

Original articles

**A case of catheter ablation for atrial fibrillation in a very young patient without structural heart disease**

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**Abstract**

The patient was an 18-year-old man who suffered frequent supraventricular premature

complexes (SVPCs) and atrial fibrillation. Catheter ablation was performed and left pulmonary vein had been isolated, although firing from within the left inferior pulmonary vein remained. After that, the patient did not exhibit SVPCs and atrial fibrillation.

## Introduction

It is known that as an individual ages, atrial fibrillation increases in frequency. Currently, it is possible to radically cure atrial fibrillation with ablation via pulmonary vein isolation. However, the efficacy of ablation for atrial fibrillation in very young

patients is not well understood.

#### Case reports

The patient was an 18-year-old man. The patient's medical and family histories contained no particular note. No oral medication. A school health checkup performed when the patient was 15 years old revealed supraventricular premature complexes (SVPCs), although no symptoms of palpitations were observed. The patient was observed by a local doctor. An echocardiogram showed a negative result for structural heart disease, while a Holter ECG revealed frequent SVPCs (Figure 1), the patient underwent follow-ups for one year afterwards. A Holter ECG performed when the patient was 17 years old revealed an approximately 4-hour atrial fibrillation, and frequent SVPCs were observed at other times (Figure 2). The patient was referred to our hospital and catheter ablation was performed.

At the start of the procedure, a Bee AT catheter (Japan Lifeline Co., Ltd., Tokyo, Japan) was advanced into the distal coronary sinus (CS) through the right subclavian vein. The distal and middle eight poles were positioned in the distal CS and right atrial lateral wall, respectively. The surface electrocardiogram (ECG) and bipolar endocardial electrograms were continuously monitored, and the ensuing data were stored on a computer-based digital amplifier (LabSystem Pro, Bard Electrophysiology, USA). After

trans-septal puncture, 10-polar circular electrode catheters (Lasso, Biosense Webster, USA) and an irrigation catheter (Thermo-cool, Biosense Webster) were advanced into the left atrium (LA) through the long SLO sheaths (St. Jude Medical, USA). The 10-polar circular electrode catheters revealed firing from the left inferior pulmonary vein (LIPV) (Figure 3). While performing extensive encircling pulmonary vein isolation (ECPVI), once the left pulmonary vein had been isolated, although firing from within the left inferior pulmonary vein remained, the patient's SVPCs disappeared (Figure 4). No dormant conduction was observed. Bilateral pulmonary vein isolation was confirmed. The absence of any complications, such as pericardial fluid retention, was confirmed, and catheter ablation was performed. Subsequent outpatient follow-ups were conducted, and over more than one year, the patient's sinus rhythm did not exhibit SVPCs.

## Discussion

Haïssaguerre et al. reported that “the pulmonary veins are an important source of ectopic beats, initiating frequent paroxysms of atrial fibrillation” (1). In this case, ectopic beats from the left inferior pulmonary vein were observed, and after ablation, once the left pulmonary vein had been isolated, the patient's SVPCs disappeared. The

patient's sinus rhythm has remained steady since.

Atrial fibrillation has been reported to grow more frequently with individual age (2). The average age of patients with atrial fibrillation has been reported to be 78.9 years; the patient in this case was extremely young in comparison.

Several reports on atrial fibrillation in young individuals have been published. Gourraud et al. (3) reported that in patients with atrial fibrillation, AF could reveal a genetic pathology or be the initial presentation of cardiomyopathy. In this case, no findings suggestive of genetic pathology or cardiomyopathy were observed. However, we should continue to follow this patient with care.

A. Saguner et al. (4) stated that catheter ablation for AF is effective in very young adults and is associated with an acceptable complication rate. Here, catheter ablation was exceedingly effective, and the patient's prognosis was good. However, the patient in this case was even younger than that of Saguner's report; no reports have been made of such a young patient, and we believe this is a point of considerable interest.

### Conclusions

We report the successful use of catheter ablation for atrial fibrillation in a very young patient without structural heart disease. Even in this case, the source of the atrial fibrillation was the pulmonary vein, and the usual catheter ablation procedure was able to radically treat this patient's AF. These results suggest that regardless of whether the

patient is old or young, the pulmonary vein is highly likely to be the cause of atrial fibrillation, and that pulmonary vein isolation is the first-choice treatment for this condition.

## References

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Figure 1

Twelve-lead surface ECG consistent with SVPCs.

Figure 2

Holter ECG

Atrial fibrillation and frequent SPVCs were observed.

★ Indicates SVPCs

Figure 3

Shows intracardiac electgram

Firing observed from the left inferior pulmonary vein

Figure 4

Shows intracardiac electgram

While performing extensive encircling pulmonary vein isolation (ECPVI), the patient's

SVPCs disappeared once the left pulmonary vein had been isolated.