Clinical Lectures ON PULMONARY EMPHYSEMA.

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LECTURE II.

GENTLEMEN,—In my recent lecture on Pulmonary Emphysema I enunciated the opinion that chronic or general emphysema is only developed, as a rule, in lungs the tissues of which are already predisposed by some form of degeneration to yield to the distending pressure to which they are subjected. This degeneration, impairing the natural tone and elasticity of the lungs, might, I also stated, be the result of a constitutional vice, or it might be the sequel of bronchitis, or, again, it might be one of the consequences of senile decadence. I accordingly recognised three forms of general emphysema—namely, constitutional or substantive emphysema, bronchitic emphysema, and senile or atrophic emphysema. I entered fully on that occasion into the consideration of the first of these three forms, and the cases I then related sufficiently exemplified the fact that, in persons of certain constitutions, emphysema may originate as a primary disease, independently of the existence of bronchitis or of any other pulmonary lesion. Sooner or later, however, as these cases also demonstrated, bronchitis never fails to associate itself with existing emphysema.

I propose to bring under your notice to-day the second of the three forms, which includes all that class of cases in which either emphysema begins simultaneously with bronchitis or is developed very rapidly after its accession, as well as another class, in which the emphysema only becomes developed after the patient has suffered from severe and repeated attacks of chronic bronchitis. In the cases belonging to the first class we must, I venture to think, admit also, generally speaking, the presence of previous degenerative changes, or at least the previous loss of tone and elasticity in the walls of the air-vesicles; for it would otherwise be very difficult to explain the circumstance that in some persons bronchitis is so speedily followed by emphysema, whilst others will suffer from severe and repeated attacks of bronchitis and yet emphysema will either be very slowly developed or will never make its appearance at all. As both chronic bronchitis and pulmonary emphysema originate, I believe, very frequently in constitutional causes, and indeed in the same form of dyscrasia, it is quite intelligible that they should often either commence simultaneously, or that the coughing incident to bronchitis should very rapidly induce the development of emphysema in lungs constitutionally predisposed to it. In other cases, however, there seems no doubt that repeated attacks of bronchitis may at length induce emphysema of the lungs without the aid of any such constitutional predisposition. And this may happen either because the frequent and forcible distension of certain parts of the lungs during paroxysms of coughing has gradually impaired the tone and elasticity of the cell-walls, or because the nutrition of the pulmonary tissues has been interfered with by the bronchitis, or, which is more probable, both these factors may act together. The case of a patient, who has been repeatedly under my care during the last four years, is an excellent illustration of that class of cases in which the emphysema appears to have originated in the same constitutional cause as the bronchitis, and I shall therefore read you my notes of it, which have been carefully preserved year by year. It is another of the very numerous examples of the concurrence of gout and bronchitis in the same patient which have occurred in my practice, and to which I have frequently drawn your attention.

W. E.—, aged thirty-seven, a rather short, square-built man, by occupation a coachman, of temperate habits but accustomed to drink beer daily, was admitted as an out-patient No. 2332.

at the Middlesex Hospital, under my care, on Nov. 24th, 1864. He had been under my care in the year 1862 for gout, of which he had another attack in 1863, followed by bronchitis. To each of these diseases he had a hereditary right, his father having been gouty, and both his parents, as well as one sister, having been subject to chronic cough. He had himself suffered from cough in winter for several years, had had it throughout the previous winter, and had now again been suffering from it for a fortnight. The cough was attended by a copious, thick, transparent expectoration, which he said closely resembled starch in appearance. On admission, his voice was hoarse, skin cool, pulse 72, and of good volume. The respirations were 22, and chiefly abdominal; the thorax expanding comparatively little in ordinary respiration, whilst the abdominal movements were very marked. His breathing was not in general much distressed, but he suffered occasionally from severe attacks of dyspnoea. His chest was broad, capacious, and prominent, and very resonant on percussion over the whole front, including the cardiac region. The apex-beat of the heart was not visible. The heart-sounds were feeble and distant, but free from murmur, normal in rhythm, and best heard on the left side of the epigastrium. The sounds of respiration were feeble, but, with the exception of slight rhonchus in the base of the left lung, they were almost normal. I prescribed a draught containing twenty minims each of compound tincture of gentian and tincture of henbane, with ten minims each of diluted nitro-hydrochloric acid and ipecacuanha wine, in an ounce and a half of water, to be taken three times a day; with five grains of the compound pill of hemlock every night at bedtime. I also directed him to discontinue drinking beer, which was likely to aggravate the bronchitis, and pretty sure to bring on a recurrence of gout. Under this treatment my patient improved very much, and although he continued his attendance, I may pass on to the notes of his case taken on Jan. 26th, 1865, on which day he complained of an accession of cough attended by the same transparent, bluish expectoration which he had been raising when he came under treatment in the preceding November. He attributed, and no doubt very justly, the aggravation of his ailments to the fogs which had prevailed for some days; and he also stated that whenever he inhaled much dust, as he sometimes could not avoid doing, in the stable, he always suffered from a temporary exacerbation of his complaint. He continued under observation until the end of March, when he was discharged apparently well.

