OBSERVATIONS ON THE PROLONGED EXPIRATORY MURMUR

AS A SIGN OF INCIPIENT PHTHISIS.

BY

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No argument is necessary to prove that the indications, by which we may hope to detect the commencement of tubercular disease in the lungs, demand our special investigation.

The earliest signs which can be traced by auscultation are, probably, first, the modification of the inspiratory murmur, sometimes denominated jerking, in which the inspiration appears to be effected by a succession of waves; and, secondly, a modification of the expiratory murmur, consisting in an apparent prolongation, and an increase of coarseness. A careful analysis of the cases under my observation illustrating the first of these signs, namely, wavy inspiration (*Monthly Journ. of Med.*, June 1849), has led me, for reasons formerly given, to conclude, that although it may not be a decisive proof of the existence of tubercular disease, yet it probably indicates the presence in the lungs of some deposit of impaired vitality; and is, moreover, a sign of great interest and value, as affording evidence of a condition in which the supervention of phthisis, although happily not certain, is nevertheless too probable, and in which the most vigilant attention is required to avert, by suitable means, a further process of deterioration.

The relation of the second sign, namely, prolonged expiratory murmur, to pulmonary consumption, is much more direct and

significant ; and to the investigation of this phenomenon the present brief communication is directed.

In the ordinary healthy state, the expiratory murmur is very slight, and very little more distinct in one part of the chest than in another. In some individuals the murmur is naturally inaudible, excepting, perhaps, during hurried breathing. Laennec observes that it sometimes becomes audible during the existence of pneumonia, and disappears on the resolution of the disease. The probable relation between the exaggeration of this murmur, and the commencement of phthisis, did not escape the attention of that illustrious observer ; but he does not appear to have recorded any definite observations on the subject. Andral remarks, in his '*Clinique Médicale*,' that the presence of a certain number of tubercles in a portion of lung occasions a diminished intensity of the inspiratory murmur, and a sound louder than usual during expiration. The late Dr. James Jackson, of America, noted the coexistence of prolonged expiration, with diminished softness of the inspiratory murmur, in cases of phthisical or pneumonic condensation ; and remarked, that the bronchial character under such circumstances became manifest in the expiration before it could be detected in the inspiration.

Dr. Cowan (London Med. Gaz., vol. xviii, p. 332), in an interesting paper on the subject, endeavoured to give a philosophical explanation of this prolonged murmur ; but we are indebted to M. Fournet for the most elaborate attempt to describe the progress of change in the expiratory murmur, and to impress the profession with its importance. The subject, however, does not appear to have obtained the attention which it deserves ; and various opinions regarding the value of the symptoms are entertained by authorities in auscultation. It has, therefore, appeared to me desirable to review the cases in which I have noted this altered murmur, in the hope of accomplishing my share in the important task of determining its significancy and value. It may be well to premise, that I agree with Dr. Walshe, in considering the duration of the natural expiratory sound equal to about the fourth of that of the inspiratory. Fournet considered it as

only a fifth ; but in the cases investigated with a view to this communication, I have not recorded the expiratory murmur as abnormal, unless it were equal in duration to at least one third of the inspiratory murmur. It is important not to confound the inspiratory and expiratory movements with the inspiratory and expiratory murmurs. The duration of the two movements is *nearly*, perhaps *exactly*, equal. In the natural state, the inspiratory murmur occupies the whole time of inspiration ; but the expiratory murmur, at least, to ordinary ears, only a fourth of the time of expiration, the remaining part of the expiratory movement being accomplished in silence. I believe the expiratory murmur follows the inspiratory immediately without a pause. With the progress of phthisis, the duration of the inspiratory murmur usually lessens materially, though not necessarily, in proportion to the prolongation of the expiratory ; and some practice is necessary, in order to acquire an aptitude in determining how much of the alteration depends on diminution of the duration of the inspiratory murmur, and how much on extension of the expiratory ; but I have found great assistance, in estimating the relative duration of these sounds, from the plan suggested to me by Dr. Sibson, namely, that of counting the number of strokes which can be given by beating time with the finger during the presence of each murmur respectively. The expiratory murmur, as disease advances, may gradually increase until its duration exceeds that of the inspiratory. In proportion to its prolongation it usually becomes increasingly coarse in quality, and at last decidedly bronchial. A change of character probably accompanies the prolongation from its commencement, but is at first too slight to be positively appreciated. The natural elasticity of the lungs is essential to soft and uniform expiration.

