A CASE OF
ANEURISMAL DILATATION
OF
THE POSTERIOR TIBIAL VEIN,
COMMUNICATING INDIRECTLY WITH
THE UPPER PART OF THE POPLITEAL ARTERY.

BY
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THE obscurity which involved this case during its progress, the remarkable and, I believe, unique character of disease which it exhibited, when at length its true character became developed, and the difficulty of explaining some of the circumstances connected with it, have induced me to lay it before the Fellows of the Medical and Chirurgical Society.

George Mortimer, æt. 28, a tide-waiter, was admitted into Guy's Hospital under my care on the 30th of October, 1850, for a painful and swollen state of the left leg.

He was married, had always enjoyed good health, and had led a steady, temperate, and active life. His statement was as follows: between three and four months ago, while stationed at Gravesend, he was attacked by fever, which confined him to his bed for a considerable period and left him in a very debilitated state. He was then removed to Carshalton for the benefit of his health; and about five weeks ago, when endeavouring for the first time to walk about, he discovered that his leg was stiff, painful, and swollen. These symptoms gradually increased until he was admitted into the Hospital.

On examining the limb (October 30) as he lay in bed, I found general enlargement and œdema from the knee down to the toes. The cellular effusion was greatest about the ankle and instep. The principal enlargement was at the back of the leg, where the calf was bulged out into a prominence, extending from the knee to rather more than half-way down, tense and tender. Deep-seated fluctuation was very distinct, and it was evident that a large collection of fluid existed under the *gastrocnemii* muscles. He had been the subject, during the last few weeks, of occasional rigors with exacerbations of pain and fever; and there was every reason to suppose that a large collection of pus had formed between the superficial and deep-seated muscles. While engaged in making the examination, my attention was accidentally directed to a large cicatrix on his thigh; and I then learnt that his femoral artery had been tied eleven years previously by Mr. Tracey of Dartmouth, for a supposed wound of the popliteal artery inflicted by a stab with a knife. The operation had been performed two weeks after the injury, on the occurrence of secondary hæmorrhage, and had been perfectly successful. He speedily recovered the full use of his leg, and never experienced the slightest inconvenience; neither has he ever been aware of the existence at any time of any tumour or swelling. He however has subsequently informed me, that two years after the artery had been tied he became the subject of varicose veins on the same leg; that he had recourse to bandages, which he wore between three and four years and then left them off. The veins had by that time somewhat diminished in size, but had acquired a permanent enlargement and thickening of their coats, which has since continued.

The history which I have just related induced me to make a second careful examination of the limb.

The femoral artery could be felt pulsating along the upper part of the thigh. The anterior and posterior tibial arteries could be felt to beat vigorously, after displacing the superjacent œdema by pressure; not the slightest sense of pulsation, not the faintest sound or murmur could be detected

in the tumour at the calf; it was totally uninfluenced by arresting the flow of blood through the artery at the groin; and I still considered it to be a large abscess.

The suffering condition of the patient required that some relief should be afforded; and accordingly, on October 30th, an incision was made into the cavity near the upper and inner part of the leg, where the walls appeared to be thinnest. A flow of blood followed the withdrawal of the lancet, until between two and three ounces had been spontaneously discharged through the opening. The blood was dark, grumous, and pitchy in its character, did *not* coagulate, and had evidently been extravasated for a considerable period. Its evacuation sensibly diminished the tension of the swelling, and the pain was relieved. A piece of lint was laid over the part; the limb was placed on a pillow, and strict quietude enjoined.

On November 1st he was again complaining of a good deal of pain in the leg, accompanied by fever and restlessness. A small quantity of pus had oozed through the wound, which was nearly blocked up by a clot of blood. On removing this with a pair of forceps a copious discharge of pus took place, and in a few minutes nearly a pint had flowed away. The fluid was offensive in its character, and contained numerous half-decomposed softened-down coagula of blood. Fomentations were applied over the leg and a generous diet ordered.

It was now quite evident, that at any rate the larger part of the swelling had consisted of an extensive accumulation of matter beneath the gastrocnemii muscles; and the free discharge which now took place was accompanied by a marked improvement in the symptoms, both locally and generally.

I need not trouble the Society with the details of the case during the next ten days, as they are those incident to a large deep-seated abscess; a large quantity of pus, partially mixed with blood, had been evacuated, and the patient had begun to rally in health and strength.

Nearly a fortnight had now elapsed since the leg was first punctured. The extravasated and decomposed blood had been entirely got rid of. The discharge of pus from

the now contracted and diminished cavity, was small in quantity and healthy in character. The leg had returned to nearly its natural size and shape; the man's health was daily improving.

During this period I had frequently turned the case over in my mind, endeavouring to account for the effusion of so considerable a quantity of blood and the formation of so large an abscess; canvassing the possibility of a connection between the recent circumstances and the former wound of the popliteal artery. My speculations on the subject could now be but of little importance. The solution of the mystery was nearer than I anticipated.

