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# CASE OF ANEURISM OF THE AORTA,

ARISING FROM THE BACK PART OF THE ARCH,

SIMULATING LARYNGEAL DISEASE, AND FATAL BY  
SUFFOCATION.

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*(Read to the Medico-Chirurgical Society of Edinburgh, 18th June 1851.)*

THE following case of aneurism of the aorta is interesting, 1st, from the absence of physical signs, and the prominence of the symptoms of a laryngeal affection; 2d, from the free communication of the sac with a mucous canal, without causing serious hemorrhage; 3d, from the termination of the disease by suffocation, and the remedial measures suggested by this termination. On these grounds I beg to lay it before the Medico-Chirurgical Society, along with a preparation showing the parts involved in the disease.

Thomas O'Brien, æt. 46, a robust labourer, was admitted into the hospital at the hour of visit on the 30th May 1851. He complained of great dyspnœa, which, in the recumbent posture, was so extreme as to threaten suffocation. The breathing was sonorous, with a distinctly stridulous character on inspiration. The countenance anxious and flushed; no fever or pain complained of. Expectoration considerable; the chest was examined as well as his state permitted, and revealed only slight bronchitic râles, the harsh laryngeal breathing being heard over all the bronchi. The voice was evidently produced with effort, scarcely husky, but having a somewhat muffled character; there was no tenderness over the larynx; the epiglottis and throat were natural. Shortly after his removal to a ward, the paroxysm subsided to some extent. I then learned that this was only an accidental exacerbation of a state which had existed for some months, and for which he had undergone active treatment. A blister was applied to the nape of the neck; and he was ordered ipecacuan wine ʒss every second hour.

On the 31st he had slept well; but the dyspnœa had returned in

the morning; at visit he was better, but not able to lie down. The chest was examined with more care; no abnormal percussion at any part; the respiratory murmur every where abundantly audible, and natural; some coarse mucous râle in both backs, and a few dry bronchial râles elsewhere; the sounds over the region of the heart and of the great vessels strictly normal. The pulse was hurried, but natural in character.

He continued in much the same state till June 4th; paroxysms of extremely difficult breathing occurring three or four times a-day, and lasting generally from twenty to thirty minutes. He expectorated daily from six to eight ounces of frothy mucus, tinged of a distinct rusty colour, with streaks of purple. Repeated examination of the lungs, however, showed that they admitted air abundantly in every part, and were free from every physical sign of disease. The treatment was not altered; the operation of tracheotomy was proposed, and, though urged as a certain means of relief from the paroxysms, was objected to in the strongest terms by the patient, who said he would rather die than submit to it.

On the morning of the 4th June, between 7 and 8 A.M., he had an attack of laryngeal suffocation of peculiar intensity, accompanied by dull pain in the lower part of the chest. He was seen by the resident clerk, and again refused the operation; he seemed to obtain relief by being supported in the erect position, and walking up and down the ward, friction being also applied to the front of the chest. Another paroxysm, not so severe, occurred in the afternoon. At half-past 7 P.M. there was a return of the paroxysm. He was seen at 8 o'clock, when he was livid and exhausted; he expressed a desire to be bled, and again refused to permit tracheotomy. At half-past 8 the dyspnoea was intense, the lividity of lips very great; the face generally pale; the skin covered with cold sweat. The operation was performed by the resident surgical clerk in attendance, but the patient was nearly asphyxiated before the tube was introduced. He continued after the operation to breathe slowly and at long intervals; the pulse continued perceptible for about ten minutes, but he did not rally, and died about a quarter of an hour after the tube was introduced. Artificial respiration was employed without effect. A small quantity of blood was lost during the operation, some of which entered the trachea, and was apparently expelled again with considerable force.

*Post-mortem examination, 6th July.*—The body unusually robust; post-mortem lividity considerable; rigor mortis well marked. No emaciation either of fat or muscle.

Pleuræ containing little fluid; adhesions at apex of right lung, corresponding to a few encysted cretaceous concretions, little larger than a barley-corn. A little emphysema in the anterior parts of both lungs, and slight collapse of the tissue posteriorly, otherwise they were healthy. The greatest bronchi had the mucous membrane slightly congested, and contained a considerable quantity of tough mucus and muco-purulent matter rather deeply tinged with blood; but nowhere any distinct coagula.