Wherever there is considerable consolidation from tubercular or pneumonic deposit, undoubted bronchial expiration is induced ; but between the healthy state and decided consolidation, there are various intermediate conditions. When the walls of the pulmonary cells are only slightly thickened, and the neighbouring structure is becoming occupied with

the glairy grayish deposit, studded with little bright cells, which the microscope teaches us to regard, as characterising early phthisis; diminished contractility of the cells, interrupted passage of air, and an increased power of conducting sound, must combine their influence in rendering the expiration murmur more durable, coarse, and audible. Such an explanation is in harmony with the production of similar changes in the murmur, when the pulmonary structure is becoming dense from pneumonia, and when the passage of air is obstructed by the secretion in bronchitis.

The object of this communication being mainly to determine the value of the size in question, as preceding other indications of incipient phthisis, I have excluded in-patients of the Hospital for Consumption, in whom the disease is usually far advanced, from the analysis, confining my researches to the out-patients, and chiefly to those in whom prolonged expiratory murmur was noted as the most prominent of the physical signs. This proves to have been the case in about a sixth of the whole number of consumptive patients submitted to this inquiry. I have recorded it as a principal symptom in 308 patients, of whom 195 were men, and 113 women. The number of women presenting the sign being slightly less than the general proportion of females to males in the list of patients. From the 308 I withdraw twenty, in whom bronchial disease coexisted. In the remaining 288, I observed it almost invariably near the summits of the lungs, where tubercular disease is confessedly most frequent. In 108 the prolonged expiratory murmur was observed only on the right side; in fifty-six on the left. In 124 it existed on both sides, or at least is not specified as confined to either. In this observation, a singular contrast is presented to wavy inspiration, the frequency of which I have observed to preponderate most remarkably in the left side. As commonly occurs in the out-patient department of hospitals, many ceased to attend without reporting the results of treatment, some became decidedly worse, with conclusive signs of rapid progressive tubercular disease; a few gained flesh and strength,

and improved in their general health, chiefly under the use of cod-liver oil ; but, with the exception of those patients who were affected with bronchitis, and two or three others entered as cases of congestion of the lungs, in whom, after cupping and other appropriate treatment, the expiratory murmur resumed its natural character, it is remarkable, that I have not recorded any instance in which this sign, after being fully established, ever ceased to be obvious ; whilst, in some individuals the duration of the murmur gradually increased, notwithstanding a decided improvement in the constitutional symptoms ; and occasionally, at no distant period, a relapse afforded affecting testimony to the accuracy of the first unfavorable prognosis. In a considerable number of the patients, no specific complaint was made, except of debility. In various instances, there were other indications of the existence of phthisis more or less advanced ; such for example, as dull resonance on percussion, bronchophony, partial flattening, cough, hurried breathing, quick pulse, emaciation, night perspirations ; but, of single special symptoms, the most frequent accompaniment was hæmoptysis, which occurred in 91 cases out of the 288, that is, in more than 31 per cent.

Among our consumptive hospital patients, taken indiscriminately, hæmoptysis, has been noticed in about 64 per cent. If we deduct about a third, in whom there was reason to conclude, that hæmoptysis did not occur till after softening had taken place, the average number of out-patients assumed to have this symptom in the first stage would be about 43 per cent. Whilst, therefore, on the one hand, the coexistence of hæmoptysis in patients with prolonged expiration is sufficiently frequent to strengthen the supposition, that there is an essential connection between this altered murmur and phthisis ; on the other hand, the frequency of hæmoptysis in these cases is so much below its average in consumptive patients generally, that when viewed in connection with the frequently trivial character of accompanying symptoms, we feel justified in drawing two important conclusions, namely, first that the prolonged expiratory murmur

takes precedence of other characteristic signs, and secondly, that hæmoptysis more frequently follows than precedes the deposit of tubercle.

