Four cases of gangrene / by Albert Vander Veer and Edgar A. Vander Veer.

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Plate I.

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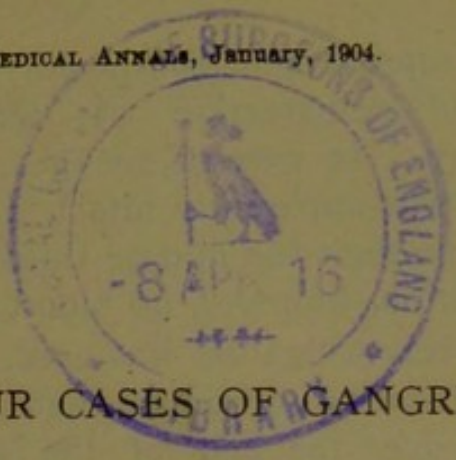

FOUR CASES OF GANGRENE.

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ONE CASE OF EMBOLISM OF THE ANTERIOR AND POSTERIOR TIBIAL ARTERIES DURING AN ILLNESS OF TYPHOID FEVER; GANGRENE: AMPUTATION THROUGH THE MIDDLE THIRD OF LEFT LEG. —TWO CASES OF EMBOLISM OF THE BRACHIAL ARTERY; AMPUTATION OF THE ARM.—ONE CASE OF ARTERIO-VENOUS ANEURISM, FOLLOWING GUN-SHOT WOUND OF THE POPLITEAL VESSELS; AMPUTATION OF THE THIGH, THIRTEEN YEARS AFTER RECEIPT OF THE INJURY.

Embolism of Anterior and Posterior Tibial Arteries, in an Attack of Typhoid Fever

CASE I. Mr. J. N. S., aet. twenty-one years; single; clerk by occupation; habits excellent; July 18, 1873, during the third week of typhoid fever, was suddenly seized with a severe pain in the top of his left foot, which required large doses of morphine to relieve. Pain afterwards extended to the inner side and sole of the foot; within twenty-four hours the parts became cold and no pulsation could be felt in the anterior and posterior tibials. His heart's action was rapid, the condition of the radial pulse feeble, an anxious expression of the face, and a general state of profound shock, lasting for a period of thirty-six hours, the temperature dropping from 103° to sub-normal. Under stimulation and heart tonics an improvement took place; his stomach responded promptly to the taking of brandy, and, although the discoloration of the foot was now distinct, yet he was relieved of his great suffer-

ing, and a gradual improvement continued. At the end of ten days the line of demarcation was well observed and amputation necessary. In view of his age, and the fact that the popliteal artery was apparently intact, it was thought wise to do an operation through the middle third of the leg. At the point of amputation, however, no blood vessels could be recognized, and scarcely a ligature was used. The stump did fairly well, yet an irritation developed, and at times an open ulcer would present over the end of the tibia, giving the patient more or less distress. He went on to complete convalescence, regaining his strength quite rapidly and put on an unusual amount of flesh. In wearing an artificial limb the irritable stump gave him a good deal of discomfort, and a second operation was done February 6, 1880. A portion of the bone was removed and a very good recovery followed. Since then he has been able to wear his artificial limb with a great degree of comfort.

At the time this case occurred not very many similar cases of arterial embolism, associated with typhoid fever, had been reported. Scarcely any of the text-books referred to the subject. Since then, however, the literature has grown, and to-day most of our text-books on surgery have some reference to this complication. The case is somewhat interesting and unusual in reference to the age of the patient, as he gave so clear a history in the absence of any pathological condition of the system. There were no specific lesions, no marked hereditary tendencies, and he was not specially exhausted when seized with the attack of typhoid fever.

Recently there have been some very interesting cases of typhoid arteritis reported, among patients as early as nine years of age, in which they would apparently be near the point of convalescence, when a rise of temperature would present, with symptoms that seemed to indicate a reinfection. There would be present tingling of the fingers or toes, great tenderness, the surface of the parts would feel cold, and in some instances become quite discolored; however, the arteritis would yield to treatment, the pulse return and the patient go on to recovery without loss of tissue.

Dr. A. Vander Veer has had in his practice one case of typhoid fever, that of a young lady, in which there must have been a thrombosis of the middle cerebral artery, during

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the very marked symptoms that appeared in the third week of the disease, followed by epilepsy, and after years of suffering, death.

This subject is one of great interest, particularly in the pathology and treatment of these cases.

Embolism of the Brachial Artery.

Case II. Miss G., aet. seventy years; housewife by occupation. Family and past history not obtained.

On November 23, 1897, patient was taken ill with pneumonia of the left lung. December 4, an embolism of the left brachial artery, accompanied with great pain, appeared, gangrene of the hand following, and gradually extending up the arm, until a line of demarcation showed about midway between the elbow and wrist.