The heart weighed  $12\frac{1}{2}$  oz.; its muscular tissue much congested. On the aortic valves, which were quite competent, and not at all deformed, there were one or two very minute granulations, and a few similar ones on the inner membrane of the vessel near its origin. The other valves perfectly normal.

The thoracic aorta had its inner membrane throughout uneven and thickened, but with little distinct abnormal deposit. The arch presented no general dilatation; it was, however, slightly dilated upwards at the root of the innominate; and this vessel, as well as the origin of the right subclavian, was uniformly large relatively to the vessels on the opposite side. The two carotids were of equal size; but both of them, as well as the left subclavian, were very slightly expanded at their origin.

At the back part of the arch, half an inch below and between the origin of the innominate and left carotid, was an oval opening, through which a hazel nut might be passed lengthways. Its edges were tolerably smooth and rounded; and it was three-quarters occluded by a mass of firm granular coagulum, which passed from this opening into the aneurismal sac beyond. This was of the size of a walnut, and was situated between the aorta and the trachea, being adherent to the perichondrium of some of the tracheal rings; the sac was nearly full of laminated, decolorized coagula, with a little fluid blood.

The left recurrent nerve, emerging from below the aorta, passed immediately to the left of the sac, and rather behind it, being bent over it, and at one point almost imbedded in the thickened cellular tissue which surrounded it; at this point there were also one or two indurated lymphatic glands around the nerve, dark from carbonaceous deposit. The pneumogastric nerve on both sides, and the recurrent on the right, had their normal relations, excepting that the subclavian artery, where it was surrounded by the right recurrent, was, as before mentioned, somewhat dilated.

The tongue rather brown, and dry in front. Its root, and the fauces natural.

The epiglottis normal in size and form; its mucous membrane faintly rose-coloured on the posterior aspect, and displaying a somewhat granular surface, from prominence of the mucous follicles, especially in the neighbourhood of the arytenoid cartilages. Ventricles of larynx and vocal cords natural.

The cricoid cartilage and three upper tracheal rings divided by a perpendicular incision in the middle line.

The mucous membrane in the larynx and upper fourth of the trachea nearly natural in colour and appearance. Below this the mucous membrane presented rose-coloured vascularity, deepening towards the bifurcation, on the left side, into purple. The mucous membrane slightly granular throughout this injected part from hypertrophy of the follicles.

About an inch and a quarter above the bifurcation on the left side there was a circular opening, admitting readily a crow-quill, and

passing into the aneurismal sac before mentioned, which lay in contact with the outside of the costal cartilages.

Nearer the bifurcation there were three or four small points slightly elevated, and of an opaque yellowish colour, as if the mucous membrane were stretched over some abnormal deposit. The cartilages of the two tracheal rings immediately behind the opening were entirely separated from their perichondrium at the part opposite the aneurismal sac.

The abdominal viscera were congested as usual in asphyxiated persons, but had no other morbid appearance. The abdominal aorta was not so uneven internally as the thoracic, but presented more distinctly atheromatous opaque deposit in its inner membrane.

The first question which suggests itself in connection with this case is, *What was the cause of death?* On this point, I think, a consideration of the whole circumstances will leave no doubt that the patient died chiefly from laryngeal suffocation, induced by pressure of the sac on the recurrent nerve of the left side. The occurrence of suffocation from this cause is too well attested by numerous cases of aneurism and tumours of the chest now on record, to admit of reasonable doubt. The evidence adduced by Dr Hugh Ley upon this subject in his work on laryngismus stridulus, although certainly insufficient to establish his exclusive theory of that disease, is strongly confirmatory of the correctness of the views entertained nearly two centuries ago by Willis as to this source of death in some intra-thoracic tumours. The experiments of Legallois, and the far more elaborate and satisfactory ones of Dr John Reid, have demonstrated, in the most unquestionable manner, the production of laryngeal suffocation by various kinds of interference with the recurrent nerve on one or both sides of the neck. "From the experiments we have detailed," says Dr Reid, "it is apparent that severe dyspnœa, amounting to suffocation, may arise both from irritation and compression of the inferior laryngeal nerves, or the trunks of the pneumogastriæ. For when both, or *even one recurrent nerve*, was irritated, the arytenoid cartilages were approximated, so as in some cases to shut completely the superior aperture of the glottis."<sup>1</sup> Section of the vagi, also, according to Dr J. Reid, produced "sudden and violent attacks of dyspnœa, which generally went off in the course of a very few minutes, when they did not terminate in suffocation;" leaving, however, the animals liable to renewed paroxysms on the occasion of a violent struggle, or any exertion tending to hurry the respiration. It is unnecessary to enter into the physiological details and principles connected with these curious results; it is sufficient for the present purpose to observe, that they fully explain the numerous cases recorded in pathological and practical works from the time of Bonetus, in which tumours involving these nerves (in the great

