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EMBOLISM OF THE LEFT CORONARY ARTERY;
SUDDEN DEATH.

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LADIES AND GENTLEMEN: The man whose body we are about to examine was thirty-two years old when he died suddenly, about sixteen hours ago. He was a carpenter by occupation, and had commenced his usual work yesterday morning, but he was soon obliged to stop; he was assisted to the sidewalk by two men, and, complaining of intense pain in the chest, he was placed in the police ambulance and hurried off to the hospital, on the way to which he died.

This is all of his history that is known.

Inspection shows a well-nourished, muscular man, without any marks of bodily violence; there is marked lividity of the posterior aspect of the body, extending up to and including the ears; rigor mortis is quite decided.

Internal examination.—The abdominal cavity is empty; the peritoneum is smooth and shining; there are firm adhesions around the spleen, and also between the gall-bladder and the hepatic flexure of the colon. The diaphragm reaches to the fifth rib on either side. The pericardium contains the usual quantity of clear, yellow fluid; it is quite smooth, but the epicardium is thickened and grayish in color over the greater surface

¹ Report of the post-mortem examination made before the class in the Cook County Hospital Dead-house, May 17, 1892.

of the heart, but not more so in the vicinity of the coronary vessels than elsewhere. Both pleural cavities are partially obliterated by quite firm adhesions, and contain no fluid. The right side of the heart contains a moderate quantity of dark-red, fluid blood; the left side is practically empty. The semilunar valves are quite competent to the water-test. The endocardium of the right heart is normal; the tricuspid orifice admits four or five finger-tips readily; the cavity of the right ventricle is 8 cm. deep, and its wall is 4 mm. thick. The endocardium of the left heart is also nearly normal, there being a few yellow areas in the anterior segment of the mitral valve, the free margins of which also appear to be a little thickened; the mitral orifice admits three finger-tips; the cavity of the left ventricle measures 8 cm. in depth, and the wall is 1 cm. in thickness. In the myocardium of both ventricles are seen small, white areas and streaks, scattered quite freely over every cut surface; there are no areas of softening. In the aorta there are a few yellowish-gray areas, of irregular outline and size, extending from the valves down to the diaphragm, and occupying in the thoracic aorta a strip about 5 cm. wide that includes the orifices of the intercostal arteries; there is no very marked thickening of the intima, the yellow areas being situated in its upper layers. At the origin of the large vessels at the root of the neck the intima presents distinct scars; situated upon the wall of the aorta, just above the junction of the anterior with the left posterior aortic leaflet, is a wart-like mass, measuring about 4 mm. in height and 3 mm. in diameter, that appears to be composed of fibrin; it is quite firmly adherent to the wall of the vessel, and is a parietal thrombus in the aorta. On slitting up the left coronary artery I come upon a quite firm, grayish, granular mass that completely occludes the lumen of the vessel, to the walls of which it is not adherent, lying just in front of the bifurcation of the artery at the commence-

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ment of the anterior inter-ventricular groove. This mass is, in all probability, an embolus that has lodged at the bifurcation of the left coronary artery.

In the coronary arteries are seen many areas of yellowish thickening in the intima, but none of these areas is rough or covered with thrombi, the lumen of the vessels being practically of normal size, except at the point mentioned, where it was completely obliterated.

The lungs are heavy and soggy, and contain much blood and frothy fluid.

The spleen presents a considerable area of thickening of its capsule; the area is 6 cm. long, 2 cm. wide, and at the thickest portion it is nearly 1 cm. in thickness; it is fibro-cartilaginous in consistence, and quite uniformly yellow on the cut surface. In the splenic substance, which is rather soft, but otherwise like the normal, are two areas that consists of caseous, granular material inclosed in a dense, measurably thick, homogeneous capsule; one of these areas measures one, the other one one-half cm. in diameter.

The left kidney is 12 by 6 by 3 cm. in size; the capsule peels readily; the surface is smooth and the cortical markings distinct on the cut section, the labyrinths presenting plainly visible and prominent glomeruli, because the latter contain much blood; the kidney is quite firm, and blood runs quite freely from the cut surface. The pelvis of the kidney is normal.

The right kidney is of about the same size as the left; the capsule peels quite readily; the surface is smooth, but presents numerous areas of a light-yellow color, of irregular outline and varying size; on section these areas are, in each instance, seen to correspond with anemic infarcts in the kidney. The kidney contains altogether eight distinct, wedge-shaped areas, which have a uniform, light-yellow color, are bloodless, have a red line at their periphery, the base of the wedge lying upon the surface of the kidney, the apex in the smaller infarcts

being situated within the cortex, in the larger ones down in the columns of Bertini; the smallest infarct has a base measuring 3 mm.; the largest has a base measuring 2 cm. in greatest diameter. The kidney is otherwise quite normal.

