FIVE CASES OF AURICULO-VENTRICULAR
BUNDLE-BRANCH BLOCK.

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BUNDLE-BRANCH block is among the most interesting of the secrets of the heart revealed by the electrocardiograph. These lesions are not so uncommon as one might expect, are of grave prognostic significance, and give rise to no clinical symptoms by which they can be identified, while on the other hand the abnormal and distinctive ventricular complexes met with in the electrocardiogram give a striking picture. Five such cases have lately come under my observation, and of these short notes are given below.

The first case was that of a business man, aged 62, of abnormal height, who travels between Brighton and London several times a week; he had been known to me for several years as the subject of bradycardia with occasional attacks

of faintness. After an interval of eighteen months he consulted me on November 17th, 1923, complaining of cramps in the legs when walking, and I took the opportunity to obtain an electrocardiogram, expecting to find some degree of heart-block. His pulse at the time was 42, sounds were pure in all areas, and there were physical signs of slight hypertrophy of the left ventricle. The result of the examination was surprising—auricular flutter with complete heart-block, and evidence also of block of the right main branch

vary according to their relation to the inverted complexes of the flutter. If bundle-branch block is accepted, the record is unusual also in the amplitude of the QRS in Leads I and II being the reverse of what is generally found in these curves, the ordinary finding being R_I of increased amplitude corresponding to the long S_{III}, and the initial ventricular complex of Lead II variable and of smaller amplitude, while here S_{II} is actually longer than S_{III} and the records of the two leads are otherwise practically identical. This point will be readily appreciated by comparing the record with that of the three leads of Case 2. I have been unable to trace a similar record in the literature, and have confirmed my findings by electrocardiographing the patient on two subsequent occasions.

The second patient, a lady aged 60, seen first on November 24th, 1923, had led a life of cardiac semi-invalidism for some two years. She was a visitor to Brighton from Guildford, and when I saw her she complained of palpitation and more than her accustomed dyspnoea on exertion, and she had, for the first time, attacks of "asthma" at night. The heart's action was rapid and was irregular

FIG. 1.—Case 1.

owing to the presence of extra-systoles, the apex was in the fifth space half an inch external to the nipple line with an apical systolic bruit conducted outwards. She was slightly cyanosed, the systolic blood pressure was 166, and the urine contained a trace of albumin. Clinically, then, she had unmistakable evidence of myocardial degeneration. At Guildford she had found the hills very trying, and her acute symptoms were, I think, attributable to excessive zeal for exercise on the Brighton front while she was taking daily 6 grains of thyroid extract, which she had been ordered

FIG. 2.—Case 2.

of the auriculo-ventricular bundle. Lesion below the auriculo-ventricular bundle is suggested in Lead I by the breadth and irregular outline of the initial QRS complex, and a bundle-branch lesion in Leads II and III by the initial ventricular complex being of increased amplitude with notching of the descending limb of S_{III}, and followed by an erect T of correspondingly increased size, so that in these two leads the ventricular complexes are diphasic as well as exaggerated in size. The shapes of the individual T waves

FIG. 3.—Case 2.

for symptoms of early myxoedema. The electrocardiograms reproduced here were taken after the tachycardia and extra-systoles had passed off; they are typical of block in the right main branch of the auriculo-ventricular bundle, or, to use Lewis's term, the record is a typical levogram. The increased breadth and length of the QRS in the record of Leads I and III, and the increased breadth in that of the three leads, the different direction of the large T wave from the initial wave, inverted when the latter is erect and vice

versa, the resemblance of each individual QRST to a left apical ventricular extra-systole, and the left-sided preponderance of the grouped QRS complexes of Leads I and III are all present in typical form. In contrast to Case 1 the complexes in Lead II are of small amplitude.

The third patient, a man aged 56, was sent to me on March 19th, 1924, by Dr. C.H. Glenn. He had been aware of dyspnoea on exertion and occasional intermittent action for some ten years, and in 1918 had been rejected for military service, being told by the Medical Board that he had myocardial degeneration. The apex beat was in the fifth space one inch external to the nipple line, and the impulse was heaving in character. There was no bruit, but the second sound was reduplicated. The systolic blood pressure was 208. The urine was normal. In February he had a severe attack of influenza, but he had been up for a month when I saw him. The electrocardiogram here again showed a lesion of the right branch of the auriculo-ventricular bundle.

The fourth case was that of a City man, aged 47, who leads an active life, mentally and physically. He states that as a boy and young man he saw many medical authorities, some of whom diagnosed congenital morbus cordis, others the effects of unrecognized rheumatism in early childhood. No one promised him much in the way of benefit, and no one gave him any, and so, he says, he "sacked the lot" and made up his mind to disregard his heart. I came in contact with him because he had an attack of bronchitis; I took an electrocardiogram on November 27th, 1923. He has slight cyanosis; the left lobe of the liver is somewhat enlarged; he has a short apical systolic murmur—musical at times—and a reduplicated second sound. He shows little or no sign

initial ventricular deflexions here are not increased in amplitude, and the presence in Lead III of an unusually long Q at first sight spoils the picture of right-sided preponderance. As, however, QIII is held to be a right-sided event,¹ this last point is further evidence that the record is a true dextrogram.

The fifth case was seen on March 14th, 1924, in consultation with Mr. W. A. Bowring. The patient, a man of 58, had a history of glycosuria for seven years, and for two years

had suffered from increasing shortness of breath. He had a soft apical systolic bruit not conducted outwards, and he also had a reduplicated first sound, but owing to obesity palpation and percussion were unsatisfactory. There was anasarca of both feet and ankles. The systolic blood pressure was 208, and he gave a history of several attacks of renal colic. His record, a typical dextrogram, shows perhaps best of the five cases, although the abnormality is present in all, the slurring, notching, and splintering of the QRS complex, so beautifully delicate and clean of outline in the normal electrocardiogram. Thus, while delay in stimulus transmission is evidenced by increased breadth of the QRS group, irregularity of spread within the ventricle in the arborization of the bundle-branch shows itself by deformity of outline in that group. In Lead III Q is longer than in Case 4, but a long RIII pointed towards an S_r of equal amplitude gives a typical picture of right-sided preponderance. It will be seen that PIII is inverted throughout that lead, and this is a small point of special interest.

In these bundle-branch lesions the picture of right- or left-sided preponderance is not produced by increase in relative weight of the corresponding ventricle, but by defect of conduction of impulses to the other ventricle. In this elderly

FIG. 4.—Case 3.

FIG. 5.—Case 4.

of cardiac inadequacy, bathes, plays lawn tennis, and leads a particularly busy life, restricting himself neither in work nor in pleasure. With the long history one inclines to the view that in his case the pathogenesis may be exceptional, the damage to the branch having been caused by some acute inflammation long ago inflicting a lesion which is permanent but stationary, in contrast with the ordinary rule that the lesion if chronic is progressive. His record I take to denote a block of the left main branch of the auriculo-ventricular bundle. The increased duration of the QRS, the slurring of its apex, and its opposite direction to the terminal T deflexion are present in all three leads, but the

FIG. 6.—Case 5.

gouty arterio-sclerotic subject I have no doubt that the mass relation of the two ventricles is altered so that the left ventricle is more than 1.8 times as heavy as the right, and but for the defect in conduction the electrocardiogram would have shown left-sided preponderance. The true relation of the weights of right and left ventricle would seem to be hinted at by the inverted PIII, for this, we know, is found at times in aortic regurgitation and other diseases in which there is predominant hypertrophy of the left ventricle.

REFERENCE.

¹ Lewis: *The Mechanism and Graphic Registration of the Heart Beat*, 1920, p. 106.