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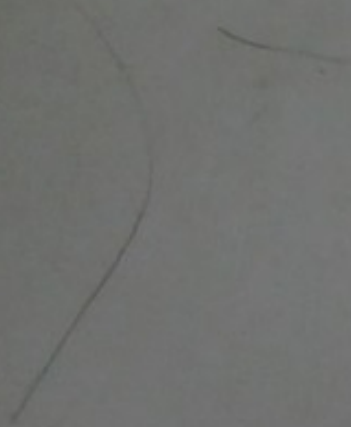
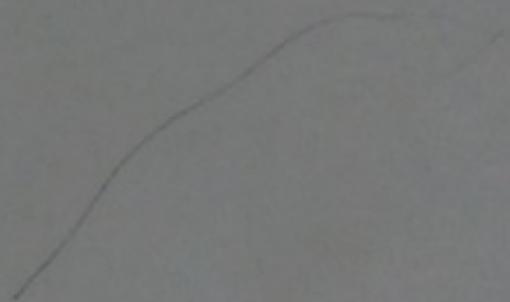
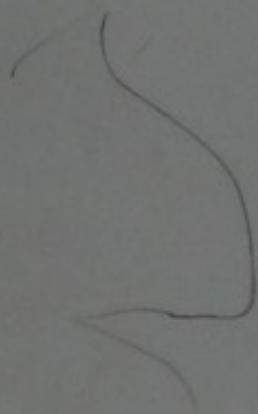
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CASE
OF
ANEURISM OF THE ASCENDING AORTA
OPENING INTO THE RIGHT AURICLE:

FATTY DEGENERATION OF THE MUSCULAR SUBSTANCE OF
THE HEART.

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Extracted from the London and Edinburgh Monthly Journal of Medical Science.

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ANDREW JACK, PRINTER, EDINBURGH.

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CASE OF ANEURISM OF THE ASCENDING AORTA.

THOUGH communications between the sacs of aneurisms of the aorta and the right cavities of the heart, have been for some time known occasionally to occur, and the memoir of Mr Thurnam,¹ has rendered pathologists familiar with the general features of these cases, it is conceived that the following instance, presenting, as it does, several points of interest, is worthy of record.

On the 24th of November 1840, I was called to see James Monk, aged 48. I found him in a state of great prostration, the pulse being imperceptible at the wrist, and his extremities cold; he complained of constant vomiting, and pain in the feet and ankles, his face was sallow and puffy, and the abdomen swollen. With these symptoms he had been suddenly seized while engaged in his occupation of a horse-keeper; he was removed to the Chester Infirmary, but though appropriate treatment was had recourse to, he continued to sink, and died about eighteen hours after the commencement of his attack. No history of his previous state of health was obtained. He had continued his occupation regularly till his seizure, and was of very intemperate habits.

The body was examined thirty hours after death.

The *abdominal cavity* contained a large quantity of yellow-coloured serum. The mucous membrane of the *stomach* displayed no unusual vascularity. The valve of the pylorus was so firm and contracted as only to admit the forefinger to be passed through it with force. The cavity of the stomach was larger than ordinary. The mucous membrane of the *small and large intestines* was healthy, there being only slight congestion of the dependant portions of the ileum and of the cœcum. The large intestine was free from fecal matter, and contracted. The *liver* displayed a very marked degree of hepatic venous congestion. The gall-bladder contained dark and viscid bile; but the ducts readily gave passage to this fluid into the duodenum. The *spleen* was healthy. The *kidneys* were lobulated and congested, but not apparently granular.

