

## Non Decremental Antegrade Only Anteroseptal Accessory Pathway

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### Abstract

Manifest accessory pathways that conduct antegrade-only account for less than 5% of all bypass tracts. We present a case of a 25-year-old patient presented with manifest accessory pathway. During electrophysiological study, there was no retrograde conduction over the accessory pathway that was successfully ablated through a subclavian venous access.

**Keywords:** Accessory pathway; Pre-excitation syndrome

### Learning objectives

1. Better understanding of bypass tracts behavior
2. Rare type of accessory pathway
3. Safe ablation of anteroseptal accessory pathway

### Introduction

Accessory pathways are a common cause of re-entrant tachyarrhythmia and ablation of these pathways is considered as one of the common electrophysiological procedures. Different types of these tracts have been identified. Of these, antegrade only accessory pathways have been infrequently diagnosed. We present a case of young man who is presented for the first time with atrial fibrillation conducting over an antegrade only accessory pathway that was successfully ablated.

### Case Report

A 25-year-old male patient presented to the emergency department in Alexandria University hospital with palpitations and syncope. On examination; the patient was pale, sweaty, his blood pressure was 85/60 mmHg, pulse rate was 180 beat per minute (bpm) irregular, and his ECG showed manifest pre-excited atrial fibrillation for which he received a synchronized DC shock. Further ECG in sinus rhythm showed manifest ventricular preexcitation with positive delta waves in leads II, III, aVF, and early transition in the precordial leads.

After stabilization of the patient and after detailed discussion with patient and his relatives regarding the nature of the accessory pathway and risk of ablation procedure, we decided to perform an electrophysiological (EP) study and ablation.

During electrophysiological study, we found an anteroseptal accessory pathway, non-decremental with incremental atrial pacing with refractoriness of 250 ms, with no evidence of retrograde conduction during pacing from the right ventricle (RV). Pre-excited tachycardia was diagnosed and we decided to ablate the pathway. The inferior approach via the right femoral vein using a long sheath was used but the catheter was not stable so the superior approach (via subclavian venous access) was used. After obtaining good signals with AV fusion, a 4 mm-tip bipolar ablation catheter was used at power of 20 Watt (Figure 1).

The pathway was successfully ablated and the fusion on the ablation catheter disappeared as well as the delta wave on the surface ECG. After 45 minutes of ablation, there was no evidence of accessory pathway conduction, no further induced arrhythmia and no evidence of heart block. The patient was discharged safely in the same day [1].

### Discussion

The atrioventricular node-His Purkinje system constitute the

only normal conduction system in the heart. AV bypass tracts (BTs) connecting the atria to the ventricles are aberrant muscle bundles lying outside the normal AV conduction system.

As many as 60% of BTs have both antegrade and retrograde conduction, and the rest conduct in only one direction. BTs with retrograde-only conduction account for 17% to 37%. However, BTs with antegrade-only conduction are uncommon (<5%), with decremental conduction properties most of the time.

In Antegrade conduction, the delta wave indicates ventricular preexcitation whereas BTs with retrograde-only conduction are called concealed and diagnosed during EP studies by the earliest site or retrograde activation during RV pacing.

In 1937, Mahaim fibers were identified areas of conducting tissue extending from the His bundle into the ventricular myocardium. These



**Figure 1:** Panel A: 1: baseline ECG, 2: retrograde block, 3: incremental atrial pacing. Panel B: 1: LAO fluoroscopic view, 2: AP fluoroscopic view, 3: fusion signal on ablation catheter, 4: disappearance of fusion and preexcitation. LAO: left anterior oblique, AP: anteroposterior.

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fibers were called Mahaim fibers or fasciculoventricular fibers. These tracts classically share common electrophysiological properties: (1) conduct antegrade only (with rare exceptions); (2) had long conduction times; and (3) had decremental conduction.

Tai et al. [2] described 33 patients with antegrade only accessory pathways among 759 patients referred for ablation of accessory pathways. Atrial fibrillation was the usual presentation of these type of bypass tracts. Antegrade only accessory pathways with non-decremental properties are rarely described and are classically silent till the development of atrial fibrillation with the risk of degeneration into ventricular fibrillation. Tina Lin [3] reported a case with accessory pathway at the aorto-mitral continuity that was ablated from the left coronary cusp. This pathway was antegrade only conducting with non-decremental properties.

So far as we know, the presented case is also one of the rare cases

of antegrade-only non-decremental accessory pathways that has been reported.

## Conclusion

Manifest non-decremental antegrade-only pathways despite being rare, they do exist. They are usually under diagnosed remaining asymptomatic until atrial fibrillation develops.

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