

## Electroconvulsive Therapy with a Cardiac Pacemaker

*To the Editor:*—Cardiac pacemakers may pose potential problems in patients requiring electroconvulsive therapy. There are few published case reports of electroconvulsive therapy of patients with pacemakers,<sup>1-3</sup> and none in the anesthesiology literature. Below we report such a case.

A 45-year-old white woman had had a Cordis Atrioor P-wave Synchronous pacemaker installed in 1966 for bradycardia of unknown etiology. She was scheduled to have electroconvulsive therapy for treatment of agitated depression. Preanesthetic chest radiograph demonstrated intact pacing leads in the right ventricle and right atrium. Her pulse generator had last been changed in November 1972. The electrocardiogram revealed capture of the ventricle with a rate of 85/min.

No preanesthetic medication was given. *D*-Tubocurarine, 3 mg, was given iv and 100 per cent O<sub>2</sub> administered by face mask for 3 to 5 minutes. Anesthesia was induced with sodium methohexital, 1.5 mg/kg (90–100 mg), iv. Succinylcholine, 100 mg, iv, was then given. After satisfactory muscle relaxation was obtained, electroconvulsive therapy was performed using a Med-Craft Mark 2 Stimulator, which delivers 110 volts for a duration of 0.4 seconds. Monitoring the electrocardiogram with a Space Labs model Alpha 9 with paper recorder provided continuous data. Treatment was discontinued after five sessions because of lack of clinical improvement. The patient had no cardiac arrhythmia or other complication during the five courses of electroconvulsive therapy.

One of the serious complications of electroconvulsive therapy is cardiac arrhythmia. Ventricular tachycardia, ventricular asystole, and sinoatrial arrest are especially serious. Thirty per cent of the cardiac arrhythmias seen during electroconvulsive therapy are caused by increased vagal activity.<sup>1-3</sup> The various types of cardiac pacemakers are listed in table 1.

No implanted pacemaker appears to be affected by the current produced by electroconvulsive therapy. Proper grounding of all electrical monitoring devices is essential so

TABLE 1. Permanent Cardiac Pacemakers

A. External
1. Percutaneous wires
2. Wireless Methods
a. Radiofrequency
b. Induction-coupled
B. Implanted pacemakers
1. Fixed rate
2. Synchronous or P-wave-triggered
3. Demand
a. R-wave-inhibited
b. R-wave-stimulated

that no current passes over the implanted low-resistance pathway to the myocardium. Care must be taken to insure that there are no defects in the pacemaker insulation and that no low-resistance contact exists between the patient and true ground.

Atropine, although valuable as an anti-sialogogue, can be omitted from preanesthetic medication<sup>4</sup> in pacemaker patients if desired, as it can precipitate atrial arrhythmias, necessitating pharmacologic or electroconversion. Additionally, the pacemaker provides "built-in" protection against vagotonic bradyarrhythmias. Our report, previous reports,<sup>1,2</sup> and experimental data<sup>3</sup> support the safety of using electroconvulsive therapy for patients who have cardiac pacemakers.

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