The *chest* was unusually broad and expanded; both pleural sacs contained serum in considerable quantity. The *lungs* were emphysematous. The *pericardium* was universally adherent to the heart by a thick layer of condensed cellular membrane. The *heart* was of very large size. The right ventricle greatly dilated, and its walls

¹ On Aneurisms, and especially Spontaneous Varicose Aneurisms of the Ascending Aorta and Sinuses of Valsalva.—*Medico-Chir. Trans.*, vol. xxiii. 1840.

thinner than usual, and covered by a thick deposit of fat. The muscular substance had also undergone the fatty degeneration; it was of a pale yellow or clay colour. The auriculo-ventricular and pulmonary apertures and valves were healthy. The cavity of the left auricle retained its usual dimensions, its parietes were somewhat hypertrophied, and the appendage contained a firm decolorized clot. The mitral valve was natural. The left ventricle was greatly dilated and hypertrophied, and the inner layers of its muscular parietes had undergone the fatty degeneration, but the change was less marked than in the walls of the right ventricle. The outer wall measured near the base, five lines in thickness, and at a point midway between the base and apex, four lines; below this the muscular substance became gradually thinner, and was replaced by a layer of fat; at the apex, where the deposit of fat was very copious, the muscular substance was reduced to a mere film. The aortic valves were slightly thickened.

The sinuses of Valsalva were somewhat dilated, more especially the posterior sinus, which formed a slight projection into the cavity of the left auricle. The *ascending aorta* was the seat of a large aneurism. This commenced about a quarter of an inch above the attachment of the right and posterior semi-lunar valves by a tolerably distinctly defined margin, and involved chiefly the anterior and right side of the vessel; below, it pressed upon the base of the right ventricle, and the appendage of the right auricle; and above, it terminated somewhat abruptly an inch and a quarter below the origin of the brachio-cephalic trunk. An oval cavity was thus formed which would contain a duck's egg, having the obtuse extremity below, and the origin of the aorta near the middle of its left side. The inferior portion formed an egg-shaped swelling projecting into the right auricle, immediately below the entrance of the vena cava descendens; and on the left side of this projection, in the appendage of the auricle, there existed two apertures, by which the cavity of the aneurism communicated with that of the auricle. These apertures, each of which was of sufficient size readily to give passage to a large bougie, were situated immediately together, and were surrounded by a belt of small granular concretions of decolorised lymph. In several of the sulci of the auricle, the septum between the aneurismal sac and its cavity was so thin as to be completely translucent. The descending cava, though compressed by the sac of the aneurism, and, as it were, expanded over its right side, was free from obstruction, but its coats were much thickened. At the upper portion of the aneurismal sac the wall was in front so extremely thin, that, had the pericardium not been here firmly adherent and much thickened, it must have given way some time before the actual occurrence of the fatal event. The lining membrane of the artery was continued throughout the aneurismal sac, and numerous atheromatous and

osseous patches were situated beneath the lining membrane of the sac and artery. The sac contained only a thin layer of coagulum resting on its base. The coats of the aorta, though in most places thickened, were in some thinner than usual, and that vessel was throughout the arch much dilated. About an inch and a quarter below the origin of the left subclavian artery, a second aneurismal pouch arose from the convexity of the aorta; this was of sufficient size to contain a chesnut, and its cavity was separated by a distinct margin from that of the aorta. The internal coats of the artery and sac were continuous.

REMARKS.—1. The aneurismal tumour of the ascending aorta in the case just related, was formed, it will be observed, by a dilation of the coats of that vessel, the sac being distinctly separated, above and below, from the cavity of the artery, and lined throughout by its internal tunic. Like the smaller tumour in the descending portion of the arch, it was therefore a true aneurism. Dr Hope states, that “almost all aneurisms of the ascending portion and arch of the aorta are originally of the true species;”¹ and I have little doubt of the general correctness of his assertion. Mr Hodgson, in a case where an aneurism had burst into the posterior mediastinum, found in the aorta three aneurisms in different stages of formation;—one of them was a small hollow, not larger than the half of a pea, a second was of the size of a hazel nut, and the third, that which had burst, was as large as a small melon. On slight maceration, he was able to separate the coats of these tumours, and in the two former, removed all the tunics entire, each layer retaining the form of small cavities; while, in the third, he was only able to trace the internal coats for a short distance into the sac.² These observations I have recently had an opportunity of repeating in two cases. In the first, an aneurism about the size of a chesnut arose from the posterior side of the aorta, about an inch and a quarter above the aortic valves; its orifice was small, and the sac was compressed beneath the bifurcation of the bronchi, and had formed a communication with the top of the right bronchus. In this aneurism I was unable to trace the internal coats far into the sac; but in the descending portion of the arch, I found two pouches, each sufficiently large to lodge a split pea, and from these I removed, after maceration, the internal coat entire, and this tunic, as well as the middle and external, retained the forms of the small hollows after its separation. In the second case, a small aneurism arose by a narrow orifice from the upper surface of the right iliac artery, near its commencement, and a second pouch, exhibiting evidently the early stage of a sac like the former, was situated shortly below; from the latter, by slight maceration, the internal coat readily allowed

¹ Diseases of the Heart, &c. 3d Edition, 1833, p. 421.

