Four cases illustrative of difficulties in the diagnosis of aneurysm of the aorta / by Geo. S. Middleton, M.A., M.D., F.F.P.S., Physician to the Royal Infirmary and to the Royal Hospital for Sick Children.

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FOUR CASES ILLUSTRATIVE OF DIFFICULTIES IN THE DIAGNOSIS OF ANEURYSM OF THE AORTA.

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THE four cases in this paper have been selected for publication to illustrate various facts in connection with aortic aneurysm. They may be divided into two groups. In the first (Cases 1 and 2) the descending aorta was the seat of the tumour, which had greatly eroded the bodies of several vertebrae, and ultimately ruptured, but in the one case pain was the predominant feature, in the other it was only a late symptom. In the second group (Cases 3 and 4) the difficulty of diagnosis between aneurysm and mediastinal tumour of other origin is well illustrated, in cases in which shiverings, high fever, and expectoration of pus were dominant features in the diagnosis.

CASE 1.

Aneurysm at junction of thoracic and abdominal aorta giving rise to diagnosis of caries of vertebrae; rupture of aneurysm below the diaphragm.

John C., the subject of this aneurysm, a ship's carpenter, 29 years of age, suffered so much from pain in the small of the back that he was sent into the surgical side of the Infirmary as a case of spinal disease.

In May, 1895, he was suddenly seized, when in apparent good health, with pain in the lumbar region of the spine. On the previous day he had been employed in lifting very heavy

weights, a thing quite unusual with him. The pain was so severe that he was confined to his bunk for 30 days, and not able to resume work for other 14 days. For about four weeks he remained quite free from pain, but had thereafter an attack of three weeks' duration. There was then an interval of two or three weeks during which the pain was absent; but, since that time, there had been very little intermission. About the middle of April, 1896, he was working in a stooping position, which aggravated the pain and made it more constant. At the end of April he had to give up work, and he entered the Infirmary in May, coming under my care at the end of June.

About the beginning of May he had for the first time observed a distinct pulsation in the abdomen, but he had felt no pain there except on pressure.

He had lost flesh to a considerable extent (from 11½ st. to 9 st. 3 lb.), and was gradually growing weaker, slight exertion causing fatigue and breathlessness. He had had no cough or spit, no palpitation, and no oedema anywhere.

The pain was situated in the lumbar region, on either side of the spine, but more severe on the left side, and was of a dull, aching character. At times it passed downwards and forwards into the iliac regions, but not down the legs. There was marked tenderness on each side of the spine at the seat of pain, especially on the left side, and considerable tenderness on percussion over the lumbar vertebrae, chiefly over the second. Pressure upward on the gluteal region also caused much pain. His back felt very weak when he stood or sat up without support.

On examination of the abdomen marked pulsation was detected in the aorta at and above the umbilicus and a pressure murmur with the stethoscope, but there was no excentric pulsation and no localized dilatation of the vessel. There was a doubtful feeling of resistance and dulness in the left lumbar region, which was regarded as probably due to faecal accumulation.

There was no loss of motor power or of sensation in the legs; the knee-jerks were very pronounced, and there was

a degree of ankle clonus on both sides. There was no trouble with the bowels or bladder.

There was no distinct cardiac apex beat; the dulness was small; the sounds were free from murmur. The pulse numbered 50, and was of good quality; the radial pulses were equal. The temperature was not febrile. No abnormality was detected on examination of the lungs, the liver, or the kidneys.

There was a history of several attacks of ague when abroad; of a hard chancre five years prior to admission; and of a left empyema operated upon by resection of rib (with discharge of some three pints of bloody fluid followed in a fortnight by pus) two and a half years before admission. There was no tubercular family history.

The diagnosis was believed to lie between some affection of the vertebrae (caries) and an aneurysm. He was treated by the combined iodides and bromides, and kept under observation for about a month, when he was again transferred to the surgical side. In the end of July he had a rigor, with a rise of his temperature (hitherto generally subnormal) to 101°, the febrile condition lasting for two days. Another rigor, with a temperature of 102°, occurred early in August, but the febrile condition lasted only for one day. He remained in hospital till near the end of August, his pain being relieved by injections of morphine. As nothing had arisen to confirm the diagnosis of aneurysm, a spinal jacket was applied in September, with apparent improvement for a few days, so that he was able to walk about. There was soon, however, a return of the pain with greater severity than ever, and more in front than formerly.

