ROBISON (J. A.)

Malignant Endocarditis with Vegetations in the Right Auricle, and a Perforation of the Inter-Auricular Septum; Mitral and Aortic Regurgitation.

CLINICAL LECTURE DELIVERED AT THE POST-GRADUATE MEDICAL SCHOOL, CHICAGO.

BY JOHN A. ROBISON, A.M., M.D.,

Adjunct Professor of Medicine in the Rush Medical College; Professor of General Medicine in the Post-Graduate Medical School; Attending Physician for Throat Diseases and Internal Medicine, Presbyterian Hospital, etc., Chicago.

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MALIGNANT ENDOCARDITIS WITH VEGETATIONS IN THE RIGHT AURICLE, AND A PERFORATION OF THE INTER-AURICULAR SEPTUM; MITRAL AND AORTIC REGURGITATION.

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GENTLEMEN,—In my previous lectures I have made the statement that disease of the right side of the heart is generally due to intra-uterine or congenital causes. It is seldom that we have an opportunity to study a case in adults of post-congenital origin, but I am especially fortunate in being able to present to you to-day the report of a case of disease of the right side of the heart in which the tricuspid valves were involved. This patient some of you saw with me in the hospital a few days ago. The history was as follows:

L. W. entered the Presbyterian Hospital on the 21st of December, 1894. He is a boiler-maker by occupation, single, twenty-one years of age. Family history good. About fourteen months ago he fell from a scaffold, striking his chest upon the ground in the region of the heart. The marks of the injury were visible in the præcordial region. There was osteomyelitis of the left fourth, fifth, and sixth ribs near their costo-sternal articulations. He thought he was injured internally also, and was confined to his bed for several days. Since that time he has suffered a good deal of pain in the præcordial region, but has never been seriously ill until nine weeks ago, when he noticed shortness of breath, pain in the region of the heart, in the back, and his legs were slightly swollen before he came to the hospital. You will notice that he cannot lie down in bed. His movements are painful. There is an anæmic and pallid appearance of the face and anxious countenance,

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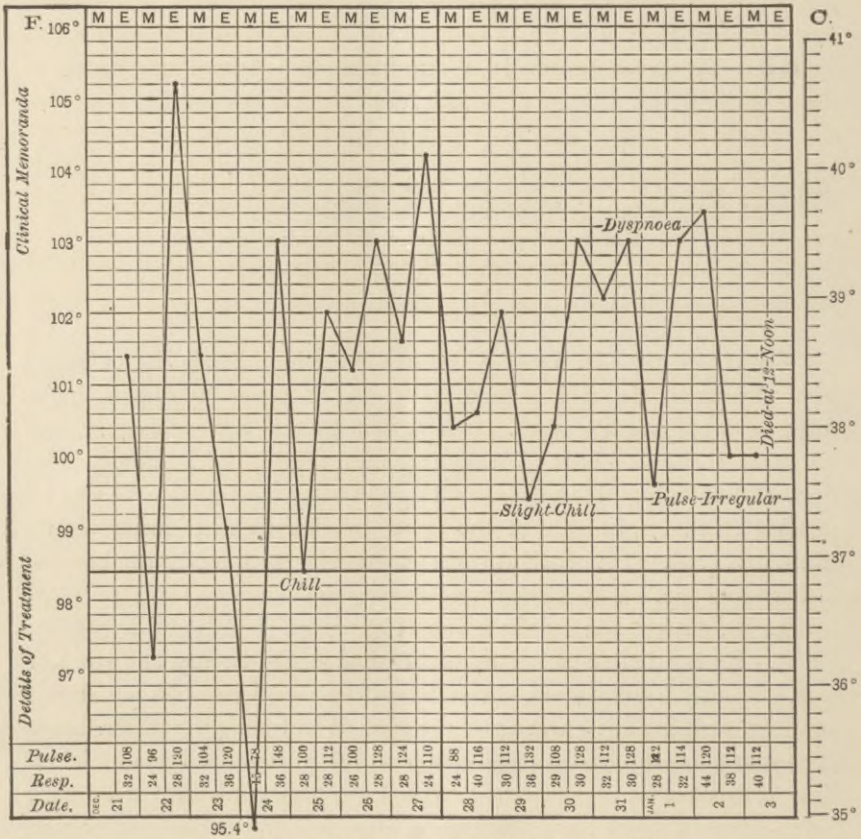
with slight cyanosis. His skin is covered with a profuse, cold perspiration. The respirations are shallow and rapid; his tongue is furred; his digestion very poor. He has no appetite; there is great thirst, and the bowels are constipated. His most troublesome symptoms are dyspnœa and insomnia.

