Back-up Reset Mode of a Cardiac Resynchronization Therapy Defibrillator After Radiotherapy Diagnosed by Remote Monitoring: A Case Study

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Abstract
A 68-year-old man with a cardiac resynchronization therapy defibrillator underwent radiotherapy for colon cancer. The defibrillator's absorbed dose was <1 Gy. Following a remote monitoring alert stating that the defibrillator was in a back-up reset mode, the defibrillator was successfully reprogrammed. Remote monitoring is useful for early detection of cardiac implantable electronic device dysfunction in patients treated with radiotherapy.

Case
Radiotherapy is a common treatment for cancer, and an increasing number of patients undergoing radiotherapy have cardiac implantable electronic devices (CIED). Neutron-producing radiotherapy using beam energy ≥15 MV has been reported to be a strong predictor of device malfunction [1] but CIED dysfunction cannot be predicted based solely on beam energy. Electrical resets are the most common malfunction, [1] and this requires the device to be reprogrammed. Close monitoring of patients and devices is therefore necessary according to recent recommendations [2,3].

A 68-year-old man with a BIOTRONIK Iperia cardiac resynchronization therapy defibrillator (CRT-D) underwent a single radiotherapy session for colon cancer using accelerated photons at 18 MV beam energy. The total dose absorbed by the defibrillator was estimated to be <1 Gy. The device was not checked after the radiotherapy session, contrary to our usual protocol. The patient was discharged home after the radiotherapy session and, that evening, we received a remote monitoring high-priority alert from biotronik-homemonitoring.com stating that the defibrillator was in back up reset mode and a message saying that only limited therapies had been available (since the time of radiotherapy) and that patient monitoring was recommended. The patient was called to come in our institution, interrogation of the device the same evening provided the report shown in the Figure 1. This told us that the backup VVI mode had been activated, resulting in biventricular stimulation at maximum energy, with tachycardia detection of 171 bpm. The patient remained asymptomatic and the defibrillator was successfully manually reactivated the same day.

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Keywords: CIED dysfunction; Radiotherapy; Defibrillator; Remote monitoring

Received: 30 July 2019; Accepted: 05 August 2019; Published: 09 August 2019

Figure 1: Interrogation of the device provided this report. A, Atrial; VD, Right ventricle; VG, Left ventricle; VF, ventricular fibrillation; VT, ventricular tachycardia

One month later, the patient underwent a series of radiotherapy treatments, consisting of 37 sessions of 2 Gy pelvis irradiation (total 74 Gy irradiation) with 6 MV photon beam energy (non-neutron producing irradiation). The defibrillator was checked after each radiotherapy session and no new events occurred.

Remote monitoring is therefore useful for the early detection of CIED dysfunction in patients treated with radiotherapy and could be a safe alternative to close physical device monitoring.

Conflicts of Interest

The authors have no conflicts of interest regarding this publication to declare

Consent

The patient gave his consent for the publication of the case

Acknowledgement

Editorial support was provided by MedLink Healthcare Communications Limited and was funded by the authors.

References


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