CASES ILLUSTRATING SOME DIFFICULTIES
IN THE
DIAGNOSIS OF PLEURITIC EFFUSION.

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CASE I.—John Isaacs, æt. 26, a labourer, of moderate stature and size, was admitted into St. Thomas's Hospital on Jan. 1, 1850. He had been subject to severe dyspnœa for three years, and an attack of more than ordinary severity commenced two months before his admission into the hospital.

When first seen by me, the countenance was expressive of great distress, the face and lips were dusky, the veins of the neck much distended, and the respiration frequent, laboured, and not quite regular.

The pulse was rapid, but too feeble to be counted. The sounds of the heart could be heard, but they were very faint, and not regular, some beats apparently being too feeble to be audible. The cardiac region was as resonant as any part of the left side of the chest. The impulse of the heart could not be felt. There was great dullness on percussion over the whole of the right side of the chest; and no respiratory sounds could be heard in the right lung, except at the upper and lower parts anteriorly, where very faint breath-sounds could be distinguished occasionally.

The left side of the chest was very resonant in every part, including the cardiac region; and throughout the whole of the left lung the natural breath-sounds were replaced by

rhonchus, sibilus, and large crepitation. The ribs on the left side were elevated as much as possible at each inspiration; the right ribs were nearly fixed. There was not much cough; the expectoration was of moderate amount, mucous and tenacious.

The man lay constantly on the right side, the body being bent a little forwards; and lying on the left side, or even on the back, immediately brought on most distressing anxiety, and a sense of impending suffocation. He never assumed any other position, when recumbent, up to the time of his death.

Eighteen leeches applied to the sternum, and full doses of Tartar Emetic, gave a little relief; but the next day all the symptoms above enumerated were increased. From the first I had entertained a suspicion that this might be a case of severe bronchitis in the left lung, with extensive effusion into the right pleura, and that the usual symptoms of effusion were somewhat modified by old adhesions.

The following points appeared to favour this view :—

1. The patient's position in bed. As already stated, he constantly lay on the right side; and a change from that to any other position, except the erect posture, seemed to threaten immediate suffocation.

2. The great and universal dullness on percussion of the right side.

3. The absence of respiratory sounds on the right side, with the exception of the very feeble murmurs heard at the apex and base of the lung anteriorly.

4. The almost fixed condition of the ribs on the right side.

On the other hand, it might be urged that nothing in the history of the case indicated a recent attack of pleuritis, and the symptoms had come on more gradually and had existed longer than seemed consistent with the supposition that they were caused by a great and rapid effusion into the pleura. Moreover, there had been several similar attacks, though not so severe, from which he had recovered more or less completely. Measurement of the chest did not lead to

any satisfactory conclusion. The extreme restlessness of the patient, when disturbed, together with the rapid and laboured breathing, rendered careful measurement impossible, and, after many attempts, I felt a doubt which side was the larger; but the difference, if any, was very slight. I did not, however, attach much importance to this equality in the circumference of the two sides of the chest. Two years ago I had a patient from whose chest 160 oz. of serum were withdrawn by a trocar, and yet, repeated measurements by three persons had not shown any enlargement of the affected side.

The evidence from the voice was negative; no vocal thrill could be felt on either side.

The faint breath-sounds heard in two places on the right side might depend on old pleuritic adhesions.

Taking all these circumstances into consideration, I thought extensive effusion probable, but not certain. But it was manifest that the right lung was useless;—no respiration was going on in that organ;—the patient's danger was great;—if there was fluid in the pleura an operation might relieve him;—if there was no fluid, a puncture, under the existing circumstances, could not do harm.

My colleague, Mr. Le Gros Clark, at my request, introduced a very fine trocar between the fifth and sixth ribs, about half-way between the sternum and the spine. No fluid escaped through the canula, but the cellular membrane immediately became slightly emphysematous. A piece of lint and adhesive plaster were placed over the wound; and except the slight pain of the puncture, the operation did not cause the least inconvenience.¹

No change took place in the character of the symptoms.