Physical examination of the heart shows the apex beat is very slightly moved downward and to the left, but there is marked increase

FIG. 1.



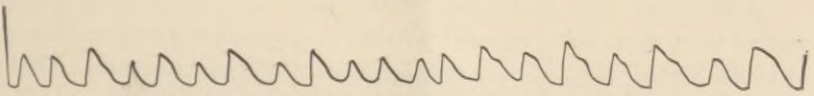
Temperature chart of a case of malignant endocarditis.

in the superficial and deep areas of cardiac dulness; the transverse diameter of the heart seems increased; there is also epigastric pulsation and lessening of the oblique angle between the heart and the liver. There is a blowing systolic murmur heard a little above and to the left of the ensiform cartilage, which becomes less towards the apex. You also notice excessive jugular congestion and a venous pulse.

I here show you a chart of the temperature, pulse, and respirations from the time of the patient's entrance to the hospital (the 21st of December) until his death on the 3d of January. (Fig. 1.) The highest temperature at any one time was on the second day, when it was 105° in the afternoon, pulse 120, respirations 28. In the forenoon of the fourth day the temperature fell to 95.4°, pulse 78, and respirations 15. In the afternoon, about 2 P.M., he had a severe chill, and the temperature rose to 103°, pulse 148, respirations 36. The next day it was normal in the morning, and rose to 102° in the afternoon, and fluctuated between 104° and 99.4° until noon of the 3d of January, when he died. On the ninth day after admission to the hospital he had a slight chill in the afternoon, on the tenth there was extreme dyspnœa, and the next day the pulse became very weak, irregular, and intermittent, and finally he died from cardiac exhaustion. You will notice from the chart that the pulse varied in its frequency as well as the respirations.

The following sphygmographic tracing (Fig. 2) was taken the third day after the patient's admission into the hospital. It will be noticed

FIG. 2.



Sphygmographic tracing of the pulse in malignant endocarditis.

that this tracing is similar to that which we obtain in aneurism of the ascending portion of the arch of the aorta. There is evidently retardation of the pulse-waves, and there is not sufficient elastic recoil of the arteries to produce the ordinary curves.

The physical signs that have already been elicited point to the fact that the disease is due to insufficiency of the tricuspid valves. What form of disease would produce tricuspid insufficiency? It might be simple endocarditis or malignant endocarditis, or an infectious disease with endocarditis, or the result of chronic valvular disease. In simple endocarditis there is generally present rheumatic fever with no marked symptoms of cardiac disease; whereas in malignant endocarditis there need not necessarily be any rheumatism; the constitutional symptoms are more severe, and indications of grave heart-disease rapidly develop. The patient is subject to rigors, profuse perspirations, and intermittent or remittent forms of fever, and embolic infarctions may occur. Typhoid or pyæmic symptoms are common, and the disease is generally fatal and runs a rapid course. Again, malignant endocarditis

might be mistaken for typhoid fever; but the former disease begins abruptly, progresses rapidly, high temperature is remittent, and the remissions frequently fall below normal; whereas in the latter disease there is a gradual rise and fall of temperature before and after the fastigium. In malignant endocarditis the pulse is increased in frequency independently of the fever; whereas in typhoid the pulse is increased coincidently with the fever. In malignant endocarditis there is evidence of valvular heart-disease in the earliest stages; the symptoms of embolic infarction are common; whereas in typhoid fever there is seldom endocarditis; the abdominal symptoms are marked and characteristic of the fever; and, finally, there is the presence of the typhoid bacillus.