<sup>1</sup> Physiological, Anatomical, and Pathological Researches, p. 120. See also pp. 167 and 272.

majority of cases aneurismal) have been shown to produce death by sudden orthopnœa, often independently of any pressure directly on the air-tubes. Indeed it is worthy of remark, that spasmodic dyspnœa is a cause of death in a very considerable proportion of cases of aneurism of the aorta.<sup>1</sup> It is sufficient to refer, in illustration of this point, to the cases by Drs Graham and Alison, communicated to the Edinburgh Medico-Chirurgical Society in 1835,<sup>2</sup> in which aneurisms of the aorta were accompanied by marked laryngeal dyspnœa from this cause, in Dr Graham's case altogether simulating a primary laryngeal affection; to a similar case under the care of Dr Todd,<sup>3</sup> in which the recurrent nerve of the left side, and all the muscles to which it was distributed, had undergone atrophy from the pressure of the tumour; to the case of aneurism of the innominata, detailed by Mr Lawrence,<sup>4</sup> in which death took place from suffocation, tracheotomy being proposed but not performed; and to several examples of this form of dyspnœa detailed in a paper by Dr Henderson,<sup>5</sup> and in the work of Dr Ley before referred to.<sup>6</sup> I shall only say farther, that the violent paroxysms of dyspnœa experienced by my patient on many occasions before they were actually fatal, the highly stridulous respiration, the difficulty he evidently had in producing vocal sounds, and their altered character, pointed unquestionably to the glottis as the source of his danger; and the absence of any physical signs or morbid appearances indicating serious pressure of the aneurism on the trachea render it not probable that death can be ascribed to this cause. There remains only one other possible cause of suffocation, and to this I am willing to allow its due influence. The exhaustion consequent upon the numerous attacks of dyspnœa during the last days of life evidently told severely upon his strength; and the considerable and increasing quantity of mucus in the bronchi must have been expectorated far less freely in the last hours of his existence. The accumulation of this mucus, which was found in the larger tubes after death, fully explains why the operation of tracheotomy performed *in articulo mortis*, was followed by so imperfect a result. It is worthy, however, of remark, that up to the last visit which I paid him, the evidence of obstruction in the bronchi continued to be not greater than in cases of very slight bronchitis, and fully warranted the idea, that the greater part of the mucus expectorated came from the upper part of the air-passages. This idea corresponded also with the morbid appearances in the dead body.

The muco-purulent matter found in the larger bronchi after death

<sup>1</sup> It may even be said that this symptom is rarely absent in those aneurisms which spring from the back part of the arch of the aorta. See Dr Greene's collection of cases of this kind in the Dublin Quarterly Journal, No. 3, new series; and Mr Crisp's table of aneurisms, Treatise on the Blood-vessels, p. 235; for numerous instances bearing on this point.

<sup>2</sup> Edin. Med. and Surg. Journal, vol. 43, p. 292, *et seq.*

<sup>3</sup> Lancet, June 1841, p. 400.

<sup>4</sup> Medico-Chirurgical Transactions, vol. vi.

<sup>5</sup> Monthly Journal of Med. Science, 1841, p. 10.

