

but slightly marked. No food or drink was given during the day, a few pieces of ice only being allowed. At 6 P.M. the temperature was 98.2° F. and the man seemed to be fairly strong and quite comfortable. At 7 P.M. severe hæmorrhage occurred, the dressings and sheet suddenly becoming saturated. The dressings were then removed and the blood was found to be coming from the lower end of the wound, which corresponded with the site of the trocar puncture. The wound was not reopened because I was certain that the hæmorrhage was not from vessels in the abdominal walls and because local treatment for hæmorrhage from the puncture in the sac did not appear feasible. Hæmorrhage again took place at 9 P.M., and also at 2.30 A.M. An ice-bag was then applied over the wound, a four-ply of iodoform gauze intervening, and no more hæmorrhage occurred. At 9 A.M. next day he was in a distinctly low condition, apparently suffering from shock from loss of blood, but not to any marked degree. He had vomited once or twice. The temperature was 99.6°, the pulse was weak (100), but quite perceptible at the wrist, and the respirations were 30 per minute and sometimes of a sighing character. He complained of extreme thirst. The wound was quite dry; the ice-bag was therefore removed and the dressings reapplied. He begged for lemonade, and some was allowed to be given him in small quantities. During the forenoon he vomited two or three times. He said he "wanted to cough, but could not." At 12 noon he was suffering from intense pain in the wound, and a hypodermic injection of morphine was given. At this time there was nothing in his condition to lead me to suppose that he was in any immediate danger of death. At 1 P.M. he was restless and inclined to retch. At 1.35 P.M. he died suddenly, the result, I have no doubt, of syncope, caused probably by his sitting up in bed, or attempting to do so, in order to vomit. He had lived twenty-seven hours after the operation.

At the post-mortem examination the stomach was found to contain an amount of fluid not warranted by the orders given regarding the quantity of drink to be supplied to him, and I have no doubt that the distended condition of the stomach tended to produce the syncope which caused the fatal issue. The aneurysm was found to be on the superior mesenteric artery. It had diminished very considerably in size after death in consequence of the cessation of tension in the sac. It was fusiform in shape, about six inches long, three inches and a half in diameter at the base, and somewhat less at the outer end. The dilatation commenced at the origin of the vessel and included the front wall of the aorta at this point. From the distal end of the sac the artery continued its course slightly dilated for an inch or so, but otherwise apparently healthy. The sac in its contracted condition was quite filled with firm recent clot entangled in the coils of wire, which were themselves entangled in each other, and its walls were lined with old laminated coagulum, this in parts being nearly half an inch in thickness. The adhesions of the tumour to the omentum had been broken down at the operation, but at the necropsy firm adhesions were found between its sides and the small intestines in its vicinity. There was no trace of blood in the abdominal cavity or any sign of commencing peritonitis. The sigmoid flexure and rectum were contracted to the size of the little finger, but they dilated to the normal diameter while being removed from the body, and no explanation of this condition was apparent. Both ventricles of the heart contained dark-coloured clots. The aorta in its whole length showed numerous patches of atheroma.

Mr. C. H. Moore of the Middlesex Hospital was the first surgeon to suggest the introduction of wire into the sacs of aneurysms not amenable to other methods of treatment. From a by no means exhaustive search through the literature of the subject I have collected records of ten cases of aneurysm treated in this way. Of these, two cases were cured, in two cases no definite result was produced, and in six cases death resulted. Mr. T. Holmes¹ has reported a case treated by Dr. Murray of Newcastle; the patient died from suppuration of the sac. Dr. Domville of Chatham² treated two cases with no definite result. Loreta³ introduced two metres of silver-plated copper wire into an abdominal aneurysm, and the patient recovered. Mr. Hulke⁴ introduced forty feet of steel wire into a thoracic aneurysm;

