An Address

ON

TUBERCULOSIS OF THE LYMPHATIC SYSTEM.*

BY

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No more fitting subject could have been selected with which to commence the activities of the Tuberculosis Society than that which has been proposed for discussion. The significance of the part played by the lymphatic system in the spread of tuberculosis throughout the body seems inadequately recognized in current medical practice and teaching. The subject calls for illumination.

Within the past hundred years medical vision has been progressively clarified regarding the main facts of tuberculosis in remarkable degree. Fundamental positions have been successively determined with precision. First came the clearing of the air, from the morphological point of view, through the convincing teaching of Laënnec as to the unity of tubercle in all its forms. Second, from the biological side, there followed the definite proof by Koch of the essential causal factor.

With these positions determined, advances have been made along numerous lines, both pathological and clinical. The morbid anatomy—macroscopic and microscopic—of tubercle, as it occurs in any organ, has been studied with great exactness. While lacunae exist here and there, our knowledge in this direction is almost complete. From the biological side the life-history of the tubercle bacillus has been followed by endless observers. Thereby much has been attained in explanation of its morbid action and in the suggestion and elaboration of methods of treatment and prevention. There has been a gradual evolution of thought regarding tuberculosis whereby the horizon has been widened and faulty perspective has been corrected.

Just Perspective.

The local manifestation of tuberculosis in any one organ, important as it is, is seen to be of relatively less significance compared with the larger fact—of which the local lesion is but part expression—that invasion of the system by tuberculosis has been effected.

Granted successful invasion and live bacilli within the body, the potential of manifestation is infinitely various, both focally and systematically. In no two cases is the pathological and clinical picture identical. In the same case kaleidoscopic effects occur from week to week, and month to month, and year to year. After many years of work in relation to tubercle, my experience is that hardly a day passes without some new point of interest or fresh illustration in one or other direction.

We are gradually getting to the vantage position in respect of tuberculosis which we have for long occupied regarding other chronic infective processes, such as syphilis and leprosy.

Continuous Observation.

This advance has been largely contributed to by prolonged continuous observation of individual cases—not for weeks or months only, but through many years—from the earliest manifestation, for example, in an isolated gland, to successive further developments throughout the subject's life. I have in this manner followed numerous patients from early childhood to manhood or from early adolescence throughout adult life. The line of study is tedious and difficult, but throws a flood of light—not otherwise available—on the natural history of tuberculosis as a whole and particularly on that aspect of the subject which we are now considering. I commend the method of observation to younger workers, who presumably have the potential of carrying it out for sufficient periods.

Facts observed clinically in this extensive fashion are illuminated by comparison with observations in inoculated animals, where the gradually advancing involvement may be more rapidly followed stage by stage from the initial changes at the point of inoculation through successive structures and viscera.

*Introductory to a Discussion on the subject at the Tuberculosis Society of Scotland, November, 1921.

Stages of Infection.

In offering a constructive representation of our present knowledge of the spread of tuberculosis in the human subject certain landmarks may be specially signalized.

Let us admit that the point of inoculation with the tubercle bacillus may be almost anywhere in skin or mucous surface. Opportunities for inoculation are numerous, obscure, recurrent, and notably conditioned by the subject's environment. Dates of exposure to tuberculous infection are less exactly determinable than in syphilis. Nor is the fact of successful invasion by the tubercle bacillus commonly registered in the human subject, as it is in the guinea-pig, by a local sore analogous to the primary sore in syphilis.

Primary Incubation and Initial Local Lesion.

None the less, from the occasional occurrence of demonstrable cases of local sore either of skin or mucous membrane, with a definite history of precedent trauma—for example, in laboratory, *post-mortem* room, or slaughter-house—we are in a position to predicate a measurable period of primary incubation between the actual entrance of the bacillus and the occurrence of the initial local lesion. Whether or not the point of entrance is indicated by the occurrence of an evident local lesion, such point of entrance must be definitely predicated. Much confusion has been introduced into the consideration of the subject, as it seems to me, by the sharp, even acrimonious, difference of opinion which has emerged between supporters of the theory of introduction by inhalation, and of introduction by ingestion. Observers have come to be ranged as if in opposing camps, while the truth would seem to be that both are right.