He spent the summer in the country, where he had two attacks of asthmatic dyspnoea. These came on at night, awaking him out of sleep about midnight, and the paroxysms recurred on each occasion for three or four successive nights. The difficulty of breathing was sufficient to cause orthopnoea, and the attacks were attended by cough and expectoration. He was re-admitted under my care on Sept. 21st, having then been in London again for three weeks, and free from asthma until the night preceding his admission. This attack had manifestly been connected with an accession of bronchial catarrh, for he was coughing much and raising a scanty frothy sputum. The skin was cool but moist, the pulse 72, the respirations about 18. The front of the chest was, as before, very resonant on percussion, but the respiration was wheezy, the sound of expiration prolonged, and sibilus and rhonchus were audible over both lungs, varying somewhat in position from time to time. Under treatment similar to that adopted the year before, the patient again improved, and was discharged in the course of a few weeks in comfortable health and quite free from cough and expectoration.

He continued well until the end of January, 1866, when he had a fresh accession of catarrh, and again presented himself at the hospital, complaining of cough and dyspnoea in the morning, of wheezing at night, and of pain and soreness in the soles of his feet. The expectoration was transparent, thick, and rather scanty, the skin moist, the pulse 84. The respiration was somewhat laborious, and the heart's impulse was only seen and felt below the xiphoid cartilage. The percussion over the thorax was remarkably clear, more particularly over the fourth rib on either side, where also the vocal vibration was very feeble. The patient again recovered, and continued unusually well for some months, escaping altogether the asthmatic paroxysms from which he had suffered during the previous summer. On Sept. 8th, however, he had a shivering, followed in the evening of the next day by a severe attack of dyspnoea amounting to orthopnoea. The dyspnoea was more persistent than on former occasions, but he still became comparatively well by the middle of the day and able to do his work as usual. He had similar attacks every successive night

until Sept. 13th, on which day I saw him. His pulse was quicker than in his former illnesses, being from 86 to 90, and he was expectorating with difficulty a scanty, white, frothy sputum. His breathing was more laborious than I had yet seen it, the muscles in front of the neck being now, as well as the abdominal muscles, in powerful action to assist the respiratory efforts. The sounds of respiration were somewhat harsh and dry, and expiration was prolonged. In addition to treatment similar to that prescribed on former occasions, I now directed the patient to smoke a stramonium cigarette as soon as he felt the commencement of an asthmatic attack. He derived much relief from the stramonium, which never failed to shorten and mitigate the asthmatic paroxysms, and in a few days he was able to dispense with the cigarettes, and continued free from the asthma until early in November. On the 3rd and 6th of that month he had attacks which were slighter than formerly, and did not disturb him at night, but came on when he first rose in the morning. On each occasion he smoked a cigarette, with, as he believed, very great advantage. He was desired to continue the use of the cigarettes whenever required, and to take a draught containing three grains of iodide of potassium, five grains of carbonate of ammonia, and twenty minims each of tincture of squills and tincture of henbane, in an ounce and a half of camphor water, three times a day.

