CASE REPORTS

SINGLE CORONARY ARTERY

BY

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The occurrence of a single coronary artery is rare, and the following case is described as it presented certain unique features. The patient died with congestive heart failure secondary to hypertension and cardiac infarction.

Case Report

A woman, aged 41 years, was admitted to hospital for investigation of albuminuria which had been found on routine examination. She was free of symptoms at this time but was found to have a blood pressure of 165/120 with cardiac enlargement. She was re-admitted three years later complaining of swelling of the ankles and dyspnoea on exertion for about four weeks, and on examination she showed signs of congestive cardiac failure. Her condition improved rapidly with rest in bed, salt-free diet, and digitalis, but two months later she was admitted again in advanced congestive cardiac failure with gross oedema. Seven weeks later she suddenly became intensely dyspnoeic and developed severe retrosternal pain, which radiated down the left arm and into the neck. Her blood pressure fell rapidly to an unrecordable level and she died.

Necropsy

The subject was a well nourished woman, with cyanosis and oedema of both legs and a sacral pad.

Heart. Weight 460 g. The heart was in the normal position. The pericardial layers were thin and glistening and there were no adhesions: there was 10 ml. of straw-coloured fluid in the pericardial cavity. There were numerous sub-epicardial haemorrhages on the posterior wall of the right ventricle adjacent to the interventricular septum and also on the diaphragmatic surface of the ventricle. The wall of the left ventricle was considerably hypertrophied, being 19 mm. in thickness, and the cavity was dilated. The wall of the right ventricle was also considerably hypertrophied, being 9 mm. in thickness, and the cavity was moderately dilated. The right and left atria were somewhat dilated and the walls slightly thickened. The myocardium was a reddish hue and generally firm. There were, however, areas of softening and discoloration due to infarction. An area immediately posterior to the apex of the left ventricle was thinned and soft and here the myocardium was mottled due to recent infarction. Attached firmly to the endocardium was a large reddish-grey thrombus. Similarly, the right ventricle showed evidence of recent and extensive infarction. These findings were confirmed by section.

Coronary Arteries. A single coronary arose from the anterior sinus of the aorta and after 2.5 mm. divided into two main branches of equal diameter, this being 6 mm.

The branch that followed the course of the normal right coronary artery passed forward between the pulmonary artery and the auricle of the right atrium. It then turned downwards in the coronary sulcus to the lower part of the right margin of the heart, and proceeded to the left in the posterior part of the coronary sulcus where it divided into the transverse branch and the interventricular branch. The transverse branch continued to the left in the coronary sulcus, and the interventricular branch ran forward in the inferior longitudinal sulcus on the diaphragmatic surface of the heart.

The abnormal main branch passed backwards to the left to enter the groove between the right auricle and the aorta and then between the left atrium and the aorta, inferior to the auricular appendage, and reached the anterior aspect of the heart. It then divided into two main branches which corresponded to the circumflex and the interventricular branches of the normal left coronary artery. The interventricular branch passed downwards in the anterior longitudinal sulcus and the circumflex ran to the left in the coronary sulcus.

FIG. 1.—The photograph shows the single coronary artery arising from the aortic sinus and dividing into its two main branches. The vessels have been opened and a small tube of plasticine has been inserted.

FIG. 2.—Postero-superior view of the heart, the atria having been removed. I.B.=interventricular branch, C.B.=circumflex branch, M.V.=mitral valve, R.C.C.B.=right coronary circumflex branch, P.A.=pulmonary artery, A.V.=aortic valve, S.C.A.=single coronary artery, T.V.=tricuspid valve, R.C.I.B.=right coronary interventricular branch, and I.S.=interventricular septum.

Discussion

A review of cases of single coronary artery by Smith (1950) showed that only 43 had been reported. In all these the single coronary artery arose direct from the aorta by one ostium.

These cases have been classified into three groups. The first consists of those in which the vessel follows the course of one coronary artery only, either the left or the right. The second group consists of those where the single coronary artery distribution is so atypical that it cannot be compared with either the left or the right coronary artery (Krumbhaar and Ehrlich, 1938). The third group includes those in which the vessel arises by one ostium either from the left or the right aortic sinus and then divides into two main branches that eventually follow the course of the normal left and right coronary arteries. The probable modes of development of all three groups have been fully discussed, but it is generally agreed that the most likely explanation of the defect in the third group is misplacement of one coronary anlage and its subsequent fusion in the remaining normal vessel.

The case described falls into this third group. Seventeen cases have been reported previously in this group. In two of these only, was there any other congenital cardiac malformation. The first was a case of thoracopagus in a fetus of 7 months described by Hyrtl in 1871. The second was an infant, three months old, with persistence and detorsion of the bulbus cordis, partial transposition of the aorta, interauricular and interventricular septal defects, patent ductus arteriosus, sinistro-position of the right atrium, and a right aortic arch, described by Ngai in 1935. Of the remaining fifteen cases all were between the ages of 35 and 65 years, the average being 47, and of these nine had the vessel arising from the right aortic sinus and corresponding to the right coronary artery. All these nine were men, and it would appear, therefore, that the case described in this paper is the only one reported in which the subject with this particular abnormality has been a woman.

The total number of adult cases of single coronary artery of all types recorded was 27, and recent cardiac infarction was described in three of them and an old infarction in one of them (Roberts and Laube, 1947, Cases 1, 3, and 4; and Smith and Graber, 1926). In this case, however, the presence of hypertension of

considerable duration precludes any assumption that the cardiac infarction might be even remotely related to the abnormality of the coronary arteries.

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