The outcome of collective observation appears to be that inoculation of the human subject by the tubercle bacillus occurs by varying channels in different cases. While, if entrance occurs through the skin, the event is commonly registered by a definite sore, an obvious lesion is seldom traceable when inoculation has been effected by way of the mucous membrane, as may be the case at any point in the alimentary tract from the lips to the anal orifice, or in the respiratory tract from the nostril to the ultimate alveolus.

The absence of local lesion is likely when infection occurs, as it oftenest does, during the tender period of developing childhood. At that date the mucous surfaces are rapidly absorbent and succulent, and the entrance of the tubercle bacilli may leave little, if any, trace. Theoretically, especially at that age, the possibility of entrance at any point of the mucous surface must be admitted, but the greater vulnerability of certain points, notably the tonsillar region, including the posterior nares and fauces, will be kept in view.

Second Incubation Period: Involvement of Lymphatic Glands.

Following successful invasion, whether evidenced by local sore or not, ascertained facts allow us to predicate the occurrence of what may be termed the second incubation period, during which gradual spread by way of the lymph stream is taking place. In the experimental animal the completion of this secondary incubation is evidenced by enlargement of a lymph gland in the vicinity of the initial sore, followed by further extension to other glands.

Careful observation in the human subject, particularly in children, frequently reveals more or less clearly a similar succession of events. Thus, following inoculation of the tonsillar region, one or two external glands may be found evidently enlarged, and then others progressively until, it may be, a network of such enlarged glands in the submaxillary and supraclavicular regions is determinable.

Specially noteworthy in many cases is the fine multiple enlargement of lymph nodes extending in fanlike fashion from the angle of the jaw downwards. The enlarged glands may vary much in size. Such infiltrated and indurated glands may show little tendency to caseation or softening. Indeed, the enlargement is, for the most part, so slight as commonly to be passed over, unless the point is *deliberately investigated by specially detailed palpation over likely regions*. So far as these glands are concerned, this is all that may happen. To local incidents—or accidents—in the course of the tuberculous involvement I shall return shortly.

Further extension of infection throughout the system proceeds insidiously by way of the lymph stream—legitimate or irregular—until presently, as is readily followed in the experimental animal, groups of glands at a greater and greater distance become implicated, the individual glands undergoing changes similar to those just indicated.

Clinically the evidence of this progressive involvement varies according to the position of the glands and merits observation. In all cases the conditions of more accessible glands—for example, axillary, bronchial, abdominal—should be investigated. Such inquiry frequently yields most important evidence.

As we have seen, the commonly occurring change in the affected glands is infiltration and induration. For the most part there is little obvious disturbance of grosser sort. In this fashion infection spreads quietly from point to point. The glandular changes are so slight as readily to escape notice.

Incidents in Glandular Spread.

Gross enlargement with caseation, with all the possible inconveniences which may follow, is a relatively uncommon event. Such obvious involvement, causing deformity of outline and calling for operative interference on that account, or because of softening and risk of rupture, may be regarded as an uncommon incident compared with the frequency of slight, progressive implication of glands, one group after another, without more striking development.

The deforming swelling or threatened rupture naturally arrests attention. The question of immediate interference requires consideration. There is, however, a serious risk that treatment may be restricted to the obvious disturbance, to the exclusion of the more significant distribution of the disease. There is too little consideration of the steady passage of tuberculous infection in the quieter fashion that has been described. In presence of gross enlargement of glands a thorough-going search should be undertaken for less obvious infiltration which extends frequently over wide areas throughout the body.

Systematic Examination of Lymphatic Glands.

Whether or not immediate local interference is required—for example, with a view to immediate removal of gross deformity, such as a large mass in a pretty girl, or for the discharge of softened caseous material when rupture is threatened—the wider issues of the case must be carefully appraised and handled.