My last note of this patient is dated Jan 29th, 1867, when he reported himself as feeling greatly better than he had done for several years past. Although it was the season during which he had been accustomed to suffer from cough, and the weather had been very severe, he had this winter remained quite free both from cough and expectoration. He had had no attack of dyspnoea since those mentioned in November. His breathing was quite comfortable excepting on foggy mornings, when he suffered slightly from shortness of breath. The physical signs of emphysema remained, however, much as before. Although the patient was quite free from subjective respiratory distress, the scaleni and sterno-cleido-mastoid muscles were somewhat hypertrophied, and were engaged in ordinary respiration, though not in the violent manner often seen in cases of extensive emphysema. The expansion of the chest was imperfect, but its movements were regular and symmetrical on the two sides. The abdominal muscles were in unusual activity, and so much hypertrophied that the situations of the linea alba and lineæ transversæ were distinctly marked by furrows. There was slight regurgitation of blood into the veins of the neck, but no cardiac murmur. The heart's impulse was moderate, and the beat was faintly seen in the epigastric region.

Although I have read you only an abstract of my notes, the foregoing case has occupied much of our time, and in my opinion not unprofitably, for I believe that, irrespective of any points of peculiar interest in a case, more is to be learnt from the careful study of the history of one patient during successive illnesses than from the history of a succession of patients each under observation for a short time only. At the same time, however, it appears to me that there are several points of especial interest in the case before us. One of these is the pretermittence of the hereditary gout, of which the patient had previously had two attacks, during the whole four years that he has been under my care for chronic bronchitis and emphysema. Since his first severe attack of bronchitis in 1863, his only threat of gout has been the pain and soreness in the soles of his feet in February, 1866. It is true that medical treatment and abstinence from malt liquor may have had some share in causing this pretermittence, particularly during the latter part of the period; and, certainly, nothing is more worthy of notice than the obvious relief which the patient has derived from treatment, both as regards the frequency of the bronchitic attacks and the severity and duration of the asthmatic paroxysms. These latter are not uncommon in emphysematous patients, and I believe are generally associated, as they were in the present case, with intercurrent accessions of bronchitis. But on the present occasion I wish more especially to direct your attention to those points in the case which relate to the emphysema and its effects upon the mechanism of respiration. I have already alluded to the very exceptional degree of comfort which this patient enjoyed during the intervals between the bronchitic attacks compared with most persons whom I have seen when suffering from equally extensive emphysema. When last examined he declared that his breathing was quite easy, and that he was not in the least distressed at his work.

This immunity from the suffering usually incident to his condition I attribute to a feature in his case which, in my experience, is of rare occurrence in chronic general emphysema,

but which was mentioned thirty years ago by Dr. Stokes in his valuable work on Diseases of the Chest. Dr. Stokes there draws a distinction between those cases of emphysema, or, as he terms it, dilatation of the air-cells, in which the diaphragm is displaced downwards, and those in which it is not so displaced; and relates the case of a young man who exhibited all the characteristic signs of emphysema, together with great enlargement of the chest, but without any evidence of depression of the diaphragm. This young man did not suffer from difficulty of breathing in the intervals during which he was free from bronchitis, and was able to take very active exercise, having only a short time before he entered the Meath Hospital walked a distance of forty miles in the course of a single day. The chief inconvenience he experienced was the frequent occurrence of bronchitic attacks. This was precisely the condition of my patient, whose case evidently belonged to the same class, for it was manifest on inspecting his chest that no material downward displacement of the diaphragm had been caused by the pressure of the enlarged lungs. The fulness of the epigastrium which is observed when the heart, diaphragm, and liver are displaced downwards did not exist, and the respiration was more abdominal than is consistent with any great interference with the position of the diaphragm. The heart, it is true, was displaced backwards and inwards, apparently by the overlapping of the enlarged lungs in front of that organ, and it could be seen and felt beating on the left side of the epigastrium, near the margin of the ribs. But the impulse was moderate, and the pulse of good volume, showing an absence of that violent action of the heart, and also of that disproportion between the cardiac impulse and the radial pulse which are commonly present in emphysema involving much downward displacement of the heart. The explanation of this remarkable feature in our patient's case I believe to be, that the cartilages of the ribs, being still elastic, had allowed the parietes of the thorax to yield gradually, as the emphysema developed, to the increasing volume of the lungs, which had not therefore exercised upon the diaphragm more downward pressure than it was able to resist, and its normal function of enlarging the capacity of the thorax during inspiration was in consequence still duly performed. To these two circumstances—the continued elasticity of the walls of the chest and the unimpaired ability of the diaphragm to do its proper work—it was doubtless due that our patient's inspiration at ordinary times had a much less spasmodic character than is usual in cases of extensive emphysema, the chest still expanding, though imperfectly, and the muscles of the neck being called into less violent action as elevators of the thorax. Again, the position and action of the diaphragm being little interfered with, the abdominal muscles could be called into unusual activity to assist the performance of expiration, which they did to the extent of rendering it a visibly active process, till they had at length become hypertrophied in the manner I have described in the case, the situations of the linea alba and lineæ transversæ being marked by deep furrows. In fact, I apprehend that at ordinary times the degree of accessory aid thus given to the act of expiration nearly compensated for the loss of contractile power in the lungs, and therefore rendered unnecessary the painful inspiratory efforts usually made by emphysematous patients. Moreover, although the right side of the heart was undoubtedly dilated and hypertrophied in consequence of the impeded flow of the blood through the lungs, here again the increased power seemed at ordinary times just to balance the impediment. It is probable, indeed, that later in life, especially when the bony cage of the thorax eventually becomes rigid, the balance may be destroyed, for the emphysematous lungs can never return to their normal condition. But if our patient continue careful in his habits, and can escape serious bronchitic attacks, the further progress of the disease may be retarded, and the balance established by means of increased power in the accessory muscles of respiration and in the heart may be long maintained, and enable him to live on in comfort for many years.