He was readmitted under my care on 3rd November, 1896, greatly emaciated and suffering much more severely than during his previous residence. The abdomen was flat, but not retracted; the whole of its left side was dull, with a feeling of increased resistance which extended some distance down the anterior aspect of the thigh (Fig. 1). There was little or no undue pulsation of the abdominal aorta, but a systolic murmur was audible over it. When lying on his

face it was evident that there was a great bulging of the left side, extending from the 9th dorsal vertebra to the sacrum, the centre of greatest prominence being at the level of the 11th dorsal vertebra, $2\frac{1}{2}$ inches from the middle line. Dulness commenced at the level of the 7th dorsal spine, extended downwards to the crest of the ilium, and was

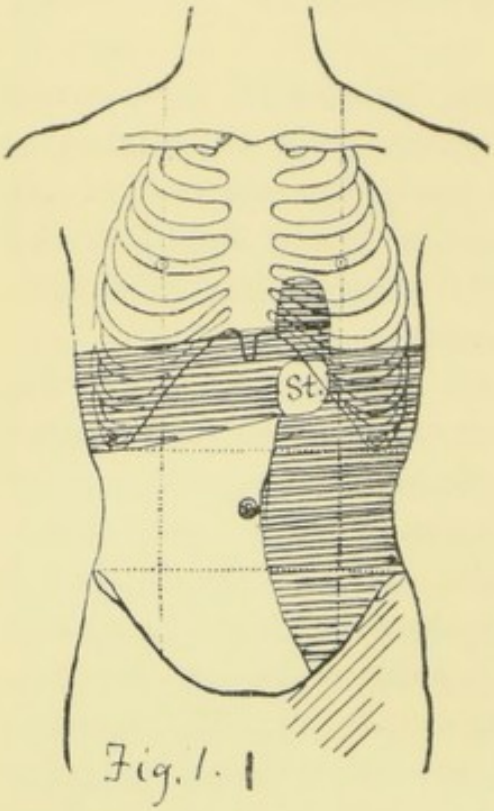

FIG. 1.—Percussion dulness, 5th November. *St.* indicates stomach note.

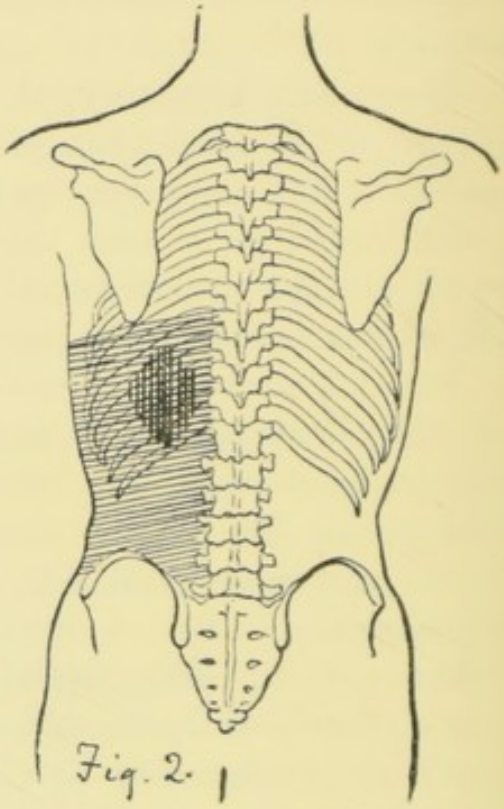

FIG. 2.—Percussion dulness, 5th Nov. The deeper shading indicates greatest bulging.

continuous with that described in front. Over the greatest bulging, *i.e.* over 10th, 11th, and 12th ribs behind, there was marked pulsation, but not excentric (Fig. 2). A systolic murmur was audible on both sides of the spine over a wide area. There was no apparent difference in the femoral arteries.

There was no tenderness on percussion of the vertebrae and no sign of any interference with the spinal cord. There were no tumours on any of the bones.

The decubitus was on the left side tending towards the prone position, with the right thigh flexed and the left extended.

The further course of the case may be briefly told, as it progressed to a fatal issue.

