veins shows that the right ventricle was relatively strong and was endeavouring to compensate for the defective action of the left heart. As regards the treatment: The bronchial catarrh and spasm, though only slight, had to be dealt with, and also small doses given of such a drug as strophanthus, which, while not increasing arterial contraction, does increase the vigour of the cardiac action, and so tend to improve the cardiac nutrition. Digitalis would, of course, not be desirable. A very important part of the treatment of such a case is the lessening of the peripheral resistance by means of drugs such as the salicylates. In such a case as this, however, the prognosis is not very hopeful. This was shown by his rate of progress, for, although the heart sounds gained in vigour after three weeks' rest in bed combined with the treatment described, the man progressed but slowly.

The third case of heart failure without any obvious cardiac dilatation or murmur was that of a woman aged 61. She had been short of breath for several years, and of late had been gradually getting worse. Recently she had rapidly got weaker, and the day before admission she had a serious fainting attack—the first of the kind she had had. There was no history of any previous illnesses, and her present condition had developed gradually. Her state on admission was as follows: A rather stout woman, very pale, not breathless when lying in bed with a moderately high bed-rest, but breathless on exertion, and unable to lie flat in bed. There was no dropsy and no cyanosis.

The pulse was decidedly small, but of good strength, and was of the strikingly collapsing character usually associated with aortic regurgitation. Although its volume was small it came up under the finger with suddenness and force, and subsided again with equal suddenness, leaving the artery empty to the touch between the heart-beats. On testing it with the sphygmomanometer, it was found that the pulse wave would withstand a pressure of nearly 160 mm. of mercury. On testing the collapsibility of the pulse when the arm was raised or lowered it was found that elevation of the arm did not (as in aortic regurgitation) increase the collapsing character of the pulse. On looking at the neck there was not only no pulsation of the veins, but there was a hollowing above the clavicles which suggested undue emptiness of the vessels.

As regards the heart there was no visible or palpable impulse anywhere, the cardiac area was small, decidedly less than normal, and the liver was not enlarged. The cardiac sounds were decidedly weak, and there was no murmur. The lungs and other organs appeared quite healthy.

This patient was evidently suffering from weakness of the heart muscle, and its degree was worse than in the second case described, for the heart had not sufficient strength to keep the superior cava and neck veins distended and pulsating as in the last case.

The diagnosis was heart weakness due to fatty degeneration, the result probably of diseased coronary arteries. A more complete analysis of the symptoms would have led to an even fuller diagnosis, but the importance of the collapsing pulse and the systolic pressure of 160 mm. coupled with the empty veins was not recognized till after the *post-mortem* examination revealed the true nature of the case.

The patient was given small doses of strophanthus and strychnine, and seemed to be improving when suddenly she had another fainting attack, five days after admission, and died a few hours later in a second attack. The earlier of the two attacks came on at 4 p.m. There was marked dyspnoea and cyanosis, with pain over the heart and left chest. The pulse was almost imperceptible. She rallied somewhat, but became worse an hour later. In this second attack she suddenly sat up in bed and then fell back dead.

At the *post-mortem* examination there was fatty degeneration involving the right ventricle, due to atheroma mainly involving the one coronary artery. The condition of the muscles of the left ventricle was good, and the artery of supply was patent. Here, then, was the explanation of the small powerful collapsing pulse.

The right side of the heart was too feeble to force the proper amount of blood through the lungs, and, as the condition had evidently developed slowly, the amount of blood in circulation had presumably diminished *pari passu* with the diminution in the strength of the right ventricle, and thus venous plethora, which might have been ex-

pected, had the failure of the right ventricle been less gradual, was not produced. The left ventricle was therefore underfilled at each beat, and, in order to get as large an amount as possible into the capillaries of the brain and elsewhere, the blood was thrown out of the ventricle suddenly and with force, the arteries being kept as contracted as possible. The rapid collapse of the pulse wave and the emptiness of the artery between the beats were due to the abnormally small volume of blood causing the pulse wave.

This case illustrates well the main signs upon which diagnosis of a fatty right ventricle with a fairly strong left ventricle is to be based—namely, great dyspnoea and weak right ventricular sounds coupled with absence of well-marked venous pulsation in the neck in combination with a regular and not very rapid pulse of small volume and fair strength. Where some amount of arterio-sclerosis is present, as in a case I saw some months ago, the rapid and great collapse of the pulse may not be noticeable, but where present, as in the case here noted and in one I have subsequently seen, its diagnostic importance is great. The prognosis, it is needless to add, is in such a case extremely grave.

These, then, are the three cases. The first showing heart weakness with diminution in the size of the cardiac area from damage to the heart muscle from the toxins or micro-organisms of acute rheumatism. In this case the left ventricle was rather weaker than the right, and the latter showed a slight amount of the adolescent type of dilatation and a pulmonary artery murmur. The second case was one of the muscular failure of the heart, without evident dilatation, due to malnutrition presumably from atheroma of the coronary arteries. In this case the left ventricle was more affected than the right.