This case, I think, clearly belongs to that class of cases in which, although the bronchitis acts as the immediate exciting cause of the emphysema, there has been some previous degenerative change in the walls of the air-vesicles predisposing to its development; for its advanced stage at the time of my first examination showed that either the bronchitis and emphysema must have commenced simultaneously, or, at the least, that the coughing incident to the bronchitis must have induced the development of the emphysema far more rapidly and generally than it usually does in lungs not constitutionally predisposed to it. I regard the case, in fact, as one in which the bronchitis and emphysema

arose out of the same remote constitutional cause. After my former lecture on Pulmonary Emphysema, you will have no difficulty in inferring my opinion that the gouty dyscrasia, which was hereditary in our patient, and which had shown itself in regular attacks of gout previous to the accession of the bronchitis, was in his case the real source of the emphysema as well as of the bronchitis. On the relation subsisting between this latter disease and the gouty dyscrasia I have spoken so fully on former occasions that I need not dwell upon it now.

(To be concluded.)

Clinical Lecture ON SIMPLE FRACTURE OF THE SHAFT OF THE FEMUR.

Delivered at University College Hospital,

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(Concluded from p. 552.)

WITH regard to the Starched Bandage in the treatment of these fractures, I may say that for the last fifteen or sixteen years I have used it very extensively in this hospital. I have been more satisfied, perhaps, with the results obtained from the starched bandage than from any other method of treatment. But the starched bandage requires to be carefully applied; not to be put on too tightly, and yet to be applied tightly enough; and hence there is a little difficulty and a little special art in its application which sometimes interferes with its full utility.

In the use of the starched bandage in fractures of the thigh there are three points to be specially attended to. The first is that the limb should be very thickly wadded, covered with a very thick layer of medicated wool or cotton wadding. The second is that the bandage and pasteboard splint should be applied tightly enough over this wool to compress it well. The wool acts as a sort of buffer, being an elastic material between the bandage and the limb. The third point is that both the knee and the hip joints should be very closely included in the starched apparatus, so that they may be rendered perfectly immovable. If there is any movement allowed either in the knee or in the hip, the success of the apparatus will be very materially jeopardised. I may say that there is a fourth and a minor point that is of importance, and that is, not to put too heavy a weight of the starched bandage on to the lower part of the limb. This should be well bandaged with a dry bandage, but it should not be too thickly coated with starch so as to give rise to too great a weight at the end of so long a lever as the straight starched limb forms under these circumstances.

