

## Recurrent Torsades de Pointes Post Direct Current Cardioversion for Atrial Fibrillation with Rapid Ventricular Response

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**Abstract :** Atrial fibrillation with rapid ventricular response results in the loss of atrial kick and shortened ventricular filling time, which often leads to decompensated heart failure. Pharmacologic rhythm control is the treatment of choice, and patients frequently benefit from the restoration of sinus rhythm. When pharmacologic treatment is unsuccessful or a patient declines hemodynamically, direct cardioversion is the treatment of choice. Torsades de pointes or "twisting of the points" in French, is a rare but under-appreciated risk of cardioversion therapy and accounts for a significant number of sudden cardiac death each year. A 61-year-old female with no significant past medical history presented to the Emergency Department with worsening dyspnea. An electrocardiogram showed atrial fibrillation with rapid ventricular response, and a chest X-ray was significant for bilateral pulmonary vascular congestion. Full-dose anticoagulation and diuresis were initiated with moderate improvement in symptoms. A transthoracic echocardiogram revealed biventricular systolic dysfunction with a left ventricular ejection fraction of 30%. After consultation with an electrophysiologist, the consensus was to proceed with the restoration of sinus rhythm, which would likely improve the patient's heart failure symptoms and possibly the ejection fraction. A transesophageal echocardiogram was negative for left atrial appendage thrombus; the patient was treated with a loading dose of amiodarone and underwent successful direct current cardioversion with 200 Joules. The patient was placed on telemetry monitoring for 24 hours and was noted to have frequent premature ventricular contractions with subsequent degeneration to torsades de pointes. The patient was found unresponsive and pulseless; cardiopulmonary resuscitation was initiated with cardioversion, and return of spontaneous circulation was achieved after four minutes to normal sinus rhythm. Post-cardiac arrest electrocardiogram showed sinus bradycardia with heart-rate corrected QT interval of 592 milliseconds. The patient continued to have frequent premature ventricular contractions and required two additional cardioversions to achieve a return of spontaneous circulation with intravenous magnesium and lidocaine. An automatic implantable cardioverter-defibrillator was subsequently implanted for secondary prevention of sudden cardiac death. The backup pacing rate of the automatic implantable cardioverter-defibrillator was set higher than usual in an attempt to prevent premature ventricular contractions-induced torsades de pointes. The patient did not have any further ventricular arrhythmias after implantation of the automatic implantable cardioverter-defibrillator. Overdrive pacing is a method utilized to treat premature ventricular contractions-induced torsades de pointes by preventing a patient's susceptibility to R on T-wave-induced ventricular arrhythmias. Pacing at a rate of 90 beats per minute succeeded in controlling the arrhythmia without the need for traumatic cardiac defibrillation. In our patient, conversion of atrial fibrillation with rapid ventricular response to normal sinus rhythm resulted in a slower heart rate and an increased probability of premature ventricular contraction occurring on the T-wave and ensuing ventricular arrhythmia. This case highlights direct current cardioversion for atrial fibrillation with rapid ventricular response resulting in persistent ventricular arrhythmia requiring an automatic implantable cardioverter-defibrillator placement with overdrive pacing to prevent a recurrence.

**Keywords :** refractory atrial fibrillation, atrial fibrillation, overdrive pacing, torsades de pointes

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