A Post-Graduate Lecture ON CARDIO-AORTIC SYPHILIS AND ITS TREATMENT.*

BY

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SYPHILIS of the aortic orifice is, I think, considered to be, in male adults, the most common cause of aortic insufficiency. The disease of the heart is so frequently associated with syphilis of the aorta itself that, from a pathological standpoint, it is not justifiable to consider the two conditions separately. Whether the aortic valves are ever primarily and exclusively attacked by syphilis—true syphilitic endocarditis—is still an open question. The pathological changes in the aorta are those of syphilitic mesoaortitis. Microscopically, the most important changes found in the media and adventitia are a perivascular infiltration of the vasa vasorum, with small-cell infiltration in areas of the media, and a splitting and destruction of elastic fibres and the muscle cells. The heart muscle shows hypertrophy more in the left ventricle than the right, and dilatation. The hypertrophy is much like that seen in the patient with hypertension. Spirochaetes are often found in the walls of the aorta and heart muscle. The normal structure of the valve area is altered so as to produce insufficiency at the orifice during diastole. The picture in most cases is that of aortic insufficiency, and not of aortic stenosis. The valve leaflets are sclerosed and retracted and sometimes there is marked sagging, and there may be actual destruction of the leaflet. The free margin of the valve may be greatly thickened and rigid. General arterio-sclerotic changes of the aorta may be noted, and complete or partial occlusion of a coronary orifice.

SYMPTOMS AND CLINICAL COURSE OF THE DISEASE.

If we analyse the symptoms of a large group of syphilitic aortics, some 200 in number, which we have had under continuous observation for a number of years in the cardiac clinic of Sir Thomas Lewis at University College Hospital, nothing really distinctive will be found to distinguish this group from another group, also under observation during a similar period, with aortic disease of rheumatic origin. A certain number, sooner or later, had symptoms of heart failure with congestion—breathlessness at rest, and the other symptoms which we are accustomed to associate with pulmonary congestion, hepatic engorgement, and other signs of increased pressure in the venous system. The onset of auricular fibrillation with a rapid ventricular rate may be the direct cause of failure in a proportion of these cases. A normal rhythm is, however, the rule. A few have subacute infective endocarditis. A second larger group had symptoms due to loss of cardiac reserve, but with the myocardium not sufficiently damaged to cause venous stasis; they had breathlessness on slight exertion, precordial pain, palpitation, giddiness, fatigue, and undue exhaustion. There is a third group, much smaller than one would expect, the chief complaint of which is pain that is anginal in character and distribution. There is, too, a small hypertension group, often, but not always, with albumin and casts in the urine. Finally, we have to consider a small number who have signs of aortic disease but no obvious symptoms of myocardial insufficiency.

The aortic arch will be found dilated in many patients with aortic regurgitation of syphilitic origin, but in not a few such aortic widening will be absent. It should, of course, be suspected in all cases of frank aortic syphilis, or where syphilis is suspected as the cause of the disease. Those with aortic dilatation and hypertension tend to fall into the anginal group, though the anginal syndrome may be absent; while in many with angina the blood pressure may not be raised. One cannot, however, say that the greater the dilatation, the nearer such dilatation becomes aneurysmal, the more frequently will it be found that the

type of heart failure is anginal in character. When an aneurysm is present the symptoms complained of may be due to pressure of the aneurysm on the surrounding tissues. Aneurysm of the transverse arch is more likely to give rise to these symptoms than aneurysm of the ascending arch. Symptoms may lead us to suspect cardio-aortic disease, but it is upon physical signs that we must rely in arriving at a diagnosis.

PHYSICAL SIGNS OF THE DISEASE.

