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PART I.
ORIGINAL COMMUNICATIONS.

ART. I.—*On Temporary Deligation of the Abdominal Aorta.*

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AMONG the conditions which militate strongly against successful results being obtained in treating aneurismal tumours by arterial deligation, two prime causes for the want of success, which so frequently attends such operative procedures, may be mentioned. These are—first, the late period at which the operation is generally performed, after the development of the aneurism; and, secondly, the hemorrhage which so frequently results from ulceration of the vessel, caused by the continued pressure of the ligature. Sir Astley Cooper was quite aware of the first of these causes of failure, and in the record of the case in which he for the first time deligated the abdominal aorta, regrets that he did not perform the operation at an earlier stage of his disease, believing that had he done so, the result would have been very different from what it was. As regards

the second cause of failure—namely, hemorrhage, it is unnecessary to name any authority in proof of it, as it is one which is familiar to every practical operating surgeon.

Ever since the case of subclavian aneurism, which was treated in the Meath Hospital by direct pressure on the arteria innominata by Mr. Porter, an operation which I had the honour of assisting at, and an exhaustive report of which from his pen, is to be found in the pages of this journal for November, 1867, the subject of the treatment of aneurisms by this, or some similar method as that adopted in the case I have alluded to, has engaged my anxious consideration. The substitution of some form of acupressure for the ligature, appears to me to be a means of possibly obviating the second of the causes of failure I have alluded to, the object of the acupressure being, not a permanent, but a temporary closure of the vessel; the occlusion being maintained, until such time as the tumour might become consolidated. Whatever may be the defects of acupressure, it cannot be denied, even by its greatest opponents, that its proper application is rarely, if ever, attended with any ulcerative process in the vessel on which it is applied. I determined, therefore, when the first suitable case presented itself, to give a modified acupressure or temporary arterial deligation, a trial in the treatment of aneurism, as the results of the treatment of so many cases of this disease by the Dublin method of compression, have shown, that often such tumours become consolidated, when the pressure has only been maintained for a very few hours.

During the past year, my friend and former colleague in the Meath Hospital, Mr. Porter, has described an instrument which, simple but ingenious in its construction, appears to me to supply all the necessary requirements for the treatment of aneurism by temporary deligation of the vessel on the cardiac side of the tumour. It is easy of application, can be removed without difficulty, and arteries of the largest calibre can, as the case I am about to record unquestionably proves, be efficiently occluded without permanently damaging any of the structures of the vessel, as the ordinary ligature invariably does.

We may now proceed to give, as briefly as possible, the particulars of the case of James Shiels, who suffered from an enormous ilio-femoral aneurism, and for the attempted cure of which, I occluded the abdominal aorta immediately above its bifurcation.

James Shiels, aged fifty years, was admitted into the Richmond

Hospital under my care on the 4th of last March, having been recommended to me by my friend, Dr. John Kirkpatrick. His occupation was that of a messenger or carrier for one of the commercial establishments of this city, and from the nature of his occupation he was obliged frequently to carry not only very large, but very heavy weights. He was always, according to his own account, a man of temperate habits, and never suffered from any rheumatic or other constitutional disease. About three months previous to his admission into hospital he observed, for the first time, a tumour in the right groin, which, however, did not give him any inconvenience or annoyance, or oblige him to abandon his usual avocation at that time. About two months afterwards, it became so very large and painful that he was obliged to seek for medical advice, and for some time he was under the care of Dr. J. Kirkpatrick, in the hospital of the North Dublin Union, and from that he was transferred to the Richmond Hospital. The diagnosis of diffused ilio-femoral aneurism was not attended with any difficulty. There was a large pulsating tumour occupying the right iliac and upper portion of the femoral region, extending downwards under Poupart's ligament, and upwards within an inch of the umbilicus. It reached as far as the linea alba in front, and past the linea semi-lunaris behind. It was soft and elastic to the touch, and when the hand was pressed over it a pulsation and fremitus were distinctly felt. On applying the stethoscope over the tumour, a loud bruit was heard; the pulsation in the right femoral artery could hardly be felt; there was no other symptom of any organic disease. There was no cardiac murmur, the only thing abnormal about the heart's action being an occasional intermission. The patient's face had a haggard, care-worn, anxious expression. He did not complain of pain when the knee was flexed and the thigh slightly drawn up, but any attempt to extend it was attended with extreme distress. His appetite was bad, and being very restless at night, required powerful anodynes in order to induce sleep.

