C A S E
OF
ANEURISM OF THE THORACIC AORTA,
WHICH OPENED INTO THE
TRACHEA AND LEFT BRONCHUS;
AND IN WHICH HÆMOPTYSIS OCCURRED FOUR YEARS
AND EIGHT MONTHS BEFORE DEATH:

WITH
REMARKS ON THE CIRCUMSTANCES ATTENDING THE RUPTURE OF
ANEURISMS, ESPECIALLY ON MUCOUS SURFACES.

BY
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COMMUNICATED BY
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THE subject of the following observations was Mr. J. B—, a merchant, of a robust frame, and more than average intelligence, who, at the period of his death, was about forty years of age. I was first consulted by him on the 9th of March, 1854, and he remained more or less constantly under my observation till his death, which occurred on the

19th of April, 1858. The mass of details regarding his symptoms, which came to my knowledge during this period of four years, would occupy much more space than can be given to them here, and I must therefore bring within very narrow limits the statement of many facts to which the intelligence of the patient, and the anxieties of his relatives, lent much interest at the time of their occurrence.

From many conversations with the patient, I am enabled to carry back the history of his complaint to nearly six years before the date of my first visit to him, *i.e.* to ten years before his death. The earliest symptoms were pains in the left side and shoulder, sometimes pretty severe, but without any distress of breathing or palpitation. He was at this time accustomed to take a good deal of exercise, and used to experience relief from his pains on walking till he was thoroughly heated. He also found that the use of stimulants frequently removed the pain, which was always lessened after a free perspiration; and partly, no doubt, on this account, the pains were regarded as "rheumatic." He afterwards became subject to more or less of difficulty of breathing, and, under the advice of his ordinary medical attendant, underwent a considerable amount of active treatment.

In October, 1852, it was for the first time intimated to the patient that there was a fault in the great vessels, indicated by a murmur, of the precise character and site of which I have, however, no information. He was forbidden to use severe exertion, which up to this time he had permitted himself without restraint; he was also directed to use palliative remedies, and was allowed moderately good diet, with a proportion of stimulants. Previous to this time, but at what precise period in the history of the case I am unable to state, he was sensible of two distinct aggravations in his complaint, one after a fall in shooting, the other connected with an injury which he received while descending from the top of a stage-coach. After this he always acted on the advice he had received, and was very chary of exposing himself to the least risk of injury.

In March, 1853, a pulsation became apparent in the upper part of the left front, and in the course of the summer he became subject to pretty severe cough. With the cough came a mucous expectoration, and though nothing that was distinctly of blood colour was observed, the sputum was slightly coloured, or "bilious" as he called it.

It was in August, 1853, that the first gush of blood occurred. The circumstances were remarkable, and served to make known Mr. J. B—'s precarious state of health to a wide circle of his townsmen. He was giving evidence as a witness in a court of justice, under some degree of mental excitement, when, without the least warning, his mouth suddenly filled with blood; and apparently without either coughing or vomiting he brought up such a quantity of pure blood as made him quite faint. He was immediately conveyed home, and there the hæmorrhage was repeated to nearly the same extent as before. For several weeks after this occurrence Mr. J. B— was confined entirely to his room, and for the most part to the sofa; he also took sedative remedies to a considerable extent. After a time, however, being dissatisfied with the results of treatment, he changed his medical advisers more than once; and ultimately placed himself under my care, as already stated, in the spring of 1854, about six months after the first hæmorrhage, and rather more than four years before his death.

It is unnecessary to go in detail into the history of the case after this. I found the patient with every sign of a large aneurism of the aorta presenting itself in the left front immediately below the clavicle, and passing backwards and upwards so as slightly to involve the left subclavian artery. The radial pulse on the left side was a little weaker than on the right (this sign became afterwards much more distinct, the pulse being ultimately almost entirely suppressed). There was less of dulness on percussion than of tumour and impulse; there was only a trace of the murmur formerly heard. For the rest, the patient was in tolerable condition, sleeping better than he had done for some time after the serious accident of the preceding August; suffering

little positive pain, and having had no considerable expectoration of blood, although he had had a slight cough, with occasional coloured sputa. The pulse was ordinarily 70 to 80. He at this time took some exercise, but as yet very little. His hopes of life had obviously been deeply shaken, and his behaviour was that of a man doomed to a speedy and probably a sudden death.