The third case was exceptionally interesting owing to the limitation of the fatty degeneration to the right ventricle as well as from the absence of physical signs of cardiac failure except those associated with a relative emptiness of the heart and great vessels, and the weakness of the cardiac sounds, especially those heard over the right ventricle.

A CASE OF OBLITERATIVE ENDO-ANEURYSMORRHAPHY FOR POPLITEAL ANEURYSM.

BY

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ENDO-ANEURYSMORRHAPHY in its most recent form, as elaborated by Dr. Matas of New Orleans, is still so uncommon an operation in this country that the publication of even a single case in which it was employed needs no apology. The reasons for abandoning the old method of Antyllus in the treatment of aneurysm in favour of the classical Hunterian operation are familiar to all British surgeons. But the grounds for a return, more or less, to the direct operation on the aneurysm practised by Antyllus require some justification. These are so ably set forth in the writings of Dr. Matas that they need not be dealt with in any detail here. I will only recall the fact that in the Antyllian operation the artery was tied above and below the aneurysmal sac, and that the latter was laid widely open, packed, and allowed to heal slowly from the bottom by granulation. In the days before the Listerian era the risks of this procedure were obviously very great. In the first place sepsis at the point ligated was almost certain to be followed by severe haemorrhage, and sepsis in a ragged cavity such as the open sac, whatever material it was stuffed with, was most likely to occur in communication with an open wound. Moreover, severe haemorrhage could occur from the branches opening into the sac which belonged to the free anastomosis around it. The probability that under modern aseptic conditions these chief risks would disappear, as well as his experiences in the case of several traumatic aneurysms treated by direct opening of the sac and closure of the entering arteries from within, led Dr. Matas to the conclusion that much would be gained if aneurysms could be immediately obliterated on the principles of Antyllus, but without leaving the sac open to granulate up as he did, with all the risks of sepsis and of haemorrhage from the ligated main

branches or the unligatured branches communicating with the sac. At all events, in this way a minimum of interference with the collateral circulation would be secured, the main arteries and branches being severed at their entrance into the aneurysmal sac, and the latter would run but little risk of sloughing with a closed aseptic wound. Further experience convinced him that not only was "obliteration" of an aneurysm on these lines possible and safe, but that in those cases of sacculated aneurysms in which only a part of the circumference of the vessel had been expanded into the tumour, it was possible to "restore" the continuity of the parent vessel by suturing the walls of the sac over the opening in two firm rolls, the remainder of the sac being obliterated by suture from within. A further extension of this method led Dr. Matas to "reconstruct" an arterial channel between the afferent and efferent mouths of the parent artery from the walls of the sac in fusiform aneurysms. His success in this field and that of those surgeons who followed his methods has placed these procedures on a tolerably firm basis, and there appears to be good ground for the belief that further experience will show that the Matas method in one or other of its forms—the "obliterative," the "restorative," or the "reconstructive"—will give the best results in most aneurysms.

In the following case the oblitative method was the only one feasible, and in operating on it I followed as closely as possible the details to be found in Dr. Matas's publications.

Mrs. M., aged 51, was admitted into University College Hospital on May 23rd, 1911. She complained of a painless swelling behind the left knee present for six years. For the last year the lower part of the limb and foot had been swelled as well, and this gradually increased so much that she was obliged to take to her bed six weeks before admission, being unable to walk. On admission the swelling in leg and foot had subsided a good deal, but the tumour behind the knee was larger than ever, and the leg was somewhat dusky. The patient appeared to be generally healthy. In 1894 Mr. C. Heath removed a tumour from the right orbit, which was suspected to be a sarcoma, but turned out to be a gumma. A rash twenty years ago and scars below the left knee also pointed to syphilis, for which at that time she was treated with the usual remedies.

On admission, a large tumour occupied the whole popliteal space, and could be seen from the front to swell out on each side of the knee, and to pulsate strongly. All the common symptoms of aneurysm of unusually large size were present. An excellent skiagram showed that it lay upon the posterior broad surface of the femur, which was slightly eroded by it, and was sacculated and perfectly round, reaching high up and low down. The leg below the knee was oedematous and dusky, and neither anterior nor posterior tibial arteries could be felt in the affected limb though plainly palpable in the other. There was no anaesthesia of the leg. The arteries of the rest of the body appeared normal.

After rest in bed on moderate diet for a fortnight, digital compression was carried out for ten hours without any apparent effect on the aneurysm.