The pain was so severe that he often required as much as 10 grains of morphine (hypodermically) in the 24 hours, and even then he had little sleep. Emaciation was progressive, and ultimately very extreme. He was pale when readmitted, but the pallor became suddenly more marked on 7th November, and again much more marked during the

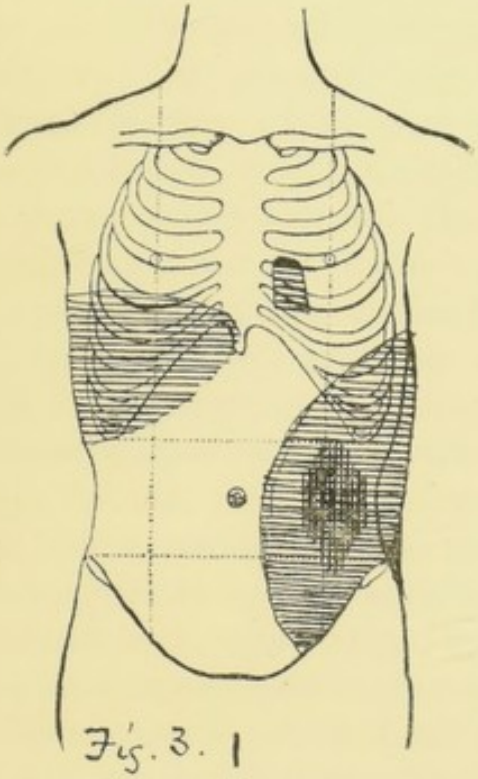

FIG. 3.—Percussion dulness, 21st November. The deeper shading indicates greatest bulging.

last 24 hours of his life. During the whole of this period of residence his temperature oscillated from about normal to 100° or more, the actual maximum being 102·4°; there was no day without one or more febrile temperatures.

The swelling in the left side increased, and was associated with a degree of yellowish discolouration of the skin and with oedema. The swelling was elastic, but scarcely fluctuant, and even in the abdomen it presented some pulsation (Fig. 3). Oedema of the left foot occurred, without any pain in the leg or thigh, and without any diminution of the pulse in the

posterior tibial artery. Later there was slight oedema of the right foot also.

The distress and exhaustion in this case were extreme. He died on 25th November, 1896.

The heart, which weighed nine ounces, presented healthy appearances, and all its valves were normal.

The right lung was somewhat adherent to the chest wall by old fibrous adhesions. The left lung was very adherent over the outer part of the lower lobe, where the pleura was considerably thickened opposite the scar of the old operation wound.

On removing the stomach and intestines, the parietal peritoneum was seen to be pushed forwards by a large haemorrhage, extending from the diaphragm to Poupart's ligament on the left side, and also on either side of the middle line behind the kidneys, the aorta, and the vena cava. This haemorrhage had arisen from an aneurysm springing from the posterior wall of the aorta just above and behind the pillars of the diaphragm. The aneurysm had first been of comparatively small size, lined with a fairly smooth, but somewhat atheromatous membrane. This sac had ruptured and given rise to a secondary sac of large size which lay behind the left kidney, its walls being formed of fairly firm, stratified clot. This false sac had again given way with the production of extensive haemorrhage behind the parietal peritoneum.

The bodies of the last two dorsal and of the first lumbar vertebrae were deeply eroded, and the last two ribs and the left transverse process of the first lumbar vertebra were also eroded.

Nothing else was observed at the examination calling for note.

This case is of interest from various points of view.

The diagnosis was for a long time doubtful. That there was some pressure on the vertebrae could not be doubted, but whether this was due to an aneurysm or to caries with abscess was uncertain. The occurrence of rigors with pyrexia, the pain and difficulty experienced in sitting up or in trying to stand, and the increase of the knee-jerks with the

presence of ankle clonus tended to the diagnosis of caries of the vertebrae, but the absence of motor and sensory paralyses, etc., seemed to show that there was no pressure on the cord, and the excessive severity of the pain was in itself an argument against caries of the vertebrae. The diagnosis ultimately had to rest upon our knowledge that aneurysm of the aorta is frequently the cause of such pain as was complained of here, the absence of evidences of any other effective cause, and, ultimately, the occurrence of internal haemorrhage. The pulsation that was present when he came under observation was of the kind met with in many affections, being a simple pulsation and not excentric; and even this pulsation disappeared as the case advanced, no doubt masked by the great haemorrhage. Even the pulsation in the tumour that formed in the back was not excentric, but it was suggestive of the presence of blood in the pleural cavity and therefore a valuable aid. The systolic murmur present was too widely spread to be of much assistance, but the fact that it increased in intensity as the case progressed might have been regarded as significant.