¹ I have great doubt whether the introduction of an ordinary grooved needle is, in all cases, sufficient to test the presence of fluid. My colleague, Mr. James Dixon, once used such a needle, and no fluid passed along the groove; but so confident did I feel of the presence of fluid in the chest, that I requested him to use a very fine trocar. He introduced this very carefully; and on withdrawing the trocar, thin serum flowed out freely. About two quarts were withdrawn.

On the sixth, four days after the operation, the man said he felt more comfortable; he sat up in a chair before the fire, and, without having made any complaint, expired rather suddenly.

Sectio Cadaveris.—The right side of the chest was very dull and the left very resonant after death. The cellular tissue around the wound which had been made by the trocar was slightly emphysematous.

The left lung was emphysematous; the disease was not very much advanced in any one part, but the whole lung appeared to be more or less affected. The left bronchial tubes were red and injected, and contained a little mucus. The heart was completely overlapped by the edge of the lung, and was pushed under and partly to the right of the sternum; indeed the emphysema of the left lung had acted on the heart and mediastinum exactly in the same way as very extensive pleuritic effusion would have done;—the heart being displaced in the manner just stated, and the mediastinum being pressed laterally so as to encroach very greatly on the right side of the chest. To such an extent had this gone, that the central part of the mediastinum was not more than two inches from the right ribs.

On the right side the pulmonary and costal pleuræ were universally adherent by delicate but perfectly-formed cellular tissue, which could be separated by the fingers without lacerating the lung. The lung itself contained scarcely any air; it was pale and bloodless, and very closely resembled healthy lung which has long been compressed by effusion into the pleura. It was described by Mr. William Adams, who made the *post-mortem* examination, as “diminished to less than one fourth of its natural size, and disposed in the form of a thin layer adherent to the thoracic parietes.” It was just possible to trace the line of the puncture which had been made by the trocar. Besides the diminution in the capacity of the right side of the chest, caused by the encroachment of the left lung, it was still farther lessened by the liver, which, though not enlarged or otherwise diseased,

extended so high into the chest, that the diaphragm had narrowly escaped being wounded by the trocar, though the instrument, introduced above the sixth rib, had been carefully passed upwards.

The condition of the lung in this case was such as I never saw before, and have not known to be described by others. It appears to me that the only explanation which can be given of the alterations which had taken place in the chest, is the following:—That there had, at some former period, been pleurisy with effusion on the right side; that the fluid had subsequently been absorbed, but that the compressed lung had not again expanded, and had become adherent to the ribs. Under ordinary circumstances, these changes would have caused great and evident contraction of the right side of the chest; but in the case now under consideration, this contraction had been prevented, partly by the opposite emphysematous lung and the heart, and partly by the liver occupying the space which had previously been filled by the right lung.

In addition to the unusual morbid changes detailed giving rise to insuperable difficulties in arriving at a correct diagnosis, this case is interesting as an example of the impunity attending a trial operation, by means of a grooved needle or fine trocar, in doubtful cases of hydrothorax or empyema. Having ascertained in this case, that if there was not fluid in the chest,—the presence of which I certainly thought highly probable,—there was at all events some very great impediment to the entrance of air into the lung, and, being assured of this, I entertained no fear of serious mischief arising from a puncture of that organ.

CASE II.—William W—, æt. 45, a flute-player, admitted Jan. 14, 1851. He stated that he had enjoyed good health until four months prior to his admission, when he was attacked with very severe pain, first in the left, and subsequently in the right iliac and lumbar regions. He was bled and salivated; and, in a fortnight, though not quite well, returned to his work. He soon became ill again, and

after attending as an out-patient at St. Bartholomew's Hospital, and elsewhere, he was admitted as my patient, bringing a note from his last medical attendant, stating that he had had rheumatism and pericarditis, and was then labouring under valvular disease of the heart.

