CLINICAL LECTURE ON A CASE OF PLEURISY.

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Brief Abstract of a Case of Pleurisy with copious Effusion.—Thoracentesis.—Quick Recovery.—Two Modes in which a copious Pleuritic Effusion impedes the Absorption of the Liquid.—Explanation of the thick Layers of Fibrine in Cases of Pleurisy and Pericarditis.—Practical Application of the Doctrine.—Albuminous Expectoration after Thoracentesis: its probable cause.

T. LONG, aged 16, an errand-boy, was admitted under my care on June 18th. On June 9th, he left off his waistcoat, and, in consequence, he got a chill. On the 12th, he first felt pain in the left side, of a dull aching character. The pain was increased by exertion and by a deep breath; and, being unable to continue his work, he went home to bed. The pain continued; and he lost his appetite, and felt weak. On the 18th, when admitted into the hospital, the left side of the chest had a rounded form, the intercostal spaces bulged, and the ribs were nearly motionless. The left side measured $14\frac{1}{2}$ inches, the right 14 inches. The heart was seen and felt beating to the right of the sternum. The whole left side was dull on percussion from base to apex. No respiratory sound was audible, except an indistinct and distant blowing near the spine. Vocal fremitus was absent. On the right side, there were normal resonance and puerile respiration. Respirations 34; pulse 120; temperature 101.4 ; urine normal. The boy had a pale, delicate, and emaciated look, and a malar flush on the face. Here we obviously had to deal with a very copious liquid effusion into the left pleura; and, after watching the case for a few days, I determined, for reasons which I will presently explain, to have the liquid withdrawn.

On June 26th, the house-surgeon, Mr. Duncan, introduced a fine cannula through the ninth intercostal space in a line below the angle of the scapula, and drew off with an aspirator forty-one ounces of opalescent fluid. The wound was then closed, and no air was admitted into the pleura. The admission of air into the pleura, if it do not increase the risk of suppuration within the cavity, certainly tends to compress the lung, and so to impede, if not entirely to prevent, its expansion after the removal of the liquid. Within a few minutes after its removal, the liquid formed a firm gelatinous coagulum. The withdrawal of the liquid was attended with immediate relief to the breathing.

Two days afterwards, the left side of the chest had regained its normal form and size, and its movement was nearly as free as that of the right. From that time, his progress towards recovery was continuous and rapid; the normal resonance and respiratory sounds gradually returned; and our last note of him, on July 21st, just before he left the hospital, was to the effect that the only remains of abnormal physical signs were some dullness on percussion and feeble respiration below the angle of the left scapula, the result, probably, of false membranes over that part of the lung.

Now, I wish to point out to you that there are two conditions which greatly impede the absorption of the serous effusion of pleurisy. These are, 1, so copious an effusion of liquid as to distend the pleural cavity; 2, a thick layer of unorganised fibrine covering the surface of the pleura. A very copious liquid effusion impedes absorption, partly by obstructing the flow of blood through the compressed lung, thereby causing a general fulness of the systemic veins, including, of course, the bronchial veins; partly by directly compressing the subpleural veins, thus retarding the return of blood, and causing capillary engorgement beneath the pleura. When the pressure of liquid is sufficient to cause bulging of the intercostal spaces, such as occurred in this case, it is obvious that the intercostal venous circulation must be seriously impeded. The mechanical withdrawal of a sufficient amount of the liquid effusion to relieve tension of the cavity and remove pressure from the lung and the veins beneath the pulmonary and the costal pleura, will usually be followed by a quickened absorption of the liquid which remains in the pleura. In like manner, when anasarca swelling of the legs has rendered the skin so tense as to impede the return of blood by the veins, and thus to favour the increase of the dropsical swelling, the discharge of some liquid through a puncture in the skin is usually followed by the absorption of a further portion of the dropsical effusion,

which, entering the circulation, exerts a diuretic influence upon the kidney, and excites a copious flow of urine.