Attention should be directed to the prominence of pain as a symptom in this case. For a long time it constituted the only complaint, and after the first few months, when it was occasionally absent for some weeks at a time, it became persistent, but liable to paroxysms. Its severity was extreme, and was no doubt in large part due to erosion of the vertebrae, but in a considerable measure also to the site of origin of the aneurysm, as it is known that aneurysms about the crura of the diaphragm are intensely painful.

The total duration of the case would, at first sight, seem easily determined, as the statement of the patient, a very intelligent man, definitely assigned the origin of the disease to a strain in May, 1895. Such a duration, 18 months, is unusually short, especially when we take into account the long periods of rest in bed with iodide of potassium, by which he was treated. The questions may, therefore, be raised whether the strain in 1895 did not simply aggravate an aneurysm already existing; and, if so, whether the bloody

fluid, undoubtedly removed from the left pleural cavity about the end of 1892, had not been derived from leakage of such aneurysm. If the latter view could be sustained, this case would prove a most interesting instance of recovery from aneurysmal haemorrhage with maintenance of good health for an exceptional length of time.

Even if this explanation of that haemothorax cannot be received, the clinical and the pathological facts indicate that life was maintained for a long time after haemorrhage had commenced. On admission there was a sense of resistance in the left lumbar region, not considered of much importance at the moment, but not unlikely to have been due to the presence of blood behind the left kidney. Haemorrhage had probably already taken place, and had found its way downwards to that situation in which an artificial sac was formed, and, where at a later date rupture again occurred, as evidenced clinically by attacks of pallor and by increasing bulging and resistance. The post-mortem facts clearly indicated repeated haemorrhage, and the highly stratified clots showed an old and marked attempt at arrest of the haemorrhage and cure of the disease.

CASE 2.

Aneurysm of the descending aorta : oozing into the left pleura and the peritoneal cavity.

This case, though very imperfectly recorded, is of interest in connection with the preceding one.

The patient, 42 years of age, was admitted to the Infirmary on 7th November, 1893, and died on the 11th. He complained of pain in the abdomen, and was obviously very ill.

According to his own statement he had always been healthy and strong up till a fortnight before admission. On the 24th of October, while at his work as a hammerman, he was seized with a severe pain in the gastric region which gradually spread over the rest of the abdomen. Thinking it was cramp, he took some brandy, but without obtaining any relief. The

pain was so severe that it took him two hours to walk home, a distance of about a mile. He went to bed and remained there for a week, during which the pain was never absent and sometimes paroxysmally severe. He had a little vomiting, but no looseness of the bowels. He had no medical attendance, but treated himself with rest, light diet, mustard poultices to the abdomen, and seidlitz powders. At the end of a week the pain was gone, but he did not resume work till the morning of 7th November. When he had been at work for a couple of hours the pain returned, and became so severe that he was brought to the Infirmary.

The pain was situated in the right hypochondriac region, and was more severe than it had ever been before. His bowels were somewhat loose, the motions being watery and faecal. There was vomiting, but only after taking fluids (no solids given). He had a rather severe cough, but no spit: the cough seemed to be induced by swallowing. He was pale, but not emaciated.

On admission the abdomen was tense, the muscles being rigid, and there was considerable tenderness below the ensiform cartilage. There was no evidence of fluid in the peritoneum, no dulness, and no enlargement of liver or spleen.

Nothing abnormal was detected on percussion over the lungs, but the respiratory murmur was accompanied by many loud sonorous râles all over the chest. V.R. and V.F. were normal.

There was great pulsation over the praecordial area, the point of greatest impulse being to the left of the nipple line in the fifth intercostal space. The cardiac dulness was somewhat enlarged to the left, and a loud rough systolic murmur was heard, loudest at the apex, but audible over a wide area. The cardiac action was irregular and intermittent; many of the cardiac impulses were not conveyed to the radial pulse, which was soft and rapid.

There was an area of dulness, about one inch in breadth, extending from the cardiac dulness to the suprasternal notch. There was, however, no pulsation over it.

There was no difference in the pupils or in the pulses, but his cough was somewhat laryngeal, and he had some dysphagia.

