Successive Myocardial Infarctions in a Patient with Mahaim Fiber Syndrome

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A patient with Mahaim fiber syndrome suffered two acute myocardial infarctions during the last two years. Anomalous atrioventricular excitation was intermittent. Diagnosis of both anteroseptal and anterolateral electrocardiographic myocardial infarction could be made despite ventricular pre-excitation. These findings have not been previously published, to our knowledge.

Ventricular pre-excitation caused by functioning Mahaim fibers is an infrequent entity. We observed two cases in a series of 400 patients with pre-excitation of different forms. Furthermore, electrocardiographic changes induced by a myocardial infarction (MI) in patients with Mahaim fibers have not been published previously to our knowledge. We report herein a patient with this type of ventricular pre-excitation who suffered two MIs in the last two years.

CASE REPORT

A 58-year-old man was admitted to the coronary care unit due to typical signs of acute MI. Two years before, he had been admitted in another hospital because of similar symptoms also attributed to an MI. During the last 20 years he had several attacks of paroxysmal tachycardia. An electrocardiogram recorded three months before the last admission (Fig 1A) showed a ventricular pre-excitation pattern of the Wolff-Parkinson-White type, but with a P-R interval of 0.19 s. The QRS complexes reflected a mean frontal axis with leftward deviation and left bundle branch block morphology. In addition, a healed anteroseptal MI pattern was observed in this tracing. Ventricular pre-excitation disappeared on the ECG obtained two hours after the onset of symptoms on the second admission, whereas the healed anteroseptal MI pattern remained practically unchanged; concomitant ST-T segment variations suggesting anterolateral acute myocardial injury were also registered in limb and precordial leads (Fig 1B).

Cardiac enzyme levels and technetium 99m phorphosphate cardiac scanning findings were in accordance with the diagnosis of acute MI of the anterolateral wall. The ECG recorded on the 5th hospital day (Fig 2A) showed an acute anterolateral MI pattern, without ventricular pre-excitation. In the tracing obtained on the 7th hospital day, the reappearance of the delta wave masked the abnormal Q waves of I, aVL and left precordial leads, but the ST-T segment changes persisted (Fig 2B). No complications were detected and the subsequent clinical course was uneventful. Before discharge on the 11th hospital day, ECGs with and without ventricular pre-excitation were recorded (Fig 3A and B); S-T segment elevation was of a lesser degree and the T wave negativity was greater than in previous tracings. Ventricular pre-excitation only masked QRS changes due to acute anterolateral MI. It is noteworthy that variations of the P-R interval occurred during the course of the MI (between 0.18 and 0.22 s) without significant change on the ventricular pre-excitation morphology.

DISCUSSION

The presence of a delta wave with a typical pattern of ventricular pre-excitation of the QRS complexes associated with a normal P-R interval conforms to the diagnostic criteria of Mahaim fibers on surface ECGs. A more accurate diagnosis can be obtained when the following additional events are recorded: (1) episodes of very rapid heart action, especially pseudoventricular tachycardias with a left bundle-branch-block morphology; intermittent delta wave; and (3) absence of change in the ventricular pre-excitation pattern in spite of P-R interval variations. The P-R interval variations may be caused by spontaneous atrial extrasystoles, noninvasive atrial pacing, or atrioventricular nodal conduction disturbances. However, sophisticated electrophysiologic studies may be necessary for diagnosis in several circumstances, including a relatively short P-R interval, and Mahaim fibers functioning only during tachyarrhythmic episodes.

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In the present case all the above-mentioned electrocardiographic characteristics were observed, except for the left bundle-branch block morphology during paroxysmal tachycardias because they were not recorded. However, this aspect with a left axis deviation in the frontal plane during sinus rhythm was observed in our patient, as in previously described cases of Mahaim fibers. This QRS morphology was attributed to the near constant location of the functioning Mahaim fibers in the posterior right interventricular septal mass. In our case, a slight shift of the QRS frontal axis to the right registered during the second acute MI could be related to the involvement of the anterolateral wall and the subsequent reduction of its electrical vector. In addition, the P-R interval variations, also occurring during the last MI, could be attributed to the myocardial ischemia or to a cholinergic factor of the same origin.

Moreover, the most relevant point of this case was the successive development of two myocardial infarctions, which were not masked by the pre-excitation of the Mahaim fiber type. This fact could be documented by the intermittent nature of the anomalous atrioventricular excitation. The anterospial MI was evidenced by typical QRS changes, whereas the second was disclosed by classic ST-T segment changes. This different behavior was also presumably related to the location of the functioning Mahaim fibers in the right interventricular septal mass. Furthermore, the P-R interval variations caused by the second MI were of particular relevance in the diagnosis of Mahaim fiber syndrome in the absence of an electrophysiologic study, which was refused by the patient.

REFERENCES


Massive Air Embolism in an Adult following Positive Pressure Ventilation*

Glenn Kane, M.D.; Brian Hewins M.D.; and Frederic W. Grannis Jr. M.D., F.C.C.P.

A 95-year-old woman presented in cardiac arrest. She had been intubated and positive pressure ventilation had been administered by paramedics. Air was aspirated during cannulation of the subclavian vein and the femoral artery.

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Massive Air Embolism after Positive Pressure Ventilation (Kane, Hewins, Grannis)