On November the 14th, just fifteen days after the puncture had been made, when the state of the patient promised a speedy convalescence, arterial hæmorrhage suddenly took place from the wound, and before competent assistance could be afforded he had lost nearly three pints of blood. The flow was arrested by a firm compress placed over the wound, and by pressure on the artery at the groin, which, however, he could only bear in a modified degree. On my arrival I found the entire cavity of the original abscess tense and distended to more than its original size, whilst its walls had evidently given way, and blood was gradually effusing itself upwards through the popliteal space into the thigh. The entire leg had a swollen, shiny, and livid appearance. There could be no doubt that arterial hæmorrhage was going on, and that the remedial means must be prompt and decisive.

Three methods of treatment suggested themselves, which I respectively considered and discussed with Mr. Poland, the only one of my colleagues whose assistance was available at the time. The first was to place a ligature on the upper femoral or external iliac artery; the second was to lay open the cavity of the leg, evacuate its contents, search for the vessel which afforded the hæmorrhage and if possible secure it; the third was to amputate above the knee.

We came to the conclusion that a ligature on the upper femoral or iliac artery would probably throw us on to the horns of a dilemma; that, from the free collateral circulation

resulting from the former operation, it might at best afford but a temporary check to the bleeding ; whilst on the other hand, if the supply of blood to the leg became materially diminished in its then present state, gangrene would follow as an almost inevitable result. This proposition was therefore abandoned. The second shared the same fate, as we considered that the operation of laying open the cavity and searching for the vessel was, as regarded the collapsed state of the patient, too severe in its character ; and, considering our ignorance of the source of hæmorrhage, too uncertain in its results to be attempted. Our last resource was amputation ; and I removed the leg a short distance above the knee.

The remaining history of the patient may be dismissed in a few words. He rallied slowly from the prostration produced by the loss of blood and from the shock of the operation ; but in a month's time the stump was nearly healed and I considered him as convalescent. He then became the subject of low fever accompanied by bronchial irritation and general constitutional irritability. His appetite failed, and he began to exhibit all the symptoms which had preceded several cases of fatal phlebitis, a disease which was at that time epidemic in our hospital. I determined to remove him before it was too late ; and finding that he had a comfortable home at Carshalton despatched him thither without delay. The change acted most beneficially. In a week's time his unfavorable symptoms had all disappeared, he rapidly recovered, and is now filling the situation of gate keeper at the Custom House.

The amputated leg was most carefully dissected by Mr. Poland who has kindly furnished me with the following account of his examination :—

The limb œdematous and much increased in size. A small lancet wound on the inner side of the calf, giving exit to puriform fluid and decomposed blood with clots. Close by, thinning of the integuments, which appeared just on the point of giving way by ulceration. On removing the integuments, all the superficial veins were found much enlarged,

and their coats exceedingly thickened, but the vessels themselves were quite pervious. A track of subcutaneous suppuration extended from near the knee to the ankle, the pus of pinkish colour mixed with some clots of blood. The gastrocnemius muscle expanded and very thin, as was also the soleus, which was exceedingly stretched and distended. On reflexing these muscles, a large diffused collection of blood in part coagulated was found beneath, extending from the knee to half-way down the leg. On washing away this blood, an aneurismal sac about the size of a duck's egg was brought into view. It was situated beneath the upper part of the soleus muscle, and had displaced the posterior tibial nerve, which curved round and was stretched over its outer border. The sac had given way by an ulcerated opening at the upper part near the entrance of a vessel. The vessels, both arteries and veins, were carefully dissected out and presented the following appearances:—

In the centre of the popliteal space, lying on the posterior ligament of the knee, was a small and firm sac about the size of a pigeon's egg: its walls, in part, cartilaginous with ossific deposit; within a cavity lined by fibrin, and empty. Leading to the sac from above were two vessels, viz. the popliteal artery and vein. The artery was somewhat smaller than normal but otherwise healthy and pervious, and freely entered the sac. The vein tapered down and was lost on the walls of the sac as a fibrous cord; above, its coats were much thickened and filled with firm old coagulated blood. From the lower part of the sac issued two vessels, both freely communicating with its interior. The smaller one was the efferent continuation of the popliteal artery much diminished in size, which, after passing down as usual to the leg, divided into the anterior and posterior tibial and peroneal branches. These vessels were quite pervious and natural, and, although small in size, evidently constituted the normal arterial distribution to the leg. The larger vessel descending from the sac, proved to be the continuation of the popliteal vein; it was greatly thickened, pouched, and puckered, but quite pervious, and passed down to the lower border of the pop-

liteus muscle where it divided into two trunks. The one of these, which was completely filled and obliterated by old firmly coagulated fibrin, accompanied the anterior tibial artery. The other, which formed the continuation of the original trunk, was pervious, and led directly into the interior of the aneurismal sac, with the walls of which its coats became identified. Again, from the lower part of the sac there emerged three or four large branches which were impervious, with thickened walls and solid fibrinous contents. These accompanied the posterior tibial and peroneal arteries. That all these vessels were veins notwithstanding the arterial character and thickness of their coats, and that they constituted, in fact, the *venæ comites* to the arteries of the leg, was distinctly made out by the dissection, and furthermore by washing out their contents and discovering their valves. They were all completely obliterated along the whole of their course; and the blood must have been returned from the leg entirely through the agency of the superficial veins.

