

A Case of Torsades de Pointes Complicating Coronary Fractional Flow Reserve Study

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Abstract

A coronary fractional flow reserve (FFR) study is a functional coronary flow assessment frequently performed in a cath lab to assess a hemodynamic significance of intermediate coronary lesions. During this study, intracoronary adenosine is injected to achieve a full hyperemia of the coronary bed. Several side effects of the intracoronary adenosine injections are well known, such as transient complete AV block, transient angina-like chest pain, nausea, and dyspnea. However to our best knowledge, there were no previous reports of torsades de pointes complicating the intracoronary adenosine injection.

Keywords

Intracoronary adenosine; FFR; Torsades de pointes

Introduction

FFR (Fractional Flow Reserve) is a widely used physiologic coronary flow study. We present a case of torsades de pointes caused by intracoronary adenosine injection during the FFR study [1,2].

Case Presentation

A 52 years old female with a history of hypertension was admitted to our department with a clinical picture of new onset angina. As a part of evaluation, a coronary angiography was performed which demonstrated 90 percent stenosis in the middle portion of right coronary artery (MID RCA) and 30-50 percent stenosis in the middle portion of left circumflex artery (mid AVLX). A percutaneous coronary intervention (PCI) to MID RCA was performed with drug eluting stent (DES) placement. There were no complications during the procedure.

One day following the procedure, the patient was discharged home with ASPIRIN, CLOPIDOGREL, RAMIPRIL and ATORVASTATIN. Three weeks later the patient was evaluated in follow up cardiology clinic. She was still having pressing chest pain during exercise and her stress test was positive for ischemia. The revision of her coronary angiography and PCI revealed good PCI result in MID RCA and intermediate lesion on mid AVLX.

We decided to perform functional assessment of the Mid AVLX lesion by FFR. The procedure was performed by right radial approach under mild conscious sedation with 2 mg of IV MIDAZOLAM and 25 microgram of IV FENTANYL and local anesthesia with SC LIDOCAINE. A 5 FFr Extra Back UP (EBU) 3.5 Guide catheter was inserted into LMCA.

We crossed the lesion in the MID AVLX by FFR wire (wireless St. Jude Medical FFR system wire). Next, 200 micrograms of adenosine were injected through the guiding catheter. Immediately after completion of the injection, wide complex tachycardia with morphology of polymorphic VT was detected on the monitor (Figure 1).

In parallel, the systolic blood pressure dropped to 60 mmHg. The tachycardia converted spontaneously to atrial fibrillation after 14 seconds. Atrial fibrillation was converted to sinus rhythm by electrical cardioversion. Revision of her ECG monitor strip immediately after intracoronary adenosine, revealed QT interval of 430 msec and QTC interval of 496 msec (Figure 2).

Revision of her ECG monitor strip after electrical cardioversion revealed QT interval of 380 msec and QTC interval of 425 msec (Figure 3). The FFR was 1.0.

Discussion

There are many etiologies for QT prolongation and Torsade de pointes ventricular tachycardia: congenital QT syndrome, drugs, ischemia. We present here a case of QT prolongation and Torsade de pointes mediated by intracoronary (IC) adenosine administration during FFR study. Ischemic etiology was excluded by negative FFR. No other drugs were administered during the case.

Article Information

DOI: 10.31021/ijccm.20181115
Article Type: Case Report
Journal Type: Open Access
Volume: 1 **Issue:** 3
Manuscript ID: IJCCM-1-115
Publisher: Boffin Access Limited

Received Date: 17 October 2018

Accepted Date: 31 October 2018

Published Date: 31 October 2018

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Citation: Lubovich A, Samniah N, Rosenschein U. A Case of Torsades de Pointes Complicating Coronary Fractional Flow Reserve Study. Int J Cardiol Cardiovasc Med. 2018 Nov;1(3):115

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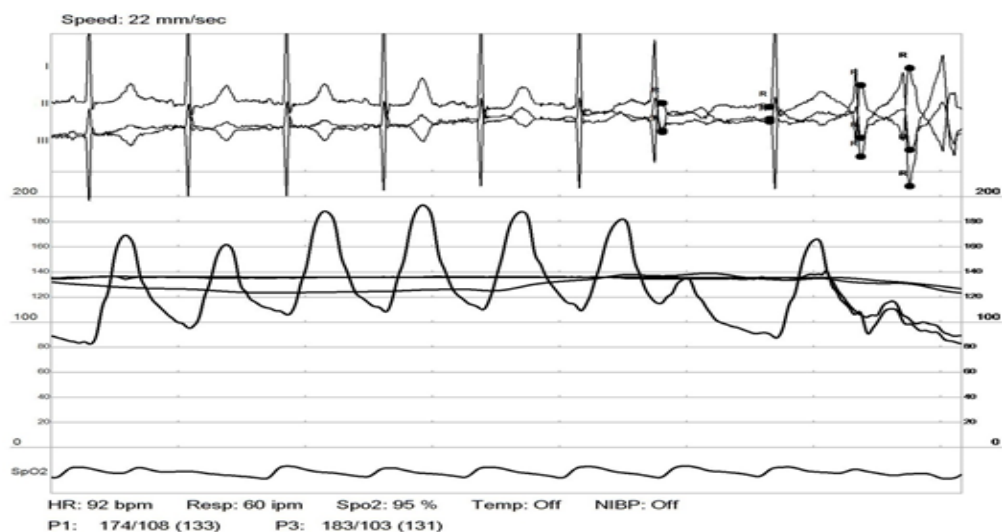


