of the patient, there was permanent arrest of the local disease in 64%; temporary arrest in 5% additional cases in which the tissues again broke down shortly before death. Looking at the ulcerated cases alone, 50% healed permanently, 10% temporarily." Levy, in 1900, reported only 26 deaths in 86 infiltrative cases. Of 60 ulcerative cases 37 grew worse or died and of those without involvement of the epiglottis or aryepiglottic folds, only 10% died or failed to improve.

The present day warrants, I believe, a still more hopeful outlook and my recent experience leads to the belief that more than one-half of the ulcerative cases can be brought under permanent control regardless of the eventual outcome of the pulmonary lesion.

For its treatment no specific is known and the vast number of agents utilized is the most eloquent tribute to their general ineffi-

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ciency, and yet the outlook each year becomes more encouraging. What is the explanation of this apparent paradox?

It rests largely with the earlier recognition of the incipient lesions; more universal utilization of the essentials of treatment—local cleanliness, vocal and general rest, establishment of physiologic nasal respiration, open air life under favorable climatic conditions, etc., and to a considerable degree upon the mental attitude of physician and patient.

Believing in its incurability the physician formerly treated these cases in a perfunctory manner, striving after the single goal of euthanasia, while today, with a deep appreciation of the necessity of constant vigilance and supervision and its not infrequent reward, his increased zeal and confidence bring greater success. In the treatment two general lines may be distinguished; the palliative and the curative. At certain points these lines converge, notably in all matters pertaining to nutrition and local and general hygiene, but with the palliative otherwise we have here no concern; its indications, except as to whether they be surgical or medicinal are clear, universally known and met.

In considering the curative treatment one is confronted by an appalling array of remedies each endorsed by some observer as standing pre-eminent. There is no specific, and probably never can be for a disease of such manifold types, but the one which fulfills the greatest number of essential requirements, each in a degree equal to any other substance, approaches nearest the ideal. The requirements common to all lesions are cleansing and bactericidal, and for special conditions, stimulative, absorbent or resolvent, caustic and sedative properties.

In meeting these various indications one remedy stands alone, without an equal in its field of universal usefulness—Formaldehyde.

Preliminary to all treatments, the mucosa must be cleared of tenacious mucous or pus and so maintained, and formalin meets this requirement as successfully as Dobell's or any of the other numerous detergents, and for this purpose may be used in weak solutions *ad libitum*. At the same time it exerts a more profound antiseptic effect than can be attained with any other substance. A solution as weak as 1 to 100,000 prevents the development of bacteria and it is germicidal in a strength of 1 to 75,000.

A 1 to 10,000 solution arrests the growth of the germs of anthrax, cholera, typhoid and staphylococcus pyogenes aureus, and it is markedly superior to corrosive sublimate in solutions of a strength which can be tolerated.

This property would of itself make it a valuable remedy in the treatment of any tubercular process where it is possible to bring it into direct contact with the involved structures as is the case in laryngitis.

That it is of great value in tuberculosis of other organs there can be no question.

According to Lamarque a 1% solution used in cases of tubercular cystitis stops hæmaturia, relieves pain and lessens the frequency of micturition, when every other remedy has failed.

In tuberculosis of the middle ear, irrigation with weak solutions are more effective than any other single procedure.

As has been shown, formalin is prohibitive to bacterial development in a strength of 1 to 100,000 and positively germicidal in 1 to 75,000, and since we can use in the larynx with perfect safety sprays as strong as 1 to 150, it is conclusive evidence that we attain a considerable germicidal effect, and this action is expended not upon the lining membranes alone but upon the deeper tissues as well, owing to its rather unusual penetrative powers.

In lesions of an ulcerative type lactic acid has long been considered the remedy par excellence but in my experience the stronger solutions of formalin have seemed even more efficacious.

It has all the virtues of the former with one or more peculiarly its own. Severe pain not infrequently follows the applications of strong lactic while formalin solutions of equal potency occasion nothing more than momentary smarting with considerable subsequent anaesthesia. Its great superiority, however, rests in its safety, which makes it feasible for the patient, by home use, to keep up a continuous cleansing, antiseptic and stimulant action, a desideratum of high importance. No other remedy has given me as satisfactory results in this form of the disease and under its influence I have seen many cases completely heal that previously resisted all other remedies. As demonstrating this, I hope to show the following case:

Mr. W. M., æt. 32. In January, 1902, six months after pulmonary tuberculosis was diagnosed, there developed complete aphonia with considerable dysphagia, and two months later, upon his arrival in Denver, he presented the following picture:

Entire epiglottis deeply ulcerated with loss of nearly one-half its substance; ventricular bands so infiltrated as to partially overlap the cords with ulcerations at the most prominent point of each. The left arytenoid twice the normal size and extensively ulcerated. Both cords infiltrated and ulcerated throughout with considerable masses of granulation tissue at their posterior attachments. The inter-arytenoidal sulcus infiltrated and ulcerated.

Treatment, of which formalin constituted the most important part, was instituted with considerable improvement at the end of three months. At this time I substituted lactic acid with the occasional use of guaiacol with continued retrogression when at the end of eight weeks the use of formalin was resumed. By the following January the ulcerations were healed except for one small spot on the under surface of the epiglottis and the infiltration of the ventricular bands and ary-epiglottic folds had almost disappeared.

