Lectures

ON CERTAIN VIEWS ON THE NATURE AND TREATMENT OF PHTHISIS PULMONALIS.

DELIVERED AT THE
BROMPTON HOSPITAL FOR CONSUMPTION AND DISEASES OF
THE CHEST, IN THE SUMMER OF 1856.

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LECTURE III (continued).

REMOVAL OF THE EFFECTS OF THE DISEASE BY ABSORPTION
AND EXPECTORATION. GENERAL SYMPTOMS: PULSATION, HÆ-
MOPTYSIS, COUGH, DYSPNŒA, NIGHT-SWEATS, WASTING, AND
DEBILITY. MODE OF ACTION OF COD-LIVER OIL.

II. *Removal of the Effects of the Disease.* This is an extensive part of the subject, and may be conveniently divided into the consideration of those conditions attaching to the lungs, and of those found in the general system. We will first consider the former.

When the only probable pathological change is the lessened action of the air-vesicles, and the retention to a greater or less extent of the epithelium, it is highly probable that the means which have been recommended for the arrest of the disease may suffice to remove these conditions; for I have in many instances observed a large increase of the respiratory murmur to follow the use of those means. It may be a question if the retained epithelium is thus got rid of; but since, in healthy parts, the normal quantity of epithelium undergoes solution and removal, and since even accumulations of matter which are more or less fluid are also capable of removal, analogy would seem to imply that such may be the case. It is, however, evident that the degree of calcareous and oily degeneration at which the tubercle has arrived must mainly solve this question; for, when hard tubercle is fully developed, it must be almost incapable of absorption, even should it be again disintegrated by the ordinary process of softening. The process of absorption will be probably slower in the lungs in every stage of phthisis than in other tissues, apart from this disease; for, with the lessened action of any mass of cells, there is a lessened supply of blood; and it is capable of demonstration, that, with complete filling of the cells with solid material, there is a more or less complete closure of the pulmonary capillary vessels; and hence but a very small supply of blood is sent to the diseased effete part, and the power of absorption is very greatly lessened. Whatever, then, tends to recover the lost power of the vesicles, tends to restore the supply of blood to that part, and to promote the power of absorption. In all these occurrences, moreover, we must make a liberal allowance for the rate of progress both towards degeneration and recovery, which, depending as it does upon constitutional as well as on local conditions, varies much in different individuals.

Thus, before the deposit has assumed the earthy form of degeneration, we should not despair of its removal; but, after this, such a result cannot be expected by absorption. Now, as we cannot by any means at our disposal determine the extent to which this degeneration has proceeded, we cannot entertain a certain hope of this result, and the less so if the case should have been of some standing, and have passed through the very early condition before referred to.

It is in these early conditions that iodine appears to be a suitable adjunct to the treatment, from its well known power of increasing the action of the absorbents; and, so long as the deposit retains much of its earliest condition, it can hardly fail to be of service. The ordinary combinations of iron and iodine, or both with quinine, appear to me very suitable remedies. I cannot believe in its efficacy at a later period; but, on the contrary, since a main feature of the disease is the wasting from a want of due deposition of material, itself partly the result of the quickened circulation, I think it would be more likely to be injurious. It is quite true that, on the theory advocated in these lectures, as the disease increases in extent, there must be a continued new accumulation of effete epithelium in the effete cells, and a transformation of it into the earthy tubercle; and hence there is a continued occasion for the employment of the absorbents: yet, with the increasing deposition, the system commonly deteriorates and wastes, and the good which iodine

might effect in one direction is counterbalanced by its harm in another. Moreover, as the absorption of the tubercle is only just possible, in consequence of the lessened circulation, and as the waste of the system is certain, the iodine will probably effect a certain injury, in order to do a merely possible good. This will of course be influenced by the stage of the disease, and the rapidity of the progress, as indicated by the rapidity of pulsation.

But, although absorption of calcareous tubercle may be fairly considered impossible, it may be got rid of by expectoration. My talented colleague, Dr. Theophilus Thompson, has recently published cases in which the hardened mass appeared to have been expectorated bodily, and the patients recovered; and it is not unlikely that equally observant physicians would have met with many similar cases. There is every reason to believe that tubercle in its softened state (that is, softened by secondary changes) is frequently spat up; and it is possible that circumscribed deposits may be removed in this way. I, however, know of no power which the physician possesses to bring about these results, or even to single out any cases in which they are likely to occur. It is the *vis medicatrix nature*, and not the physician, to which we must look.