<sup>6</sup> On Laryngismus Stridulus, &c., p. 453, *et seq.*

was considerably more tinged with blood than that expectorated at any period during his fatal illness. But it is very doubtful whether this increased hemorrhage was from the sac; as I am told that a good deal of blood was drawn into the trachea during the operation. At all events, it is clear that hemorrhage was not connected with the fatal event, nor did it ever form a serious complication,—never amounting to more than was sufficient to give a purplish, and often only a rusty tinge to the expectoration.

With this absence of material hemorrhage, it is important to ask, *how long the communication of the sac with the trachea had existed before death?* The lungs having presented no symptom of disease, and being found after death free of all serious lesion, it is difficult to suppose that even the small quantity of blood in the sputa had any other source than the aneurism; and yet we have evidence that, if this be so, the opening must have continued for months, yielding only these small quantities, as the patient distinctly stated that he had at no time coughed up clots of blood. When we consider the nearly complete occlusion of the sac by coagula, this phenomenon will appear less difficult to understand; at all events, it is far from rare in the histories of aneurisms opening on mucous surfaces, and especially into the air-passages, to find, even after one serious hemorrhage has given evidence of a rupture of the sac, that the hemorrhage reduces itself to a very trifling amount, and sometimes is altogether suspended. The case of Mr Liston at once suggests itself as an illustration of this fact. In the only record published of the fatal illness of this distinguished member of our profession, it appears that the first hemorrhage was followed by a period of exemption from symptoms, and that when these recurred, it was in the form of a cough attended with expectoration, which was “difficult, small in quantity, and of a rusty colour;” no further material hemorrhage occurring till his death, which was from orthopnoea.<sup>1</sup> In the remarkable case of abdominal aneurism which I read to the Society last year,<sup>2</sup> it is more difficult, owing to the situation of the first opening into the duodenum, to judge of the amount of blood that may at different times have been ejected, and it is highly probable that some bleedings may have taken place unobserved; but it seems in every way probable that no considerable hemorrhage occurred during twenty-two months, from an aperture which had evacuated gallons of blood in a few days, and which was found very nearly, if not entirely, sealed up after death.

*Could the aneurism have been discovered during life?* On this point we have the following data;—no dull percussion, abnormal pulsation, or tremor at the upper sternum; no abnormal sound over the heart and great vessels in front or behind; normal and symmetrical percussion over the lungs in every part; no abnormal respiratory sound over the trachea in front or at the root of the lung be-

<sup>1</sup> Lancet, December 11th, 1847.

<sup>2</sup> Aneurism of the Superior Mesenteric artery opening into the duodenum, twenty-two months before death.—*Monthly Journal*, vol. x. 1850, p. 83.

hind; abundant and symmetrical respiratory murmur in both lungs and over every part of them, mixed with slight mucous râles behind, and a very little sonorous râle in front. These physical signs, in regard to which full and careful examination may be relied on, form the elements of a tolerably complete negative diagnosis of aneurism, the suspicion of which was certainly entertained at the second examination of the chest, but soon dismissed, the case being treated as one of laryngeal affection. Perhaps it is still doubtful if more than a bare guess could have been formed under the circumstances; but the event showed that the suspicion thus negatived by physical diagnosis was allowed too hastily to be driven from the mind by the apparently greater probability of an ulcerative lesion of the larynx and trachea; and during the short period he was under my care no time was given for considering the case in all possible points of view, especially as the indications of practice appeared sufficiently distinct. After a careful consideration of the diseased parts, however, I am led to think it probable that while no sure sign of aneurism of the aorta could have been made out, a very close and accurate examination at the root of the neck, and in the course of the arteries, *might possibly* have discovered the dilatation of the innominate and subclavian vessels. Circumstances which did not come to my knowledge till after the patient's death were also calculated to arouse suspicion. The long persistence even of a trifling amount of blood in the expectoration would certainly have justified the belief in something more than an ordinary ulceration in the larynx; and a pain which he is said to have suffered at one time at the upper part of the sternum, but which was not complained of during the last part of his illness, would have confirmed the diagnosis of some fault in the thoracic region. The absence of any marked tenderness on pressure over the larynx, and of swelling of the epiglottis, was calculated to attract, and did attract, attention from the first; but this negative circumstance was considered as outweighed by the rest of the evidence.