When first seen by me, his countenance was expressive of much suffering. He had no headache, but said he had lately been much troubled by *muscæ volitantes*. His speech had become thick and indistinct within the last few weeks; and within the same time, he had almost lost all power in his lower extremities, having a little power only in the right leg, but none in the left; sensation, however, was not impaired. Respiration was short, hurried, and chiefly abdominal; the lower ribs on the left side did not move at all. The resonance of the anterior and lateral parts of the chest, on both sides, was natural, and the respiratory sounds were healthy, with the exception of slight rhonchus. When he lay on the back, with the shoulders a little elevated, he suffered little pain so long as he remained perfectly still; but, turning to either side, rising up, coughing, drawing a deep inspiration, or making any other movement of the trunk, caused most excruciating pain. The seat of pain was stated to be limited to the left side of the body, occupying the lowest part of the chest and the abdomen on that side; and this, he said, had for some time past been the sole seat of his sufferings. So great was the agony caused by turning to either side, or sitting up, that it was with great difficulty he could be placed in such a position as to enable me to examine the back of the chest. Nevertheless I satisfied myself that the chest was everywhere sufficiently resonant, and that healthy respiration was going on in the posterior parts of both lungs. Percussion of the two lowest dorsal and upper lumbar vertebræ caused pain of the same kind, and limited to the same parts, as any movement of the trunk had done. Although he was said to have had rheumatism and pericarditis, and to be then suffering from valvular disease, the account he gave of his case would not have led me to suppose that he had had the two former, and

I could not detect any evidence of the latter disease. He had been repeatedly blistered over the left side of the abdomen; but no blisters or leeches had been applied to the cardiac region. The pulse was about 100, small, and soft.

My examination of this case not having led to the detection of any symptom of disease in the viscera of the chest or abdomen, I could not account for the excruciating pain in the left side, unless the spinal cord was diseased at the lower part of the dorsal division; the seat of the pain, the fixed state of the lower left ribs, the feeble condition of the lower extremities, and the complete paralysis of the left leg, could all be accounted for on the supposition that this disease of the cord existed; and the severe pain caused by percussing the lower dorsal and upper lumbar vertebræ, strengthened this view. Except in two respects, the symptoms did not change their character, and no others supervened up to the time of his death. After he had been slightly affected by mercury, he became quite free from pain, so long as he remained completely at rest; but any movement of the trunk continued to cause as much agony as when he was first admitted, and consequently he always lay on his back, with the shoulders a little raised. The respiration gradually became more hurried, and a very slight cough became more troublesome. Four days before his death no change had taken place in the respiratory sounds, except that the rhonchus was rather louder and more general than when he was admitted, and the posterior part of the chest had become a little more dull on percussion on the left than on the right side, with a corresponding feebleness of the respiratory sounds, these changes being more remarkable in the lower than in the upper portion of the back. Two days before his death, although he made no complaint, observing that the respiration had become much more rapid, I again examined the chest completely. On the right side there were the ordinary sounds caused by slight and partial bronchitis; on the left, over the anterior and lateral parts, that is, over the whole portion which could be examined

whilst he was recumbent, there was tolerably good resonance, though not quite so clear as on the right side, and slight sibilus and rhonchus could be heard everywhere. On placing him in the erect position, I found the whole of the back of the chest gave a very much duller sound, when percussed, on the left than on the right side; and over the same parts, the respiratory sounds were feeble and distant. I could not hear œgophany; and the change in the patient's position did not cause the least alteration in the sounds heard, either on percussion or auscultation, in the anterior parts of the chest.

The patient had gradually been becoming feebler, and the tongue dry and brown, but the mind was not affected; and there was no other change in the symptoms except those already mentioned. He took a good deal of nourishment and stimulus, but died two days after the last examination of the chest, and seven days after his admission into the hospital.