Assuming, then, that by any means the deposit has been removed from the lung, is the lung-tissue capable of restoration to a healthy condition? When it has been destroyed, we must admit that no such restoration can be effected, and the only substitute is then to close up the vacant places. When, however, no actual loss of tissue has occurred, but the parts have lost more or less of their vitality and power of action, the capability of restoration must be proportionate to the amount of injury. It is quite within belief that the earliest diminution of vitality is not irremediable, and hence some degree of progress may be made by the disease before we should despair. When, however, the parts which are implicated are restricted to narrow bounds, as would be the case when restoration might be looked for, the recovery of the vital powers of those parts is of but little moment, seeing that Nature has made the lungs so much more capacious than our ordinary wants require. The same remark would apply to the instances in which tubercle remains inactive in small patches for many years; for so common is tubercle in small masses in the lungs, that but few bodies can be opened in which they are not found; and yet during those years no evil was done by them.

We will now turn to the general system, and to the general symptoms. These are, chiefly, excited pulsation, hæmoptysis, cough, dyspnœa, night-sweats, wasting, and debility.

Rapid pulsation is no more characteristic of phthisis than it is peculiar to it, but yet it commonly attends it. In the investigations already referred to, I found the pulse below 60 and above 160 in different cases, and in the former the disease had passed into the stage of softening. One-fifth of the cases exhibited an average pulsation in all postures, for a whole month, of under 90; one-fifth, above 100; and three-fifths, between 90 and 100: and, on dividing the cases into two classes, of advanced and less advanced disease, the former had the quicker pulsation. The rapidity varied very greatly in the course of the twenty-four hours. In the night, it was so low as from 20 to 40 pulsations per minute lower than during the day, and was then still lower both by night and day during sleep; whilst during the day it was increased by food, sunlight, excitement, and much exercise. The effect of food was to increase the pulse up to 20 pulsations per minute; but, on the total average, the increase was about 11 pulsations from breakfast, 10 from dinner, 7 from tea, and 3 from supper. This increase was obtained within from one to three hours after the meal, and it subsided before the next meal. Thus the effect of food on pulsation was temporary, and, in consequence, the pulse exhibited a series of elevations and depressions corresponding with the number of the meals. The effect of short fasts was to prevent this variation of pulsation; and such would be the case with very frequent meals, except that, in the latter, the elevation would be greater than in the former. *Posture of body* was exceedingly powerful in this influence, and it varied with the period of the day. At 8 A.M., the excess of pulsation in the standing over the lying posture was so much, on the total average of 1,500 observations, as 20 pulsations; and at 4 A.M., it was 14 pulsations per minute. It is probable that, at a later period of the day, the excess would have been yet more greatly reduced. *Sunlight* was also most important, since it sustained the pulse to the extent of about 10 pulsations per minute throughout the whole daylight day. *Temperature* also, when considered in the long interval of a week or a month, had considerable influence in quickening the pulse, as the temperature

rose. (See diagram at page 110.) Its effect was not, however, uniform; for when the temperature rose above the degree which was comfortable to the system, the pulse rose in vastly greater proportion; and when the temperature fell from such an elevation, the pulse fell also, but not to the extent which would be proportionate to the degrees of lessened temperature. The pulse, however, rose with heat, and fell with cold. In like manner, with dryness of the air, as it increased, the pulse rose; and as it fell, the pulse fell; but in both directions there were limits to this parallelism. Thus it is manifest that season, as well as daylight, must have much influence over the progress of this disease.

Such, then, being the conditions of the pulse, with some of the circumstances to which they are due, the following are indications for practice in the treatment of the disease.

In the cases in which it is desirable to increase the pulsation, this may be effected by abundance of food, by exercise, by the sitting and standing postures, and by sunlight. These cases do not perhaps form a very numerous class of persons; but there are many of lymphatic or lymphatico-bilious temperament, in which the pulse is both infrequent and feeble, and is indicative of little vital power and activity. The progress of the disease in such cases is slow, but they are not the less difficult to treat.

In all cases, it is desirable to maintain a pulse of tolerable frequency, and with as much uniformity as possible. This is difficult, since the tendency is both to rapid pulsation and to very great variations. The following will have a tendency to the desired result.

