Case reports


Muscle potentials simulating pacemaker malfunction

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Interference spikes were noted on the electrocardiogram of a patient with an implanted demand pacemaker. Runaway malfunction was suspected and the generator replaced. Subsequent investigation showed that the interference originated from fasciculation in the left leg caused by underlying neuromuscular disease. Skeletal muscle potentials can produce an electrocardiographic appearance closely resembling ‘runaway’ pacemaker. Such abnormalities should prompt a search for occult neuromuscular disease.

Skeletal muscle activity may be recorded on the electrocardiogram, and the resulting somatic artefact is well recognized. However, multiple discrete signals on a recording which otherwise exhibits a normal isoelectric baseline have not previously been reported. This may be because the phenomenon is very rare or because it has been thought to have no clinical relevance. We report a patient who presented with this electrocardiographic pattern. Its significance was not initially appreciated, and this resulted in an implanted pacemaker being removed because of presumed runaway malfunction.

Case report
In May 1974 a 61-year-old man was transferred to this hospital for insertion of a permanent pacemaker system. He had presented elsewhere with a history of four blackouts during the preceding six weeks. Intermittent complete heart block had been diagnosed and temporary pacing had relieved symptoms. A Devices Demand Unit (3821RC), for right ventricular endocardial stimulation, was implanted in the left pectoral region. Diabetes mellitus and hypertension, diagnosed 20 years previously, were controlled with metformin 1 g 8-hourly and methyldopa 250 mg 6-hourly, respectively. At outpatient attendance one month later he was pacing well, with no recurrence of syncope. Three months later he returned with a five-week history of palpitations accompanied by dizziness and dyspnoea. The electrocardiogram showed sinus rhythm with right bundle-branch block and left axis deviation and sharp discrete signals at a rate of 300/min in leads II and III (Fig. 1). Clinical examination revealed no abnormality in the abdomen, cardiovascular, or respiratory systems. The demand pacemaker was activated by a magnet into a fast fixed rate mode and normal pacing was evident. Analysis

![FIG. 1 Normal lead arrangement. Presumed inhibition of demand pacemaker by return of sinus rhythm. Artefact seen in leads II and III.](image-url)
recent thought manufacturers the malfunctions unlikely the establishment of pacemaker. slight revealed the modified operation recording transferred was that the obvious interference was the spike spontaneous fasciculation electrode. The was muscles patient's stimuli. sensory peripheral was the left leg should spikes from the electrocardiogram mimicking those from a runaway pacemaker. It is clearly important to appreciate that discrete fasciculation potentials from muscle underlying an electrode may produce interference spikes on the electrocardiogram which, in patients with an implanted pacemaker, may be misinterpreted as malfunction. Furthermore, when these spikes are seen on a routine electrocardiogram the presence of neuromuscular disease should be suspected.

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References


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FIG. 2 Modified lead arrangement. Leads I and II now identical, but artefact seen only in II. Artefact clearly seen on lead III.