A case of patent ductus arteriosus, attended with a peculiar diastolic murmur / by C. Hilton Fagge, M.D.

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A CASE

OF

PATENT DUCTUS ARTERIOSUS,

ATTENDED WITH

A PECULIAR DIASTOLIC MURMUR.

By C. HILTON FAGGE, M.D.

In the last volume but one of these Reports, in a paper on the subject of mitral stenosis, I described a case which had been under my observation in which a murmur was audible entirely different in character from any bruit that I had ever before heard. Two views as to its cause suggested themselves to my mind—one that it was due to a communication between the aorta and the pulmonary artery; the other, that it was a modification of an auricular systolic murmur. The patient had left the hospital when my paper was written, and there seemed but little probability of my being able to ascertain which of these views was correct. Within the past year, however, she has been readmitted, and has died, and on post-mortem examination it has been found that the only lesion to which the peculiar bruit could be attributed was a patent ductus arteriosus. The case appears to me to be of sufficient interest to justify my reprinting from my previous paper the detailed account of the murmur which was heard when she was before admitted into the hospital (op. cit., pp. 326 et seq.).

"Harriet H—, æt. 42, was admitted into the clinical ward under the care of Dr. Fagge, July 3rd, 1869. She has never

had rheumatic fever. She has had four children and was confined six months since; after her confinement her abdomen gradually began to swell. For the last six weeks she has not been out of bed. Her breath has been very short, and she has had a bad cough and has spat blood and matter. Her breath is better now, but she has not been able to lie down during the last few nights.

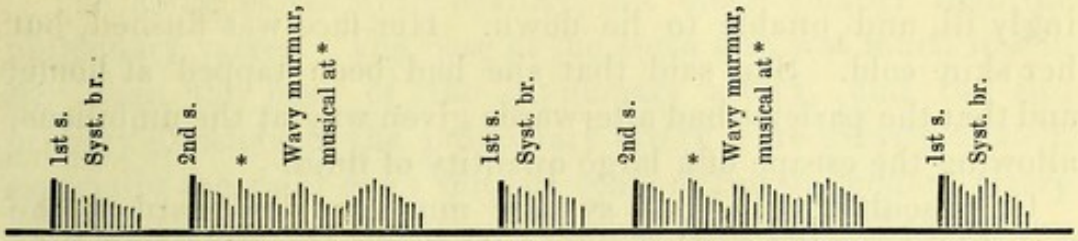
"The enlargement of the abdomen is principally in the antero-posterior diameter, but there is a little lateral bulging. There is resonance on percussion from above to within three inches of the umbilicus; below this and in the loins the percussion note is dull. Fluctuation is distinct in all directions.

"The pulse is extremely slow, 34 when first counted, 43 when the report of her present condition was being taken. The heart's impulse is widely diffused. Even the sternum is slightly raised by it, and it can be plainly felt even to the right of that bone. It also reaches externally to the left nipple. The most definite 'apex beat' is situate between the fifth and sixth ribs. Here there is a distinct drawback, and at times, I think, a feeble subsequent pulsation can be felt following the first.

"The systolic murmur appears loudest and most blowing between the fourth and fifth costal cartilages, near the sternum; its intensity diminishes both towards the axilla and towards the ensiform cartilage.

"Below the fifth rib the second sound, although rather thick and like a 'thud,' is not followed by any murmur. But above this region it is followed by a most remarkable wavy bruit. This wavy bruit is, and always has been, loudest about the second left costal cartilage, close to the sternum, and it has at this spot a musical quality, almost wanting elsewhere. Here, also, I think that there is no interval between the second sound and the bruit; but lower down there is an interval, the bruit seeming to belong to a distinct movement of the heart or of some large vessel during the pause.

"The rhythm of the heart-sounds at the base may be best indicated by the accompanying diagram.



"It will be observed that the peculiar features in this case were extreme slowness of the pulse, and the presence of a wavy, partly musical murmur audible at the second left costal cartilage, extending considerably to the left of the sternum along the cartilage, not carried along the sternum downwards, following the second sound, but not everywhere continuous with it, separated from the next first sound by a considerable interval. It occurred, therefore, during the diastole, at a time when the whole of the heart is naturally at rest, and yet it gave one the impression of being produced by the tumbling, rolling movement of some part of the organ.

"Two views suggested themselves at the time as possible explanations of this remarkable bruit.