² Diseases of the Arteries and Veins, p. 66.

of being removed, and retained the form of the pouch when separated from the other tunics. In two or three other cases I have dissected aneurismal tumours of considerable size, consisting, like that described in this paper, of expansions of the arterial tunics; and I believe that aneurisms of the aorta, throughout its course, originate, in the largest proportion of cases, in sacculated dilations of the coats. It rarely occurs, that in the larger tumours, the internal tunics can be traced throughout the sacs.¹

2. The portion of the ascending aorta above the attachment of the right and posterior semi-lunar valves,—where in this case the aneurism originated,—would appear to be less liable to this affection than that near the attachment of the right and left valves; of ten aneurismal sacs observed by Mr Thurnam in these situations, one only arose from the former, and eight from the latter point.

From Mr Thurnam's researches it also appears, that the cavities of aortic aneurisms more frequently form communications with the right ventricle, than with the right auricle; of the cases which he has referred to, eight are examples of the former, and two only of the latter kind. The greater frequency of communications with the right ventricle is owing to the situation of that cavity,—in close contact with the left and right sinuses of Valsalva, and the points of attachment of the corresponding valves,—exposing it to the pressure of aneurisms in each of these situations; while the auricle is in contact with a much smaller portion of the origin of the aorta. During the time that I conducted the dissections of the Royal Infirmary, a case in which an aneurism of the ascending aorta had opened into the right ventricle, fell under my notice.² In this instance, the aneurism arose from the anterior and left side of the aorta, about half an inch above the attachment of the semi-lunar valves. The aperture, the size of half-a-crown, and bounded by firm and projecting edges, opened into a large sac, extending above to the level of the arch, and burrowing below into the base of the right ventricle. The septum between the cavity of the latter and the aneurism, was so thin as to be perfectly diaphanous, and in the centre had given way, leaving an aperture of sufficient size to allow the point of the little finger to be passed through.

3. This case affords us no assistance in what is at present a great desideratum, viz. the physical diagnosis of communications between the aorta and right cavities of the heart. There can be no doubt that the symptoms under which the patient laboured during the short time he was under notice before his death, were

¹ It is extremely improbable that the external coat of the aorta can alone sustain a column of blood extravasated between it and the middle tunic, as supposed by Scarpa. See experiments illustrative of the mode of formation of dissecting aneurisms, by the author, in the number of the *London and Edinburgh Monthly Journal* for October 1843.

² For full particulars of the symptoms attending this case during life, and the morbid appearances, see a Clinical Lecture by Dr Henderson in the *London and Edinburgh Monthly Journal* for May 1843.

induced by the sudden formation of the openings from the aneurismal sac into the auricle. The size of these apertures, and the belt of small granular concretions by which each was surrounded, evinced their very recent formation. In the second case also, to which I have referred, the patient, who had long laboured under aneurism, died very suddenly; and it seemed probable, from the appearances observed after death, that the fatal event was occasioned by the giving way of the very thin septum between the cavity of the aneurism and the right ventricle. Of the cases related by Mr. Thurnam, one patient died immediately after the formation of the communication between the sac and the cavity of the heart, three others survived from nine to twelve hours, a fifth lived a month, and a sixth eleven weeks; of the five remaining cases, the patients were supposed to have survived from two to ten months.