Were this line followed the guidance afforded by early illness would not be lost. It would cease to be common experience to have case after case come under observation for advanced disease with a history of two, four, six, even twelve, successive operations for enlarged glands, or to encounter as great a number of discharging sinuses without indication of effective attempt to deal with the larger question.

Sphere of Vaccine Therapy.

From long-continued observations in a great variety of cases I am satisfied that this is the moment to institute sufficiently prolonged vaccine therapy. The effect of tuberculin, maintained for long periods, is remarkable (1) on the glands which for the moment are more immediately in evidence, (2) on groups of glands less obviously affected, which may be discovered in other areas, and (3) on the intoxication, which is more or less determinable in most instances.

Under the continued use of tuberculin—whether subcutaneously or percutaneously (by inunction), as I have practised with excellent results for many years—the grosser tumours gradually melt away. The agglomerate mass separates into discrete glands, which in turn become smaller and smaller until all that remains, in most instances, is a firm, apparently fibrous core, possibly calcified in part. *Pari passu*, the glands at a distance are influenced, and the advance of disintoxication is registered by the improved appearance of the patient, increase of weight, and recovery of muscular tone.

Further Spread of Infection.

If the lymphatic system has been widely invaded and the advance unchecked, the possibilities of extension to individual viscera and generally throughout the body become almost unlimited, in the absence of arrest of infection. The tubercle bacillus readily passes elsewhere by a variety of channels.

Let me accentuate the point that these channels may be what we may term legitimate, or they may be less regular. In presence of large masses of agglomerated glands—for example, about the neck—there is often conspicuous stasis, and even reversal, of lymph flow. The resultant is the production of the full, heavy, porcine or scrofulous aspect, to which older observers paid much attention. From many

observations following the special lines of treatment indicated, it seems to me that the classic scrofulous appearance is to be explained largely in the way suggested. Under treatment, the gross enlargement becomes sensibly reduced and the agglomerate mass resolves into discrete glands, lymph stasis is gradually relieved, and the natural outlines of face and neck are restored.

Among most civilized peoples the stage of glandular involvement—whether as the more commonly occurring fine, multiple implication, or the grosser enlargement associated with deformity and softening—is chiefly determinable in children, occurring more rarely at later ages. Among uncivilized peoples, on the other hand, this stage or type of disease—which is fitly described as the “infantile type”—may be strikingly found in adults who, passing from primitive, more or less savage, life, come abruptly into close contact with massed infection in older countries. It was typically seen among native troops during the recent war—for example, the Senegalese troops in France. In his native country the Senegalese hardly suffers from tuberculosis. Its occurrence is limited to dwellers in more urban districts in contact with European settlers. The Senegalese troops recruited from such primitive regions were found on arrival in France—after minute examination—to be for the most part free from tuberculosis. Yet, notwithstanding the enforcement of good sanitary conditions, as typically in the Fréjus camp, where Professor Borrel made his observations, tuberculosis developed rapidly, with gross enlargement of lymphatic glands and grave toxæmic symptoms—commonly terminating fatally.

Passage from Lymphatic System.

The extension of infection from the glandular system to the viscera and blood stream does not call for detailed discussion on the present occasion. Suffice it to recall that extension may proceed along a variety of courses—for example, by way of the thoracic duct, or, more abruptly, by direct extension from an involved gland to other structure; by propinquity, as from glands to pleura or lung; or by more abrupt rupture of such gland into, it may be, a bronchus, with rapid widespread involvement of lung, or into a blood vessel, with the grave possibilities of generalized dissemination. On the details of such carriage I do not enter, as taking us beyond the limits of the present discussion. Much may be learned as to the possibilities of this extension from a study of the facts of comparative pathology.

Observations in the experimental animal and also in the slaughter-house point to the probability of the direct passage of the tubercle bacillus from one group of glands, in which individual glands have been successively invaded, to groups of glands in other regions, apparently by direct lymphatic connexion, and no less to the possibility of the passage of the bacillus from an adherent gland to a contiguous viscus. The deductions from such observations are endorsed by observations which have been recorded by various observers from autopsies in the human subject. The occurrence of direct spread from cervical glands downwards to thoracic and abdominal glands, and, conversely, a spread from abdominal glands upwards, may be accepted. The fact may be readily illustrated by comparing the results of inoculation—for example, of the guinea-pig—in one case in the groin, and in another case in the cervical region. While the ultimate result is a general involvement of the lymphatic glands, the sequence of events depends on the point of primary entrance.