The *post-mortem* examination was made on Jan. 22, twenty-four hours after death. The arachnoid, covering the upper part of the anterior and middle lobes of the brain, was white and opaque; and, when cut through, it was found that this membrane, together with the pia mater and intervening areolar tissue, formed a dense layer, a line in thickness, extending over and dipping between the convolutions. The brain was healthy. The spinal cord and its canal were most carefully examined, but exhibited no mark of disease in any part, excepting on the arachnoid of the cervical portion, where there were a few small white patches. The viscera of the abdomen were quite healthy. The heart was of natural size and structure. On the mitral valves were a few patches of atheromatous deposit; and, at the base of each aortic valve, was a minute quantity of earthy matter. The pericardium contained 3ss of serum, and there was an old, firm adhesion, of small size, at the back of the left ventricle. The right lung collapsed, and was quite healthy. The left lung collapsed, but did not fall to the back of the chest; it was found to be floating on fluid. This fluid was confined to the back part of the chest by a narrow line of

pleuritic adhesion, extending from the upper part of the root of the lung to the top of the chest, behind the apex, and continued along the ribs to the diaphragm, which it joined about half-way between the ensiform cartilage and the vertebræ. A portion of the base of the lung being adherent to the diaphragm, completed the separation of the left side into two cavities. The pleura of the anterior and larger cavity, was perfectly healthy; that lining the posterior part was completely coated by a thin layer of loosely adherent granular lymph. This cavity contained about three pints of dirty serum, mixed with granular matter, offensively fetid; and there was also a considerable quantity of air. The lung was quite healthy, with the exception of one spot, the size of a filbert, at the lower and posterior part of the upper lobe, from which it was evident that a gangrenous slough had recently separated. The cavity resulting from this communicated with a small bronchial tube. The line of adhesion between the pleuræ was in no place more than half an inch broad. In some parts of this line, the adhesion, though evidently recent, was firm; but in others it was so slight, as to cause surprise that the weight of the fluid, when the body was moved, had not separated it. I think it very probable that the completion of the communication between the sac of the pleura and the bronchial tube, had only taken place very shortly before death. When the chest was last examined by me, the man being erect, there was no resonance at the upper part, which must have been the case, if air had then been present; and after the examination had been made, I ascertained, from the sister of the ward, that, although the man had died "very easily," as she expressed it, his respiration had, rather suddenly, become much accelerated about two hours before death.

The *post-mortem* appearances in this case fully account for the symptoms referable to the chest, which were observed two days before death; but they do not, in my opinion, explain the long-continued and severe pain in the left side of the abdomen and left lumbar region. It is true, that both in pneumonia and pleurisy, some other part than the chest is often stated to be the seat of pain; but, in this case,

though there may be a doubt as to the exact time when the pleurisy commenced, it is quite certain that the pain in the abdomen preceded it by many weeks. The only other morbid change observed was the disease in the arachnoid and pia mater, and between this and the pain seated in the abdomen there was no apparent connection.

It is difficult to assign any date for the slough in the left lung, and the commencement of the pleuritic effusion. It is certain that these did not exist when he was first seen by me. At no time was there any sudden increase of, or alteration in the symptoms, such as would, in ordinary cases, arise from commencing pleuritis. Four days before death I am satisfied that the effusion, if it existed, was not extensive; and I entertain no doubt that a considerable amount of the effusion must have occurred within two days of death.