I directed him to take gentle exercise, and after a time to go for two hours daily to his place of business, but not to lean over the desk; to take light, nourishing, solid food; to abstain from medicine; now and then, when pain was severe, to put one or two leeches over the tumour; and in general to think as little as possible about his complaint, except in the way of caution against violent movement. Under this regimen his condition improved considerably. In the beginning of May he removed to the seaside, and before the end of the same month he took lodgings at a quiet railway station on the Gala Water, on the banks of which he spent the summer with very considerable enjoyment. He became a brother of the angle, and with the help of his wife and a light rod, managed to do a considerable amount of execution among the Gala trout. His mind, too, found great relief from suffering in a resigned and intelligent view of his condition. From having abandoned all idea of an ultimate cure he seemed to derive decided comfort as regards the present no less than the future.

But in the midst of this improved state of health, he continued occasionally to bring up a more or less tinged expectoration; sometimes rusty, sometimes purple, almost never of anything approaching pure blood. This, I believe, continued to be the case, with intermissions of, at most, a few weeks, during the remainder of his life. The two succeeding summers were spent, in part at least, on the Gala; but, although the progress of the disease was slow, I had no difficulty in recognising a distinct progress, chiefly in the direction of the left lung, of which the sounds gradually became more and more impaired. Occasionally he had attacks of severe pain, and now and then paroxysms closely

resembling *angina pectoris*. He had also one or two attacks during the night, which, according to the description, I believe to have been of an epileptic character, but which lasted only a few minutes, and were not accompanied by marked convulsions. In the winter of 1857-8 it was evident to me that the end was approaching; the patient was worn and haggard in appearance; he had lost flesh to a great extent; he breathed with difficulty, and had a somewhat hoarse, rather laryngeal, inspiration, and an altered voice; he occasionally complained of difficulty in swallowing; he frequently brought up blood rather more copiously than he had done since the first attack of hæmoptysis, but never in large quantity, or pure. He also had sickness of stomach to a distressing extent, often lost his sleep at night, and was altogether in a pitiable condition. At length the respiration of the left lung became completely suppressed, the percussion at the same time becoming dull all over the left side; and on the 19th of April, 1858, a small gush of blood, probably not exceeding eight or ten ounces, occurred, which terminated life by suffocation in a few minutes.

A careful post-mortem examination was performed by Dr. Haldane; and the result of it, so far as the interest of the preceding facts extends, is now before the Society. The aneurism involves the descending aorta, from the left subclavian, which is barely free of the sac, to several inches lower down. The sac rests on the vertebræ behind, on the ribs above, on the left lung below and in front. To the left lung it is firmly adherent over a space of many inches square. The left bronchus is stretched over the sac, and has its posterior wall absorbed throughout its whole length. The sac is filled with firm coagulum, which is freely exposed to view from the interior of the bronchus. Exactly at the bifurcation of the trachea there exists another opening into the sac; it is not larger than will admit a probe, and from its smooth rounded edges has evidently been a long time present. This opening, too, rests upon a firm, solid, laminated clot. The left pneumogastric nerve, and the corresponding recurrent, are deeply involved in the wall of the

sac. The left lung is much collapsed, and infiltrated with a considerable amount of purple blood. The right lung was quite normal, and has not been preserved.