Figure 1: The QT prolongation after IC Adenosine

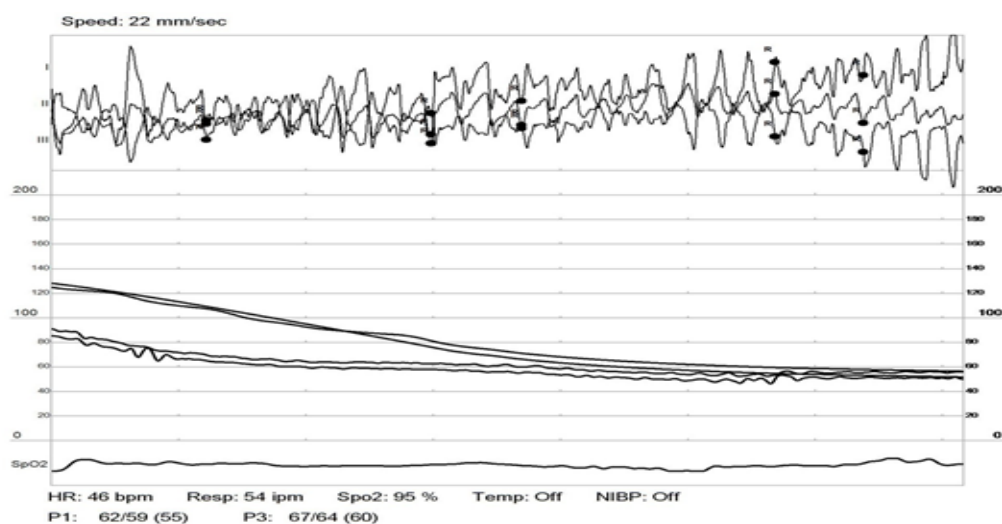


Figure 2: The development of Torsades de pointes

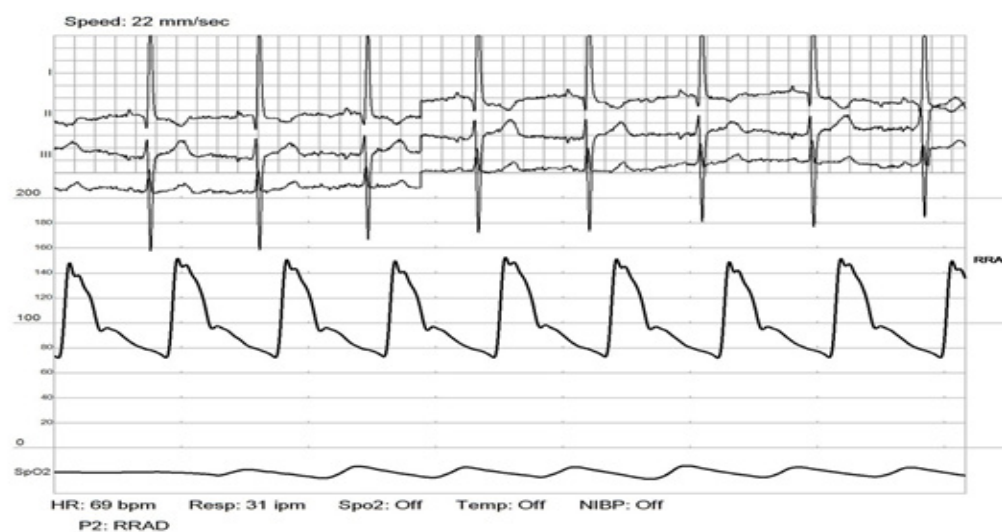


Figure 3: The normalization of QT after electrical cardioversion of atrial fibrillation

We found two case reports of Torsades de pointes arrhythmia which developed after IV adenosine administration to patients with acquired or congenital prolonged QT syndrome [3,4]. However, to our best knowledge, there were no previous reports of QT prolongation and Torsades de pointes mediated by IC adenosine injection.

The FFR study with IC adenosine administration has become a routine coronary artery flow physiology assessment tool which is performed in any patient with intermediate coronary stenosis. It is important to recognize this complication and be prepared to administer appropriate therapy in case of prolonged arrhythmia.

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