"Firstly, it appeared to be conceivable that, supposing an opening to exist between the aorta and the pulmonary artery, the recoil might cause a higher pressure in the one than in the other vessel, and so a flow of blood through the opening, producing a bruit.

"Secondly, it appeared possible that the case might be one of contracted mitral orifice, and that the basic murmur might be due to the systole of an hypertrophied auricular appendix, occurring so early that it seemed to follow a second sound rather than to precede the next first sound.

"In favour of this last view it was noted that occasionally a slight second beat seemed to be discoverable at the apex. One could explain this by supposing it to be due to the flow of blood through a narrowed mitral, impinging on the point of the left ventricle; it would have been unintelligible on the other hypothesis.

"Opposed to the view that the case was one of contraction of the mitral orifice was the fact that no presystolic murmur was ever audible."

On February 28th, 1872, the same patient was readmitted into the hospital under the care of Dr. Wilks. She was exceed-

ingly ill, and unable to lie down. Her face was flushed, but her skin cold. She said that she had been tapped at home, and that the parietes had afterwards given way at the umbilicus, allowing the escape of a large quantity of fluid.

On auscultation a loud systolic murmur was heard at the heart's apex. I listened very carefully for the peculiar bruit at the apex, but, if audible at all, it was exceedingly faint, and certainly no unusual sound would have been noticed if attention had not been specially directed to it. The heart's pulsations were still only forty in the minute.

Very few notes of her case were taken during the fortnight that intervened between her admission and her death. On March 2nd it is recorded that four punctures were made in the thighs. On the 7th the pulse was 48 per minute. On the 8th she was almost pulseless, her face and lips were purple.

She died on March 13th.

I made a post-mortem examination on the following day (March 14th).

The body was moderately emaciated ; there was considerable œdema of the legs, with inflammation of the skin.

The head was not examined.

The right pleural sac contained much fluid of a straw-yellow colour. The lower lobe of the right lung was compressed and airless. The bronchial tubes in both lungs were reddened, containing much mucus.

The heart weighed twenty-two and a half ounces. Its apex was rather rounded. The left ventricle was dilated and hypertrophied (a condition ascribed to the renal disease which was afterwards found), and the right ventricle likewise in apparently about equal proportion. The right auricle was greatly more dilated than the left, its appendix was opened out, and its enlargement might fairly be said to be extreme. The endocardium of the right auricle was opaque. The foramen ovale was closed. The tricuspid orifice was much enlarged, admitting five or six fingers. The muscular substance of the right ventricle was hard and tough.

The mitral valve allowed four fingers to pass its orifice. In the endocardium of the left ventricle, about the musculi papillares and elsewhere, there were numerous yellow opaque patches, but the muscular substance was healthy.

The aortic valves were healthy, but much smaller than the pulmonary valves. The base of the aorta also was much less in size than the base of the pulmonary artery, and the two primary divisions of the pulmonary artery were greatly dilated, especially the right one; but the coats of the pulmonary artery were apparently not thickened, bearing their natural proportion to those of the aorta.

The ductus arteriosus was patent, allowing a 6 or 7 catheter to pass through it. It formed a short canal, communicating with the aorta by a somewhat oblique opening. (See Plate.)

The peritoneal cavity was divided into a number of distinct chambers by adhesions. Thus, there was one above the transverse colon, another in the centre of the abdomen, and a third in the right loin—all quite distinct from one another. There were also numerous adhesions, which formed more partial septa. The mesentery was much contracted, and the intestines were matted together. (It may, perhaps, be doubted whether the peritonitis which led to these changes was set up by the operation of paracentesis; but, on the other hand, it is to be remarked that when she was first admitted into the hospital the physical signs presented by the abdomen were such as to suggest the opinion that the abdominal enlargement was due to some form of "encysted dropsy.")

The liver weighed sixty-four ounces. Its capsule was greatly thickened and opaque. The gall-bladder wss thickened and narrowed, so as to be hidden from view beneath the opaque capsule. The whole liver was rounded and deformed. On section the hepatic veins were intensely congested.

The spleen was firm and hard; it weighed eleven ounces.

The kidneys weighed eleven and a half ounces. The cortex was granular on the surface, and much narrowed. There were numerous cysts.

The uterus was healthy, but its mucous membrane stained with blood.