There is no difficulty in understanding that a thick layer of fibrine covering the surface of the pleura, and therefore interposed between the subpleural vessels and the liquid effusion, must greatly impede the absorption of the liquid. In some cases of pleurisy, with copious liquid effusion, the pleura has been covered by firm unorganised fibrine from a quarter to half-an-inch in thickness. Now I wish to show you that an exact knowledge of the mode in which a thick layer of fibrine is formed upon an inflamed pleura affords a powerful argument for early tapping in cases of pleurisy with copious liquid effusion. The explanation which I am about to give you applies to the formation of false membranes upon the pericardium and peritoneum, as well as upon the pleura. In the first stage of inflammation, the serous membrane is roughened by a thin layer of exuded lymph; in the next stage there is an effusion, more or less copious, of an albumino-fibrinous liquid. Then the subsequent thickening of the false membrane on the pleura occurs by successive deposits of fibrine from the liquid effusion upon the previously exuded and deposited lymph. The process is exactly analogous to that which occurs on the surface of an inflamed cardiac valve. The endocardium being roughened by a scanty exudation of lymph, there occurs a subsequent deposit of fibrine from the blood upon the damaged valve, and thus the so-called warty vegetations are formed. The fibrine coagulates and is deposited upon any part of the endocardium, which has been roughened by inflammation, as it coagulates and concretes upon a wire or other foreign body introduced within the vessels of a living animal.

The liquid effusion of pleurisy may be looked upon as blood minus its red corpuscles. We have seen that the liquid drawn from our patient's chest quickly clotted into a gelatinous mass; and this coagulation, which occurs rapidly after the removal of the fluid from the chest, often takes place gradually within the chest, upon the roughened surface of the inflamed pleura. The explanation which I have given you of the process by which fibrine is deposited from the liquid effusion of pleurisy is in accordance with the fact that, while in cases of dry pleurisy, the effused lymph is comparatively scanty, the very thick and firm false membranes occur only in association with a copious liquid effusion.

And now for the practical application of this pathological doctrine. It is obvious, that the longer the liquid effusion of pleurisy remains within the chest, the greater is the probability of a copious deposit of fibrine upon the roughened surface of the pleura, and the thicker this fibrinous deposit, the less is the probability that the liquid will be absorbed. These considerations, then, suggest the expediency of early tapping in all cases of pleurisy with a copious liquid effusion; and I have no doubt that the timely performance of thoracentesis in the case of our patient greatly promoted his recovery. If the liquid had not been pumped out of the chest, it is probable that the pleura would have become coated over by successive layers of fibrine deposited upon its surface; the result would have been a tedious convalescence, and ultimately an incomplete recovery, with more or less contraction of the side, the lung being bound down, and its expansion prevented by a thick and firm false membrane over its surface.

During the last few months, the French medical societies and journals have been much occupied with the discussion of the "albuminous expectoration" which sometimes occurs after the operation of thoracentesis for pleurisy. In two leading articles in the BRITISH MEDICAL JOURNAL of the 4th and 11th of October, you will find a clear and able summary of the discussions, and an account of the various theories to which this interesting subject has given rise. The expectoration of a frothy albuminous, sometimes blood-tinged fluid, may begin within a period varying from ten minutes to an hour after the withdrawal of the pleuritic fluid; and its duration varies from a few hours to a whole day. Referring you to the articles in question for an account of the various theories relating to the subject, I may state now that the explanation which appears to have met with the most general acceptance amongst the French pathologists is, that the readmission of air into the previously compressed lung acts as an irritant to the air-passages, and so excites active pulmonary congestion, which results in a serous transudation through the capillaries into the air-cells and bronchi. This explanation appears to me unsatisfactory. I doubt whether the readmission of air could exert any such irritant influence upon the pulmonary tissues as the theory in question assumes; and I venture to suggest a different explanation of the phenomena. While the lung is compressed by a copious liquid effusion into the pleura, it is probable—nay, it is certain—that, in consequence of the more or less complete blood-stasis within the compressed lung, coagula will form in the minute pulmonary vessels, and especially within the pulmonary veins.