December 10, Dr. A. Vander Veer saw the case in consultation with Dr. P. A. Hayes, her family physician. Amputation was advised and accepted. Arm was amputated just below the shoulder-joint. No ligatures were needed as the vessels were all occluded. The stump was slow in healing, there being much sloughing of the tissues. Eventually, however, a good stump was obtained. Patient remained in fairly good condition until May, 1902, when she fell and sustained a fracture through the neck of the left femur, from which she has made a slow recovery. (See Plate I.)

Case III. Mrs. Jennie B., aet. thirty-three years; native of United States; housewife by occupation.

Family history negative.

Past history:—Patient is the mother of two children, one ten and the other six years of age. Has had no miscarriages. She gives the history, however, of impaired health for several years, with a tendency to the development of chronic pulmonary disease.

Present illness:—On December 22, 1902, patient was seen by her family physician, Dr. A. Beach, of Coxsackie, N. Y. At that time she was five months' pregnant, and had a slight uterine hemorrhage.

The doctor prescribed for her and was not called again until January 17, 1903. At that time her tissues were oedematous, with scanty renal secretions, and the urine, upon

applying the usual tests, one-half albumin. This latter condition increased in a few days to an almost solid precipitate.

January 26, labor pains came on and in a few hours she was delivered of a stillborn child. The placenta was a marked example of fatty degeneration, and, apparently, came away complete. For several days following delivery nothing unusual occurred, and there was every prospect of a speedy recovery.

February 2, one week after delivery, she had an attack of dyspnoea, so severe that it was necessary to set her up in order to breathe. Her temperature was several degrees above normal, pulse accelerated, and crepitation over a part of both lungs, but at no time positive evidence of solidification. The dyspnoea and other unpleasant symptoms yielded promptly to treatment.

February 5, the right arm became suddenly blanched; there was an absence of the radial pulse, and other symptoms of obstruction of the brachial artery, near the axilla. In a few days a line of demarcation formed between the elbow and the wrist, with sluggish circulation nearly up to the shoulder. As there was danger of septic absorption, with its attendant unfavorable symptoms, it was deemed advisable not to defer amputation.

February 11, Dr. Edgar A. Vander Veer was called to see the case in consultation with Dr. Beach. At that time the fingers were gangrenous and a line of demarcation could be made out just below the elbow-joint. The whole arm, however, was oedematous. The pulse was 110, of a fair quality; temperature 101.2°. The patient was weak and emaciated and not in the best possible condition for an operation. Amputation, however, was advised, and assisted by Doctors Beach, Van Slyke and James N. Vander Veer, amputation was done through the upper third of the arm.

Upon removing the Esmarch there was hardly any bleeding from the flaps, and the vessels, even at this high point, seemed thrombosed. The patient stood the operation well and came out from under the influence of the anaesthetic without any unfavorable symptoms. She began to improve speedily and March 24, there was almost complete union of the flaps. There is almost complete disappearance of the cough and other pulmonary symptoms. November 1, 1903,

patient is in excellent health and doing her housework. (See Plate II.)

It is reasonable to believe that in these two cases there was a general infection of the system, in the one instance being due to the pneumococcus and in the other to the streptococcus. These organisms circulating in the blood caused thrombi to form on the mitral or aortic valves of the left ventrical; these clots, in turn, becoming loosened, formed emboli and entered into the circulation. In the first case the embolus reached the right axillary artery and formed an obstruction which completely shut off the supply to the arm. In the other case the embolus reached the left axillary artery and acted in the same manner. That a thrombus was caused by feeble circulation of the part does not seem probable as the patients were in excellent health previous to the illness. Also there was no indication of any inflammation of the walls of the arteries themselves.

Gunshot Wound in Popliteal Space, Followed by Arterio-Venous Aneurism

Case IV. Mr. J. P., aet. seventeen years, on the morning of July 4, 1880, while walking through the yard in the rear of his father's residence, heard the report of a pistol, and soon after realized that he had been shot. Dr. A. Vander Veer was called to see the case a couple of hours afterwards, by his family physician, Dr. Cook, and upon examination they found a wound indicating that a ball had entered the popliteal space of the right leg. There had been quite free bleeding, which was now under control, but considerable of a haematoma presented. Pulsation in the posterior tibia was very weak, and while a probe was not used to any extent, yet they could not locate the bullet. It was thought best to elevate the foot, apply aseptic dressings and keep the patient absolutely quiet. The question of enlarging the opening, rolling out the clots, finding the injured vessel, and ligating it, was carefully considered, but it was thought at the time that it was mostly an injury of the vein and that, unless hemorrhage presented, it would not be wise to interfere with the artery itself, the patient being kept under close observation in the meantime. No untoward symptoms presented. The case progressed favorably, the wound healed without