On June 7th I performed Matas's operation, closely following the details laid down by him. Spinal analgesia relaxed all the tissues perfectly. An Esmarch's bandage high up the thigh controlled all haemorrhage. A 9-in. incision in the middle line of the ham was necessary to expose the large aneurysm. The most prominent part of the sac was at once opened, and a large quantity of soft dark clot and then masses of more or less decolorized fibrinous material were evacuated. The sac was then seen to be incorporated with the periosteum of the posterior broad surface of the femur, and to be very thin at this part. The rest of it was thicker. The posterior part was very thick, and it was found that the popliteal vein was obliterated in it. The afferent and efferent arterial openings were widely separated, entering on the posterior aspect above and below in such a way as to forbid any attempt to restore the continuity of the vessel. The entering artery was closed by fine linen thread (No. 90), just at its junction with the sac, and the leaving mouth similarly. After careful search only one collateral branch could be found entering the sac from below on the inner side, and this was closed from within. The vein which had been mistaken for the artery at first was also tied above the sac, but being then found obliterated in the sac wall was not tied below. The walls of the sac, which had been left undisturbed with their surroundings as far as possible during the operation, were now wiped clean, and were folded and drawn together from within by several series of mattress sutures of the same fine linen thread. The rubber tourniquet was now removed, and a few very small bleeding points were secured. One small artery in the lower angle of the wound spouted freely, showing that the collateral circulation was good. The whole long wound was now closed from end to end without drainage. The limb was well packed with cellulose wadding and lightly bandaged, the foot being separately wrapped in cotton-wool.

Convalescence was absolutely uninterrupted. Warmth and colour returned and the swelling of the foot subsided rapidly.

There were no abnormal sensations in the leg. The stitches were taken out of the skin on the tenth day, when primary union was perfect without a flaw.

It was noticed during the operation that some collateral vein had apparently taken up the work of the obliterated popliteal vein, which relieved my anxiety when the latter was seen to be obliterated.

As to the ultimate result *qua* recurrence of the aneurysm, it is too soon to speak. There seems to be no abnormality of the conditions of the parts so far, and I hope to present the patient for examination at one of the societies later on. On this point Dr. Matas's figures are encouraging. Out of 85 aneurysms treated by his method, there were 28 popliteal treated by this oblitative procedure, in none of which were there any recurrences. It was among the "reconstructive" operations alone that relapses of the aneurysm occurred. In 13 such cases there were 4 relapses. As in my case a typical "oblitative" operation was done, there is every hope that it will be as permanent a cure as in all the other cases of this variety of the procedure recorded.

Here in London one has a natural, but perhaps too deeply rooted, feeling in favour of the classical Hunterian operation at a distance from the aneurysm.

But it must be admitted that the conditions under which operations are now done have marvellously altered for the better since Hunter's time, and our views as to the nutrition of diseased arteries have been modified. I confess I have been much impressed by the reasoning which Dr. Matas applies to this subject and by the results which have been obtained by his method. The case now recorded, though the first in which I have followed Dr. Matas (the only one, indeed, operated on by this method in our hospital), has impressed me much by the simplicity of the procedure and the result as contrasted with many other cases in which I have operated by older methods.

A CASE OF ANTHRAX TREATED BY SCLAVO'S SERUM.

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THE patient in the following case, a farmer, called to consult me about his hand on April 10th. It presented on the dorsum just above the wrist a typical malignant pustule about the size of a shilling. On hearing my diagnosis he said that he had had an outbreak of anthrax at his farm, but had not connected that fact with the sore on his hand.

History.

On March 29th one of his heifers died of anthrax, and as is the custom in this district, he cut off its ear to supply the veterinary surgeon with a sample of blood. While he was doing so blood from the ear ran over the back of his hand. On March 31st and April 1st two other cattle died, but he did not again help the veterinary surgeon.

On April 8th he noticed a pimple on the back of his left hand, but it was so insignificant and absolutely painless that he thought nothing about it. The following day it was a little bigger, but still painless, and he applied a poultice to it.

On April 10th, having noticed a small lump in the hollow of his elbow, he came on his bicycle to see me.

Treatment.

I made up my mind to excise the pustule, but as the patient's temperature was quite normal and he was feeling very well, I thought I had better get the Medical Officer of Health, Dr. Ledingham, to see it. We finally decided to cauterize the pustule and to wire for Sclavo's serum. The pustule was duly cauterized and he went home cycling.

Progress.

When he went to bed, two hours after seeing me, he felt quite well, but in the night his wife thought he was very warm, and, on taking his temperature, found it to be 103.8° F. in his axilla. She immediately sent to me a message to that effect, and I sent him out 5 grain quinine powders, one to be taken four-hourly. The following morning he was looking quite well, but his temperature was 102.6° F. The serum arrived, and that evening about 7 p.m. we injected 40 c.cm. of it—10 c.cm. in four different places under the skin of his abdomen. He was looking very ill by this time, was unconscious every now and then; his pulse was very weak and his temperature 105.6° F. We practically gave him up.

One hour after the dose of serum he began to rally, and his temperature began to fall until, at 12 midnight, it was 101° F.

At 3 a.m. the temperature rose to 104° F., and his wife, knowing that cattle always have a rise of temperature before death, got alarmed and sent for me.