It is worth while to remark, although it is difficult to obtain any accurate data on the subject, that the combination of symptoms presented by this case may probably be expected not unfrequently to occur in chronic or acute ulceration of the laryngeal mucous membrane. Local pain and tenderness are by no means of constant occurrence in these cases; neither can alterations of the epiglottis and upper vocal cords be recognized in all cases, though some kind of local symptom will doubtless be accessible in the great majority. On the other hand, the presence of blood in the sputa, though of course a suspicious circumstance when long continued, is neither universally present in aneurism, nor always absent in laryngeal ulceration. I have lately seen a case almost precisely parallel to this one in every important feature, in which paroxysmal laryngeal dyspnoea, apparently very little under the influence of remedies, and accompanied for a considerable period by blood in the expectoration, is probably due to a primary laryngeal affection, of which the local



symptoms have lately become more distinct, while physical signs of aneurism remain, after repeated and careful examination, undiscoverable. If this man remains under observation for a sufficient length of time, it is probable that a more secure diagnosis may be formed; but at first it would have been impossible to act on an assured conviction either of thoracic or laryngeal disease, while the state of the patient has been, and continues such, as may render a recourse to tracheotomy an extremely necessary expedient for his security, or even his rescue from impending death.<sup>1</sup>

In reference to diagnosis, the practical conclusions which follow from the above remarks are no less evident than important. The mistake of an intra-thoracic tumour for a laryngeal affection is one of those accidents which has probably occurred in practice far more frequently than it has been accurately recorded; although a sufficient number of instances have been published to show that it may readily occur in the most careful hands, in the absence of stethoscopic examination. It cannot, therefore, be too strongly insisted on, that a physical examination of the chest should take place in all cases of supposed laryngeal disease. This is indeed an invariable rule with all careful practitioners, on many grounds; although it may be doubted whether the lungs and air-passages do not often too exclusively absorb attention in such examinations. But the present case, while it proves still more strongly that no amount of caution in the examination of the chest, and especially of the great vessels, is superfluous, also shows, I think, conclusively, that the absence of the physical signs of aneurism or tumour should not suffice to remove completely the suspicion that they may be concerned in the

<sup>1</sup> Since the above was published in the Monthly Journal, this case has terminated fatally by profuse hæmoptysis and consequent suffocation; the source of the symptoms having been shown on dissection to be an aneurism, arising at the back part of the innominate artery, and bursting into the lower third of the trachea. The aneurism pressed on the right recurrent nerve, which was flattened and involved in the sac, and the internal muscles of the larynx on the right side were slightly atrophied; the mucous membrane of the larynx, as in the case at the beginning of this paper, being nearly normal. The branches of the innominate were normal; the arch of the aorta not dilated; the heart 9½ ounces in weight, normal. The sac was nearly full of coagulum; and this circumstance, with its deep situation and projection backwards, must account for the absence of appreciable pulsation at the root of the neck, and of all the other physical signs, to which the expansion of a sac, the size of a large date, communicating with nearly the entire length of the innominate, would assuredly have given rise under any other conditions. The case forms a most instructive addition to the facts recorded in this and other papers on the diagnosis of aneurism. I may therefore state, that although not recorded in detail during life, it was most sedulously and accurately examined by three physicians, under the express suspicion of aneurism, and that every known physical sign of that disease was sought for in vain. The patient was likewise seen by a fourth physician, not of Edinburgh, but of large special experience in regard to affections of the throat and larynx, who unhesitatingly pronounced the epiglottis and neighbouring parts ulcerated and thickened,—a diagnosis which I am by no means prepared to justify, but which, with some slight redness of the mucous membrane, plainly enough discernible to every one concerned, gave a bias to the opinion expressed in the text.

affection of the larynx. It is obvious that the part of the aorta most apt to be affected in these cases is the middle or transverse portion of the arch, and particularly its posterior or inferior surface, where it is most removed from the possibility of physical diagnosis. It is also evident that a very small tumour in these situations is enough to give rise to all the symptoms of laryngeal obstruction. Dr Todd correctly remarked, in his clinical lecture upon the case above alluded to as having occurred under his care, that "most observers had attributed these symptoms (those of chronic laryngeal affection) to compression of the trachea and bronchi, and had overlooked the condition of the recurrent nerve." In the present case, as in that of Dr Todd, "there was the most ample evidence that the pressure upon that nerve occasioned the laryngeal distress."