Suppose, now, that coagula exist within the minute pulmonary veins at the time when the liquid is being removed from the pleura; the lung begins to expand, and blood and air are again more freely admitted into their respective channels. It is obvious that obstruction of the pulmonary veins by coagula would cause a backward passive engorgement of the capillaries, and a consequent serous transudation into the air-cells and bronchi. This serous transudation is analogous to that which occurs from the Malpighian capillaries into the uriniferous tubes, thus rendering the urine albuminous, when from any cause, either within the kidney itself, or in the heart or lungs, the return of blood through the renal veins is much impeded. A consideration of the obvious tendency which there must be to the formation of coagula within the vessels of a lung compressed by a copious pleuritic effusion, affords an additional argument in favour of early thoracentesis in such cases.

ABSTRACT OF LECTURE

ON

THE PROGRESS OF SANITARY SCIENCE.

Delivered at the Birmingham and Midland Institute.

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HE said:—Sanitary science is a thing of yesterday, comparatively speaking; but sanitary art, the art of preserving the health, whether of individuals or of communities, has been studied and practised for ages. Sanitary science is the latest and highest development of medicine. I say it is the highest branch of medical science, because of the extreme importance of its objects, and, I may also add, of its results. It is the study of the causes of diseases, and it points out the means of preventing them; and I am sure you are all agreed that "prevention is better than cure;" as Rollet, of Lyons, well said, "Medicine cures individuals; hygiene saves the masses." But, while we contrast hygiene (another name for sanitary science) with curative medicine, we must not forget that it is altogether a medical science, and that its great lights have all been medical men (mind, I am not speaking of the art now, but of the science), and this is necessarily so, and always must be so. I have said that sanitary science is the study of the causes of diseases, of the modes in which they originate, and in which they spread from one person or place to another. It is, therefore, plain that only those who are acquainted with diseases are competent to deal with it at all, and these are those who have made medical science generally their special subject. You sometimes hear it said that medical men don't know much about diseases. Just think what this means: disease has been studied by earnest men in all its varied forms for thousands of years; experiences have been recorded, comparisons made, the effects of remedies noted from generation to generation, and yet we are asked to believe that medical men don't know anything about diseases. The thing is absurd on the very face of it. Sanitary science is, then, a medical science, and the most intimate acquaintance with diseases is necessary for its prosecution—I mean for its advancement as a science. Sanitary investigations can only be scientifically conducted by medical men, just as pianos can only be played by musicians. This science is also the latest development of medical science. We must understand simple things before we can study complex ones. It is little use for a boy to study higher algebra until he has mastered the rule of three; and so pathology, or the study of diseased actions, becomes more and more advanced as physiology—the study of normal healthy actions—is more scientifically pursued; while the study of sanitary matters in a scientific way has only become possible of late years from the great advances made in the study of pathology, physiology, and chemistry; but, being possible, it has made such rapid strides, and evolved such startling facts with regard to the causes of diseases, that it has become the popular subject of the day. Every one thinks that he is competent to speak about it, and every one who wants to make an effective discourse must needs take upon himself to expound some, to him, new view of sanitary matters; this is very mischievous. A man may do more harm by giving the weight of his authority to erroneous views respecting the method to be employed for the prevention of diseases than he has done good during the whole of his life in any other way. None but those who have made a special study of this subject have a right to speak on it, or at any rate have a right to try to influence the public mind with regard to it. The amount of good which may be done by the exposition of correct views on sanitary matters is incalculable; the amount of evil done by the enunciation of