The idea of treating this case by pressure, was the first I entertained, but the patient could not bear any pressure either above, below, or on the tumour. In any situation pressure was attended with such extreme pain that it had at once to be desisted from. The other modes of treating aneurism recently suggested were also inadmissible, as, for example, the injection of different fluids with the object of producing coagulation of the blood, the introduction of wire, manipulation, &c. The great size of the

tumour prevented us having recourse to any of these comparatively novel procedures, the efficacy of which, even in small aneurisms, is, in my opinion, very questionable. Two courses, therefore, remained. One was to abandon the idea of any surgical interference, which would have been to leave the patient to perhaps a slow, but certain and painful death; and the other was to attempt to bring about consolidation of the tumour by occluding the vessel above the seat of the aneurism. After much consideration I determined to have recourse to the latter of these procedures, and, if possible, to apply either a permanent or a temporary ligature on the common iliac artery on that side, or, if I found that diseased, to go higher and occlude the abdominal aorta.

Accordingly, on the 8th of March, I proceeded to expose the artery, and in doing so was ably assisted by my friends Mr. Hamilton, Mr. Porter, Mr. Henry Curran, and my clinical assistants, Mr. Alexander Montgomery, Mr. W. Browne, and Mr. Agmon Vesey; many eminent surgeons, also, honoured me with their presence, among whom may be mentioned Mr. Tufnell, Mr. Croly, Mr. Kirkpatrick, Mr. R. St. John Mayne, and others. The patient having been brought well under the influence of chloroform, I commenced by making an incision on the left side, semi-lunar in shape, five inches and a-half in length, extending from one finger's breadth below the tenth rib, to a point two finger's breadth above the junction of the outer with the middle third of Poupart's ligament. The incision was, in fact, the segment of a circle, the centre of which was the umbilicus, and the radius about two and a-half inches in length. A careful dissection was then made down to the transversalis fascia, and a small opening having been made in that structure, Ferguson's broad steel director was passed with great care between it and the peritoneum. There was considerable difficulty in separating these two structures from one another. In truth, their separation constituted the chief difficulty in the operation. Finding that the incision was not sufficiently extensive, I enlarged it upwards and inwards, dividing the structures on the broad director. In doing so a slight wound was accidentally made in the parietal layer of the peritoneum, and through this there was a small intestinal protrusion. In order to secure the vessel behind the peritoneum, I passed my hand into the pelvic cavity, separating with great care that membrane from its cellular attachments, and then tried to get a view of the great vessels by pushing the peritoneum and intestines,

which, unfortunately, were greatly distended, towards the right side. It was, in truth, attended with such extreme difficulty, that at one moment I feared I should have to abandon my project. However, after getting the patient well over on the right side, and carefully retracting all the tissues in this direction by means of a pair of very broad brass retractors, which Mr. Croly kindly lent me for this operation, I was enabled at last to get a good view of the abdominal aorta and its bifurcation. The view for the first time of this great vessel pulsating strongly, of the two common iliacs, and the commencement of the enormous aneurismal tumour, to a great extent overlapping, and adherent to the right common iliac artery, made an impression on my mind that time can never efface!

Owing to the way in which the tumour overlapped the iliac artery, and the adhesions which had formed between the aneurism and the vessel, I found that any attempt to deligate the common iliac would be impracticable. Accordingly, I passed Lühr's aneurism needle round the aorta just before its bifurcation, and attached to the ligature a piece of silver wire, which was then drawn round the aorta. The ends of this wire were then passed through Mr. Porter's artery compressor, and traction was made on them until all pulsation and bruit had perfectly ceased in the tumour. The ends of the wire were then secured to the ring of the clamp, and the tissues, &c., being replaced, the edges of the wound were brought together by numerous points of interrupted silver wire suture. Strips of adhesive plaster, compresses, and flannel bandages were then applied; both legs were bandaged from the toes upwards with flannel, and the patient then removed to bed. The operation was almost bloodless.