The physical signs of cardio-aortic disease of syphilitic origin are in some cases those signs we associate with heart failure of the congestive type—that is, signs of pulmonary congestion, with engorged veins in the neck, hepatic engorgement, renal congestion, etc. There is nothing in this type of failure which indicates the syphilitic origin of the disease. Identical signs occur in aortic disease of rheumatic origin. All degrees of enlargement are seen, from the heart which is normal in size to dilatation and hypertrophy extending past the anterior axillary line. The signs of valve disease are those of aortic insufficiency—a diastolic murmur heard over the aortic cartilage. This valve defect in some can only be recognized by listening carefully to the left of the sternum at the level of the third interspace, and sometimes the patient must be placed in a horizontal or left lateral position and the murmur listened for at the end of expiration. This aortic leak may be slight or considerable, and this is determined by the character of the pulse. A collapsing pulse is a sign of free aortic regurgitation. The leak is probably slight when the pulse is not of the Corrigan type. In many patients with the pulse collapsing—that is, with free aortic regurgitation—a presystolic rumble is heard at the apex. It is safe, in the absence of a rheumatic history, to treat this as a Flint's murmur. This murmur may be accompanied by a thrill over the mitral area. Aortic stenosis can be diagnosed when, along with a systolic murmur and most frequently a diastolic murmur as well, a systolic thrill is felt over the aortic cartilage, and the pulse is slow rising, of the anacrotic type. The signs of aortic dilatation are visible palpable pulsation in the second or third interspace to the right and left of the sternum, submanubrial dullness, and impaired resonance on percussion over the area of pulsation. Aortic dilatation should be suspected when submanubrial dullness alone is present. Always when possible the diagnosis of aortic dilatation or aneurysm should be confirmed by x-ray examination of the chest. It is humiliating when an aneurysm presenting no clinical signs looms up on the fluoroscopic screen, and disconcerting when the x-ray picture reveals a normal-sized aorta when an aneurysm has been suspected. A normal rhythm is present in the majority; auricular fibrillation in a few; extra-systoles are common. Sometimes subacute infective endocarditis completes the clinical picture. There were very few of these cases in this series.

EFFECT OF SPECIFIC TREATMENT IN CARDIO-AORTIC SYPHILIS.

Certain interesting facts emerge from the study of the after-histories of pensioners and ex-service men with aortic syphilis, whom we have kept under observation during the past five years. Of these men referred to the special heart clinic at University College Hospital from the Ministry of Pensions an unselected group of 58 was chosen and given special treatment, and accurate notes were made of the results obtained. An approximately equal number of control cases was selected, closely resembling in age, symptoms, and signs, the group of treated cases. The object of this investigation was to determine if possible the effect on the course of the disease of specific treatment in cardio-aortic syphilis. Since 1919-20 the treated cases were given each year a series of six to eight intravenous injections of novarsenobillon 0.6 gram at weekly intervals. An initial dose of 0.3 gram was given before beginning treatment as a safety measure. These injections were always made in the out-patient department; and no special precautions were taken regarding diet or rest. No accidents have been recorded and no symptoms of consequence developed as the result of treatment. It was felt that 0.3 gram was too small a dose to be of any therapeutic value, and 0.9 gram

* Given at the National Heart Hospital, January, 1926.

too large to give to patients with cardio-aortic syphilis in an out-patient department. A few patients complained of breathlessness after the injections; these were of a nervous type, and no attention was paid to this symptom. Others felt giddy and some fainted, but these gave a past history of giddiness and syncopal attacks. These symptoms were looked upon as vaso-vagal in origin, and not an indication to discontinue treatment. Mercurial inunctions were prescribed at each monthly out-patient visit, and the patient was instructed how to apply the ointment. The majority were given mercury in this way. Some were directed to take hydrarg. cum creta, 1 grain thrice daily, in place of the inunctions. Rarely were symptoms of mercurial intoxication recorded. Potassium iodide, 10 grains thrice daily, was given to all. General tonics were substituted for the mercury and potassium iodide in the control cases, and novarsenobillon was withheld from them. No appreciable change in the physical signs or symptoms in these patients could be detected as a result of treatment. Some felt better; others not. The murmurs remained unaltered, and the size of the heart unchanged. The Wassermann reaction—positive in all—became negative in 12, and all

Chart showing the age incidence of the disease (continuous line), and the ages of those who died (broken line), in two groups of cases of cardio-aortic syphilis—treated (58 cases) and untreated (56 cases). The average age incidence of the disease was: treated cases 46.8, untreated cases 46.9. Of the treated cases 14 died, the average age at death being 45 years; of the untreated cases 19 died, the average age being 43 years.

this reason the ages in the treated and untreated cases are approximately the same. The dotted lines represent the age incidence of death. It will be seen from these curves that the average age at death in the treated cases is 45 years, and in the untreated cases 43 years—a difference of two years. Of the treated cases 14 (24.1 per cent.) have died, and of the untreated 19 (33.9 per cent.)—a difference of 9.8 per cent. A difference in the death rate of 10 per cent. over a period of five years may not be without some prognostic significance. If two years have been added to the life of those patients in the treated group over a period of five years' observation, it is possible that the arrest in the disease was due, at least in part, to the treatment which they received. In both groups deaths occur at a lower age level than the average age of all patients in the series under observation. The numbers in this chart are too small, I think, to allow one to draw further conclusions as to the value of specific treatment in aortic syphilis.