With regard to the treatment of such cases, the present narrative seems also not devoid of instruction. Had an aneurism been discovered or strongly suspected in this case, it seems probable that general blood-letting, together with such remedies as would have contributed to control the heart's action, might have been pursued farther with advantage to the patient; whereas the chronic nature of the supposed laryngeal affection, and the active treatment to which he had already been subjected, were accepted as sufficient reasons for foregoing these remedies and trusting to blistering, ipecacuan, and the performance of tracheotomy. This operation was absolutely refused by the patient while he had sense and vigour, and the case accordingly adds one more to those in which the operation was performed too late to be of any service; but I think it is impossible not to admit that it would probably have prolonged life had it been performed at any period before the final agony, and that the patient's sufferings throughout his illness would have been greatly less severe had advantage been taken of one of the earliest threatening paroxysms of dyspnoea to place a tube in the trachea. In a clearly ascertained case of aortic aneurism, such a proceeding could of course only be proposed as a temporary relief from immediate and pressing danger; and even in this point of view it could only be prudently recommended after careful examination had ascertained the freedom of the lung and of the air-tubes from any considerable pressure; but under these circumstances, I should certainly not hesitate in offering to the patient the benefit, even though temporary, which this little operation is calculated to afford. Much less should I feel justified in withholding it, on the ground of the uncertainty of diagnosis, in cases like the present, where an obvious laryngeal spasm exists, the source of which cannot be discovered, but which is unconnected with any other ascertainable affection of the respiratory passages. For further remarks upon this subject, however, I beg to refer the reader to the following report of the debate on this paper in the Medico-Chirurgical Society.

CASE OF ANEURISM OF THE THORACIC AORTA, WITH OBSERVATIONS ON THE PROPRIETY OF PERFORMING TRACHEOTOMY IN SOME CASES OF ANEURISM.

*Dr W. T. Gairdner* read a case of aortic aneurism, which presented the following peculiarities :—The sac, about the size of a walnut, arose from the back part of the arch, which was but slightly dilated ; the tumour pressed upon the left recurrent nerve, and had in this way determined frequent attacks of orthopnoea, with laryngeal obstruction ; at the same time that there was no evidence nor appearance of serious pressure upon the air-passages. The aneurism had opened into the trachea, but without important hemorrhage ; nothing but a tinge of the expectoration had resulted, the sac being full of coagulum. There was no physical sign of the presence of a tumour, and the aneurism remained undiscovered till the patient's death, which occurred, not from hemorrhage, but from spasmodic suffocation. Tracheotomy was projected from the first, and repeatedly urged, but the patient would not submit to it until he was moribund, when accumulation in the bronchi had taken place to such an extent as to render it unavailing.

*Dr Gairdner* discussed several points in the pathology and diagnosis of this case, and concluded by observing that the state of the parts as found after death, fully justified the attempt to relieve the patient of his distressing symptoms by tracheotomy. He argued that there was distinct evidence of the frequent termination of aneurisms in this situation by spasmodic laryngeal suffocation ; and under such circumstances, if it was ascertained that the lower air-passages were tolerably free from impediment, he thought that tracheotomy was not only justifiable, but imperatively demanded as a means of prolonging life. That the operation of tracheotomy might have the effect of prolonging existence, even in aneurisms, more advanced, and circumstances far more desperate than the present, was proved by a case recorded in the *Lancet* for 1844, in which *Mr Judd* performed it upon a patient in articulo mortis, with the effect of prolonging life thirteen days, although a large aneurism of the aorta had been pressing upon, and had burst into the trachea, causing hemorrhage to the extent of thirteen ounces. And although few would be inclined to covet an opportunity of following this practice under the like circumstances, the case was instructive as pointing out how much might be done for the relief of those in whom the symptoms were chiefly or exclusively laryngeal. At all events, as the propriety of tracheotomy in aneurism was not, so far as he knew, formally recognised by any authority, and as in several well known works it appeared to be discouraged, or even viewed as unjustifiable, *Dr G.* had thought it his duty to lay the subject before the Society, with the view of eliciting the opinions of members present.