1. Food in somewhat small quantities, and very frequently, and especially of milk, as opposed to the use of tea and coffee, since both of the latter are amongst the most powerful stimulants taken as food, whilst milk has but little influence in increasing pulsation. An important period for the administration of food, with the object now in view, is in the evening, during the night, and in the early morning; for at all these periods the pulse is either low or falling; and I am convinced that nothing can be more acceptable to the system than a small meal of milk and bread and butter, or of some such food, at from 3 to 6 A.M. With the same view, also, a diminution of food during the day, whilst the sunlight is powerful, is valuable.

2. Free exposure to sunlight in winter, and a limited exposure in summer; and hence both much out of door exposure in summer, and dark rooms and houses at all seasons, cannot be beneficial for this purpose.

3. A due cultivation of the horizontal posture. The sitting posture is not enough, since it implies a pulsation of 10 beats per minute more than the former.

4. An assiduous cultivation of sleep during the daytime; for then the pulse cannot fall so low with sleep as during the night; and thus the height of the day pulsation and the depth of the night pulsation are both modified.

5. A freely ventilated dwelling, as preventing a high temperature and dry air; and, for the like reason, a residence in a moderately cool and moist locality. At the stage of the disease when the pulse is commonly excited, an inland and upland residence is undesirable, and more particularly if that be in a hot climate. It is probable that a voyage on the Nile, or a residence at Malta or other ports on the Mediterranean coast, or a sea voyage, are of use amongst other things, by thus supplying a moderately cool and moist air, and hence preventing excessive increase of pulsation. Moreover, it is not unlikely that the fatality of our summer months (without the existence of any complication) is in great measure due to the great temperature, sunlight, and dryness of the air at that season of the year, all of which directly tend to exhaust the system by maintaining an increased rapidity of the blood-current, and a lessened degree of respiration. There is also a lessened evolution of carbonic acid.

The above general remarks are intended to be limited to phthisis when free from inflammatory complications; and, as the latter is an accidental circumstance only, and one to which my investigations do not refer, I shall not further enter into it.

Hæmoptysis is a very common accident in chest-diseases, and indeed in cases in which no chest-disease exists, and therefore ought not to be regarded as a very marked indication of the existence of phthisis. On the other hand, whilst it is commonly met with in the latter disease, during some part of the long period during which the disease continues, cases in the last stage, and with large cavities, are not infrequent, in which it was never observed. I have made careful inquiry into the subject, and am satisfied, that whenever, and from whatever cause,

there may have been violent attacks of cough, with or without any impediment to respiration, slight hæmoptysis probably occurred. It has appeared, on close inquiry, that the so called hæmoptysis consisted of minute streaks of blood mingled with the expectoration; and, for the most part, it occurred with violent cough, with tickling and relaxation of the throat, or on first rising in the morning, without the occurrence of much or indeed of any cough. All these conditions are commonly found in simple chronic bronchitis. When with the two former conditions, it is fair to attribute the cough to the local irritation, and the hæmoptysis to congestion of some part of the mucous membrane (probably that about the fauces), induced by the obstruction to the circulation in the capillaries from the mechanical effort of coughing. In the latter, it has appeared to me to be rather due to congestion in the capillaries of the lung from long existing, and not temporary causes. These remarks apply primarily to chronic bronchitis, but they are equally applicable to phthisis. In that disease, even in a very early stage, there is often an irritable cough, not due directly to the condition of the lung, but to local irritation, itself partially the result of a general exalted sensibility of system, and of a tendency to local relaxation about the fauces. The suitable treatment for this is clearly first to allay this irritability by direct means, as by local applications to the fauces, and by sedatives; and, second, to so improve the tone of the system that the general sensibility shall be less exalted. For the former purpose, I find the local application of chloroform with oil, or of a solution of nitrate of silver, and very minute doses of morphia, taken internally, the most beneficial; and when the latter are so small as the one-sixteenth to the one-twelfth of a grain, the cough and tickling are commonly removed without the sensorium being in any way affected. I attribute great importance both to the plan and to the remedy; for I think it cannot be doubted that the irritable cough is an evil, and leads to greater evils; and I am convinced that the remedy, if fairly tried, will suffice to keep it in check.