Again, malignant endocarditis may be confounded with ague. In the former disease, however, the intermissions are seldom regular; whereas in the latter they are. The constitutional symptoms are more severe in the former, and the latter runs a longer course and is seldom fatal. Finally, no evidence exists of disease of the other valves. Therefore all signs point to the fact that this case is one of malignant endocarditis affecting the right side of the heart.

It is stated that malignant endocarditis more frequently affects women than men, being especially liable to accompany puerperal fever. It is also stated that not over two per cent. of the cases of endocarditis that arise after birth occur in the right side of the heart.

There is, undoubtedly, a casual relation between the osteomyelitis that we find present and the existing malignant endocarditis; and there is little doubt in my mind that the commencement of this disease dates from the time of his injury fourteen months ago. There was, doubtless, endocarditis produced then, and vegetations were formed, and the disease recently assumed a malignant form.

Post-mortem.—This heart weighs thirteen ounces; the aortic and pulmonic valves are normal. There is no hypertrophy of the left ventricle, but there is a slight degree of hypertrophy in the right ventricle, which measures at its thickest part three-eighths of an inch. There is dilatation of the right auricle, it holding about an ounce and a half of fluid. At the base of the front anterior segment of the tricuspid valve upon its auricular surface there is a vegetation about an inch in length, situated upon an oblong base half an inch long and one-quarter of an inch wide, and projecting into the cavity at least half an inch. Near the end of the vegetation on the auricular septum, just at the upper margin of the auriculo-ventricular cavities, there is a perforation leading from the right auricle into the left auricle, piercing the walls of

FIG. 3.—Interior of right auricle and ventricle. A bristle has been introduced into the perforation in the inter-auricular septum. Upon the auricular surface of the anterior segment of the tricuspid valve a large vegetation with an oblong base is situated.

FIG. 4.—Interior of left auricle and ventricle. A bristle is seen protruding from the inter-auricular septum just below the aortic valves. The perforation measures one-quarter of an inch in diameter. The ventricular walls are not hypertrophied.

the latter just below the aortic valves. This perforation is one-quarter of an inch in diameter. Dr. D. D. Bishop made cultures from the granulations and demonstrated the presence of the staphylococcus pyogenes aureus. Examination of sections of the granulations demonstrates the presence of the same organism. The examination of the specimen shows that there were, undoubtedly, three abnormal currents of blood produced during the heart's action: (1) A tricuspid direct current; (2) a tricuspid regurgitant current; and (3) a current from the left side of the heart into the right side through the perforation during systole. During the systole of the heart a murmur would be produced which was heard, as has already been stated, over the lower portion of the sternum near the ensiform cartilage; but this murmur was lost as we approached the base or apex of the heart. The cause of the jugular congestion and venous pulse was undoubtedly the dilated condition of the right auricle and the tricuspid insufficiency, as has been admirably explained by Paul, which permits the blood propelled by the ventricle to flow back into the vein.

The photographs show the position of the granulations above the tricuspid cusp and the perforation in the septum. (Figs. 3 and 4.)

Recapitulation of the Signs and Symptoms of Tricuspid Incompetence.—Dilatation of the right auricle and ventricle lessens the supply of blood to the systemic arterial circulation, and the normal sphygmographic tracing is lost; at each contraction of the right ventricle the backward flow of blood into the superior and inferior venæ cavæ produces a venous pulsation in the neck and sometimes in the liver. There is a soft-blowing systolic murmur in the tricuspid area, propagated upward and to the right. There is increased dulness over the lower end of the sternum and epigastric cardiac impulse. These patients suffer from dyspnœa and insomnia. I think there is such a disturbance of the cerebral circulation that it causes sleeplessness.

MITRAL AND AORTIC REGURGITATION.

Having reviewed the signs and symptoms that accompany tricuspid regurgitation, I desire to relate a case of mitral and aortic regurgitation to illustrate the difference in the signs and symptoms which occur in the separate forms of disease.