By attention to these rules you will find that the starched bandage is a most invaluable agent in the treatment of fractured thigh. I may say that the amount of success obtained by the starched bandage upon the whole has been greater than that obtained by the long splint alone; and many cases, even in the adult, have been turned out of the hospital with scarcely any appreciable shortening after the starched bandage, and most commonly with not more than half an inch of shortening at the outside, which is a very good result in cases of oblique fracture of the shaft of the femur. In very many cases in the adult I think it is useful to combine the long splint with the starched bandage; to put up the limb in the long splint for the first week or ten days till the parts have become quiet and it has become of a good length, and then to apply the starched bandage; and, as soon as the starch is set, to allow the patient to get up and to go out upon crutches, so as to avoid the lengthened confinement to bed. In an ordinary case of simple fracture of the shaft of the thigh-bone, the patient may be allowed to walk upon crutches at the end of from twelve days to a fortnight if treated in this way. Children, indeed, may be allowed to get up at the end of three or four days, because the starched bandage may be applied from the very first in children and young people, where the swelling is not great,

the muscular power small. In infants very little apparatus is needed, and what is used is apt to become soiled. But even in them I think a gutta-percha or pasteboard splint, well wadded, should be applied, and retained by the starch or glue bandage.

I may observe that I have tried other methods of fixing apparatus in cases of fractured femur—of rendering the apparatus immovable,—such as plaster of Paris, glue, and other things; but none, in my opinion, is equal to the starch, for this reason: that the starch when well applied forms a stiffer and stronger, and also, what is very advantageous, a somewhat heavier, coating. The heavier coating has a tendency, as I shall by-and-by mention, to cause more complete relaxation of the muscles of the limb.

Now I believe that the Long Splint and the Starch Bandage, and, indeed, every apparatus that is employed in fractures of the thigh, act very much in the same way. These methods act, not by violently influencing the condition of the muscles of the limb; not by putting the muscles of the limb upon the stretch and so overcoming the displacement that is induced by their forcible contraction. Nothing of the kind. They act by keeping up a certain amount of extension, and so, by fatiguing the muscles of the limb, causing their insensible relaxation at the end of a few days—a relaxation, as it were, from fatigue. They are constantly striving against the impediment that is offered to their contraction; they become exhausted in this effort—that is, their contractility becomes exhausted,—and they fall into a state of relaxation and repose. That is the way the long splint acts. You put on the perineal band and tighten it; and you will find that there is still shortening to the extent of three quarters of an inch. You leave the limb; and in the course of a day or two you put it up again, tighten the band a little more, and then reduce the shortening to half an inch. You leave it again for two or three days, and tighten the band a little more. The muscles get fatigued and relaxed by the constant effort against the strain induced by the traction upon the foot and against the pelvis, and you bring down the shortening to only a quarter of an inch, or to nothing at all. That very commonly happens.

So, again, with the Starched Bandage. After the limb has been put up in the starched bandage it may be of its proper length, or there may be a slight degree of shortening. But after the starched bandage has been applied—at the end of three days say,—you will find that the muscles of the limb are completely relaxed, and that the limb comes down to a proper length. How is this? Why, I believe that it is partly owing to the pressure of the bandage, the continuous circular compression of the limb fatiguing and relaxing the muscles; and it is partly owing to the friction that is exerted between the surface of the limb and the interior of the bandage, lined with a thick and elastic layer of cotton-wool. This prevents the limb being drawn up within the bandage, if the bandage has been properly applied; and the muscles become fatigued by this constant action and reaction, and fall into a state of relaxation in the course of two or three days. No violent traction is needed, no forcible effort in attempting to bring down the limb to a proper length; but by waiting quietly, by leaving it at rest, the limb falls into its normal length. I may say that, in using the starched bandage, you do not disturb the axis of the limb, but the thigh always falls into its normally-curved shape—that tendency to slight convexity outwards which always exists in the thigh-bone.

Of late we have employed another method of treatment in fractures of the thigh. We have employed it, partly as an experiment, but also in some instances where other methods have failed. And I think it is well in these cases always to have several strings to your bow, so as not to be too exclusive in your method of treatment, but to fall back upon any one if the circumstances of the case present conditions which render one plan of treatment more advantageous than another.

That method of treatment which we have employed of late is an American method, introduced or perfected by Dr. Buck, of New York. It is a method of treatment by constant gentle traction of the limb exercised by a weight attached to the foot. This constant traction evidently fatigues the muscles of the thigh in exactly the same way that the traction of the perineal band in the long splint does, exactly in the same way that the pressure and the friction in the starched bandage do, and, at the end of a few days, it brings down the limb to its normal length without any material difficulty. It seems to me an exceedingly valuable method of treating these cases; and so far as our experience in this hospital is concerned, I think it is a very useful addition to our ordinary methods of treatment.

Dr. Buck has been good enough to send me a pamphlet