The hæmoptysis which results from congestion of some part of the lung is to my mind a more serious question, and the remedy for it is not so easily determined. It may be, and often is, associated with irritability in the trachea and fauces, which is capable of relief as just mentioned; but it may be apart from it; and if it be associated with it, it yet demands a very different treatment. The cause of this congestion does not need to be of an inflammatory nature; neither is it necessary that inflammation should attend or follow it; but the latter result is a circumstance always to be feared. It appears to me to be due to the interference with the circulation in that part of the lung by the mechanical pressure of the deposited tubercle, or even probably from the inaction of the vesicles before the tubercle is deposited. It is clear that, when the cells become useless, the circulation will be lessened; and this will occur to a much greater degree when there is a mechanical pressure exerted by the deposit. This will cause congestion not only in the limited locality in which these changes occur, but also in every other part of the lung, by throwing a larger amount of blood into other vessels than they were accustomed to transmit. This would be so much the greater as the changes referred to were sudden in their development, and as their seat was widely fixed. It is also clear that this secondary congestion would be greater in the lobe in which the changes are proceeding than in other parts of the lung, from the localised distribution of the primary and the ultimate subdivision of the pulmonary vessels. Thus, I think, we account for congestion from local causes in the very earliest period of phthisis, and also, and to a greater extent, in the period of deposition, and long before the occurrence of any destruction of tissue.

In this point of view, the hæmoptysis is rather a remedial than a morbid agency, by relieving the vessels, and preventing or modifying more serious complications; and hence it may be a very serious question as to how far, in any given case, it may be proper summarily to arrest it. In some instances, there may be a rupture of the coats of the capillaries; but in most we may infer that it is rather a transudation. Whichever it may be, it cannot really influence the treatment. When it is not due to succession from cough, but to congestion of a part of the lung, the correct plan of treatment must be derivative through the liver, bowels, and extremities, and not repressant. I do not see the value of local bleeding, since its action is too remote, and its power too little; but that of the horizontal posture, darkness, lessened temperature in hot weather, or a milder one in cold weather, by acting through the skin, with diminished food and excitement, must be proper. Gallic and the mineral acids cannot, I think, be safely employed at this period; but, in

the subsequent period, when there is extensive destruction of tissue, these stypic properties may be of great value. As the cause of this hæmoptysis is thus local and permanent, and moreover is commonly increasing, it would clearly be more constant than it is if the slow progress of the case did not permit the system to accommodate itself to the altered circumstances by increasing the rapidity of the blood-current. Hence rapidity of pulse may arise from prophylactic causes, and yet become one of the greatest enemies of the system. To the same cause we may probably further attribute the comparative infrequency of any inflammatory attacks in those parts of the lungs which are thus diseased; for, as the blood is carried along at a quicker rate, the quantity impelled at each pulsation is lessened; and hence the pervious vessels are less liable to congestion, and the evils which would follow from the local resistance to the blood-current are diminished.

Cough is an act which, in my opinion, should be sedulously restrained within narrow limits. Its remedial action seems to me to be restricted, or nearly so, to the removal of detached phlegm; but, as the circulation is quickened by it, it might be open to inquiry if temporary congestion could seek for its relief in coughing, as imperfect evolution of carbonic acid from the lungs induces frequent yawning. I think there may be a question raised on this point; but, as the increase of the respiration, and to a less extent of the pulsation also, occurs directly after the act, and as, during the act, the respiration is rather suspended, the former may admit of explanation by the latter. It cannot be maintained that cough is needful for the elimination of tubercle beyond the degree which is needful to remove detached mucus; for a cough which could suffice to detach matter from the air-cells must surely be sufficiently potent to be able to induce much mischief by disturbing the circulation. Hence I think it of prime importance that the frequent irritable cough should be arrested. It must, however, be effected by such means as will not in any degree derange any other part of the system, as the action of the bowels and liver, and the integrity of the sensorium. This is the best effected, if there be no inflammatory complication, by minute doses of sedatives, given alone and apart from expectorants, and only in doses and at times sufficient for the purpose in view. The combination of sedatives and stimulants, as in the common form of poppies and squills, appears to me to be indefensible; for both cannot have their full effect at the same time; and, in employing them, we must at the moment decide which effect we would desire. The removal of phlegm is commonly followed by relief to the cough; but that is the result of secondary influence, viz., the exhaustion of the nervous irritability; and the more direct way is to arrest the latter at once by suitable sedatives. When inflammation or congestion exists, the treatment will of course require modification; but, under all circumstances, as the cause of the cough is ever existing or recurring, it must in some degree ever attend the disease.

The importance of the state of the throat, as causative of cough, is most important; and I have frequently found that a cough, which had been intractable under every form of general treatment, yielded to local applications to the fauces.

