A case of extensive arteriosclerosis simulating aneurysm of the arch of the aorta / by John M. Swan, M.D., demonstrator of osteology, University of Pennsylvania; instructor in clinical medicine, Philadelphia Polyclinic; pathologist to St. Mary's Hospital.

A CASE OF EXTENSIVE ARTERIOSCLEROSIS SIMULATING ANEURYSM OF THE ARCH OF THE AORTA.

BY

JOHN M. SWAN, M.D.

FROM THE

UNIVERSITY OF PENNSYLVANIA MEDICAL BULLETIN,

JANUARY, 1904.

Reprinted from the University of Pennsylvania Medical Bulletin, January, 1904.

A CASE OF EXTENSIVE ARTERIOSCLEROSIS SIMULATING ANEURYSM OF THE ARCH OF THE AORTA.[1]

By John M. Swan, M.D.,
Demonstrator of Osteology, University of Pennsylvania; Instructor in Clinical Medicine, Philadelphia Polyclinic; Pathologist to St. Mary's Hospital.

The patient, whose case I herewith report, was a well-developed negro male, aged, at the time he first came under observation, about fifty-two years, and at his death about fifty-four years. He was born in Washington. He entered the United States Navy in 1867, and served until 1871. He had yellow fever, smallpox, dysentery and pleurisy, and a disease that he calls Chagres fever, which I judge from his description was malaria. He did not have typhoid fever nor scarlet fever, and he denied having gonorrhœa and syphilis.

I first saw him in January, 1901, when he was complaining of severe pains in his chest. He had been complaining of pain behind the sternum for a year or two. This pain began behind the sternum and ran through the chest beneath the left nipple,

[1] Read before the University of Pennsylvania Medical Society, November 20, 1903.

but not down into the arms. The pain was made worse by walking, and then became so bad that he lost power in his arms and became nauseated. This pain had been getting worse, and recently, while at the University Dispensary, he had a violent attack which was accompanied by vomiting. Vomiting usually appeared only on exertion. The chest pain was made worse by eating, although there was no pain in the stomach. The patient belched some gas, his bowels were usually regular, but he had spasmodic attacks of diarrhœa, when he sometimes passed blood. He attributed this to his former attack of dysentery. He slept poorly; his appetite was good; he had some headache; his eyesight was poor, and he passed plenty of urine.

On examination of his chest the respiratory sounds were found normal, and the following note was made about his cardiac condition: "Apex in fifth interspace, midclavicular line. Dulness, third interspace, midclavicular line, fifth interspace, midsternal line. There is a rough systolic murmur at the apex, transmitted toward the axilla for about two fingers' breadth. The aortic diastolic sound is accentuated. Pulse 68 per minute, regular, full, and strong. No evidence of aneurysm."

A urine examination made at that time gave the following result: pale, acid, 1020, moderate amount of cloudy sediment; microscopic examination showed a few leukocytes and cylindroids; chemical examination showed the presence of phosphates, but neither albumin nor sugar.

His condition improved under treatment with blisters, sodium iodide, and nitroglycerin.

Early in the evening of March 7, 1901, the

patient complained of pain in his stomach, which was followed by vomiting. He walked to his home, a distance of about two squares, and when seen he was sitting up in a chair complaining of the pain. He said that he had vomited twice. He did not lose consciousness, and was not paralyzed. During the night he took a powder every hour containing one-eighth of a grain of calomel, one grain of pepsin, and two grains of sodium bicarbonate. He said that he vomited after taking each powder, and in the morning he found that he could not move his right leg or his right arm. There was, however, slight voluntary movement in the right arm, and the plantar reflex was present and somewhat exaggerated. The pupils were contracted, and the left pupil did not react to light. Three days later the following note was made: "Loss of motion in the right leg and arm is complete. The family say his speech is thick. Tongue protruded straight; pupils as at last note; forehead wrinkled alike on both sides; no facial paralysis; knee-jerks absent on both sides; plantar reflex diminished; cremasteric reflex present. There are dark patches on the skin of the abdomen, said to be due to blisters, and scars from old ulcers on both legs. Patient again denies syphilis. Heart regular, no murmurs. Urine: amber, acid, 1030, moderate amount of sediment; microscopic examination showed cylindroids, leukocytes, and mucus; chemical examination showed phosphates in abundance and a trace of albumin, but no sugar.