I am led to believe the preceding case not unworthy of the attention of the Medical and Chirurgical Society—1st, because of the very long period which existed between the occurrence of rupture of the sac and the ultimate fatal event; and, 2dly, because of the occurrence of hæmorrhage, in a modified form, at intervals during the whole of that very long period. There is not much room for remark on the diagnosis, which, from the time that I first saw the case, was too clear to admit of a doubt. Nor did the case illustrate any new symptom or combination of symptoms in thoracic aneurism, such as to call for remark. But as it presents an undoubtedly very rare, if not unique, example of the prolongation of life after rupture of the sac, and as this particular class of cases has not been made the subject of any very formal investigation, though incidentally discussed by most authorities, I have thought it desirable to accompany the statement of the facts with a short commentary, illustrative of some points which may have escaped the attention of members of the Society.

It is well known that sudden death by hæmorrhage in the case of aneurisms of the thorax and abdomen, opening on mucous surfaces, is very generally preceded by minor discharges of blood, and sometimes by more or less considerable gushes, occurring many hours, and sometimes many days or weeks, before the fatal event. This fact, indeed, though apparent to all who have studied the records of aneurism, was not duly appreciated until a comparatively recent period; these slight hæmorrhages being often either allowed to pass unnoticed, or being referred to some other cause than the true one. The celebrated case of Mr. Liston probably did much to diffuse among the members of his own profession a knowledge of the variable character of the hæmorrhage from aneurismal sacs, and of the remarkable intermissions to which that symptom is occasionally subject. It is well known that between July, 1847, when

hæmoptysis occurred to the extent of many ounces, and October of the same year, when cough recurred, accompanied with a rust-coloured expectoration, Mr. Liston enjoyed an almost complete immunity from symptoms; an immunity so remarkable, that all the warnings of his medical advisers were inadequate to lead him to consider himself an invalid. Mr. Liston died in December, 1847, five months after the first gush of arterial blood, and without any new considerable hæmorrhage. The trachea was found perforated in three or four places, and portions of the aneurismal clot were discovered projecting through the openings, and partially blocking them up. It is evident, therefore, that in Mr. Liston's case the rupture of the aneurismal sac had actually taken place at least five months before death; and that, notwithstanding the unclosed openings, no discharge of blood such as to cause serious alarm to the patient himself had occurred in the interval.¹

Mr. Liston's case was probably not unique even at the time at which it was published. Very few recorded cases, however, exist in the literature of medicine, in which death was postponed so long as five months after a serious hæmorrhage from a mucous surface in aneurism. In proof of this assertion, I may mention that Dr. Edwards Crisp's laborious collection of cases, added to my own reading, and to a list with which I have been kindly furnished from the manuscripts of Dr. Sibson, whose very elaborate and careful study of this subject is known to the members of the Society; furnish in all only nine, or perhaps ten, instances in which an interval of a month or more existed between hæmoptysis and death, and in very few of these was there an interval nearly so long as in Mr. Liston's case between a considerable bleeding and the fatal event. In one case, indeed, pointed out to me by Dr. Sibson's manuscript,² hæmoptysis

¹ See 'Lancet' for December, 1847, p. 633.

² Guy's Hospital Museum, Preparation 1489⁵⁰. I have had an opportunity to-day (April 25th) of inspecting this preparation, along with Dr. Sibson. The aneurism forms a three-fold dilatation, involving the greater part of the arch, and communicating by separate openings with

is stated to have taken place seven years before death; the connexion of the hæmorrhage with the aneurism, however, does not appear to be clearly made out by the history. Of all intervals less than a month the examples appear to be numerous enough.

It has been my fortune to observe and describe two cases of aneurism in which copious bleeding occurred on a mucous surface, and in which the interval between the first bleeding and death greatly exceeded that observed in the case of Mr. Liston. One of these cases is the one just narrated; the other was a case of aneurism of the superior mesenteric artery, remarkable as a specimen of a rare disease, and a curious, though incorrect, diagnosis, but still more remarkable as showing a minute opening (from the aneurismal sac into the duodenum), which was nearly closed at the time of the patient's death, but had led to profuse hæmorrhage twenty-two months before the fatal rupture into the peritoneum. The whole facts connected with this case are of great interest; but I cannot venture on an abstract of them in the present paper. They will be found in the 'Monthly Journal of Medical Science,' vol. x (for 1850), p. 83.