On 9th November a degree of dulness and increased resistance were made out on the right side of the abdomen, extending downwards from the hepatic dulness.

During the time he was under observation he had numerous attacks of dyspnoea, and he became quite unable to swallow anything. His temperature, 97° on admission, rose to 100° on the day of his death. He was never in a condition in which he could be subjected to much examination.

In this case the diagnosis naturally could not be a definite one, but it was clear that there was something abnormal both in the thorax and in the abdomen.

At the post-mortem examination, "on opening the abdomen, a small but quite distinct trace of blood was found covering the loops of intestine, particularly those lying in the pelvis. The lower part of the omentum was covered with a thin layer of blood. On opening the chest, the left pleural cavity was found to contain 14 or 15 ounces of thin blood. On turning forward the left lung, a bulging, fluctuant, elongated swelling was found in the posterior mediastinum, extending from the level of the sterno-clavicular articulation to the diaphragm, and occupying the region of the descending aorta." This swelling was found to be a large aneurysm, which "had evidently become diffused into the tissues of the posterior mediastinum without actually rupturing the pleura or the pericardium. The blood had thus made its way through the posterior openings of the diaphragm into the region of the abdomen, infiltrating the tissues behind the peritoneum, and also extending for some distance on to the anterior wall of the stomach. This infiltration of blood, which lay immediately behind the cardiac end of the stomach, was so abundant as to at first suggest the possibility of a second aneurysm of the abdominal aorta, but that part of the vessel, beyond very slight atheroma, presented no abnormality throughout its whole extent. It was clear that the traces of haemorrhage met with in other parts of the peritoneum had originated here. The aneurysmal dilatation ceased abruptly at the

diaphragmatic opening. The sixth, seventh, and eighth dorsal vertebrae were much eroded by the pressure of the aneurysm, and this was probably the original site of the tumour before it began to diffuse itself."

The heart was not enlarged. The lungs were somewhat emphysematous, but otherwise presented no abnormality beyond some oedema and hypostatic engorgement, while the bronchi of the left lung contained a pretty abundant purulent secretion. The other organs were normal.

With the results of this examination before us, it is of importance to note the facts as to pain, so far as we could get them. Notwithstanding that erosion of the vertebrae must have been going on for a long time, there was no history of pain in the back at any time. Even when pain did set in, it was not referred to the region of the tumour, but to the abdomen, and it was almost certainly caused by the bleeding into the peritoneal cavity. I am quite prepared to admit that the history was defective, and that this patient probably had had attacks of pain about which he had forgotten; but his well-nourished condition and his being able for heavy work up till a recent period satisfied me that he could not have suffered from severe and continuous pain. This case would seem, therefore, to prove that erosion of the vertebrae may go on without much pain, and that probably the situation of the erosion, involving as it does the nature of the structures on which the aneurysm impinges, must have a good deal to do with the amount and nature of the pain.

This case also illustrates the tendency of aneurysm to rupture and to have the haemorrhage confined, with later rupture and fresh haemorrhage. Along what should have been posterior wall of the aorta there was an old stratified clot, with recent haemorrhage outside of it and in the pleural cavity, etc. A serious rupture had no doubt occurred on the day of his admission to the Infirmary.

The absence of evidence of rupture of the pleura would seem to indicate that oozing into that cavity to a considerable extent may take place from rupture of an aneurysm in the

posterior mediastinum, a fact of some importance in connection with what has already been recorded in the previous case in regard to a pleural haemorrhage.

The date of the first rupture cannot be stated with certainty, but it probably was not very long before his admission. Not improbably it was on the day when he first felt pain, and in that case the duration of life thereafter was short. The duration of the aneurysm itself could only be guessed at vaguely.

CASE 3.

Aneurysm of the arch of the aorta, with attacks of severe dyspnoea, high temperature, and expectoration of pus, causing a mistaken diagnosis of mediastinal abscess.

Early in September, 1898, there was admitted into the Royal Infirmary under my care a man, 38 years of age, a tile-layer to trade, complaining of great shortness of breath of three months' duration. For some time before the breathlessness attracted his attention he had had a slight pain about the right shoulder.

His illness was of very gradual onset, the shortness of breath troubling him at first only on exertion, and slowly increasing in severity as time wore on. By the time of his admission this symptom had become severe, causing him great distress, much aggravated by even slight exertion. Pain had not been a prominent symptom, was of a dull aching character, increased by coughing, and located about the region of the right nipple and of the right scapula; it never shot down the arm.