SUMMARY.

In closing, let me rapidly recapitulate some of the chief points covered by this address towards which discussion may suitably be directed:

1. The part played by the lymphatic system in the early spread of tuberculosis requires to be emphasized.
2. Patients should be examined with that in mind, and the more important groups of glands should be systematically reviewed. In cases of general delicacy, all the readily accessible lymphatic glands should be carefully investigated.
3. In young children, the lymphatic system should be investigated with especial care, from time to time.
4. Lymphatic tuberculosis, conspicuous in children, becomes less marked in later life.
5. In cases of gross enlargement of one or more glands, exacting search should be made into the state of adjacent glands and other groups of glands.
6. Operative treatment should be limited to emergencies—for example, the immediate removal of an ugly deformity in

certain cases or the evacuation of an obviously softened gland.

7. Save in exceptional cases, such operative treatment should not involve extensive incision.

8. Operative treatment should not be regarded as radical.

9. Tuberculous involvement of the lymphatic system can be effectively combated by continuous vaccine therapy.

SOME LOCAL RESULTS OF DENTAL INFECTION.*

BY

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I PROPOSE in this lecture to refer to various cases which have come under my notice during the year just past, in which local complications had been set up by infection arising in connexion with the teeth.

It will become evident to you that I have been greatly indebted to the teaching of the late Sir Henry Butlin, particularly concerning the way in which cancer of the tongue may be prevented, and also to that of Dr. William Hunter, consulting physician to Charing Cross Hospital, as to the manifold harm resulting from oral sepsis. The importance of Dr. Hunter's observations is shown by the number of communications which have appeared of late on the chronic general infections set up by oral sepsis—osteo-arthritis, gastric and intestinal complications, septic anaemia, etc. Such chronic general infections are much more frequent and of greater importance than the local complications which I am about to mention, but these latter are at least troublesome, and may be dangerous, whilst I hope to show how they may be prevented.

Irritation by Tooth Plates.—Patients complain of stinging pain and tenderness along the sides of the tongue; there may be no apparent alteration of the surface epithelium, or merely this, that some papillae have become unduly prominent, in particular the line of papillae running forwards from the junction of the anterior pillar of the fauces, in the rabbit called the foliate papillae, may be a little swollen. Close inspection may discover dental defects, and lead to explanation that there has been delay in carrying out what a dental surgeon had advised. But in many it is impossible to find anything wrong with the remaining teeth. I have had continual opportunities of confirming the note by Butlin on p. 126 of the second edition of *Diseases of the Tongue*, 1900, which refers to tooth plates made of irritating materials. The note commences:

"For some reason which I am not able to explain red vulcanite appears to me to act as a very decided irritant, and exciter of chronic superficial glossitis."

In the middle of the note occurs this sentence:

"But the dental surgeons are by no means generally of my opinion."

No year has passed since that date but that patients have consulted me, and the persistent irritation has disappeared when the vulcanized rubber composition of the tooth plate has been replaced by metal. The black composition seems less often than the brown a cause of irritation. I do not know whether the irritant is a purely chemical one, such as a larger amount of sulphur used in vulcanizing, or whether a growth of micro-organisms occurs on the roughened surfaces, which cannot happen on smooth metal.

Herpetic eruptions are very painful when the corneous layer becomes detached and the persistent recurrence is very troublesome. It is quite useless to treat the middle-aged women, who are commonly the sufferers, for dyspepsia, neuralgia, and anaemia, unless all causes of dental irritation are removed first of all. Generally the outstanding dental treatment over which difficulty arises is that for the relief of pyorrhoea alveolaris affecting the lower incisor teeth; anything short of extraction may be unsatisfactory.

Precancerous Lesions.