The bladder, seminal vesicles, prostate gland, and testicles present no abnormality. The liver and the gall-bladder are also apparently normal. The mucous membrane of the stomach is covered with a viscid, grayish, turbid mucus; it presents many folds and elevations—so that in places it is almost distinctly nodular; the folds are not obliterated on stretching the muscular coat, and the gastric mucous membrane rises above the esophageal at their junction—it is consequently thickened. The pancreas is normal.

There is no fracture of the skull; the membranes are smooth and shining; there are no areas of thickening in the pia, which is not abnormally adherent. The ventricles are empty; there are no changes, no thrombi, no emboli in the vessels at the base, and after the usual section of the brain we cannot discover any foci of old or of recent softening.

The anatomic diagnosis will consequently read: Chronic deforming endarteritis of the aorta and coronary arteries; parietal thrombosis of the aorta; embolism of the left coronary artery; chronic fibrous myocarditis; anemic infarcts of the right kidney; congestion of the left kidney; chronic gastric catarrh; chronic fibrous perisplenitis and pericystitis; gummata (?) in the spleen; chronic pleuritis; pulmonary edema and congestion.

REMARKS.—It can be quite safely stated that our examination has demonstrated the cause of this man's death, namely, embolism of the left coronary artery. This would cause anemia of almost the entire left half of the heart; a collateral circulation could not be established, because the coronary arteries belong to the so-called terminal arteries, and death would consequently ensue from

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cardiac paralysis before any consecutive degenerative changes in the myocardium could have time to become apparent. The source of the embolus was, undoubtedly, the thrombus in the aorta from which fibrinous masses might at any time have been washed away with the blood-current. The thrombus formed upon a rough spot, due to the degeneration and loss of substance incident to the extensive chronic endarteritis that was present in the commencement of aorta. From the same thrombus came also, in all probability, the emboli that, lodging in the branches of the right renal artery, gave rise to the formation of infarcts as described; the yellow wedges or areas are due to coagulation-necrosis following the anemia that was caused by the blocking of the renal arterial branches, which are also terminal arteries; each anemic infarct marks out the area nourished by the corresponding vessel peripherally from the seat of the obstruction by the embolus.

The edema and congestion of the lungs can, in this case, be easily explained by the weakness of the left ventricle, as compared with the right, during the last moments of life.

The hyperemia of the left kidney is to be looked upon as compensatory, the right kidney being rendered functionless to a considerable extent by the many areas of anemic necrosis.

The fibrous myocarditis resulted from the chronic disease of the coronary arteries, which, gradually reducing the nourishment of small areas of the heart-muscle, finally caused a complete degeneration of these spots and connective-tissue substitution.

The truth of the statement "that a man is only as old as his arteries" is shown indirectly by the findings in this case; had the patient not had atheromatous patches in his aorta, the thrombosis and secondary embolism need not have resulted. Not knowing anything about the man's history, we cannot form any definite idea as to the etiology of the endarteritis; we cannot say whether

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it is an instance of the not uncommon, prematurely early involuntional degeneration, the man being only thirty-two years old, or is due to some of the causes usually mentioned in connection with this disease, such as lead, alcohol, overwork, or syphilis. We can say that it is not secondary to renal disease, because the kidneys were found quite healthy, with the exception of recent infarcts; alcoholism, syphilis, and other causes cannot, however, be excluded, and whether, with regard to syphilis, actual evidences of this disease were present or not, in the shape of the possible gummatous areas in the spleen, cannot be definitely settled without a microscopic examination.

Finally, remember that we have here an excellent illustration of death due to blocking of a coronary artery—one of the most common causes of sudden death. The blocking may, as in this case, be due to embolism; it may be due to thrombosis secondary to chronic disease of the coronary arteries, or it may be due to occlusion of the orifice of one or both of the coronary arteries in the aorta by atheroma in this vessel, with or without the formation of a thrombus at the very orifice. The latter mode of obstruction was well illustrated in a man, thirty-five years old, who died suddenly in the street, and whose body I examined a few days ago. All the organs were found to be apparently quite normal, except the aorta, which was atheromatous down to the iliac arteries; just at its very commencement the process was most extensive, resulting in the formation of a grayish, raised, annular area, 1 cm. broad, involving the coronary orifices, which were only as large as pin-points; the left was occluded by a small thrombus hanging over the opening. In this case the coronary arteries themselves were not diseased, and the myocardium was quite healthy, but pale-grayish in color.

In all cases of sudden death that come up for medico-legal investigation the coronary arteries should invariably be thoroughly and completely examined.