He had been troubled a good deal by cough, often absent for days, at other times very annoying and accompanied by a peculiar sound which made people in the street turn round and look at him when they heard it. Very little spit accompanied his cough, but he had frequently seen streaks of blood in it. For about five weeks he had had some difficulty in swallowing solid food.

He had been a heavy drinker, but had never had syphilis. His work was not heavy.

He was a strongly-built, well-nourished man. His colour was dusky, the lips and nails being livid. The respiration was normal in rate, but there was orthopnoea. Inspiration was stridulous, and the cough brassy, but no aphonia. The pupils were somewhat unequal, the left being slightly contracted, but both reacted well to light and in accommodation.

There seemed to be slight bulging of the left side below the clavicle, with undue prominence of the second costal cartilage. There was no enlargement of the superficial veins of the thorax or arms, but the veins of the neck were rather full. There was no pulsation in the supra-sternal notch, and no impulse could be detected on palpation over the manubrium sterni or the upper intercostal spaces, but on testing for tracheal tugging there was a very distinct pulsation made out, if not true tugging. The trachea was slightly deflected to the right.

There was a dull area beneath the manubrium sterni, and extending far on either side of it up to the clavicles, but its exact limits could not be laid down. This dulness did not reach as far down as the cardiac dulness, which was small. There was practically no cardiac apex impulse. The sounds were everywhere free from murmur, and they were not accentuated over the praecordial area, but there was some accentuation of the second sound over the manubrium. Only slight difference was made out by the fingers in the radial pulses, but the sphygmograph showed the right to be smaller and of higher tension than the left. There was no oedema of the face, neck, or arms, and no enlargement of lymphatic glands in the neck. The respiratory murmur could scarcely be heard in front, and behind it was feeble on both sides.

Such were the main facts on admission, so that a provisional diagnosis of aneurysm was made, and he was put upon 30 grains of iodide of potassium per day, with inhalations of oxygen when required for his breathing.

He was under treatment until 24th December, when he left at his own request, greatly improved.

During his residence in hospital he had many extremely severe and protracted attacks of dyspnoea, during which his temperature always rose high (maximum 103·4°), and which were generally associated with an expectoration (often 10 oz. in 24 hours) of pus, the latter taking the place of the mucus of which his spit usually consisted. On the first occasion the pus was extremely offensive, but in later attacks the bad odour was absent. Occasionally the spit was blood-stained.

On the morning of 1st October he was seen in one of his bad attacks which had come on late the previous evening. His distress was extreme, so that he could not sit or lie in one position for more than a minute or so at a time, and he was wandering in his talk. This distress was evidently due to the fact that air was not entering a large portion of the lungs, and it was noted that this difficulty did not seem to arise at the larynx (although the left cord was partially paralysed), but from pressure on the trachea. A hurried examination of his back discovered great weakness of the respiratory murmur from the interscapular space downwards on both sides. The sputum was considerable, and consisted almost entirely of blood-stained mucus, quite free from bad odour. He felt cold, but his temperature was 102·6°. Lividity was very marked. Oxygen, nitrite of amyl, injections of sulphuric ether, etc., were tried without the slightest benefit. As a last resource, and because he looked as if he would die unless relieved, one-sixth of a grain of morphine was given hypodermically, which acted almost at once and extremely well. In all such attacks at a later date, the morphine was employed at once, and always with good effect. Following the above attack, there was an expectoration of several ounces of pure pus.

Occasionally a slight systolic murmur was heard over the manubrium, but it was more commonly absent. The general physical facts varied little, *i.e.* the dulness, the R.M., the pulses and pupils, etc.

Between the severe attacks of dyspnoea he improved greatly, his temperature being normal or subnormal, and his respirations almost down to normal, and he was ultimately able to go

down stairs and to come up again (three storeys) without much difficulty.

This case was shown at a demonstration to the Eastern Medical Society,[1] when it was stated that, while many of the facts pointed to aneurysm, the attacks of shivering, with high temperature, and excessive dyspnoea followed by expectoration of pus, at first foetid, indicated rather "the existence of a mediastinal glandular tumour in which there is a suppurating cavity, the retention of the contents of which causes the urgent dyspnoea and high temperatures." That was regarded as the most probable diagnosis, even in the absence of enlarged glands in the neck, and of oedema in the face, neck, or arm, so often associated with such tumours. When at his worst the question of trephining the sternum was even raised, but it was deemed advisable to wait for more definite indications, especially as the morphine relieved the most urgent symptoms so readily.

