

**Four cases illustrating the injuries to which the aortic valves are liable during muscular efforts / by Richard Quain.**

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# FOUR CASES

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ILLUSTRATING THE

INJURIES TO WHICH THE AORTIC VALVES ARE LIABLE

DURING

MUSCULAR EFFORTS.

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## CASES.

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CASE 1. *Separation from the Aorta of the United Attachments of Two of the Aortic Valves. Signs of Regurgitation and Hypertrophy. Death.*—A music smith, twenty-six years of age, had always enjoyed good health, and had been accustomed to work hard; he had never had rheumatism, palpitation of the heart, or shortness of breathing. In August 1843, he one day observed a workman in his employment working indolently with a sledge. Annoyed at this, and using some expression of censure, he wrested the implement from the man, and commenced working vigorously with it himself. After giving a few blows, he was suddenly seized with a most distressing sensation in the region of the heart, which compelled him to cease his efforts at the moment. He retired to his apartment faint, unable to make an effort, feeling “an uneasy shaking of the heart,” suffering from shortness of breath, and hearing a peculiar noise “up his chest, and neck, and in his ears.” This noise prevented him that night, and subsequently, from sleeping. He was seen by a medical gentleman, who prescribed some medicine for him—he continued at light work for a week, when, getting worse, he came under my care. He was first seen by Mr Mercer, who, during a temporary absence, was doing duty for me at the hospital, and this gentleman immediately concluded that some injury had occurred to the aortic valves. In a day or two I saw him. He then complained of the uneasy sensation in the region of the heart, and of its palpitation. His breathing was short, and he was unable to make any effort; on lying down he still heard the noise; he felt a throbbing in the neck, and in any part on which he rested. There were then very distinct evidences of imperfection of the aortic valves: in the situation of those valves, and replacing their sound, was heard a loud ringing musical murmur—the first sound was also accompanied by a murmur in the same situation, but much less loud: there was present the peculiar diastolic or regurgitant pulse. Leeches were applied to the region of the heart, and some sedatives administered with slight advantage.



In five weeks from the date of the accident, it is noticed that "there are now very evident signs of enlargement of the heart. The dulness over it and its impulse are extended, and the force of the latter is increased. The murmur is so loud that it can be heard at several inches distance from the aural end of the stethoscope, and the diastolic pulse is so marked as to give a very peculiar appearance to the course of the superficial arteries."

