BRIEF COMMUNICATION

Pacemaker Failure Following External Defibrillation

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The enclosed tracings were recorded from a patient with transvenous Medtronic Demand Pacemaker Model 5841 no. 9K00824 after d-c shocks at 400 w-sec administered for ventricular fibrillation. The beginning of ventricular fibrillation is shown on strip A. The first and second d-c shocks did not abolish the fibrillation. The third d-c shock transiently abolished ventricular fibrillation, and irregular pacemaker activity was observed. Strip B was obtained after the fourth d-c shock. The pacemaker rate was faster than the set rate; later it became irregular and subsequently ceased. Strip C, obtained after a fifth shock, shows spontaneous slowing of the pacemaker rate. It returned to the set rate of 78 beats/min as demonstrated on strip D, taken 15 min later and strip E recorded 1 hr later.

On admission to Harper Hospital in Detroit this 78-year-old patient was in severe heart failure. Electrocardiogram demonstrated atrioventricular block with idioventricular rate of 40 beats/min. He was known to be hypertensive with two myocardial infarctions and right bundle-branch block. He developed ventricular fibrillation 6 days after implantation of a pacemaker. At autopsy, the pacemaker catheter was found hooked under chordae tendineae.

The pacemaker was returned to the manufacturer and was reported to function normally. According to the manufacturer, failure of this model in humans after d-c shock was not previously reported to them. In my review I failed to find a similar case. However, Lau et al.\(^1\) reported pacemaker failure in dogs given d-c shock. If careful attention is given to pacemaker performance after d-c shock, more cases will be found. This may be a transient but serious complication of d-c shock. Pacemaker design should provide protection well in excess of 400 w-sec. Patients with implanted pacemakers, by virtue of the underlying condition that required pacing, are more likely to develop arrhythmias necessitating the use of d-c shock.

When d-c shock is administered to a patient with implanted pacemaker the following should be considered: (1) use of low-energy d-c shock, (2) monitoring with special attention to pacemaker performance, (3) availability of an alternate pacemaker, and (4) avoidance of close proximity of paddles to pacemaker electrodes in patients with the unipolar system.

Occasional absence and irregularity of pacemaker artifacts could be the result of a ventricular fibrillation not recorded by the surface ECG but inhibiting the pacemaker. However unlikely, this is an alternate explanation.

Reference

1. LAU FYK, BILITCH M, WINTROB HJ: Protection of implanted pacemakers from excessive electrical energy of D.C. shock. Amer J Cardiol 23: 244, 1969

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