CASE REPORT

Ventricular Fibrillation Complicating Endomyocardial Biopsy of Transplanted Heart

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Life-threatening arrhythmia is an unusual complication of endomyocardial biopsy in transplanted heart. Herein we described a case of VF during endomyocardial biopsy. The possibility of VF during a biopsy necessitates immediate access to defibrillation during endomyocardial biopsy.

Ann Noninvasive Electrocardiol 2013;18(4):413–414

ventricular tachycardia/fibrillation; electrophysiology - cardiac arrest/sudden death

Figure 1. Onset of sustained VF initiated by short coupled PVC, triggered by biptome.

A 63-year-old man with a long history of dilated cardiomyopathy (presumed viral etiology) and single vessel coronary artery disease (prior RCA intracoronary stent) underwent orthotopic heart transplant. His postoperative course was fairly uncomplicated. He presented for his fifteenth follow-up cardiac biopsy and reported that he had felt quite well and had been exercising regularly. His previous biopsy was ISHLT grade 0. While the second specimen was being taken under echocardiographic guidance, a closely coupled ventricular premature beat (VPC) falling on top of the T wave (R-on-T) was observed followed by immediate onset of ventricular fibrillation (Fig. 1.). CPR was started immediately and NSR was restored with 360 joules biphasic shock. Two myocardial tissue samples were obtained prior to aborting the procedure due to ventricular arrhythmia. He was admitted into the telemetry unit and was observed for 24 hours without recurrence of any arrhythmias. His potassium and magnesium levels were within normal limits

(3.8 mmol/L and 1.3 mEq/L, respectively) as were his white blood cell count of 5400/ μ l and hemoglobin level of 13.3. Microscopic evaluation of the endomyocardial biopsy tissue (limited to 2 samples) showed no evidence of rejection. Echocardiogram immediately after the ventricular arrhythmia and the following day showed no significant effusion and normal left ventricular function.

Despite the increasing use of alternative techniques, endomyocardial biopsy remains the primary method for diagnosing cardiac allograft rejection. Although endomyocardial biopsy is usually considered a safe procedure, no large studies of the risks of endomyocardial biopsy specifically in the transplant population have been undertaken. All available data are retrospective analyses from high volume centers. The overall risk of complications during endomyocardial biopsy ranges from 1.8 to 3%. Reported complications include risk of carotid puncture (0.9–1.8%), heart perforation (0.15–0.2%), abscess formation (0.15%), superior vena cava perforation with hemothorax, pneumothorax (0.1%), arrhythmias (0.25–0.4%), and conduction abnormalities (0.2%).^{1–3}

Observed arrhythmias are usually premature ventricular contractions related to mechanical stimulation of myocardium by biptome (very common during any cardiac instrumentation). Occasionally, nonsustained VT/VF can occur during endomyocardial biopsies. To our knowledge,

there has been only four other case reports of sustained VF triggered by biopsy which required DC cardioversion.^{4,5} In the previous case reports, the myocardial tissue biopsies showed evidence of acute rejection (moderate acute rejection according to "pre ISHLT" classification). In contrast, our patient had no evidence of rejection on the current limited biopsy as well as the immediate prior biopsy 4 weeks earlier. Moreover, the onset of the arrhythmia can be ascertained by reviewing continuous rhythm monitoring. In our case, a single VPC triggered by biptome forceps incidentally happened during the vulnerable phase of repolarization (R on T phenomenon) inducing sustained VF. We hypothesize that the mechanism of arrhythmia can be compared to induction of VF in commotio cordis, where the precordial impact delivered within a narrow temporal window between 30 and 15 milliseconds before the peak of the T wave, reproducibly induces VF in normal heart (animal model).⁶ When the impact is delivered just outside the 15 millisecond period of vulnerability, unsustained polymorphic ventricular tachycardia may occur. The vulnerable period of the car-

diac cycle amounts to just over 1/100th of a second.⁶

The likelihood for inducing sustained VF during the biopsy is very low. Nevertheless, the biptome can cause sustained VF in normal heart and a defibrillator must be at the bedside for all endomyocardial biopsy procedures.

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