He left the Infirmary at his own request on 24th December, feeling fairly well, and he died suddenly on the morning of 26th December. He was alone at the time, so that no account of his last attack could be obtained, but there were no indications of haemorrhage.

Permission having been obtained, Dr. Workman made a partial post-mortem examination, and removed the contents of the anterior mediastinum, remarking that there was certainly a tumour. It was only when the tumour was opened that it was found to be an aneurysm of the aorta, just where the ascending passes into the transverse portion, but its cavity was almost filled with laminated clot. The trachea was impinged upon by the tumour, and its mucous membrane was greatly congested and abraded in one or two spots. There was no purulent centre.

The specially interesting facts in this case are the attacks of shivering, with high fever, associated with severe dyspnoea and expectoration of pus, phenomena which are all (with the exception of dyspnoea) unusual in the case of aneurysm.

[1] See *Glasgow Medical Journal*, April, 1899.

Even in the light of the examination after death it is not quite easy to explain their occurrence. It seems to me most likely that they were due, in great part, to sudden aggravations of the tracheal inflammation. But in part, also, they may have had a nervous origin, and this view is supported by the good effect of the morphine. The rapidity with which the injection acted was such as to suggest that the dyspnoea could not be entirely due to pressure on, and congestion of, the trachea, but must in part be due to nervous spasm.

CASE 4.

Mediastinal tumour with many of the signs of aneurysm: when apparently moribund, recovery after profuse expectoration of pus.

In the case just recorded we had the opportunity of completing the diagnosis by post-mortem examination. In the present case the diagnosis is still uncertain, as the patient has fortunately recovered. In their clinical history the two cases present many similar features.

Donald M'M., aged 45, blacksmith, was admitted on 13th October, 1896, complaining of cough and loss of voice, the former of five weeks' and the latter of eight days' duration.

Early in 1894 he began to suffer from pain in the chest. Originating in the middle line in front, it passed round the left side to both shoulder blades, but more especially to the left. The pain never affected the shoulders, the arms, or the neck. It was worse when he lay in bed, and ultimately was so severe that for months he spent the nights sitting by the fireside, and had to have injections of morphine.

In July, 1895, he was in the Western Infirmary; while there he always lay on his back or on his right side, the pain being unbearable when he lay on the left side. About May, 1896, the pain became less severe, and at the time of his admission it had almost disappeared, any that remained being in the left shoulder blade.

The cough was painless and unaccompanied by expectora-

tion; he had never at any time spit blood. The hoarseness and loss of voice came on gradually, reaching their greatest intensity in a couple of days. He had never had palpitation.

But for an attack of sciatica in his left leg in 1892 he had always been a healthy man. He had never had syphilis or gonorrhoea. For 14 years he had had no hard work, as he had been in charge of the smiths' shop; prior to that he had had heavy work.

The patient was a strongly-built man (over 14 stones), inclined to be fat. He lay in bed quite comfortably in any position. Generally he spoke in a whisper, but occasionally his voice had a natural tone except for a slight roughness. Every now and then he gave a harsh vibrating cough of an imperfect character. There was no swelling of the face, arms, or legs. The pupils were equal, and responded to light and in accommodation. There was no visible impulse in the vessels of the neck, nor could pulsation be felt in the jugular fossa. There was no tracheal tugging. The pulse numbered 72 per minute and was regular; sphygmograms showed that the tension was good, but that the right radial gave a less ample tracing than the left; there was no rigidity of the walls of the radial or temporal arteries. Respirations numbered 16 and were quiet.

The apex beat of the heart, not very pronounced, was in the fifth intercostal space in the left nipple line. The cardiac dulness was not enlarged. There was no cardiac murmur, and, though there was some reduplication of the second sound, neither the aortic nor the pulmonic element seemed accentuated. The lungs were normal, but on deep inspiration a snoring sound was heard from the larynx. The urine (sp. gr. 1030) contained neither albumen nor sugar.

Dr. Fullerton kindly examined the throat, and reported as follows: "Both in pharynx and in larynx a catarrhal condition is present. Both true cords are somewhat red and thickened. The left cord is absolutely immobile; the movements of the right cord are unimpaired. There is no localized swelling or thickening seen."