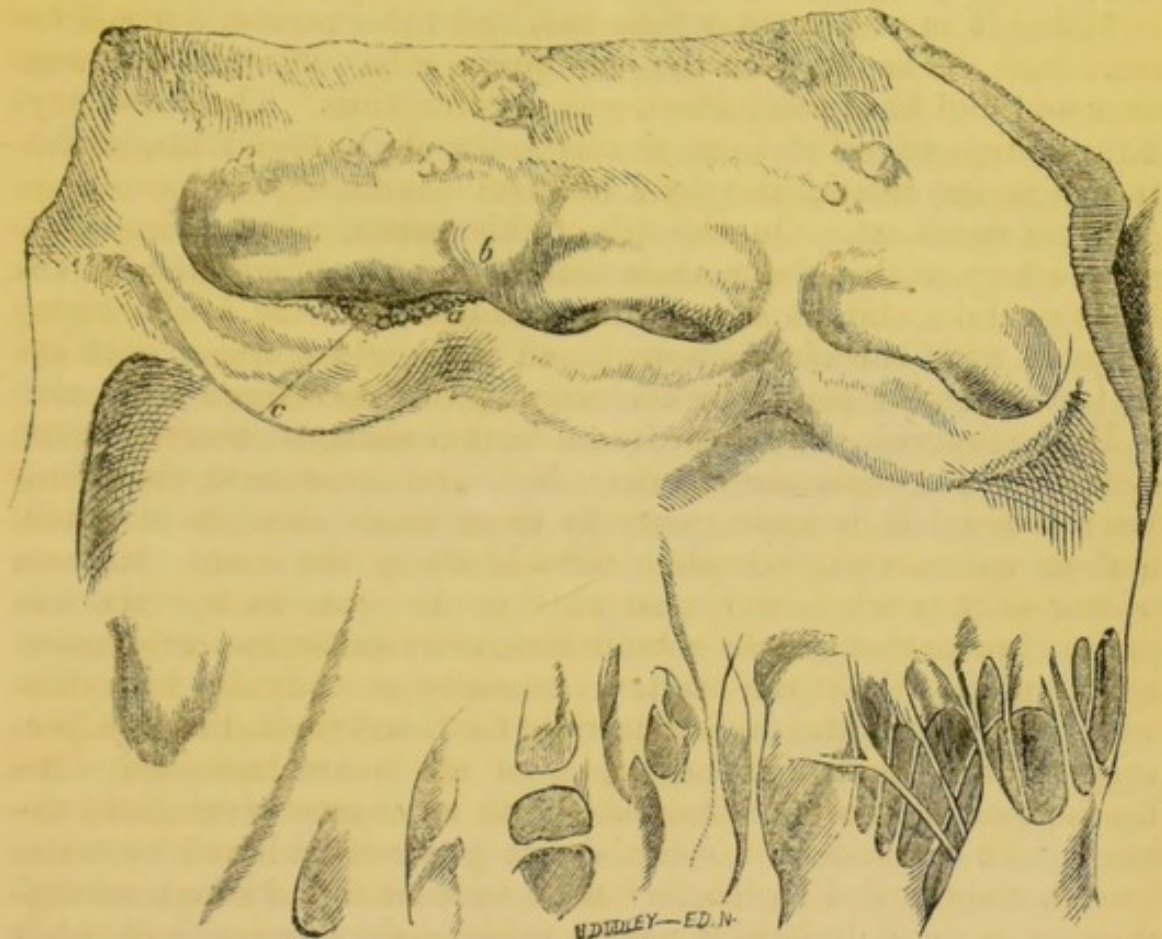
In January 1844, four months from the date of the accident, it is stated in my notes, that "he has, up to this period, derived benefit from the use of a mixture containing ether, digitalis and prussic acid; but he is now suffering from bronchitis." In a few days he experienced relief from the latter by the internal administration of tartar emetic, and by a liniment containing croton oil, applied on the chest. On the 9th of this month, when trying to do some heavy work, he was again made conscious of a change in the heart's action, and, on seeing him, I found that the loud ringing murmur with the second sound, and the slight murmur with the first, were both replaced by the ordinary double bellows murmur.

In the progress of this case, some further changes occurred in the symptoms and signs already described, and some fresh symptoms were added. It is unnecessary to trace those changes in detail, and an epitome will complete the history of the case. He was occasionally much better, and able to do some work. He was subject to repeated attacks of bronchitis, of dyspnœa, and orthopnœa; he had palpitation of the heart, occasionally gastrodynia; his symptoms were aggravated by indigestible food, and he had angina pectoris. The signs of hypertrophy of the heart increased; the loudness of the murmur diminished, but its character remained the same. The attacks of bronchitis were generally relieved by tartar emetic, combined with lobelia inflata, by leeches and counter-irritations; ether and digitalis generally relieved the dyspnœa and palpitation. Finally, in July 1845, after nearly two years' suffering, the attacks of dyspnœa became more frequent, his legs became anasarcous, he lost flesh, suffered more severely from the pain and palpitation; the urine was occasionally albuminous. The physical signs were nearly as before, regurgitation through the jugular veins being now very evident; and on the 10th August he died suddenly in one of his attacks of dyspnœa.