Dyspnoea, although so constant an attendant of the disease, can hardly be said to be a source of great suffering; and this is doubtless due to the gradual adaptation of the system to the altered circumstances. As the vital capacity of the lungs is lessened, and the space for the residual air is diminished, it is manifest that, in order to the aeration of the blood, the circulation of the blood and the rapidity of respiration must both be increased. A period soon occurs, however, when this increase in rapidity does not suffice for the purpose, and then the dyspnoea appears; and the more so under such circumstances as exertion, erect posture, and the exhibition of food, which ordinarily call for a full supply of air. Thus it is due to an ever acting and increasing mechanical cause; and, when no complication exists, it may fairly be a question if we can really do anything which shall relieve it. No doubt, under the influence of temporary causes, as cold, inflammation, and derangement of the liver and other parts of the body, it is capable of relief proportionate to the influence of these causes; but otherwise I fear we may, and perhaps do, torture our patients with blisters and other irritants to very little purpose. The only directions for hope are the increase of the capacity of the lung, and the accommodation of the general system to the lessened vital action of the organ. The former is to be sought in the improvement of the general health, and in the employment of deep inspiration, both of which tend to increase the respiratory act, and also to prevent the further diminution in the vital capacity. In the early stage, it is probable that these plans of

treatment may be efficacious; but, in an advanced case, hope can scarcely be cherished. The latter alternative is unfortunately the one which Nature is alone able to supply, and one also in which the physician even is compelled to take refuge. As, however, its tendency must be to favour the progress of the diminution of the vital capacity, so that ultimately the admitted air shall be inadequate to maintain life, if we favour it by medical aid, we lessen the present distress of the patient at the risk of shortening his life. It may, however, doubtless be effected by the employment of such plans as call for but little aeration; viz., repose, horizontal posture, somewhat elevated temperature, and little food.

[To be continued.]

Reviews and Notices.

HINTS ON THE PATHOLOGY, DIAGNOSIS, PREVENTION, AND TREATMENT OF THORACIC CONSUMPTION. By J. C. HALL, M.D., Fellow of the Royal College of Physicians, Edinburgh; Physician to the Sheffield Public Dispensary; late Lecturer on the Practice of Medicine at the Sheffield Medical Institution; etc. London: Longmans. 1856.

THIS little work contains an excellent *resumé* of the present state of knowledge respecting pulmonary consumption. Dr. HALL has presented us, in a compendious form and readable style, precisely with that amount of practical information with which the medical student can most easily furnish, and the busy practitioner most readily refresh, his memory.

Commencing with the statistics of consumption, we find treated in succession the general and microscopical pathological anatomy of pulmonary tubercle, the diagnosis of the disease, its physical signs, its general treatment, and the special treatment of its more important incidental symptoms. Thus, no part of the subject is left unnoticed; whilst no part is dwelt upon with an amount of detail that is wearisome.

We will cull a few of the interesting points which have struck us in perusing the volume.

In England and Wales, of the whole population, one person out of every 310 dies annually from thoracic consumption.

"When the health of the parents undergoes a change during the increase of their family, it sometimes happens as a consequence that the elder children are healthy and the younger ones the victims of thoracic consumption."

In phthisis, the apex of the left lung is most frequently the part affected; in pneumonia, the base of the right lung. There is thus a double contrast in point of localisation between the two diseases.

"All writers agree in stating that one half of the deaths from thoracic consumption occur between the twentieth and fortieth years, and that its maximum is reached at thirty; from this age the rate of mortality sensibly diminishes."

Amongst several very interesting cases of *arrested* phthisis, one given at p. 46, presented hæmoptysis, a humid click at the left apex, and with troublesome cough: "the expectoration consisted of free fat and other granules, disintegrating nucleated cells imbedded in a matrix, together with elastic tissue of the lungs; one or two pus-globules were also present."

Speaking of the earliest signs of phthisis, the author remarks, that "a prolonged expiratory murmur, slight in degree, when heard only on the right side, must not be considered conclusive; but it is far more significant when confined to the apex of the left lung."

The paragraph headed "Microscopic examination of the sputa," contains so good an exposition of recently acquired information, that we are tempted to quote from it largely, both as presenting valuable matter, and as furnishing a fair example of our author's style.

"For our knowledge of the microscopic appearances of the sputa in phthisis, we are not a little indebted to the labours of Schröder van der Kolk, Dr. Black, and especially to the valuable papers of Dr. Andrew Clark, and my friend and namesake