*Dr Sellar* thought that the presence of an aneurism should in general counter-indicate the operation. In this particular case, however, had *Dr G.* been allowed to act at an earlier period, the life of the patient would, in all probability, have been prolonged. But he repeated his conviction that tracheotomy, though justifiable in this case, was not applicable in cases of aneurism in general.

*Drs Keiller* and *Andrew*, who had had the care of the patient before *Dr Gairdner* took charge of the case, had detected no physical sign of aneurism, and quite concurred in the propriety of performing tracheotomy.

*Professor Miller* concurred in the main with the statements of *Dr Gairdner*, and thought that he had laid an important as well as interesting communication before the Society. Cases of aortic aneurism, with reference to the performance of tracheotomy, seemed to be divisible into two classes,—1. Those wherein the tumour was so circumstanced in situation and bulk as to compress the air-passage, narrowing its calibre, and producing a permanent obstruction to breathing. In those the dyspnoea would be continuous ; liable, it may be, to aggravations and remissions, but never wholly absent ; and, in most examples also, diagnosis both as to the existence of aneurism and of such mechanical interference with the air-passage, would not be very difficult to the experienced and careful observer. In such cases he would be inclined to refrain from operation, anticipating little or no benefit from it, even of a temporary kind ; and fearful lest, by obvious failure, the

department of operative surgery should be brought into discredit. Into this class the melancholy case of the late Mr Liston, alluded to by Dr G., evidently came; the windpipe compressed, the breathing continuously laborious, and no likelihood of satisfactory relief from artificial opening of the windpipe.

The case quoted by Dr G. from the *Lancet*, might seem to oppose this opinion. But he (Professor Miller) felt inclined to regard that case as quite an exceptional one. The man could breathe only through a small tube or catheter thrust down from the wound past the aneurismal swelling; and that tube—so small, so liable to displacement, so liable to obstruction, so certain to cause advance of ulceration in the part of the tumour on which it lay—seemed to him too miserable and slender a tenure of existence to warrant its being had recourse to with any hope of success. It was only surprising that through such a precarious access to the lungs, the man continued to live so long.

2. The second class included those cases in which the tumour, not so large as to compress and narrow the air-passage, is yet so circumstanced as to affect the larynx dangerously; as in Dr Gairdner's case, irritating or compressing the recurrent branch of the eighth nerve, so as to excite paroxysmal attacks of intense laryngeal dyspnoea, similar in their nature to those of laryngismus stridulus. These tumours, from their small size and deep locality, would be difficult of detection; and yet there were means, too, as Dr G. had shown, both positive and negative, by which their existence might be at least strongly suspected. And, under such circumstances, he (Professor M.) would have no hesitation in saying, as his own belief, that—provided the paroxysms of dyspnoea were such as to threaten instant extinction of life—he would have recourse to tracheotomy at a comparatively early period of the case, not waiting till the patient was in *articulo mortis*; and for the following reasons:—The operation in itself was not formidable, not difficult of performance, and not dangerous to life. By having recourse to it, he would relieve the patient at once from intense agony and suffering. Besides, at comparatively little cost, he would prolong existence—for hours, weeks, or months; and all well knew how vastly important even a comparatively short period of reprieve might be found to be under such circumstances. Further, it was not wholly utopian to suppose that such relief and prolongation of life might, in some rare cases, contribute towards the actual occurrence of spontaneous cure. In listening to the details of the post-mortem examination in Dr Gairdner's case, one could not fail to be struck with the near approach made in that case to cure. The small aneurism was almost entirely filled with clot, and the oval aperture by which it communicated with the aorta was almost wholly obstructed by a mass of fibrin. Very little more might have silenced the tumour. And that little might have been greatly contributed to by the relief of respiration afforded by tracheotomy timeously performed; while, on the other hand, the oft-recurring attacks of dyspnoea, with the attendant excitement and distress of the patient, could not fail not only to oppose all attempts at spontaneous cure, but also to hurry on the fatal advance of the tumour.