The several facts connected with this case which were brought to light by the dissection, may be shortly enumerated as follows :—

1st. That the popliteal vein and artery had both been wounded by the original injury eleven years ago, and that a permanent communication had become established between the two vessels, maintained through the intervention of a small sac common to both.

2dly. That the popliteal vein above the seat of injury had become obliterated and was obstructed up to the line of amputation. That it probably regained its permeability at its junction with the saphæna minor vein, which vessel appeared to have returned the greater part of the blood from the leg.

3dly. That the popliteal vein below the seat of injury had become dilated and thickened, apparently from the impulse of the blood received into it from the artery, and that it terminated below in an aneurismal dilatation of the posterior tibial vein, while all the *venæ comites* of the leg had become completely obstructed and obliterated.

4thly. That at some subsequent period the walls of the venous aneurismal dilatation must have given away, allowing the extravasation of a certain amount of blood beneath the *gastrocnemii* muscles.

5thly. That in consequence of or at any rate connected with this extravasation of blood, was the occurrence of an abscess, which finally, after the lapse of eleven years, again brought the patient under surgical treatment.

Thus it will appear that the history of this case extended over a period of eleven years; the original wound and the final abscess constituting the commencement and termination.

The chronological order in which the other intermediate changes and events occurred, necessarily becomes a subject for conjecture and discussion. We possess no precise clue to guide us as to the succession observed by the obliteration of the popliteal vein above the original wound; the dilatation and formation of the venous aneurismal sac below, the obliteration of the *venæ comites* of the leg, and lastly the escape of blood from the sac beneath the muscles. Consequently it is by no means clear how far these events were dependent on each other.

It will, however, be remembered that the superficial veins of the leg became dilated and thickened about two years after the femoral artery had been tied; and this may, in some measure, serve to fix the period when the obstruction of the *venæ comites* took place.

The subject presents a wide field for inductive reasoning and ingenious speculation, but I have forborne to add to the length of my communication by stating more than was necessary to lay before the Society a simple recital of facts.

I subjoin a communication which Mr. Tracey has been kind enough to send me, relative to the details of the original injury.

"I saw Mortimer within an hour of the event, October 30, 1839, and found a small wound in the popliteal space from which blood was oozing slowly; a small thread of arterial blood being distinctly visible over the darker venous blood, which constituted by far the greater part of the hæmorrhage.

As the blood did not issue *per saltum*, my impression was that only a small artery had been wounded, and that the popliteal had escaped, more especially as I found that moderate pressure of the thumb over the wound commanded all bleeding.

The lad was sent to bed, strict rest was enjoined, and a firm compress was placed over the wound secured by a bandage.

Before leaving the house, I was shown a dinner knife, old and well worn at the back towards the end, so that, although originally round, it had become tapering at the extremity. On comparing the length of the wound with the breadth of the blade, I found that the knife must have penetrated deeply, but still could not reconcile such slight hæmorrhage with the wound of an important artery.

Every thing went on well for the first day or two, the bleeding was completely restrained, and there was no complaint but from the tightness of the bandage. About the third day a spot of dark coloured blood appeared through the compress. This was removed and more carefully applied, and the bandage carried higher up the thigh so as to make firm pressure on the femoral artery below the groin. Things again went on well up to the eighth or ninth day, so that I began to entertain hopes that nothing more would be necessary, when the spot again made its appearance. On examining the wound, no union had taken place, but, with the exception of a little puffiness, it looked healthy. The same treatment was continued till the 12th of November (twelve days after the accident), and I doubt whether during that time a tablespoonful of blood had been lost. On that day (*viz.* the 12th) I found the edges of the wound everted and the colour of the surrounding skin slightly livid. On making moderate pressure with my finger, a small sized coagulum slipped out, and a moderate flow of clear blood followed. I determined to take the bull by the horns, and accordingly tied the femoral artery, the ligature around which instantly stopped the hæmorrhage.

From this period everything went on most satisfactorily. On the fifth day union throughout the line of operation had

taken place, except immediately about the ligature, which came away on the twelfth day, by which time also the wound in the popliteal space had firmly united. The lad perfectly recovered and returned to his work, and for some two or three years afterwards felt no inconvenience, as I used to see him constantly. He then left the town, and I heard no more of him until you again brought him to my recollection."

DESCRIPTION OF THE PLATE.

- A. Small Aneurismal Sac resulting from the original wound of the popliteal artery and vein, communicating with the artery above and below, and with the vein below.
- B. Popliteal Artery entering the sac from above.
- C. Popliteal Artery leaving the sac below, and proceeding to its normal distribution in the leg.
- D. Upper portion of the Popliteal Vein obliterated and attached as a cord to the sac.
- E. Lower portion of the Popliteal Vein dilated and thickened, leaving the sac and carrying arterial blood, and terminating below in an aneurismal dilatation of the posterior tibial vein.
- F. Aneurismal dilatation of the posterior tibial vein.
- G. Venæ Comites of the leg, anterior and posterior tibial, and peroneal, obliterated.