On a post-mortem examination, the chest being opened, the heart, enveloped in the pericardium, was found to have encroached much on the situation of the inferior lobe of the left lung. There were traces of old disease of the apices of the lungs; the bronchi were thickened, and the mucous membrane congested. All the cavities of the heart were enlarged and filled with blood. The arch of the aorta was somewhat dilated. The heart weighed  $22\frac{1}{2}$  oz. The chief disease was found at the entrance of the aorta; here it was noticed that the conjoined attachments of two of the valves to the aorta had been separated from the wall of that vessel, and thus



those valves were allowed to drop below the level of the third, which retained its connexions. In the drawing, *a* indicates the junction between the valves, *b* is the point at which the separation has taken place; here the wall of the vessel was raised into a superficial elevation about one-third of an inch in length and one-fourth of an inch across. The margin of one of the valves was everted slightly, and studded with small granulations, represented at *c*. It seemed as if



*The Wood Cut represents the Conjoined Attachment of Two of the Aortic Valves, torn (at b) from the Valves of the vessel.*

a small strip of the living membrane had been torn off at this point. On trying the valves with water before the vessel was cut open, they were found to be quite inefficient; not so the pulmonary. The liver was much enlarged, extending as far as the umbilicus; the stomach was healthy; the kidneys were congested, and irregularly mottled.

My object in the present communication being rather to illustrate the origin of this and similar lesions, than to enter on the general history of regurgitant valvular disease, its progress, its symptoms, or treatment, I shall refer but briefly to the facts in the above history which are connected with those points.

*First*, may be noticed the rapidity with which the hypertrophy occurred; in five weeks it was very decided.

*Secondly*, The great extent of the hypertrophy; the heart being increased to nearly three times its ordinary volume. A condition



which will explain the improvement which occurred in the patient's symptoms. The increased muscular power of the heart overcoming in some degree the insufficiency of its valves.

*Thirdly*, The proneness to bronchitis which the patient exhibited—a consequence of the irregularity in the circulation.

*Fourthly*, The fact of the patient himself being conscious of the morbid sound, and of its change during the progress of the case (on whatever this change depended) is curious.

*Fifthly*, The treatment which relieved the bronchitis has been mentioned. The effect on the palpitation of a mixture, containing ether and digitalis in full doses, was very striking. The frequency of the heart's action was apparently subdued by the latter, whilst its energy was increased by the former.

In reference more immediately to the nature of the injury, it may be argued that the pathological appearances were the result of congenital malformation—two valves being present in the place of three; or of chronic disease. Such suppositions are refuted by the history of the case, which clearly assigns the period when the accident occurred, and antecedent to this there were no symptoms of either malformation or disease. Moreover, in cases in which but two valves exist, they are generally so arranged as to be effective in their action, and then the traces of three valves are never so evident as they were in this case. Were the present appearances due to chronic disease, we should find some induration or deposit as its result. The post-mortem appearances coincide with the opinion formed in the first instance, and entertained through the progress of the case, viz. that the aortic valves had sustained, during the excited efforts of the individual, an injury which had rendered them insufficient. When the case presented itself to notice, I was unable to find the history of any similar to it, though several of lesion of the mitral valve were recorded, and I believed the case to be little more than a pathological curiosity. Subsequent experience has however shown me that this impression was wrong, and that such cases do occur with sufficient frequency to render a record of them necessary. Dr Williams, whose extensive opportunities of observation in these diseases, could not fail to have brought them under his notice if this were so, has shown me some drawings which very much resemble that which is here presented, and he is confident that the origin of the lesion represented by them, and in some other cases remembered by him, may be traced to a cause similar to the above. In connexion with this opinion, the following cases in outline will be interesting.

CASE II.—*Separation of the Convex Margin of one of the Aortic Valves from the Aorta—Signs of Regurgitation—Hypertrophy—Death.*—A porter, resident in Paris, when in good health, endeavoured, in a state of excitement, to force open with his shoulder a door which had been closed against him. He too, as the smith,



was seized at the moment with an oppressive sensation in his chest, and when examined with the stethoscope, the aortic valves were found to be imperfect. His breathing became embarrassed, his heart hypertrophied, and his body anasarcaous. He died in about eighteen months from the date of the accident. The imperfection of the aortic valves was found to depend on the convex (inferior) margin of one of them being torn from its attachments, resembling thus a pocket which had been ripped or torn at the end. The heart was much hypertrophied. For the facts of this case I am indebted to Dr Jones Quain.

