TRAUMATIC RUPTURE OF THE INTERVENTRICULAR SEPTUM

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The results of damage to the heart from indirect violence have aroused a good deal of interest in recent years, for in many cases modern methods of investigation have increased the possibilities of diagnosis. The account of this unusual case seems worthy of record.

A young man of nineteen years had a head-on collision with a lorry when driving a motor car. He was thrown forcibly against the steering wheel and hurt the front of his chest. Breathing was rather painful, but no bones were broken. He was in hospital for a fortnight. No cardiac murmur was noted. On returning home later he was examined by his family doctor and a murmur was heard. He was then referred for further examination. Three months before the accident he had been passed by a medical board for the R.A.F.

FIG. 1.—Teleradiogram of the heart, showing no abnormality except a little enlargement to the right.

The patient was a tall thin youth with rather a flat chest, somewhat depressed just to the left of the sternum. The apex beat was in the fifth left space, four and a half inches to the left of the mid-line. It was rather increased in force and rate from nervousness. An intense rough systolic murmur was audible all over the præcordium, loudest about the left edge of the sternum in the fourth left intercostal space. It was not conducted in any particular direction. A strong systolic thrill accompanied the murmur. The mitral first sound was faintly reduplicated until the rate slowed down; a faint third sound followed the mitral second, but only on acceleration. The pulmonary second sound was rather loud. The

FIG. 2.—Electrocardiogram, showing some right axis deviation.

blood pressure was 140/90. There was no dullness to the right of the sternum. There was no cyanosis, nor engorgement of the jugular veins or liver. He had no symptoms. At the time it was not possible to take a cardiogram or a skiagram.

Three and a half years later he was seen again. He had had no symptoms and was following a quiet occupation in a technical laboratory. The physical signs had not changed at all. The blood pressure was 120/80. Screening showed that the left auricle had a normal contour, without any systolic pulsation during ventricular systole. The antero-posterior view is shown in the illustration; the right side seems to be a little enlarged (Fig. 1). The cardiogram shows slight right axis deviation (Fig. 2).

Discussion

It is certain that the murmur was not there before the accident. It seems to have developed as a result of the blow on the chest; not at once, but after a latent period, perhaps about a fortnight. No symptoms accompanied the appearance of whatever lesion it is due to. Such a thrill and murmur may suddenly appear in the heart from three possible causes, and they may all arise from indirect violence.

Rupture of a chorda tendinea of the mitral valve usually results from disease. Bailey and Hickham (1944) describe cases in which there was the sudden appearance of a mitral systolic murmur and thrill between the apex and the left border of the sternum, conducted to the axilla. The left auricle becomes enlarged and may pulsate. Failure may develop,

with fibrillation, soon or only after years. Frothingham and Hass (1934) have described the rupture of a normal chorda from indirect violence.

Rupture of a papillary muscle of the mitral valve is usually a very grave occurrence. The same signs are produced. In the case of Glendy and White (1936) trauma was the cause. It may occur after infarction (Morargues, 1939). In Anderson's case (1940) there were a systolic murmur and thrill conducted to the axilla; at first there was failure but later a good recovery. The site of the murmur suggests that it was due to the rupture of a valve, but one cannot entirely exclude the septum. For the most part rupture of a papillary muscle of the mitral valve is more serious than rupture of a chorda tendinea, and leads to the onset of rapid fatal failure. Perforation of the interventricular septum is met with from time to time after myocardial infarction. I have seen it arise from an abscess. There may be symptoms of pain, shock, and dyspnoea (Stanley, 1937), with the rapid appearance of failure of the right ventricle. On the other hand there may be no symptoms at all, and but little ill-effect (Wood, 1944). A mid-præcordial thrill and murmur at systole are usually described, such as are produced by the congenital lesion. The acquired perforation is usually low down in the septum (Gross and Schwartz, 1936). Damage to the myocardium may cause angina pectoris (Campbell, 1939). The contused area may become the site of an aneurysm (O'Farrell, 1939) and perhaps rupture later. Indirect violence to the heart may damage the septum itself; for partial heart block has been recorded from the effects of blast (Campbell, 1943), and from a crushing injury (Barber, 1942); complete block has also been noted (Coffer *et al.* 1941).

The signs in this case suggest that rupture of the interventricular septum occurred. The site of the thrill and murmur and the absence of any effect on the left auricle or on the efficiency of the heart are in favour of this diagnosis. One might suggest that the septum softened, and ruptured some time after the accident, perhaps giving way gradually, so that no sudden disturbance occurred. If the membranous portion had given way, this would probably have happened at once. In any case it is most unlikely to do so unless it is the site of a congenital aneurysm.

The original description of Henri Roger (1879) is worth recalling, for he made his diagnosis some years before an autopsy confirmed it. He described "a murmur loud and long; it is single, begins at systole, and is prolonged so as to hide the natural tic-tac; it has its maximum, neither at the apex, nor at the right base, nor at the left, but in the upper third of the præcordial region; it is median, like the septum itself; and from this central point it diminishes evenly in intensity and by degrees, accordingly as one gets further away from it; it is local and without propagation into the vessels. It coincides with no sign of organic disease other than the thrill. An abnormal murmur which comprises this combination of character is the pathognomonic sign of patency of the septum of the ventricles." The remark of one of those who heard this communication of course applies to the case described here. "C'est là une circonstance regrettable, il faudrait au moins une observation avec autopsie."

Conclusion

With this precedent of Roger, the proposed diagnosis is traumatic rupture of the interventricular septum. The history and physical signs in such a case are described.

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