erroneous views, backed by apparent authority, fearful. But, if sanitary science is a thing of yesterday, such is not the case with the observation of sanitary facts, nor with the practice of sanitary art; and, while it is true that sanitary science is essentially and entirely a medical study, and is necessarily so, it is equally true that the practice of the art of preserving the health is not only possible to all, but it is a duty which devolves upon all. In all ages we have had writers on this subject. From all countries we may learn useful lessons about it. From the times of Hippocrates, Galen, and Celsus, we have had records of the results of observations on the methods of preserving the health; from the time of Moses we have had lawgivers imposing salutary conditions of existence upon unwilling, because ignorant, populations. We look upon the immense engineering works undertaken and carried out by the Romans to supply their towns with pure water with astonishment, when we turn round and see our own towns supplied from polluted rivers, or, worse still, from shallow wells dug in the soil upon which they themselves stand, wells supplied in most cases chiefly by the foul water which has percolated from the surface of the ground. We have found out, in later times, that one of the main conditions of the health of communities depends on the purity of the drinking water, and we see that the Roman engineers, by having to go to a considerable distance for water in order to get it to a sufficient height in their cities, accidentally, as it were, fulfilled one of the most important of sanitary requirements.

"Knowledge is power," and, as we come to know more of the conditions which favour the spread of diseases, as we do daily, it is our own fault if we neglect to use the power which that knowledge gives us. There are two conditions of insalubrity which are pre-eminent. I hardly know which to place first. The one is overcrowding, and the other the accumulation of refuse matters in and about dwellings. These conditions were those which especially favoured the spread of the fearful plagues of the Middle Ages; as a result of overcrowding, we have a deteriorated condition of the air, from the diminution of the amount of its most essential constituent, oxygen; and, worse still, we have it rendered foul by the exhalation of decomposing organic matters from the bodies of the persons breathing it. Such a state of air is especially favourable to the multiplication of the poisons of diseases; such a state of the air is also brought about by the non-removal of refuse matters from the vicinity of habitations. Dr. Laycock tells us that the plague in York, in each of its visitations, and also the cholera, broke out in the same abominably filthy place; and in cholera epidemics it has been repeatedly noticed that those parts of towns which are most filthy and most overcrowded always suffer worst. But the danger is not only from special epidemic diseases. Such insanitary conditions induce a lowered vitality of the inhabitants, who become more prone to attacks of diseases of all sorts; and then we have sickness, inability to work, and consequent inability to earn bread and to pay rents, and so the evil recoils from the tenants upon the landlords. One witness says, "Rent is the best got from healthy houses." Another, "Sickness at all times forms an excuse for the poorer part not paying their rent, and a reasonable excuse." I consider that one of the most important conclusions that the study of sanitary science has forced upon us lately is the conclusion that the immediate removal of refuse matters is one of the first necessities of the healthy existence of a community. There are those who would have you believe that refuse matters may be rendered innocuous in one way or another, so that they may be kept with safety in and near to houses. Don't listen to them; the principle is wrong—radically wrong. Depend upon it that the true method is to get rid of such matters at once, and in the simplest possible way, and that is the cheapest plan in the end.

Show me a town where refuse matters are kept—no matter how they are treated—and I will show you a town where the standard of vitality is low; I will show you a town with a high death-rate, especially among children. To take the other side of the question, look at London. There you have a population of three millions and a quarter, with the lowest death-rate of any very large collected population in the world, with one of the lowest death-rates among the large towns of even our own country. Why is this? I say unhesitatingly, and without fear of contradiction, that, with all allowances made for the excellent position of London, it is mainly due to the fact that the principle there, however incompletely it may be carried out, is the immediate removal of all refuse matters; in London, the water-carriage system by which the foul water, containing a very large proportion of the refuse matters of the population, is removed by gravitation in sewers, is carried out far more perfectly than in any other large town, and this system is daily being rendered more perfect there; it is the right system based upon a true principle, and its results are most salutary. When you have got rid of refuse matters, then see what you can do with them; and here arises a very curious consideration. Sewers, in