In the 'Medical Gazette' for Nov. 10, 1843, I published a case in which a very small slough, at the posterior part of the left lung, had given rise to pleurisy with extensive effusion and pneumothorax. Three days before that on which the presence of air and serum in the pleura was detected, there had been no more marked symptoms of disease in the lungs than those which were observed in the case just related; *i. e.* slight sibilus and rhonchus; and yet, in those three days, air had been admitted into the cavity of the chest, through the gangrenous perforation in the lung; and pleuritis, with extensive effusion, had occurred without any symptoms arising which had attracted the attention of the patient or his attendants. There had been no pain, no uneasiness, no acceleration of the circulation or respiration, no fever, no unusual position in bed,—in short none of the prominent symptoms which usually attend such cases. We cannot, therefore, doubt the possibility of the changes in the chest which were observed in the case of W. W—, just related, having all occurred within a few days of death; and that such change may take place in very debilitated subjects, without giving rise to constitutional disturbance, local pain, or any great disorder of the respiration, must be well known to every careful observer of disease.

In the case last mentioned there were adhesions so

situated, that healthy respiration could be heard in the upper and anterior part of the chest as low as the seventh rib, whilst the unequivocal sounds of pneumothorax were confined to the anterior parts below that rib, in whatever situation the patient might be placed ; recumbent, upright, on either side, or bending forwards.

There was a peculiarity in the line of adhesion between the costal and pulmonary pleuræ, in the case of W. W—, which I have seen in three other cases. It commenced behind the apex of the lung, and extended obliquely forwards, until, at the diaphragm, it was about half-way between the ensiform cartilage and the spine. All the pleura, posterior to this line of adhesion, which may be roughly estimated at one third of the entire membrane, was thickly coated with granular lymph ; all the membrane anterior to this line was perfectly healthy. Looking to the position which the patient constantly maintained in bed, this line of adhesion must have been nearly horizontal ; and it appears probable, that the effusion into the pleura was not, in the first instance, limited by previously existing disease, but that the fluid had gravitated to the posterior part of the chest, and that adhesions of the pleuræ, at the margins of the fluid, had subsequently taken place.

Only one of the three cases in which I have observed similar morbid changes was seen by me during life. The man was under the care of a surgeon for a tumour in the neck, and confined to his bed, where he lay almost constantly on his back. I was asked to see him, on account of his respiration having been observed to have become short and rapid, but the man made no complaint ; and it was only after he had been closely questioned, that he made mention of pain on the lower part of the right lumbar region, which he thought was rheumatism, as it did not distress him when he kept quiet. On examining the chest, the symptoms were almost the same as those observed in W. W—, two days before death. Puerile respiration on one side ; on the other side, rather feeble respiratory sounds, and diminished resonance over the anterior half of the chest ; dullness on

percussion and very feeble respiratory sounds over the posterior half. The man died the next day. In this case there was no disease of the lung; but the morbid appearances in all other respects, so far as the chest was concerned, were so similar to those observed in the case of W. W.—, that I do not think it necessary to describe them.

Before concluding this paper, I will briefly notice two other cases in which there were all the symptoms which are usually enumerated as indicative of pleuritic effusion, excepting the absence of respiratory sounds; in both, feeble sounds could be heard on almost every part of the right (the suspected) side. In the first of these cases, there was reason to suspect tubercles in an early stage; but there had been symptoms of pleurisy five weeks before I saw him. He lived nine weeks afterwards. After death, the costal and pulmonary pleuræ were found adherent in all directions, so as to divide the cavity into about twenty compartments, many of which communicated freely with each other. The symptoms of effusion, minus the loss of respiratory sounds, were in this case easily explained.

In the other case, the patient passed from under my care before he died, and no *post-mortem* was made; but, whilst he was under me, the pleura was punctured three times, in three different situations, in consequence of bulging and fluctuation in the intercostal spaces.

At the first operation 16 oz. of pus escaped; at the second about 5 oz.; at the third a still smaller quantity. In this case there can be little doubt there were adhesions dividing the sac of the pleura into distinct cavities, and keeping portions of the lung in contact with the parietes of the chest.

Notwithstanding the number of cases which have been related of unusual and complicated morbid changes in the viscera of the chest, necessarily causing doubts, difficulties, and errors in forming a diagnosis, I believe there are some novel features in those which I have related; and in that belief I have offered them to the consideration of the Society.