4. The heart was in this case enveloped in a thick deposit of fat, and the muscular substance of the ventricles was thinner than usual: the latter had also undergone the fatty degeneration. The accumulation of a thick layer of fat beneath the attached pericardium, has often been observed by anatomists, and has been regarded as giving rise to various symptoms during life; but the conversion of the muscular substance of the heart into fatty matter has only recently been noticed, though a similar change has been long known to occur in the voluntary muscles.¹

Mr. Burns relates in his work on Diseases of the Heart, &c., published in 1809, the dissection of the body of a butcher, who died suddenly after having long exhibited symptoms of cardiac disease, and in whom he found the walls of the ventricles converted into a substance intermediate between fat and cartilage. In 1816, Dr. A. Duncan, Jun.,² published the case of a female who died of Pericarditis, and in whom the walls of the heart were transformed into matter possessing all the qualities of fat. In 1818 and 1827, Dr. Cheyne³ and Mr. Adams⁴ related remarkable examples of the same change in men who had died with symptoms of apoplexy; and since this time, two instances of marked fatty degeneration of the heart, in one of which the death of the patient was occasioned by rupture of the left ventricle, have been published by Mr. R. W. Smith.⁵ More recently, M. Bizot has referred to the affection in his paper in the "*Mémoires de la Société Médicale d'Observation*."⁶ Most recent writers on the

¹ Journal Général de Médecine, t. xxiv., p. 3.; also, Cragie's General and Pathological Anatomy, where the same authorities are quoted.

² Edinburgh Medical and Surgical Journal, vol. xii., p. 65.

³ Dublin Hospital Reports, vol. ii., p. 216.

⁴ Dublin Hospital Reports, vol. iv., p. 396.

⁵ Dublin Journal of Medical Science, vol. ix., p. 411.

⁶ T. i., p. 356.

diseases of the heart have, indeed, noticed this form of cardiac lesion. Corvisart, though he had not personally observed the change, mentions that it was known to some of his contemporaries. Laennec "had only seen it in a small portion of the heart at one time, and only at the apex."—*Trans.*, p. 584. The observations of Andral appear to have been similar; but Elliotson and Hope have found the transformation affecting nearly the whole of the ventricles. Dr. Copland has himself seen this form of disease, and refers to a case published by Dr. Simeons of Heidelberg, and quoted in the *Archives Générales de Médecine*, t. xviii., 1828, p. 427.

More or less complete fatty degeneration of the muscular fibres of the heart seems, indeed, not to be of unfrequent occurrence, though it is very rare that it attains so advanced a degree as in the instances first quoted. I have myself seen several cases in which it existed to a slight extent, and have twice observed the change in a marked degree. Of the two instances referred to, the first occurred in a female, twenty-nine years of age, who died of Pleuropneumonia. The heart weighed $11\frac{1}{2}$ ounces; it was entirely free from fat externally; the walls of the left ventricle were of a pale yellowish brown colour, and were covered with small whitish spots or lines. On section, the walls of the ventricles towards their interior, and the columnæ carneæ of the left, and muscoli pectinati of the right ventricle, had lost all appearance of muscular fibres; they were of a pale clay colour, had a greasy appearance, and resembled pieces of very advanced fatty liver. The liver was fatty, and weighed $54\frac{1}{2}$ ounces; the spleen was very pale-coloured; and both kidneys were unusually large, pale, and greasy-looking, but without distinct granular deposit. The second instance also occurred in a female thirty years of age. She had suffered during life from dyspnœa, slight jaundice, and dropsical symptoms, and died comatose. A bellows murmur was heard with the first sound, loudest at the aortic orifice. The condition of the heart was similar to that last described; the liver was also fatty; the kidneys granular; and the body displayed an average deposit of fat. The lungs were in both cases free from tubercle.

In each of the above cases, I was able to satisfy myself that the peculiar change in the appearance of the muscular substance was owing to the large amount of fat which it contained. The knife employed in the section of the most altered portions was left greasy, and oil exuded on their compression. On examination with the microscope, the muscular fibres were found covered with small globules, which on the addition of æther were dissolved, and again left, on its evaporation, in the form of large masses of oil floating in the field of vision. The transverse striæ were imperfectly traceable, or altogether absent, in the demonstrations taken from the inner layers of the ventricles.