During its performance he got brandy at intervals dropped from a sponge on the tongue; his pulse got very slow, and his lips lost their colour two or three times, but brandy and ammonia brought him round each time. The operation was concluded at 11.15. Warm blankets were then wrapped round the patient, hot jars applied to his feet, and he got some warm brandy and water. Fifteen minutes afterwards he got twenty-five drops of sol. mur. morphia, in some brandy. The pulse was then 125; the colour of the lips was good; the temperature of the right leg and foot was lower than that on the opposite side. There was no paralysis whatever; on the contrary, he kept continually drawing up the left leg. He was very restless, wanting to loosen the bandages.

12 o'clock noon.—He got another draught of morphia and brandy. He is still restless, trying to throw off the bedclothes. He has quite recovered from the immediate shock of the operation. About every quarter of an hour he shouts out complaining of the burning pain in the ball of the right great toe, and in the sole of the same foot. This pain is only of a transitory nature, and subsides when firm pressure is made on the toe. Occasionally he felt, he said, the same pain a little above the right knee. These pains came on in paroxysms.

12.30.—Pulse 124. He is still restless, and complains of the pain and burning heat in the great toe. There is no external cause that could give rise to these symptoms.

1.30 p.m.—He got another draught of morphia and brandy. It is difficult to keep the bedclothes on him, he tries so frequently to throw them off.

2.30 p.m.—During last hour has taken some warm beef-tea with relish, and seems inclined to sleep. The temperature in the left lower extremity is very good; that in the right has greatly improved. The toes do not feel at all so cold as they did.

3.30.—Has had some sleep.

4.30.—No particular change. Seems still inclined to sleep.

5.30 p.m.—Just previous to this hour he had a semi-syncopal attack, from which he was roused by the exhibition of small quantities of stimulants. The pulse at the wrist became, during these attacks, almost imperceptible, the heart's action very weak, and the lips white. All these symptoms passed off. Then short semi-syncopal attacks recurred three or four times subsequently, from which, however, he always rallied on being given brandy and ammonia, &c.

9 p.m.—Pulsation in *left* femoral artery had returned; in the tumour no pulsation or bruit whatever.

At 10 p.m. it became obvious that his end was approaching.

10.30.—He is perfectly unconscious.

At midnight he expired.

On making the *post mortem* examination the following day, it was found that the aneurismal tumour engaged the lower part of the right common iliac, the external iliac, and also the upper portion of the femoral artery on that side. The tumour was firmly adherent to the surrounding structures, and had partially eroded the pelvic bones. The tumour contained a considerable amount of coagulated blood, and also some recently-deposited fibrine. About

an inch of the upper portion of the right common iliac was found free of disease, but owing to the overlapping of the tumour the vessel was to a great extent concealed from view, and what was seen was flattened out by the pressure of the tumour on it, which gave it the appearance of being very much dilated. For this reason, as well as from there having been extensive adhesions between the anterior wall of the artery, and the posterior wall of the aneurismal sac, the application of the clamp on any portion of the iliac artery was not deemed practicable. In truth, the adhesions were so intimate that the separation of the tumour from the artery, which it to so great an extent overlapped, was after death accomplished with considerable difficulty.

The wire compressor was found immediately above the bifurcation of the aorta. On removing the instrument, which was done with the greatest facility, and slitting up the vessel, which I did in the presence of Mr. Porter, Mr. Robert Mayne, and Dr. Hewitt, the artery was found without the slightest injury being done to any of its coats. No abrasion or any sign of injury was found in the vessel; a slight degree of paleness and a small amount of recently-formed fibrine being the only traces of any attempt at deligation. Before removing the compressor, and slitting up the vessel, I passed a stream of water down the aorta, none of which passed the instrument. The muscular structure of the heart was found pale and friable, and presented, under the microscope, evident traces of fatty degeneration. The microscopical examination was made by my friend and colleague in the Carmichael School, Dr. Purser. There was no evidence of any organic disease discovered in any other vital organ. No filament of a nerve was found to be pressed on by the wire, which, during the patient's life, I thought might have occurred, and been the cause of the severe pain which, after the operation, he so frequently complained of, and referred to the right foot.

The points of special interest and importance which we learn from this case are—

1st. That a vessel of such calibre as the abdominal aorta can be efficiently occluded without doing any damage whatever to the coats of the vessel.