the patient died. Mr. Pearce Gould⁵ treated a thoracic aneurysm by means of thirty-two feet of steel wire; the patient died. Mr. Morse⁶ has reported a case in which he treated an aneurysm of the abdominal aorta by laparotomy and the introduction of one yard and a half of silver-plated copper wire, recovery taking place. Mr. H. Morris⁷ treated a case of abdominal aneurysm, but only one foot of wire could be passed; the patient died. Guido Baccelli of the Italian Paris Academy of Medicine recommended the use of watch springs for the purpose under consideration, and this was done twice unsuccessfully. The two cases above referred to as "cured" are probably the only ones in which this result has been achieved by this means. In considering the question of the propriety of performing this operation, I take it that the surgeon would only be justified in the procedure: (1) when his patient was in imminent danger of death from impending rupture of the sac of an aneurysm which was not open to treatment by other means offering a hope of cure; and (2) when the probable result of the treatment had been clearly explained to the patient, and he expressed himself as anxious that it should be undertaken. Both these conditions existed in the above case. The man's death, no doubt, was due in a secondary way to hæmorrhage. He died from syncope eleven hours after all bleeding had ceased and when he was apparently in a fair way to recover from its effects. A short time before his death his temperature was 99.6°, and his pulse was quite perceptible at the wrist. He was not, therefore, in a condition of collapse from loss of blood; but he was in a sufficiently low state to allow of the effort he made inducing a syncope from which the heart did not recover. As regards the hæmorrhage from the trocar puncture, I have no explanation to offer for its occurrence. The instrument was specially made for the case, and was extremely small, only large enough to pass the smallest steel wire made, and all bleeding from it quite ceased a few seconds after the cannula was withdrawn. In the accounts of other cases similarly treated hæmorrhage from the puncture is not mentioned as one of the dangers to be considered. The mechanical effect of the wire towards the formation of coagulum within the sac was found at the post-mortem examination to have been all that could have been desired so far; the sac was found filled with firm clot entangled in the coils of wire. But, after all, the question arises: Had the man lived long enough for the process of cure of the aneurysm to proceed so far as to block the vessel, what would have been the effect of this state of things on the nutrition and blood-supply of that portion of the intestinal tract supplied by the superior mesenteric artery?

The coloured illustration (painted by Surgeon-Colonel Irving) is an excellent representation of the aorta, the aneurysmal sac, and the wire and coagulum *in situ* soon after removal from the body; the specimen itself is in the museum of the Army Medical School, Netley.

Netley.

A CASE OF DOUBLE POPLITEAL ANEURYSM.

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A MAN thirty years of age was admitted into Haslar Hospital on Aug. 16th with an aneurysm in each popliteal space. The left one was a large sacculated aneurysm displaying the usual characters of that disease, whilst the right was considerably smaller and more elongated in form. There was nothing definite in the history of the case to account for the occurrence of these two aneurysms except that the man's general health was not good and that he thought he had strained himself whilst standing about on board a rolling ship at sea. Owing to my absence on leave at the date of the patient's admission to hospital, the case was taken in hand by Surgeon Townsend, who began to treat the left (or larger) of the two aneurysms by slow or intermittent pressure, leaving the other alone for the time being. By the application of Carte's tourniquet to the left femoral, according as it could be borne, consolidation gradually took place and at the

¹ THE LANCET, June 8th, 1872.

² THE LANCET, Aug. 26th, 1871.

³ The case was first published in the Memoirs of the Royal Academy of Sciences of the Institute of Bologna, Feb. 8th, 1885.

⁴ THE LANCET, Feb. 27th, 1886.

⁵ Brit. Med. Jour., Oct. 12th, 1889.

⁶ The Pacific Record for 1887.

⁷ THE LANCET, April 16th, 1887.

end of five weeks was completed and the aneurysm cured, a large, hard, non-pulsating mass remaining in the popliteal space. Having now returned to duty I determined to undertake the treatment of the right aneurysm by the method with which my own name is associated in surgical writings, and which consists in locking up the blood in the aneurysmal cavity by means of elastic appliances sufficiently long for its coagulation *en masse*, and not by the deposition of fibrinated laminæ as usually follows treatment by ligature or slow pressure. I began by keeping the patient at rest for a few days on a light non-stimulating diet. Iodide of potassium was also administered with the view of increasing the plasticity of the blood. Carte's tourniquet was occasionally applied to the femoral for the purpose of opening up the collateral circulation preparatory to the occlusion of the vessel by the rapid consolidation of the aneurysm. On Oct. 3rd, the patient consenting to take chloroform if necessary, I carried out the method originally described by myself,¹ using in addition a protector over the aneurysm so as to take the pressure of the elastic bandage. This was made of gutta-percha so as to cover the tumour in the popliteal space with the joint somewhat flexed, and sufficiently strong to protect it effectually from direct pressure. I now applied an elastic bandage firmly and evenly from the toes upwards and over the protected aneurysm to the level of the middle third of the thigh. Here a soft elastic constrictor was secured over several turns of a flannel bandage. The elastic bandage and protector were now removed, whilst the constrictor was kept in position. The blood was thus locked up in the aneurysmal cavity, whilst the rest of the limb below the constrictor remained bloodless. It is important to render the limb bloodless in this way, as otherwise coagula might form in the veins and smaller arteries during the arrest of the circulation by the constrictor. Were they to do so there might be a risk of their interfering seriously with the circulation through the limb after the main vessel has become obstructed by the rapid consolidation of the aneurysm, and the blood-supply has to be passed down by the collateral branches with diminished force. The patient was now covered with warm blankets, the limb being semi-flexed and the elastic constrictor remaining in position. He complained of no pain during the first forty-five minutes; after this he began to feel much distressed, but preferred to do without chloroform. At the end of an hour—the aneurysm being then hard, solid, and decidedly smaller—I carefully adjusted a Carte's tourniquet upon the femoral, and removed the constrictor and flannel bandage; but about five hours afterwards on easing off the tourniquet a pulsation (faint, tremulous, and at times hardly perceptible) was felt in the aneurysm. This symptom occurring at this stage has been noted in other cases treated by the same method, and was referred to by Mr. Pearce Gould in an interesting paper read by him at the International Medical Congress in 1881, when this mode of treating aneurysm was discussed. Mr. Pearce Gould explains its occurrence by the clot contracting more rapidly than the sac upon it, thus leaving a space between the two, which after a time becomes filled either by the deposition of fibrin or by further contraction of the sac. In the present case it ceased after five days, and the vessel became occluded in the lower part of Hunter's canal. It is instructive at the date in which I write to observe the conditions arising from the treatment of these two aneurysms in the same patient by methods differing essentially from each other in principle. In the left one, treated by slow and intermittent pressure, which aims at consolidation by the gradual deposition of fibrinated laminæ in the cavity of the aneurysm, the remains now form a hard, unyielding lump in the popliteal space, causing a good deal of discomfort to the patient and interference with the use of the limb. It must be some time before this mass of fibrin can be absorbed to any extent and cease to trouble the patient. On the other hand, in the right aneurysm, treated by a plan which aims at the rapid formation of an ordinary blood-clot in the aneurysmal cavity, the soft material has contracted as well as the sac which encloses it, so that there is only a small mass left in the floor of the popliteal space, which can hardly be distinguished by the observer and is not felt by the patient in any way. Another point of difference in the results is that in the left limb, treated by the slow method, no pulsation can be felt in the femoral