F. C., single, American, aged twenty-three years; admitted to the hospital December 17, 1893. Several years ago he had an attack of pneumonia, followed in two months by inflammatory rheumatism. The rheumatism was brought on by exposure to cold, and he was confined to his bed for seven months, after which he apparently completely

recovered. The patient then went to California and remained well for a time, working at blacksmithing. In January, 1891, he noticed that he was short of breath during active exercise. A second attack of rheumatism confined the patient to bed for two weeks. Soon after this, however, he began to work at times, but not steadily. Subsequently he felt weak and fainted several times, and had great distress in the heart. This was followed by œdema of the lower extremities, anasarca, and ascites. Patient's habits are temperate. On inspection we notice anæmia, puffiness of the eyelids, blue lips; skin is pale; pulse very weak and variable; has a great deal of thirst; pulsation of the carotids and venous pulsation of the external jugular; hands club-shaped; cyanosis of the finger-tips and lips; apex-beat of the heart is four inches below and one inch to the left of the nipple. By palpation, there is marked fremitus over the præcordial region; the apex-beat strikes forcibly against the chest-wall; the pulse is full, but recedes rapidly from the fingers; the areas of heart-dulness are increased; the deep area of cardiac dulness extends from the right edge of the sternum at the junction of the second rib down to the ensiform cartilage, then to the left about four inches below the nipple, one inch to the left of the mammary line; then upward around the nipple in a curved line to the sternum with the junction of the second rib. On auscultation there is a murmur at the apex during systole transmitted to the left, also a murmur at the base of the heart with the second sound. His pulse varied during his stay in the hospital from 82 beats to 120; temperature was either normal or subnormal; respirations from 22 to 30. The amount of urine varied from seventeen to twenty-nine ounces daily. From the 5th until the 16th of January he expectorated a slight amount of blood daily, and a portion of the time he was delirious at night. He had severe attacks of retching and slight vomiting. Urinalysis on January 3 showed the urine dark, amber color, alkaline reaction, specific gravity 1022; albumen sixteen and a half per cent.; phosphates. January 6, urinalysis, same result, except the specific gravity was raised to 1030. January 13, color dark brown, reaction neutral, specific gravity 1025; albumen eighty per cent.; phosphates in the blood.

The patient was given alcoholic sweats daily, and a diuretic pill, composed of one grain each of powdered digitalis, nitrate of potash, extract of buchu, and citrate of caffeine, three times a day for several days. A short time thereafter the albumen began to disappear from the urine, the ascites and anasarca became less, the patient's appetite returned, and he convalesced so that he was able to return to his home.

The hypertrophied heart in this case caused the arteries to be suddenly filled with blood at each systole, and the aortic regurgitation allowed them to be as quickly emptied, producing the characteristic water-hammer pulse. The area of cardiac dulness extended downward and to the left, and the murmurs were propagated in their usual directions respectively.

The mitral regurgitation caused dyspnœa, orthopnœa, œdema, anasarca, and albuminuria in their turn, while the aortic regurgitation produced the painful symptoms of over-distention of the heart cavities, cardiac distress, palpitation, intermittent and irregular heart-action, and syncope. The pulmonary circulation was greatly embarrassed, as evidenced by cyanosis and hæmoptysis.

Having looked upon these clinical pictures, the question of treatment presents itself. Unfortunately, the first case was one in which treatment is of little avail. Had it been a case of simple tricuspid incompetency without any malignancy, the treatment could be summed up in a few words: treat tricuspid incompetency in the same manner as mitral incompetency.

Before the failure of compensation the treatment of mitral incompetency, simple or complicated with aortic incompetency, should consist in maintaining nutrition at its highest perfection, by giving easily assimilated diet, keeping the digestive and eliminating organs active, having a serene mind, a quiet life, taking gentle exercise in the open air, and the avoidance of excesses of all kinds, Turkish baths and strong purgations. In the latter stages of the disease give cautiously the cardiac tonics, and treat the symptoms as they arise.