Causes of patches of leucoplakia, papillomas, fissures, and chronic ulcers on the tongue and inside of the cheeks have of late years diminished. The clay pipe has become almost obsolete; tobacco, whether smoked in pipes, cigarettes or cigars, seems to give rise to much less irritation than was

the case formerly, and most people, when any irritation is experienced, are wise enough to stop smoking, or to change the kind of tobacco. Only in the East, where tobacco is mixed with caustic lime and betel nut, and held in the mouth as a quid, is there any regular sequence of cancer. Of course this refers to tobacco when there is no other lesion present, for, although it is a matter on which it is difficult to speak with precision, smoking indefinitely increases the general effects of oral sepsis arising from the teeth.

Syphilis as an antecedent to cancer of the tongue has been influenced of late by the arsenical treatment; early superficial glossitis is quickly removed, and is thus prevented from going on to a definite leucoplakia, which neither mercury nor arsenic can remove. Against the improvement by the more rapid removal of early secondary manifestations is the uncertainty how far an advance has been made in the actual curing of syphilis. The effect of salvarsan and its substitutes in causing the rapid disappearance of the primary and secondary manifestations of syphilis may prove misleading, and prevent the carrying out of a prolonged course of treatment by mercury.

The practice of applying caustic to sores on the tongue continues; I am quite sure that caustic determines the commencement of those changes by which a chronic inflammation passes over into cancer.

There is one way in which cancer of the tongue can be prevented—namely, by the patient, or the first doctor he consults, or both, taking into account any lesion on the tongue, and in the mouth, as seriously as if it were an acute disease, to be kept continuously under observation until it has entirely disappeared, or has been cut out. I have never seen a case of cancer of the tongue or mouth, in a patient over 30 years of age, in which there has not been a definite history of a preceding inflammatory stage, during which interval the lesion might have been made to disappear, or it might have been removed by a slight operation.

In some cases, no doubt, the failure as to this lies with the patient, but it is a regular feature of the history of cases of cancer of the tongue that the impression made on the patient by the first doctor consulted has been that the condition was both trivial and transient. The doctor, however, failed to make the patient understand that for the trouble to be trivial and transient the patch should entirely disappear in a few days. The doctor did not tell the patient that every inflammatory condition affecting the mouth and tongue should under treatment completely disappear within three weeks, and that, if it should not do so, it should be removed by a superficial excision, and the wound so made closed by suture.

Complete disappearance implies that not only is any breach of surface covered by healthy epithelium, along with cessation of all pain and tenderness, but there should persist no subepithelial induration. If such epithelial induration is examined under the microscope it will be seen that a chronic inflammation is continuing which affects the epithelium from below. Hence an epithelioma can be started from below whilst the epithelial surface is apparently intact, just as well as when the epithelial surface is continually irritated by a jagged tooth.

The excision of patches of leucoplakia, fissures, subepithelial induration, nodules, warts, scars, and chronic ulcerations, however caused, followed by suture, is a completely successful procedure. The operation is attended by no danger, and as the removal involves only the epithelium, there is no impairment of the movements of the tongue.

Where there is subepithelial induration it is difficult to distinguish chronic inflammation from early malignant disease. Therefore when a patch has been removed and submitted to a microscopical examination, if in addition to epithelial overgrowth and subepithelial infiltration by small round cells, there has already set in a downgrowth of epithelial columns, the lymphatic glands, together with the external part of the submaxillary salivary gland, should be at once dissected out from the corresponding anterior carotid triangle. In such cases the lymphatic glands will generally show an increase of small round cells in the lymph spaces of the gland and its capsule, but definite epitheliomatous cells may not be recognizable. Exceptionally, when the patch removed has been situated across the middle line, the dissection has to be done in both anterior carotid triangles. Such operations are safe as regards life; there is little trouble after the operation, and that for a few days only, after which the patient is freed from anxiety, immediate and prospective. The scar of the incision in the neck becomes less obvious than one after removal of tuberculous glands.

* The Second Hunterian Society Lecture, delivered on January 11th, 1922.