artery below the origin of its deep branch in the groin, whilst in the right limb the femoral can be felt pulsating in the lower part of Hunter's canal. In my original case, in which the patient died eight months after cure from other causes, I had an opportunity of examining and making a preparation of the parts. This preparation is now in Haslar Museum and shows that the vessel is only occluded for about two and a half inches of its course.² It would appear, then, from these two cases that when this plan of treating popliteal aneurysm is successful the circulation is brought down through the main vessel of the limb and becomes finally arrested only a short distance from the aneurysm, as if, in fact, the latter were cut out and the vessel tied.

Haslar.

THE CONDITION OF THE BLOOD IN THE CYANOSIS OF CONGENITAL HEART DISEASE.¹

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NOTWITHSTANDING the numerous works published within recent years on the state of the blood in disease, we nevertheless not only need information as to the changes which it undergoes in a great variety of different conditions, but we also require explanations to account for many of the alterations which are generally recognised. This is the case even in regard to some of the affections met with in every-day practice; in the disturbances of the circulation produced by valvular diseases, for example, there are some modifications of the blood of common occurrence, but as yet insufficiently known and inadequately explained. More particularly is this true of the state of the blood in the cyanosis of congenital heart disease, which presents changes which have from time to time been recorded, but have not yet received satisfactory elucidation. A most interesting case of congenital disease of the heart has lately been for some time under my observation, and from the clinical features presented by the patient some conclusions have been forced upon me to which attention will in this paper be briefly directed.

A boy aged eight years was admitted to the Deaconess Hospital on Oct. 25th, 1894, complaining of breathlessness on exertion. Both parents were alive and had always been healthy; he was one of a family of eleven, of whose members two sons had died, one from scarlet fever and another from hydrocephalus, but the remaining six sons and two daughters were in good health. At the time of his birth the patient was apparently a healthy infant, but when a few months old he became bluish in colour and had always since been delicate. He had an attack of scarlet fever some years ago from which he recovered perfectly. On admission he was observed to be deeply cyanosed; the skin everywhere was of a bluish tint, the lips were almost black, and the conjunctivæ were dusky. The fingers and toes were markedly clubbed, and the nails, which were much curved, were almost black. The patient was 3ft. 9in. in height, and weighed 2st. 10lb. The temperature was below normal, but has fluctuated between 97° and 99° F. The alimentary system showed no symptoms of disturbance. The second dentition was in progress. The tongue was clean, but of a very dark purple colour. The liver exactly reached the costal margin in the right mammillary line. The hæmopoietic system presented some interesting facts. The spleen reached to the mid-axillary line, and was therefore of the usual size. On examination of the blood with the hæmoglobinometer the hæmoglobin was found to be 110 per cent. With the Thoma-Zeiss hæmocytometer the red corpuscles were seen to be 8,470,000 per cubic millimetre, while the white corpuscles numbered 12,000. The spectroscope showed the characteristic double band of oxyhæmoglobin. With regard to the circulatory system, the patient on any exertion became much more cyanosed and panted violently, but when lying quietly in bed showed much less cyanosis and almost no breathlessness. On inspection there was no visible pulsation in the neck, and in the precordial region there was no impulse save the apex

¹ THE LANCET, Sept. 25th, 1875.

² THE LANCET, Aug. 5th, 1876.

¹ Read before the Edinburgh Pathological Club on Dec. 19th, 1894.