able for the detection of acute myocardial necrosis. A 42-year-old man with severe three-vessel and left main coronary arterial disease developed pain in the chest and ST-segment depression during an exercise test in our laboratory. Immediately following exercise, he developed ventricular tachycardia and then ventricular fibrillation, which was converted with direct-current shock. Subsequent enzymatic analysis (Table 1) and serial electrocardiograms (Fig 1) indicated the absence of myocardial infarction. Thus, this level of myocardial hypoxia, ventricular fibrillation, and direct-current shock did not result in elevation of the concentration of the MB isoenzyme of creatine phosphokinase in this patient.

Therefore, an elevation of the concentration of the MB isoenzyme of creatine phosphokinase following exercise-induced myocardial ischemia is much more likely to be a result of myocardial infarction than myocardial hypoxia.

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Unusual Hepatocellular and Cardiovascular Complications of Disopyramide

To the Editor:

Recent publications in Chest have reported the efficacy of intravenous disopyramide phosphate in the treatment of ventricular and supraventricular tachyarrhythmias. Reported side-effects have been related principally to antiarrhythmic properties of the drug or occasional systemic hypotension. In our own series of 50 patients, we have similarly found intravenous disopyramide a valuable antiarrhythmic agent, but in five patients, have encountered complications which have not previously been discussed.

Case Reports

Case 1

A 74-year-old man presented with paroxysmal ventricular tachycardia. His arrhythmias were controlled by administration of intravenous disopyramide 2.0 mg/kg followed by 0.2 mg/kg/hour. A mild fall in arterial pressure from 120/90 to 95/75 mm Hg resulted. However, after five hours, the infusion was discontinued, and disopyramide 150 mg po, qid commenced with prompt return of his arterial pressure to preexisting levels within two hours. Three days later, abnormal results of liver function tests were noted. Serum alanine-aminotransferase peaked on the fourth day after disopyramide was commenced at 6,200 IU/L (normal < 35). Serum alkaline phosphatase rose to 125 U/L (normal 25-100), serum bilirubin to 88 µmol/L (normal < 20) and prothrombin ratio was prolonged to 2.6 (therapeutic range 2.0-3.5). At the time of deterioration in hepatic function, Swan-Ganz catheterization showed a pulmonary capillary wedge pressure of 20 mm Hg and normal right atrial pressures. Urine output and renal function were maintained and, although disopyramide may cause significant myocardial depression, the findings appeared to reasonably exclude either low cardiac output or congestive cardiac failure as the cause of the hepatic deterioration. He was receiving no known hepatotoxic agents, and neither hepatitis antigen nor antibody was detected. Complete reversal in his biochemical abnormalities over 14 days after disopyramide was ceased, strongly suggested drug hepatotoxicity. Liver biopsy done six days after cessation of disopyramide showed nonspecific inflammatory changes, with no intrahepatic cholestasis which has been reported as a rare toxic effect of the drug.5

Case 2

A 55-year-old man with ischemic heart disease and refractory ventricular tachyarrhythmias was referred for electrophysiologic study. Prior to study, all medications were curtailed for five days. During sinus rhythm with left bundle branch block and PR interval 200 msec, his HV interval was prolonged (80 msec). Ventricular tachycardia was induced by programmed ventricular extrastimuli. This could not be terminated by pacing techniques. Disopyramide 100 mg IV was administered and his tachycardia then terminated by rapid right ventricular pacing. In sinus rhythm, immediately post-reversion, the HV interval was 90 msec. He then developed 2:1 and complete infraHisian block, persisting until 1:1 AV conduction resumed 20 minutes later. The abnormal HV prolongation following disopyramide and the period of 2:1 AV block suggested that disopyramide and not catheter-induced right bundle branch block was the cause of complete heart block. Although disopyramide is reportedly safe, we feel that caution is necessary when it is administered to patients with impaired distal conduction.

Cases 3-5

Although the more frequent effect of disopyramide was mild systemic hypotension, three of the 50 patients demonstrated a hypertensive response. Both systemic and diastolic arterial pressures rose by 40-50 mm Hg and fell to preexisting levels within two to three hours of cessation of disopyramide. The evidence is circumstantial, but is consistent with demonstrated peripheral vasoconstrictor effects of the drug.6

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