2nd. That after the closure of this vessel the collateral circulation can be re-established in a very few hours.

3rd. That rapid consolidation of the contents of an enormous

false diffused ilio-femoral aneurism can take place after occluding the abdominal aorta.

4th. That death in this case was caused by the shock of the operation in a person with fatty degeneration of the heart.

5th. That if the patient had not had this condition of the heart, and been able to bear the shock of the operation and survive, the chances of gangrene subsequently occurring would have been small, from the fact of the rapid re-establishment of the collateral circulation, and the power we had of removing the occluding instrument at any moment and allowing the circulation to go on as before.

The particulars of the five cases preceding mine, in which the abdominal aorta has been deligated, are so well known to every well-informed surgeon, that I shall refrain at present from entering into the particulars of them. In the accompanying table will be seen the names of the surgeons who have performed the operation, the places where it has been done, the age of the patient, the date, and the form of aneurism for which the operation was performed. The cases which give most promise of the operation ultimately succeeding are those of Dr. Monteiro, Mr. South, and Sir Astley Cooper. In the first, the patient lived ten days, and then died from hemorrhage at the seat of the ligature. In the second the patient survived the operation forty-three hours; and in Sir Astley Cooper's twenty-three hours. The other patients died at shorter intervals.

Table of Cases of Deligation of Abdominal Aorta.

Surgeon	Hospitals	Sex and age of patient	Date of operation	Form of Aneurism
1. Sir A. Cooper	Guy's Hospital	Male, æt. 38	June 25, 1817	Diffused ilio-femoral aneurism
2. Mr. James	Devon and Exeter Hospital	Male, æt. 44	July 5, 1829	Aneurism of external iliac artery
3. Mr. Murray	Civil Hospital, Cape Town	Male	Oct. 4, 1834	Aneurism of external femoral artery
4. Dr. Candido Monteiro	Rio Janeiro	Male	July 5, 1842	False diffused aneurism of femoral artery
5. Mr. South	St. Thomas' Hospital	Male, æt. 28	June 21, 1856	False diffused aneurism of common iliac artery

Looking at the formidable nature of an operative procedure which necessitates the exposure and occlusion of a vessel of such magnitude as the abdominal aorta, and the want of success which

has hitherto attended such procedures, justly described by the late Mr. James of Exeter, as the "most formidable that could be conceived," it is not surprising that so few operations of the kind have been undertaken by practical surgeons. This want of success, however, should not lead us to abandon the hope that the operation may yet be the means of saving, as it has been of prolonging, life, and adding another to the long list of brilliant achievements that have been already accomplished by surgical art. May we not hope that ultimately the operation will succeed, when the illustrious Astley Cooper, who, as a surgeon, was as philosophical as he was bold, in speaking of the case, in which he, for the first time in the history of surgery, applied a ligature to the abdominal aorta, observed, "if a case were to offer itself similar to that I have told you of, I would immediately perform the operation again; and *my own conviction is, that it can be done, and done with success.*"

ART. II.—*On the Differential Diagnosis of Abdominal Aneurism.*^a

By WILLIAM MOORE, M.D., Univ. Dub.; "King's Professor of the Practice of Medicine;" Physician to Sir P. Dun's Hospital, &c.

OF late years great advances have been made in the diagnosis of thoracic aneurism and intra-thoracic tumours, through the combined application of physiology and pathology; and the same branches of science, when carefully applied to the diagnosis of abdominal aneurisms and tumours, have thrown increased light on their detection. I am happy to see among us in health and vigour a gentleman who was one, if not the first, to give us an accurate detailed account of the *symptoms* of abdominal aneurism. Some forty years ago Dr. Beatty pointed out the deep-seated pain in the back, with neuralgic exacerbation; the agonizing intestinal pain, with occasional complete intermissions and other symptoms, to which I shall allude more fully hereafter. These phenomena were present in a case under Dr. Beatty's care, which proved fatal on the 26th of February, 1829, and in which a large aneurism was found, covered by the crura of the diaphragm, which were expanded and tightly stretched over the sac. The aneurism lay on the three last dorsal vertebræ, the bodies of which it had deeply eroded.

^a Read before the Medical Society of the King and Queen's College of Physicians.