Dr. Bowditch observes (Memoir of Dr. Jackson, p. 345), "Every one can decide whether there exists a lengthened expiration, when he cannot tell whether it is bronchial or not . . . . . A question has lately been raised in relation to this interesting subject of this nature, namely, whether there be not often a prolonged expiration at the top of the right shoulder, and none at the left, and this without any disease? I do not know that this has been proved, and there is a great difference between opinion and proof. At any rate, the subject is too important not to excite every one who desires our knowledge of the early stages of phthisis to be advanced: for it is in these early stages that we must hope to be able to do something towards preventing its rapid progress."

The facts in my possession may, I think, assist in determining this question. We agree that the relative frequency of hæmoptysis, in a given class of cases of pulmonary disorder, is a fair element for calculating the degree of probability of the existence of a relation, between the conditions presented by that class and tubercular deposit. Now, of the cases referred to in this paper, taken without reference to hæmoptysis, 108 are specified as having prolonged expiration on the right side only, 56 on the left side only. If the peculiarity in question often occurs on the right side, as a natural phenomenon, independently of disease, it would follow, that the proportion of cases in which hæmoptysis occurs would be greater amongst those patients in whom the prolonged murmur is observed on the left side, than amongst those presenting it on the right; but it is an interesting fact, that no such discrepancy exists. In the patients affected with hæmoptysis, in whom the altered murmur is noted as confined to one side, it was observed 39 times on the right, and 19 times on the left; a proportion so nearly corresponding to the relative frequency of the sign on the two sides, irrespective of spitting of blood, as decidedly to negative the surmise in question.

A disturbed rhythm of murmurs, when established, I believe to be an unnatural condition, and the greater frequency of its detection on the right side may, I conceive, be readily explained ; for if the respiratory sounds be naturally rather louder on the right side, the more delicate indications of pulmonary obstruction should first be detected in that direction. It would follow, that in doubtful cases of apprehended phthisis, the absence of any change in the expiratory murmur, at the upper part of the right lung, would be a strong presumptive evidence of freedom from the disease.

It is true, that in certain individuals some degree of febrile action attends tubercular cachexy before any local signs exist of tubercular deposit ; but it has repeatedly occurred to me, when hereditary phthisis has manifested itself in a family, to be able, on examining the respiration of the surviving members, to prognosticate the approach of phthisis from this sign alone, in the absence of any other suspicious circumstance, either local or general. When the expiratory murmur is altered, in consequence of emphysema or bronchitis, the extensive diffusion of the sign, and the other concomitant circumstances, will usually suggest a correct interpretation ; and if we are careful to separate these sources of fallacy, I cannot but believe, that the sign under review will prove no useless refinement ; but one well deserving of careful attention, being the most early, significant, and conclusive of the evidences of incipient phthisis.

It is no valid objection, that the detection of the symptom requires close attention, since the object is to trace the first appreciable inroads of an insidious disease.

When the prolonged expiratory murmur is heard extensively, or on both sides, unassociated with bronchitis or emphysema, there is great reason to fear, not only that the disease is phthisical, but that it will make rapid progress. When the change of murmur is limited to a small portion of lung, and the general condition of the patient is favorable, the evidence of phthisical disease is fully as conclusive ; but there is ground to hope that, by careful regulation of diet, by securing exercise in the open air, by promoting healthy nutrition,

and administering suitable remedies, such as iodine, iron, solution of potash, and cod-liver oil, more decided mischief may for a time be averted. I have reason to think, that under such circumstances, some years may occasionally elapse before softening takes place ; and I cannot but believe, that when this particular sign under consideration is more generally sought for in suspicious cases of phthisical tendency, the average duration of pulmonary consumption, in persons possessing means to avail themselves of necessary comforts, will be found considerably to exceed the period commonly assumed.