When discussing, at the bedside of the patient, the cause of the remarkable bruit which was heard during her stay in the hospital in 1869, I often used to refer to the well-known case in which Dr. Wade, of Birmingham, correctly diagnosed the exist-

ence of a communication between an aortic aneurism and the pulmonary artery. And after the autopsy, when a communication between the aorta and the pulmonary artery had been found in the case of H. H—, I turned again to the forty-fourth vol. of the 'Med.-Chir. Trans.' to see how nearly Dr. Wade's case and my own might resemble one another. The following is Dr. Wade's description of the bruit which he heard:

"On the cartilage of the fourth left rib two loud murmurs were heard, instead of the usual cardiac sounds, that with the second sound being of a hissing character, and so prolonged as to continue till the commencement of the next ventricular systole. At this same spot a very considerable purring tremor accompanied the second murmur. The first murmur was of a loud bellows character. Both murmurs were audible as high as the bifurcation of the common carotids, in the back, and over all the upper part of the chest; they did not seem to be peculiarly propagated towards the left subclavicular space. At the apex of the heart a single murmur only was to be heard, and this evidently attended, or rather replaced, the cardiac first sound; it could be heard easily down to the ensiform cartilage. At the apex the cardiac second sound was very distinct and quite natural; no trace of murmur."

It thus appears that no very exact correspondence existed between the auscultatory sounds observed in the two cases, nor, indeed, could any exact correspondence have been looked for, since the causes of the communication between the aorta and pulmonary artery were so different. In the one (Dr. Wade's) case there was an aneurism, the size of a hen's egg, between the vessels, and the stream of the blood entering the pulmonary artery was directed somewhat horizontally and to the left. In my case the blood flowed through a patent ductus arteriosus, and therefore downwards and to the right.

But it is nevertheless true that in their main features the bruit heard by Dr. Wade and that observed by myself resembled one another; they were both diastolic in rhythm, prolonged nearly to the commencement of the next cardiac systole, and entirely inaudible at the apex of the heart.[1]

[1] Dr. Hughes Bennett has also recorded a case of aneurism of the aorta communicating with the pulmonary artery, in which a double murmur was heard at

It may be added that my case resembled Dr. Wade's in another feature, on which he rightly laid considerable stress in forming his diagnosis. The liver was enlarged, and there was evidence pointing to hepatic engorgement (in Dr. Wade's case hæmorrhoids, in mine ascites), while the lungs were comparatively free from congestion. Such symptoms certainly favoured the inference that the blood passed across from the left to the right side of the heart, without traversing the pulmonary capillaries. But it is to be borne in mind that in my case the peritoneal effusion presented some peculiar physical signs which made it doubtful whether the fluid was not encysted, and the effusion, therefore, of local origin.

Very few cases are on record in which a persistent ductus arteriosus has been believed to have given rise to a murmur. In the first volume of the 'Pathological Transactions' (p. 55) a case is recorded by Dr. Babington, in which the late Mr. Wilkinson King had diagnosticated "patescence of the ductus arteriosus," and in which a communication was found after death to exist between the aorta and the pulmonary artery in the position of the duct. The grounds of Mr. King's diagnosis are unfortunately not stated, but it could hardly have rested on any auscultatory peculiarities, for the two loud murmurs which were heard over the whole præcordial region were evidently due to coexisting disease of the aortic valves. This case is the only one mentioned by Dr. Walshe.[1]

In the 'Prager Vierteljahrsschrift' for 1862 a case is recorded by Kaulich from the clinique of Professor Jaksch, in which there was a murmur which seems to have been very similar to that heard in the case forming the subject of this paper. It is described as a prolonged diastolic rasping murmur (Feilengeräusch), most intense above the third rib. There was also a systolic murmur at the same spot. Over the ventricles, along the aorta, and also over the pulmonary artery, a sharp second sound was heard. On post-mortem examination the foramen

the base of the heart, while the second sound was clear and healthy. The sounds were regarded as "exceedingly puzzling," but the real nature of the disease was not suspected during life. ('Princ. and Pract. of Med.,' 3rd edition, p. 595.)

[1] 'A Practical Treatise on the Diseases of the Heart and Great Vessels,' 1862, p. 538.

ovale was patent, as well as the ductus arteriosus, but it appears probable that the diastolic murmur was produced in the latter. No diagnosis was made during life, although (according to Kaulich) the position and character of the murmurs justified an expectation that the pulmonary valves would be found diseased.

Other instances have been recorded by Schnitzler, from Oppolzer's practice ('Wien. Med. Halle,' 1864, v, 10; 'Schmidt's Jahrbücher,' cxxiii, p. 44), and by Skoda; but apparently without any details that would aid in the recognition of future cases.