suppuration, and no further attempt was made to find the ball. The patient was seen about six months after the injury when there was every indication of an arterio-venous aneurism presenting. The case was now laid before his parents, yet it was their feeling and expression that they did not wish to have an operation done. In talking the case over with Dr. Cook it was thought wise to keep the patient under observation and watch for such complications as might present. Mr. P. moved away from the city and was gone for a long time, but later returned and presented an unusual history of venous trunks being very much enlarged, and an aneurismal dilatation extending up towards Scarpa's triangle. Ulcers began to form about the leg and it was feared he might have serious hemorrhage if not relieved. The case was presented to him plainly and he readily consented to the operation, with the understanding that if it were possible to ligate the venous trunks, also repair the arterial supply, and save the limb this procedure would be carried out. Upon making an incision, February 21, 1901, the bleeding was very great and it was found impossible to accomplish anything short of an amputation through the thigh.

With our present knowledge of the repair of arteries, in a case like this, it would undoubtedly be the better surgery to cut down, expose the bleeding vessels, and if the artery were torn in such a manner as to prevent stitching, then make a clean resection, doing an end-to-end anastomosis, also taking somewhat similar care of the vein. We all know how serious is the ligation of the popliteal artery, as regards the blood supply to the leg, and that, in the past, a number of cases of gangrene and mortification have been reported, due to operations upon this vessel.

At the time of the operation the ball was found deep down in the popliteal space, towards the lower end of the femur, encysted, and not in the aneurismal sac.

The illustration does not give a complete presentation of the enormous venous trunks that were found at the time of the operation. (See Plates III and IV.)

When we read over the literature in regard to gangrene of the extremities, one is struck by the small amount written upon the subject. In fact, the only text-book that makes any reference to the subject, so far as we could obtain, was

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the *International Text-Book on Surgery*. In this the opinion is expressed that the embolus comes from the left side of the heart, is swept into the blood current, and, in cases of gangrene of the upper extremities, generally blocks the artery immediately below the axilla. Stengel, in his *Text-Book on Pathology*, expresses the opinion that emboli in the arterial circulation, following septic conditions, are formed in the blood by a peculiar fibrin ferment of the germs themselves. The circulation in the whole body, particularly in the heart, becomes sluggish, this ferment causes the blood to coagulate on the walls of the heart, and thus the thrombus, and eventually the embolus, is formed.

In the second case, that of a patient seventy years of age, the embolus might possibly have been caused by poor circulation, the patient having reached that time in life when the arteries are more or less atheromatous and the circulation sluggish; however, the fact of her having lived so long after the operation, and having made such a good recovery, would mitigate against this idea.

In the third case there might possibly have been an acute endocarditis, due to the general septic condition of the patient, this endocarditis causing an exudate on the walls of the heart which was swept off and caught in the brachial artery.

Some authors speak of secondary shock, that is vaso-motor disturbance. This condition has been recognized since the history of surgery has been recorded, but unquestionably it is many times confounded with concealed hemorrhage or infection. This secondary shock is developed up to an interval of several hours to one or two days after the operation, and is dependent upon the formation of blood clots, which may cause death by directly embarrassing that organ, or, more remotely, by fragments becoming detached and plugging the arteries in the different parts of the body. In both of these cases reported, however, the period of the onset of the disease was so remote that this conjecture can be set aside.

When one thinks of the sudden deaths following operations, it is generally found that the thrombus has formed in the venous circulation, and caused death by stoppage of the heart, or of the lung, the arterial circulation seldom being affected.

Keen, in his *Text-Book of Surgical Complications and Sequels of Typhoid Fever*, says, that gangrene of the extremities, in typhoid fever, is due to obstruction of the circulation. The three factors causing gangrene are altered blood, weakened heart, and the mechanical difficulties of the circulation in distant parts, especially the last two, still hold good, but there must be added to them the important rôle of the typhoid bacillus in assisting, and often, it may be, in directly precipitating, the coagulation of the blood, which is the cause of the obstruction. Four varieties of obstruction may therefore exist and sometimes co-exist: First, arterial emboli of cardiac origin; secondly, autochthonous thrombi in the arteries; thirdly, autochthonous thrombi in the veins; and, fourthly, probably, though he thinks there have been no cases absolutely demonstrated pathologically, thrombi in the small peripheral vessels.

Arterial emboli of cardiac origin have been observed not only at postmortems, but clinically. Thus, Hayem observed the alteration of the heart two days before gangrene of both legs commenced, the first symptom being acute pain in the legs, with a sensation of cold. Pulsation disappeared first in the dorsalis pedis, then in the popliteal, then in the femoral. Amputation showed that, although the arterial walls appeared to be healthy, the femoral artery was partly obstructed by clot.

Cases one, two and three are particularly of interest, in reference to the suddenness of the attack, the very decided arrest of the circulation, and eventually terminating in gangrene of the parts. Another interesting point to be observed is the very complete obliteration of the blood vessels, scarcely a ligature being required, and no secondary hemorrhage occurring later on.

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