CASE III.—*Signs of Regurgitant Disease in the Aortic Valves—Hypertrophy—Anasarca.*—This case came under my own notice, and the patient still lives. He is a carpenter, fifty-four years of age, and accustomed, until the date of this accident, to work hard.

He had met with several severe injuries, but never had rheumatism, nor any disease of the heart of which he was aware. About five months before this history was taken, he was one day engaged in carrying timber on his back across a yard. He had carried several loads, when, arriving at the last, it was made much heavier than any which preceded it. He carried it, however, to its destination, and whilst in the act of stooping to admit of its removal, he was suddenly seized with a severe pain or stitch in the region of the heart, and by it he was compelled to let fall his load. Palpitation of the heart and shortness of breathing commenced at the same time; and at night on lying down, he heard a noise which has since then distressed him. Orthopnoea, ascites, and anasarca were subsequent events for which he was treated. The latter symptoms had been relieved when I saw him. He then complained of dyspnoea, cough, palpitation of the heart, and of inability to do any work. He could not lie down in bed. He presented such well marked signs of imperfection in the aortic valves, and of hypertrophy of the heart, that it will not be uninteresting to extract the record which I took of them. "Both sides of the chest are equal in circumference, showing therefore an increase of the left. The apex of the heart is *seen* and *felt* to beat below the seventh rib. The motion has an undulatory appearance. The strength of the impulse is not proportioned to its extent; a distinct vibratile thrill is *felt* over the entire region of the heart, also over the right carotid and subclavian, but to a much less degree in the left. The diastolic pulse is seen and felt. On *percussion*, dulness in the region of the heart is found to extend upwards from the seventh rib, in a line with the right shoulder, 5 inches; vertically from the third costal cartilage,  $3\frac{3}{4}$  inches; and directly across the centre of the heart,  $3\frac{1}{4}$  inches. By *auscultation*, the second sound is not heard, but its place is taken by a loud musical murmur, which is heard all over the chest, but most distinctly at its upper part, and over the base of the heart. There



is also a murmur, but much less loud with the first sound ; it is heard in the same situation, but more distinctly in the carotids than that with the second." His urine was slightly albuminous.

He was cupped on the region of the heart ; he had small doses of blue pill and sedatives given him. He was so far relieved after a few weeks by this treatment, that he was then enabled to lie down, and even to use when he required it, slight exertion.

CASE IV. *Separation of the united attachment of two Valves from the Aorta—Signs of Imperfection—Hypertrophy—Death.*—The particulars of this case have been given to me by Dr Bence Jones, and the appearances which he has sketched very much resemble those represented above. In abstract the case is as follows :—A stableman, 26 years of age, who never had rheumatism, was admitted into St George's Hospital for palpitation of the heart, which had commenced twelve months previously. At the time it began he was running by the side of a horse, which he was exhibiting for sale. He had on admission cough, dyspnœa, and orthopnœa ; he had also the physical signs of great hypertrophy of the heart, together with a murmur heard at its base, and no second sound, phenomena, indicating disease and imperfection of the aortic valves. He became anasarcaous, and died in about two months from the date of his admission. After death, the heart was found enormously hypertrophied. The mitral valves were healthy, the aortic valves were slightly thickened. Two of the valves had the septum between them broken down, both being formed into one irregular pouch. Atheromatous deposit was present in the ascending aorta and in the arch of that vessel. The liver was very large. Kidneys and spleen healthy.

The conclusions which the cases related enable us to arrive at are :

1. That the valves placed at the entrance of the aorta are liable, during muscular efforts, to serious injuries.
2. That those injuries seem to occur when the heart is acting vigorously under excitement.
3. That they are not necessarily immediately fatal, but that this will probably be the result in from twelve months to two years, when the lesion is such as to interfere materially with the function of the valves.
4. That the symptoms, signs, and effects of this lesion resemble those produced by disease of the valves.

*London, October 1846.*

*Note.*—Since this article has been in type, the second volume of Dr Latham's book on Diseases of the Heart has appeared. It contains the particulars of Dr Jones' case, and some valuable observations on the nature of the injury here described.