On March 20th the urine examination gave the following result: amber, acid, 1030, moderate amount of sediment; microscopic examination showed a few hyaline casts and uric acid crystals;

chemical examination showed a trace of albumin, but no glucose.

From April 13, 1901, to May 3, 1901, he was in the Presbyterian Hospital, where his hemiplegia was treated with electricity. While in that institution he had neither albumin, casts, nor sugar in his urine.

During the last half of 1901 and the greater part of 1902 he went to the Dispensary for Nervous Diseases of the University Hospital for the treatment of his hemiplegia with electricity. There the following note was made: "Paretic in right arm and leg. Reflexes plus on right side, ankle-clonus present, Babinsky sign present, no astereognosis present."

In March, 1903, the patient began to complain more insistently of severe pains in the chest. These pains began on the right side of the sternum in the region of the manubrium, and radiated to the back and to the left side of the thorax, and sometimes into both arms. They were not the pains of angina pectoris, but suggested those observed accompanying aneurysm. They usually came on at night and kept him awake. In consultation with Dr. Edsall it was agreed to send him to the University Hospital, where an *x*-ray examination might be made to determine the presence or the absence of aneurysm of the aorta. Dr. Edsall said at the time that the pains might be due to the extensive arteriosclerosis which he demonstrated at his examination. The *x*-ray examination was made by Dr. H. K. Pancoast, who diagnosed the presence of an aortic aneurysm from the shadow seen in the course of the descending portion of the arch of the aorta. This shadow indicated that the aorta was abnor-

mally dilatable, and the extent of the dilatation was interpreted as due to aneurysm.

After remaining in the hospital for twelve days the patient was discharged at his own request. On the night of May 27, 1903, he had an unusually severe attack of chest pain, and he was again admitted to the ward, May 28, 1903, when the following notes were made: "Physical examination: Patient is a well-nourished negro male subject. Muscles and panniculus adiposus well developed. Patient lies in dorsal decubitus. No general or local rise of temperature. Skin is moist, no perceptible eruption. Superficial arteries show distinct arteriosclerotic changes. Postcervical and epitrochlear lymph nodes somewhat enlarged. Head of characteristic African shape. Scalp and hair in good condition. Lips are full, and of good color. Teeth are irregular and decayed. Tongue moist, slightly coated. Gums of good color and moist. Eyes dark brown; scleræ dirty yellow; some growth on conjunctiva of right eye reaching from the internal canthus to the cornea; pupil of the right eye is irregular; left pupil reacts to light and accommodation. Neck is short and full; no unusual pulsations noted; no thyroid enlargement; no restriction of laryngeal movements; no tracheal tug. Chest is of good conformation, soft tissues very well developed and nourished; movements equal, unrestricted, and of good amplitude. Apex beat in fifth interspace, just within the midclavicular line, regular, forcible in character, impulse somewhat heaving. Percussion of lungs shows a good resonant note over normal area of resonance, no pathological findings except a slight impairment of resonance to the right of the sternum in the

second interspace. Auscultation of the lungs is negative except for a slightly exaggerated breathing over the upper half of the left chest posteriorly. Cardiac dulness, third rib, fifth interspace, mid-clavicular line, one finger breadth to right of sternum ; outline doubtful on account of the thickness of the chest wall. Auscultation of the heart shows a slight roughening of the first sound at the apex and at the pulmonary cartilage. No murmurs at the aortic cartilage. Cardiac sounds are unusually plainly audible to the right of the sternum in the first and the second interspaces. Abdominal walls are thick and relaxed, nothing abnormal noted. Liver dulness extends from lower border of the fifth rib to the costal margin. The spleen is not palpable, and is not enlarged to percussion. Blood examination : erythrocytes, 5,190,000 ; leukocytes, 9360 ; hæmoglobin, 84 per cent. Urine examination : clear amber, acid, 1021, slight flocculent precipitate ; microscopic examination shows a few hyaline and finely granular casts and amorphous urates ; chemical examination shows a trace of albumin, no sugar.