When aneurisms open into serous cavities it is rare to find death long delayed. Dr. Stokes, however, has referred to one case, where some days probably intervened between rupture into the pericardium and death. I have seen one instance in which "hæmorrhagic pericarditis" was caused by aneurism, and where I was led at the time very strongly to suspect that what appeared to be an inflammatory effusion was in reality a hæmorrhage, the blood having been churned about in the course of the movements of the heart so as to

the ascending and the descending aorta. The anterior part of the aneurism is extensively adherent to the right lung, while the posterior sacculated dilatation communicates with the left bronchus. The patient was a woman of fifty-four years of age. She had suffered for some months from palpitation, with pain between the shoulders, at times extending down the left arm; but "it was ascertained after death that she had been the subject of hæmoptysis six or seven years before." She died of hæmoptysis shortly after admission.

decolorize its fibrin. In a case of aneurism fatal by rupture into the peritoneum, also, it has occurred to me to observe adhesions which appeared to have confined the hæmorrhage, during some days at least, to the posterior part of the sac. But these cases are extremely few.

Several cases have been recorded in which, in aneurisms opening on the external surface of the body, a considerable interval existed between the opening and the fatal event. One of the most curious of these is a case communicated by Mr. Ramsay, surgeon at Broughty Ferry, to Mr. Syme.¹ A man affected with aneurism of the arch and of the innominate artery, lost a very large quantity of blood from a rupture opposite the cartilage of the third rib. The stream of blood is reported as being "somewhat larger than a quill;" and, strange to say, the patient, "nothing alarmed, got hold of a bowl, and held it at arm's length to receive the red arch, which he supposed was the contents of a 'bloody boil,' pressing the tumour with his chin to effect a more speedy clearance. After about a quart of blood had gushed out, he fainted, and the bleeding stopped." The patient lived for four months, without any new bleeding, and died in the end, not of the aneurism, but of "typhus fever." Not less curious is a case communicated by Dr. Neligan to Dr. Stokes.² A ship-carpenter, aged 56 years, had all the signs and symptoms of an aneurism of the aorta, opening externally about the second rib on the right side, in front. For more than a year the tumour discharged at intervals, sometimes copiously and in a continuous stream, a quantity of blood sufficient to cause alarm, and occasionally arrested with difficulty. Two of these hæmorrhages occurred under Dr. Neligan's observation. After the first of them, which was by far the most considerable, the tumour diminished considerably in size, and became much more dense, losing the fluctuating character it had previously had. The cough and dyspnoea also sub-

¹ 'Monthly Journal of Medical Science,' vol. x, p. 89.

² 'Diseases of the Heart and Aorta,' p. 582.

sided, and three weeks after the last hæmorrhage the patient left the hospital, "stating that he felt quite well." This is assuredly one of the most remarkable cases on record. The only flaw in it, as an observation, arises from the very circumstance that makes it so interesting, viz., that no opportunity occurred of ascertaining, with absolute certainty, that it was an aortic aneurism. I agree, however, with Dr. Stokes, in thinking that the early signs and symptoms leave no reasonable doubt of this diagnosis. And it is possible, therefore, though perhaps hardly probable, that this case may have ended in a more or less permanent cure of the disease; or, at all events, in long-continued exemption from external hæmorrhage, and death from some other cause.

Cases are not very uncommon, in which aneurisms of the aorta, after opening on one mucous surface and leading to hæmorrhage, are actually fatal by hæmorrhage in another direction, or by some other complication. I have several times seen an aneurism open nearly simultaneously into the trachea and œsophagus; the fatal event having been probably delayed for days after both openings. Similar cases have been recorded, and preparations illustrative of such double openings will be found in many museums. Rupture of an aneurism into the œsophagus, and into the alimentary canal generally, is probably rarely detected until the hæmorrhage is very large, indeed fatally large; because small bleedings, discharged downwards into the stomach and intestines, are almost sure to pass unnoticed. Hence we rarely obtain the opportunity of observing closely the process of rupture on the œsophageal mucous membrane. In the air-passages it is different; very small discharges of blood being here easy of detection. Sometimes, indeed, the true nature of the disease is overlooked, and the hæmorrhage is ascribed to pneumonia, pulmonary hæmorrhagic condensation, malignant disease of the lung, or, perhaps quite as commonly, to ordinary tubercular phthisis. I have seen each of these mistakes made by physicians nowise incompetent or inattentive; indeed, where large gushes of