Hitherto his creed had been—(he had taught it in his class, and published it in his *System of Surgery*)—in regard to the performance of tracheotomy in connection with aortic aneurism, that the operation should not be had recourse to, the cause of the suffering being apparently beyond relief by tracheal wound. But now he was bound to say, that he saw reason to alter that opinion, and to hold that, while the rule of non-interference still held good in the first class of cases which he had specified, in the second there was not only a warrant but a call to operate, with the hope of certainly relieving suffering and prolonging life, and with the chance of even contributing towards the occurrence of spontaneous cure. There might be a third class of cases (as suggested by Dr Gairdner) in which pressure on the windpipe was slight, but yet with a certain degree of contraction of its calibre, and in which *paroxysmal* laryngeal dyspnoea was also urgent. In such circumstances he would hold that the latter part of the case, or major, would rule the former part, or minor; and that, therefore (more especially if urged to it by the patient), he would be inclined to operate, though, of course, with a less favourable prognosis than when no compression and contraction of the windpipe existed.

On the whole, he considered that Dr Gairdner had made an important contribution to practical surgery; extending its operative interference to a class of cases—few in number, doubtless, and not holding out much hope of permanent benefit—hitherto supposed by many to be excluded from its range. It was the province and duty of the surgeon, as well as the physician, to palliate by every reasonable means where he cannot cure; and if unable to save life, at least to protract and soothe its closing day.

After some remarks by Dr D. Maclagan, Dr W. T. Gairdner said that he had alluded to Mr Liston's case as conclusively showing that an aneurism of the aortic arch might remain without physical signs, or at all events, might present an extremely obscure diagnosis, up to a period when it had threatened life by one or other of its secondary accidents. The present case, as well as others, proved that spasmodic dyspnoea, a frequent cause of death in aneurism in this situation, might occur and prove fatal while the air-passages were exempt from pressure; and while the larynx, involved through its nerves, was the sole cause of dangerous symptoms. In such a case, the practitioner was surely not warranted in making the probable or certain fatality of the disease an excuse for non-interference, especially when the operation was one not in itself dangerous, and almost certain to secure to the patient not only a comparative immunity from distressing symptoms, but a longer lease of life and a slower progress of his disease. Nothing was more likely to accelerate the increase and fatal result of an aneurismal tumour, than the violent inspiratory and other effects which accompanied the paroxysms of stridulous breathing in these cases; and if these paroxysms could be entirely removed in many cases of aneurism by so simple a proceeding as tracheotomy, it would surely be allowed that this operation presented a fair claim to be admitted into the legitimate treatment of such cases; and to be resorted to, not unwillingly and as a last resource, but *as early as it could be ascertained that laryngeal symptoms were the source of the more immediate danger.* No doubt the operation became less and less eligible in proportion as *other* sources of danger became imminent; but so long as these did not reduce the laryngeal symptoms to a manifestly secondary importance, Dr G. did not feel that he would be justified in refusing to a *willing* patient, *after due explanation*, the chance of life and comparative comfort for an additional day or hour. The amount of pressure of an aneurism on the air-passages could always be estimated by careful stethoscopic examination with considerable precision; and though other sources of danger might remain unknown, this fact ought not to be made an argument against interference for the removal of the palpable and imminent hazard. And if these rules of conduct were sound when an aneurism was *known* to exist, they were all the more evidently so in the case where such a tumour was only suspected, or where, as in the present case, the suspicion had been allowed on the strength of negative evidence, to drop too hastily from the mind.

An authority so justly and so universally known as Dr Watson, had stated that no man with a stethoscope in his hand, and the power to use it properly, ought to be seduced into the error of performing tracheotomy in a case of aortic aneurism. If the principles adopted by him (Dr G.) were correct, there was here an opinion extremely calculated to mislead; and no doubt there were many physicians who would be alarmed at the idea of opening the trachea, not for a laryngeal, but for a thoracic disease. For his own part, Dr G. had no desire to screen himself from criticism, if it was thought that by any reasonable precaution, a correct and secure diagnosis might have been formed in the present case; but on general, and not on personal, grounds, he thought that a different bias ought to be given to the practical precepts current on this subject, and that practitioners should neither be taught to be too sure of the diagnosis of thoracic aneurisms, nor too apprehensive of the performance of tracheotomy.