In the case which is the subject of this paper, I was able to repeat these observations, though the preparation had been three years in strong spirits: the most altered portions of the walls of the right ventricle, when exposed to heat, exuded a large quantity of oil, which both greased paper, and inflamed. The left ventricle exhibited the change in a less degree.

In all the instances of this transformation which I have seen, the change involved more or less the muscular substance of both ventricles, but more especially of the right. It did not, as stated by Laennec, proceed from without, inwards, being always most marked in the fibres of the muscoli pectinati and columnæ carneæ, and the inner layers of the ventricles; and the base of the heart was as much affected as the apex. In the case described in the paper, and those related by Cheyne and Adams, there existed a redundant deposit of fat on the surface of the heart; while in the two others referred to, the partial conversion of the muscular fibre into fatty matter was unattended by any deposit of free fat beneath the Pericardium. In the two cases related by Mr. Smith, the blood, especially of the vena porta, contained free oil; and in one, the liver also was diseased.

M. Bizot met with the true fatty degeneration of the muscular substance of the heart in four out of fifty-seven cases, in which the state of that organ was expressly investigated. In these cases the transformation was observed in the right ventricle, chiefly in its inferior portions; and in all the heart was also more or less loaded with fat, though there existed no adipose deposit beneath the integuments. In the cases in which the liver was examined, that organ was also found fatty. The subjects in whom this transformation was observed were all females, and had died of Phthisis. The details which have been given above, show, however, that the fatty degeneration of the heart, like the similar transformation of the liver, is by no means confined to the female sex, or to those who die of tubercular phthisis, and will probably be occasionally found in the bodies of persons who have suffered from any form of chronic visceral disease.

2, SOUTH PLACE, FINSBURY, LONDON,
October 22, 1844.

In the case which is the subject of this paper, I was able to make post-mortem observations, though the preparation had been three years in strong spirits; the most altered portions of the walls of the right ventricle, when exposed to heat, exuded a large quantity of oil, which both pressed paper, and inflamed. The left ventricle exhibited the change in a less degree.

In all the instances of this transformation which I have seen, the change involved more or less the muscular substance of both ventricles, but more especially of the right. It did not, as stated by Lennec, proceed from without, inward, being always most marked in the fibres of the muscular pectinati and columnar curves, and the inner layers of the ventricles; and the base of the heart was as much affected as the apex. In the case described in the paper, and those related by Cheyne and Adams, there existed a redundant deposit of fat on the surface of the heart, which in the two others referred to, the partial conversion of the muscular substance into fatty matter was attended by any deposit of cholesterol beneath the pericardium. In the two cases related by Richardson, the blood, especially of the venous parts, contained free oil; and in one, the liver also was diseased.

My friend met with the true fatty degeneration of the muscular substance of the heart in four out of fifty-seven cases, in which the state of that organ was extensively investigated. In these cases the transformation was observed in the right ventricle, chiefly in its inferior portions; and in all the heart was also more or less loaded with fat, though there existed no adipose deposit beneath the internal surface. In the cases in which the liver was examined, that organ was also found fatty. The subjects in whom this transformation was observed were all females, and had died of I think, the details which have been given above, show, however, that the fatty degeneration of the heart, like the similar transformation of the liver, is by no means confined to the female sex, or to those who die of tubercular phthisis, and will probably be occasionally found in the bodies of persons who have suffered from any form of chronic visceral disease.

J. Keen Esq. F.R.S. &c. F.R.S. &c. F.R.S. &c.
(1842-1843)

new specimen of the same disease, which I have seen in the heart of a female who died of tubercular phthisis, and in which the transformation was observed in the right ventricle, chiefly in its inferior portions; and in all the heart was also more or less loaded with fat, though there existed no adipose deposit beneath the internal surface. In the cases in which the liver was examined, that organ was also found fatty. The subjects in whom this transformation was observed were all females, and had died of I think, the details which have been given above, show, however, that the fatty degeneration of the heart, like the similar transformation of the liver, is by no means confined to the female sex, or to those who die of tubercular phthisis, and will probably be occasionally found in the bodies of persons who have suffered from any form of chronic visceral disease.