blood occur in connexion with obscure physical signs, it is not unfrequently all but impossible to decide between aneurism and phthisis, unless the history, age, and appearance of the patient constitute a ground of decision. Even these grounds of diagnosis, carefully investigated, sometimes fail; and I have notes of one case, where large quantities of cod-liver oil were ordered, not unreasonably, nor without benefit, to an aneurismal patient, under the idea of his being consumptive, for several months before the true diagnosis was made.

But the cases in which aneurism is most apt to be overlooked after rupture of the sac are those in which no large hæmorrhage occurs; but in which, for weeks together, perhaps for months, an inconsiderable leakage occurs into the air-passages, assuming the form of—1st, a frothy bronchitic sputum *streaked* with blood; 2d, a rusty sputum very like that of pneumonia, but usually more abundant, more frothy, and less viscid; 3d, a deeply dyed purple or brownish-purple sputum, like the so-called “prune-juice” expectoration, characteristic of the third stage of pneumonia, and of certain forms of pulmonary hæmorrhagic condensation from valvular disease of the heart; 4th, any of the preceding, alternating with small discharges of pure, unmixed, but generally imperfectly coagulated blood. All of these forms of expectoration I have seen on several occasions; most of them occurred at different periods in the preceding case. In general, it may be remarked, that the bronchitic varieties of sputum, either stained or streaked in different proportions with blood, occur chiefly in tumours pressing directly on the trachea and larger bronchi, and not producing consolidation of any part of the lung; while the “prune-juice” sputum, and the varieties more truly resembling the expectoration of pneumonia, occur when the lung is directly involved in the tumour; or when by long-continued flattening of a bronchus, perhaps with extensive ulceration of its mucous membrane, and necrosis of its cartilages, secondary changes have been induced in the pulmonary texture. Such changes are rarely of the nature of inflammation, at least in the first instance. They partake more of the nature of collapse of the air-cells, which is some-

times the result of mere pressure on a bronchus, producing obstruction to the evacuation of the bronchial and pulmonary excretions; while occasionally we find a chronic and continuous infiltration of the lung with blood, either from the aneurismal sac through the bronchus, or from rupture of the aneurism directly into the pulmonary air-cells. The "lobular" character of these lesions is often very clearly demonstrable, and shows that they spring, not from inflammation proper, but from some derangement of the mechanism of the air-passages. In the more advanced stages, however, inflammatory changes are apt to occur; and I have repeatedly seen an entire lung, or some considerable portion of it, ulcerate and break up into suppurating cavities, under the continued pressure of an aneurism upon the bronchus. In one or two cases this has been attended with many of the symptoms and signs of tubercular ulceration, and the morbid appearances after death have also to a remarkable degree resembled those of softened tubercle; confined, however, absolutely to the side on which the aneurismal pressure took place. Possibly some of the cases alleged to be "aneurism associated with phthisis," may have been of this kind.

In systematic works, it is customary to ascribe the minor hæmorrhages to which I am now alluding, not to rupture of the sac, but to "congestion of the lung" from pressure on the veins, and consequent impediment to the return of blood. I am certainly not prepared to maintain that the pressure of aneurisms on the pulmonary veins never causes hæmorrhage. But that this is the chief cause of minor hæmorrhages cannot, I think, be admitted; 1st, because even in cases in which pressure on the veins may have occurred, hæmorrhage (at least continuous or repeated hæmorrhage) is almost always associated either with direct pressure of the sac upon the lung, or upon an ulcerated bronchus; 2dly, because some of the most characteristic cases I have observed of slight and continuous hæmorrhage have been from aneurisms in which no pressure on the pulmonary veins was possible; but in which there was undoubtedly pressure upon, and opening of the sac into, the trachea. I may refer in

particular to two cases of aneurism with laryngeal symptoms, which I recorded some years ago with a view chiefly to other points of interest, but in one of which the patient died of dyspnœa after weeks of constant though inconsiderable hæmorrhage; while in the other a fatal hæmorrhage occurred after many days of very slight tinging of the sputum. In both these cases there was no reasonable doubt, from the condition of the mucous membrane of the trachea, that the blood must have come from the sac.¹