In the table I have given a general survey of the type of cases which make up the two groups of cases under observation. It also displays the relative frequency of deaths in the two groups. The mortality is naturally higher in the group with congestion. Five of these were treated

but one of these are living; this reaction was incompletely positive in one after treatment. In 66 cases there was a definite history of syphilis; the average time since infection in these was twenty-four years. In one case, a man aged 72, syphilis at the age of 18 was admitted. The youngest, aged 36, died of infective endocarditis and gave a history of a syphilitic infection four years before.

The accompanying chart is a graphic representation of the age incidence of the disease in the two groups, treated and untreated, and the ages of those who died. In selecting controls the age of the patient was considered. For

Survey of the Type of Cases in the Two Groups under Observation (Treated and Untreated).

SIGNS.	TREATED. (55 cases; 14 dead.)			UNTREATED. (52 cases; 18 dead.)		
	Aortic Regurgitation: Syphilis.			Aortic Regurgitation: Syphilis.		
	Aneurysm.	Aortic Dilata- tion.	Nil.	Aneurysm.	Aortic Dilata- tion.	Nil.
No Congestion:						
Much enlarged ...	—	7 (1)	8 (2)	2 (2)	9 (2)	4 (1)
Enlarged ...	1	18 (7)	14 (2)	2 (1)	5 (1)	27 (8)
Not enlarged ...	—	2	—	—	—	—
Congestion:						
Much enlarged ...	—	2 (1)	—	—	1 (1)	1 (1)
Enlarged ...	2 (1)	—	1	—	—	1 (1)
Not enlarged ...	—	—	—	—	—	—
Total ...	3	29	23	4	15	33
Dead ...	1	9	4	3	4	11

The figures in parentheses indicate the deaths in the respective groups.

and two died (40 per cent.). There were 3 in the untreated group and all died. The numbers are too few to enable a statement to be made as to the value of treatment when signs of failure with congestion are present. When signs of congestive failure were present it was felt that the disease had advanced too far to expect any improvement in the condition of the patient from specific treatment. It was also considered to be not without risk to treat this type of patient with injections of arsenic. In the treated group without congestion there was one aneurysm with the heart moderately enlarged; this patient is alive, as against 4 with aneurysm, the heart much enlarged in 2 and moderately or slightly enlarged in 2; 3 of these died. It is unfortunate that this incidence of aneurysm is so high in the untreated cases without failure. It might be thought advisable to exclude these 5 cases from the series. Before doing so we must recognize the difficulty of distinguishing between dilatation and aneurysmal dilatation. The line of demarcation is not an easy one to follow. When we consider the next group, with aortic dilatation, we find 27 among the treated and 14 among the untreated, with considerable enlargement of the heart in 7 of the former and 9 of the latter; 8 in the treated group died, and 3 in the control group. Here it might be said that we are dealing unfairly with the treated cases, for on account of the larger number of patients with aortic dilatation in the treated group we might expect the number of deaths to be higher. In the third group—22 treated without dilatation of the aorta, and 8 of these with the heart much enlarged, as compared with 31 controls and 4 with the heart much enlarged—4 of the treated group died, and 9 of the untreated.

Everything considered, the grouping on physical signs is fairly evenly distributed among 56 control and 58 treated cases: 14 of the treated, or 25.4 per cent., died, and in all but one of these treated cases the Wassermann reaction remained positive, as compared with 18, or 34.6 per cent.—that is, the mortality rate is 9.2 per cent. lower in those patients who received specific treatment as compared with patients from whom such treatment was withheld. In the table I have not included 7 cases noted in the chart, as they had no valvular disease.

CONCLUSIONS.

I think it justifiable to conclude from these observations that specific treatment is indicated in syphilitic cardio-aortic disease; that no danger is attached to the intravenous injections of arsenic in moderately large doses given without any special precautions; and that arrest in the disease, as shown from the after-histories of cases treated, may be due to specific treatment given over a period of five years.