During his stay in the hospital he became markedly toxic ; at first he was much excited, talked incoherently, and wanted to get out of bed ; later he became quiet and unconscious, with stertorous breathing. He became constipated, and his abdomen became painfully distended and quite tympanitic. On the morning of June 4th he had a slight clonic convulsion, lasting about two minutes, and followed by unconsciousness and a deviation of the right eye to the right side. The albumin disappeared from the urine after admission and could not be demonstrated again. While uncon-

scious he passed large quantities of urine involuntarily, in which a few hyaline casts were found. He was taken home from the hospital on the afternoon of June 5, 1903, and died at about 6 o'clock that evening.

NECROPSY RECORD.

Pathological Diagnosis. Distention of the intestines; pleural adhesions (left); hypostatic congestion of the lungs; emphysema of the lungs; pigmentation of the lungs; hypertrophy of the left ventricle of the heart; sclerosis of the aortic and mitral valves; chronic parenchymatous nephritis with contraction; cysts of the kidneys; fatty infiltration of the liver; atheroma of the aorta; cyst of the lenticular nucleus; cyst of the pons; arteriosclerosis of the cerebral bloodvessels.

The necropsy was made about twenty hours after death. The body of a well-developed, well-nourished, and muscular negro male; apparent age forty-five years. Rigor mortis well marked.

Abdominal Cavity. On opening the abdominal cavity the transverse colon and the small intestine were seen, very much dilated, filling the entire space below the costal arch. The liver and the stomach could not be seen.

Thoracic Cavity. On opening the thoracic cavity the organs were seen occupying their normal positions and relations. The left pleural cavity was crossed by numerous bands of old adhesions, which extended from the lung to the thoracic wall, from the level of the third rib to the diaphragm. These adhesions were particularly dense at the lower

portion of the cavity, and when torn caused the rupture of the lung tissue. The right pleural cavity was free from adhesions and was normal in appearance.

Heart. The heart was slightly enlarged. The pericardium was normal. The left ventricular wall was much hypertrophied, but the cavity of the ventricle was not dilated. The aortic valves were thickened at the edges; the mitral valve leaflets were also a little thickened at the edges. The right ventricle contained a large chicken-fat clot. The pulmonary valves were normal; the tricuspid valve leaflets were normal. The coronary arteries were not examined.

Lungs. The lower lobe of the left lung was closely attached to the thoracic wall and to the diaphragm by old pleural adhesions, which when torn tore the lung substance. This lobe was the seat of marked hypostatic congestion, and when torn allowed the escape of considerable dark blood into the pleural cavity. The superior lobe of the left lung was pigmented and congested and showed numerous subpleural areas of emphysema. The right lung was deeply pigmented, crepitant throughout, and showed areas of subpleural emphysema. The lower lobe was the seat of decided hypostatic congestion.

Kidneys. The left kidney was smaller than normal. Two cysts were seen beneath the capsule. The organ was congested. There was a fair amount of cortex, but the Malpighian pyramids were distorted. There were numerous dark-red lines and alternate streaks of yellow through the cortex. The cysts contained a dark fluid. The right kidney resembled the left in appearance. There was one

large cyst visible beneath the capsule, the contents of which were the same as of the cysts in the left kidney.

Spleen. The spleen was about normal in size, dark in color, and firm in texture.

Liver. The liver was about normal in size and showed some evidence of fatty change. The gall-bladder was filled with dark bile; there were no calculi.

Stomach. The stomach was dilated and contained a considerable amount of blackish material. There was no evidence of blood in its contents. The mucous membrane was pale and unbroken.

Aorta. The arch of the aorta was uniformly dilated to a slight degree. There were scattered atheromatous patches in the intima, but this coat was not broken in any place. The thoracic and the abdominal aortæ were of normal size and contained numerous small patches of atheroma. There was no evidence of aneurysmal dilatation at any place.

Œsophagus. The œsophagus was normal.

Trachea. The mucous membrane of the trachea was injected.