While, therefore, I will not venture to say that blood in the discharges of a patient affected with aneurism *always* indicates the communication of the sac with a mucous membrane, I believe it *generally* does so; and more especially is this the case in aneurisms accompanied by hæmoptysis, if the pressure of the tumour be on the trachea, and if it be unaccompanied by the indications of pulmonary change. The importance of this view, if correct, both as regards the diagnosis of obscure cases of aneurism, and the prognosis of this disease in well-marked cases, it is unnecessary to point out at length. I may be permitted, however, to detain the Society over one view of diagnosis, which, if it be as generally applicable as my own experience would lead me to affirm, must be one of considerable importance. In aneurisms characterised chiefly or exclusively by laryngeal symptoms, it is often extremely difficult to arrive at a satisfactory conclusion as to the cause of the very distressing dyspnœa. Now, it is precisely in this class of cases that the repeated presence of even small quantities of blood in the sputum becomes a most valuable means of diagnosis. For, if there be laryngeal dyspnœa and stridulous respiration (which are seldom present to any marked extent in mere laryngeal phthisis); if the epiglottis be not thickened; if the mucous membrane of the larynx, in so far as it is within reach of the finger, be sound; and if, with these signs, positive and nega-

¹ See 'Monthly Journal of Medical Science,' vol. xiii, p. 137; and vol. xvi, p. 116.

tive, there be a persistent tendency to even the slightest amount of blood in the sputum, while auscultation and percussion give negative results both as regards the lungs and heart, I believe that aneurism may be predicated with as near an approach to certainty as is possible without the physical signs of tumour; and further, the aneurism will be small; it will arise from the back part of the arch, or from the commencement of the innominate artery; and it will be so placed as to entangle either the left or the right recurrent nerve. These considerations have more than once led me to the diagnosis of aneurism under circumstances where, without them, it would have been impossible to give a decided opinion; and hitherto they have not led me wrong. In fact, there is but one form of disease which, in any considerable number of instances, leads to laryngeal stridor and to hæmoptysis, without positive ulceration of the larynx. Malignant tumours very closely resemble aneurism in their diagnosis in these respects. But I have never yet seen malignant disease of the chest leading to hæmoptysis, without manifest physical signs of disease in one or other lung. So that I am inclined to believe that the rules of diagnosis mentioned above, will hold good in the great majority of instances.

A reference to a drawing¹ illustrating the usual mode of opening of an aneurism upon a mucous membrane may close this rather desultory paper. It is from the case of a man who died, not of hæmorrhage, but of suffocation; but in whom, nevertheless, an opening into the trachea existed, which had yielded blood in small quantities for some time before the fatal event. The rupture has been arrested by death at its earliest stage; and it will be observed that while five or six minute papillary eminences, with distinct pale apices on a congested membrane, are to be seen, only one of these has been perforated; the actual opening not exceeding

¹ This drawing was exhibited at the meeting of the Society at which this paper was read.

the size of a pinhole. The mucous membrane as viewed from within, opposite a necrosed cartilaginous ring, is puffy and thin ; and in all probability a larger rent would ere long have formed there. But it is very easy to understand on looking at this drawing, how these small pinhole openings should sometimes heal up ; especially after a sudden removal of pressure, such as occurs after a copious hæmorrhage. Such would appear to have been the course of events in the case of Mr. J. B—, and also in that of Mr. Liston ; as well as in the case of aneurism of the superior mesenteric artery referred to above.