Such was his condition up till 17th October, when his

breathing gradually became difficult and the cough more troublesome. There was no sudden onset of dyspnoea. On the 18th he was rather worse, with slight variations. The lungs presented no difference on percussion on the two sides, and no dulness; the respiratory murmur was equal on the two sides, and there were no râles. In the evening of the 18th his breathing became much more difficult, and he complained of pain in the upper part of the front of the chest. Inhalations of oxygen gave him some relief. About 10 p.m. a very severe attack of dyspnoea occurred, there being as much difficulty with expiration as with inspiration. The pulse ran up to 140. After two hours the attack gradually became less severe.

On the morning of 19th October he was in extreme distress from difficulty in breathing, and very livid; pulse, 140; temperature (previously normal or subnormal), 102·2°. He had then expectoration for the first time, purely mucous, without any trace of blood. A hurried examination of his chest discovered a systolic murmur in the left interscapular space, where also the respiratory murmur was tubular.

He insisted on going home, but he was so ill that he was warned that he might not reach home alive.

The history of pain, the cough, the voice, and the paralysis of the vocal cord led us to the conclusion that we were dealing with an aneurysm of the arch of the aorta. The aggravation of the symptoms was regarded as due to pressure on the trachea, into which it was presumed the aneurysm would burst.

On 1st December, 1896, he presented himself for examination, looking well. His medical adviser, Dr. J. S. Muir, reported that on his return home "signs of pneumonia set in on the left side, and he was very low. An enormous amount of purulent matter was expectorated" (patient says he has been told that this occurred three days after his return home, but he has a very indistinct recollection of what occurred during the first fortnight), "and he has gradually recovered. He is now better than he has been for two years and completely free from pain." The condition of the larynx was the

same as when he left, and the only new phenomena noted were a band of dulness on the left side from the cardiac dulness to the spine, obliterating the gastric clear crescent, with feebleness of the respiratory murmur and marked pleural friction.

When seen again on 31st December, 1896, he had no complaint except of hoarseness. It was then noted that the whole of the left side was full, with bulging and pulsation in the episternal notch. There was no tenderness on pressure and no bulging of the intercostal spaces. The percussion note on the left side was not quite so resonant as that of the right, but the only definite dulness was in the left lateral region and a band of dulness from the cardiac dulness up to the left sterno-clavicular articulation. There was no marked difference in the respiratory murmur on the two sides. There was no cardiac murmur.

On 11th July, 1899, he reported himself as quite well but for hoarseness and cough. He had grown very stout, but he was quite able for ten to fourteen hours' work daily, during which time he was constantly on his feet. At times he had severe attacks of coughing, which sometimes lasted for a whole day, and were associated with a good deal of mucous expectoration, without pus, and only on very rare occasions presenting a few specks of blood. Stooping aggravated both cough and breathing. The left vocal cord was still immobile; voice very hoarse, cough laryngeal, and inspiration stridulous; never dysphagia.

The left side was still unduly full, and somewhat deficient in movement, and its respiratory murmur was rather feeble, especially in front. There was no dulness anywhere over the lungs. During bad attacks of coughing he still felt pain where the friction had been.

There was no enlargement of glands anywhere; no distension of veins in the neck; no pulsation in the episternal notch; no displacement of the trachea; no oedema anywhere.

The cardiac dulness was small, and there was no definite murmur, though the first sound at the fourth left costal

cartilage was so prolonged as almost to amount to a murmur. There was an indefinite dulness about the midsternum, but it did not reach up to the manubrium.

Here, as in the previous case, there occurred a marked accession of dyspnoea, with rise of temperature, followed by expectoration of pus, in this case profuse; but the further progress of the case has rendered the diagnosis of an aneurysm more than doubtful. That there was a mediastinal tumour of some sort is certain, and that suppuration occurred is equally so; but it is not certain whether this was simply a slowly growing abscess, originating, say, in some of the bronchial glands, or whether the suppuration took place in a tumour of another nature. In any case, the present condition of the patient is very satisfactory, though there is no hope that he will regain the use of the vocal cord. That paralysis and the partial obstruction to the entrance of air into the left bronchus are no doubt due to inflammatory adhesions and thickenings which cannot be removed.