Brain. The calvarium showed nothing abnormal. The dura was easily removed from the skull and was normal in appearance. The pia-arachnoid was slightly cloudy, but was otherwise normal. On section of the brain an old area of softening due to a previous hemorrhage or embolism was present in the left lenticular nucleus, extending into the anterior portion of the internal capsule. There was also a cyst about the size of a split pea in the tegmentum of the pons near its cephalic margin.

The entire arterial system of the brain was the seat of a very extensive arteriosclerosis. The basi-

lar artery was twice the size of the normal artery, and might be considered as the seat of an aneurysmal dilatation.

The points of particular interest in this case are: 1. The antagonism between the *x*-ray findings and the post-mortem findings. 2. The extensively diseased kidneys and the slight evidences of that disease in the urine during life, so that the existence of uræmia was doubted. 3. The severe pain due to the arteriosclerosis. 4. The cause of the arteriosclerosis.

The result of the *x*-ray examination seemed to give satisfactory evidence to the operator, that the severe thoracic pain complained of by the patient was due to an aneurysm. At the necropsy, however, no aneurysm was found. The aorta was slightly dilated, but its walls were unbroken and there were no blood clots adherent to them, as one would expect to find in the interior of an aneurysmal dilatation of a vessel. It appears that such a slight shadow as can be demonstrated in this skiagraph should not be interpreted as indicating the presence of an aneurysm, but that a more positive degree of shading should be requisite before that diagnosis is made.

During his life the patient's urine gave evidence of renal disease, but the analyses would lead one to suppose that the organic changes had not progressed beyond the beginning stage. At the autopsy however, the kidneys were found to be extensively diseased, and showed the condition of chronic parenchymatous nephritis with contraction. The terminal symptoms noted in the case—the toxicity, the delirium, the stertorous breathing, the clonic

convulsion, the unconsciousness, and the paralysis of the external rectus muscle of the right eye—were undoubtedly uræmic. This conclusion is further confirmed by the absence of recent brain lesions.

The severe thoracic pain due to arteriosclerosis alone is a symptom of importance. I do not believe this pain could have been due to the left-sided pleural adhesions, because the adhesions were situated at the lower and posterior portions of the thoracic cavity, while the pain was complained of in the upper portion of that cavity and to the right side. The paroxysms of pain were not typical of angina pectoris. While the patient thought that he might die in such an attack, the pain never radiated into the left arm alone, but rather into the back and left side of the thorax or into both arms. The attacks usually came on when the patient was in bed.

The cause of the arteriosclerosis is not determined. The patient had suffered from malaria, yellow fever, smallpox, and dysentery. I was never able to get satisfactory information about his drinking habits, and he denied having had syphilis. It is possible that the four acute infectious diseases from which he suffered produced the anatomical changes found in his arteries.

My thanks are due to Dr. Stengel for permission to use the notes made in the University Hospital; to Dr. Henry A. Newbold, for the notes from the Dispensary for Nervous Diseases of the University Hospital; to Dr. H. K. Pancoast, for the *x*-ray examination, and to Dr. D. J. McCarthy, for assistance at the autopsy and for the description of the brain and its bloodvessels.

DISCUSSION.

DR. HENRY K. PANCOAST : I want to say a word about the *x*-ray diagnosis of aneurysm, particularly as this case shows an *x*-ray picture in which you cannot judge much of the condition present. There are two portions only of the aortic arch in which you can possibly diagnose an aneurysm by the skiagraph or by the fluoroscope : on the right side as the aorta arises from the heart the shadow is seen on the right side of the sternum and vertebra ; and, second, as the shadow is cast on the left side of the sternum and spine on the descending part of the arch. Between these two points it is almost impossible to obtain a diagnosis from a skiagraphic picture. This case was one of the first of the kind skiagraphed by me, and I was not very well versed in the art at that time. Since then I have noticed the same results. There are two lines, one representing the maximum amount of contraction of the aorta, the other the maximum amount of dilatation, whether to the right or the left, depending on the situation of the aneurysm.

It seems to me there are two conditions in which shadows of aneurysm may be present : (1) when the aorta can be dilated during the contraction of the heart to such an extent as to show a shadow either on the left or right side ; (2) the condition in which aneurysm actually is present. I do not know just what the clinical difference is.