DESCRIPTION OF PLATE

Illustrating Dr. Hilton Fagge's paper on a Case of Patent Ductus Arteriosus.

Fig. 1 represents the anterior surface of the heart, with an incision into the right ventricle. The aorta is also laid open, so as to show a probe passing into it from the pulmonary artery.

a is the cavity of the right ventricle.
b is the pulmonary artery.
c is the aorta.

„ 2 represents the base of the pulmonary artery and a portion of the aorta, the latter being turned back, so as to show the ductus arteriosus, through which the probe is still seen passing.

b is the pulmonary artery.
c is the aorta.
d is the right branch of the pulmonary artery.
e is the left „ „

„ 3 represents, more exactly than fig. 1, the form and relative size of the opening by which the ductus arteriosus communicates with the interior of the aorta.

All the figures are considerably reduced in size.

The preparation is preserved in the Museum of Guy's Hospital.

Fig. 1.

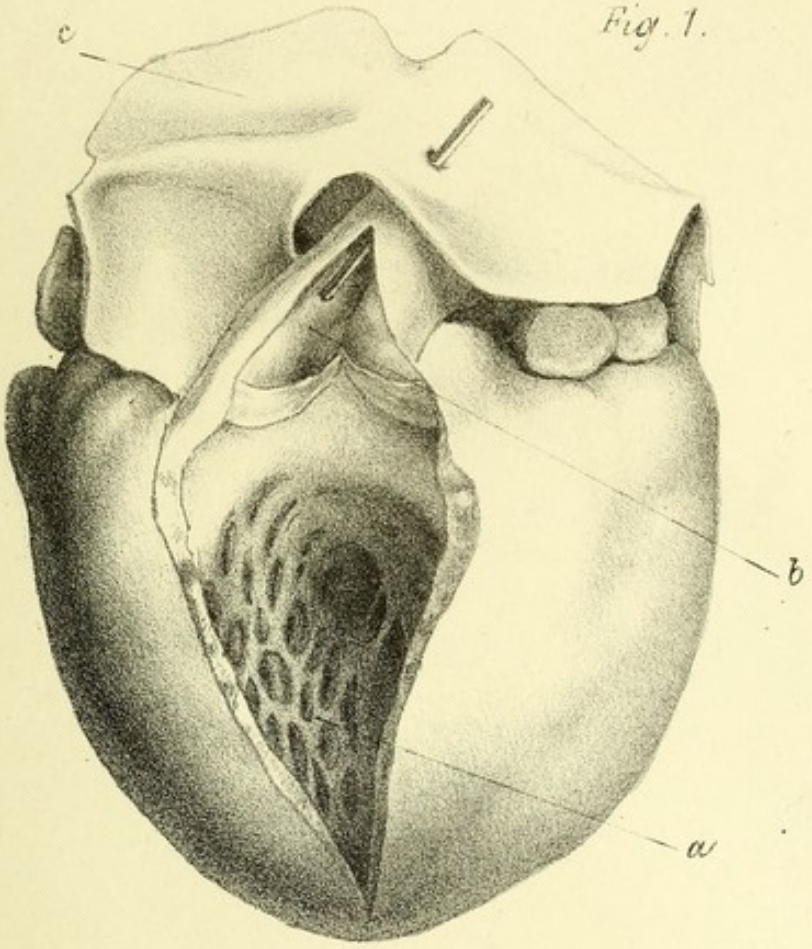


Fig. 2.

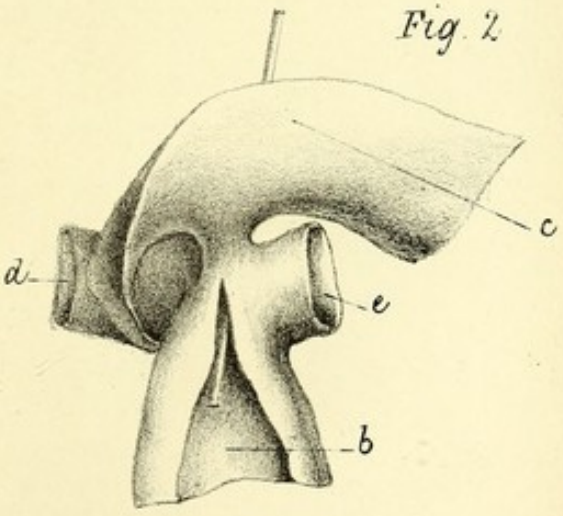


Fig. 3.