At this time I left the city for four months and the patient was under the care of a colleague, who, having no faith in this treatment, used lactic acid and methylene blue. Upon my return the condition was worse than at the first examination and a hopeless prognosis was again made. Under the old treatment, however, the condition rapidly improved and six months later he accepted a position as a retail salesman which he has since uninterruptedly held.

In examining the larynx today, were it not for the distorted epiglottis and slight scarring at several points, one could have no suspicion that it had ever been the seat of tubercular disease.

While fully the equal of lactic in the ulcerative type, it is in the infiltrative cases and especially where vegetations exist, that its chief superiority is manifest. The lactic cannot act through an unbroken membrane and to be effective it must be used in the form of sub-mucous injections of a moderately weak solution, 10 to 20%.

Iodine, ichthyol, resorcin, creasote, menthol in oil and the various phenol combinations, after more or less extended experience, have seemed inferior to either the formalin or lactic and personally I now use the latter, only in exceptional cases.

T. J. Gallaher, one of the pioneers with this method, whose experience with it has been extensive, says: "It is the most satisfactory remedy I have ever used in infiltrative cases."

For a time sub-mucous injections of formalin were tried, but were not found to possess any advantage over the simple rubbings, added proof of its penetrative powers.

When vegetations or infiltrations are localized or excessive, they should be surgically removed provided the general conditions are favorable; but after all the tissue capable of surgical treatment has been dealt with, or primarily in case operative procedures be deemed inadvisable, the frequent use of formalin is generally most effective. That its influence in the reduction of hyperplastic tissues is a direct one was strikingly shown by a recent case of pachydermia laryngis where the continued use of this drug caused gradual shrinking with complete restoration of the voice. This action is likewise shown by

its effect upon dural granulations, whether they be tubercular or simple inflammatory.

It may, under certain conditions, produce some anæsthesia but this power is too slight and unreliable to be depended upon. It has a distinct sedative effect but rarely sufficient to permit the withdrawal of other remedies of this class. It is credited, in so far as I have been able to ascertain, with but one deleterious result; the possible production of local dry gangrene. While the danger of this has been mentioned it must be an accident of extreme rarity, for during a period of more than four years I have used it extensively in an infinite variety of patients and lesions without once seeing any evidence of such a complication.

In only one type of the disease, perichondritis of the arytenoids—has it proved inefficient and I believe all other agents are equally so. Partial resolution may result but where true perichondritis has occurred, not a mere œdema, complete restoration to the normal rarely, if ever, ensues, unless through the medium of surgical procedures. It is in this condition that I have seen the only favorable results from photo-therapy. The use of the concentrated rays of the arc light, as advocated by Freudenthal, has frequently resulted in great lessening of a dysphagia that resisted all other means. This has occurred in many cases but never has there been the slightest change in the appearance of the tissues, its sole action seemingly being one of more or less prolonged anæsthesia.

The effect of the X-Rays has been even more disappointing.

Some time ago I carefully selected a series of cases, representing almost every known stage of the disease, and placed them under the care of various experts in the use of electricity. Some were treated daily, some at longer intervals; various tubes were used and daily laryngeal examinations were made without once seeing evidence of the slightest improvement. Indeed, the effects seemed sometimes unfavorable, the marked reactions causing some increase in the subjective symptoms. In using formalin the key to success is the maintenance of continuous action and it is to the neglect of this, I believe, that the many negative reports may be credited.

In the average case it should be used according to the following method: After thorough cleansing with a one-half per cent solution, and the previous application of cocaine, the parts should each day be vigorously scrubbed with a solution of from three to ten per cent, depending upon the nature of the lesion and the susceptibility of the individual. In addition to these daily treatments the patient should use a spray, about 1 to 250, every three or four hours. The usual

method, according to the literature, is to use the stronger solutions once or twice a week with the use of simple detergents in the interim, thus violating the entire rationale of the treatment.

Formalin should never be used blindly to the exclusion of all other remedies for other substances at certain times and in certain individuals may give better results, and while I have come to consider it the sheet anchor of medicinal treatment and rarely supplant it, it is invariably supplemented by other approved procedures. It is the most satisfactory remedy today not because it fulfills any of the attributes of a specific; not because it is invariably superior to all other agents, and not because it always noticeably decreases the period during which treatment must be maintained, but because of the following facts:

1. It surpasses all other bactericides in solutions of a strength which can be tolerated.
2. In tubercular ulcers it is fully the equal of, and probably superior to, lactic acid.
3. Its effect upon vegetations is prompt and pronounced.
4. In infiltrative cases it is by far the most satisfactory remedy.
5. It possesses some anæsthetic properties.
6. It is the only remedy of the curative class that can with safety be placed in the patient's hands, thus maintaining a continuous cleansing, germicidal and stimulant action.
7. Its field of usefulness comprises all of the varied types of the disease.

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Bullet-wound of the External Auditory Canal—B. CHORON-SHITZKY—*Monatsschrift f. Ohrenheilkunde*, Jan., 1904.

The path of the bullet in this case is of interest. It entered the skin above the zygoma, glanced off from this bone and passed through the external auditory canal. It was then deflected by the mastoid and appeared in the neck between the sixth and seventh cervical spines. The drum membrane was not injured.

YANKAUER.