

## Pulmonary Vein Isolation for Treatment of Paroxysmal Atrial Fibrillation on Patient with Situs Inversus Totalis

G.A. Gromyko<sup>1,2</sup>, S.U. Mihaylichenko<sup>2</sup>, S.A. Novichkov<sup>2</sup>, D.A. Mangutov<sup>2</sup>, D.L. Kranin<sup>2</sup>, E.V. Krukov<sup>2</sup>

<sup>1</sup>I.M. Sechenov First Moscow State Medical University, <sup>2</sup>FSGE «Burdenko Main Military Clinical Hospital» of Russian Federation Defense Ministry.

### Abstract

A 56-year-old male with paroxysmal atrial fibrillation refractory to class IC and class III antiarrhythmic drugs was admitted to our hospital for radiofrequency catheter ablation of atrial fibrillation. During preoperative examination situs inversus totalis was revealed. Pulmonary vein (PV) isolation was successfully performed with atrial fibrillation termination and elimination of all PV potentials. The procedure was performed without any complications. Our report shows that PV isolation for treatment of drug-refractory atrial fibrillation can be safely performed in patients with dextrocardia and situs inversus totalis.

### Introduction

Recently, pulmonary vein isolation (PVI) has become a common procedure for the treatment of drug-refractory paroxysmal atrial fibrillation (AFIB). The presence of abnormal anatomy can make the procedure more complex. There are limited data about the feasibility and safety of PVI in patients with situs inversus totalis.

### Case Report

A 56-year-old male with 10-year anamnesis of paroxysmal AFib was admitted to our hospital. Episodes of atrial fibrillation were highly symptomatic, appeared two to four times per month, lasted for two to three hours and were terminated by beta blockers or amiodarone. Chronic antiarrhythmic therapy with class IC and class III drugs was ineffective for AFib prevention. During preoperative examination dextrocardia and situs inversus totalis were revealed.

According to current guidelines<sup>[1]</sup> radiofrequency ablation (RFA) targeting PV was considered. The procedure was performed using intracardiac echocardiography (ICE) and the CARTO 3 (Biosense Webster) navigation system. Two Swaz SR0 introducers and an 11Fr introducer for ICE were inserted via the left femoral vein. A double transseptal puncture was performed under ICE control. Angiography [Figure 1] and 3D reconstruction [Figure 2] of the left atrium were performed. When a Lasso catheter was positioned in the anatomical right superior PV, prominent left atrial appendage potentials were registered. Atrial fibrillation was induced during manipulations near the left superior PV.

Point-by-point antral isolation of all pulmonary veins was performed using a bi-directional SmartTouch catheter (Biosense Webster), with termination of AFib during anatomical left superior

PV isolation and elimination of all PV potentials, confirmed by Lasso catheter. The procedure duration was 85 minutes; fluoroscopy time – 4 minutes 35 seconds. There were no complications during the procedure.

### Discussion

There are few case reports of successful PVI in patients with situs inversus totalis using RF energy<sup>[2],[3]</sup>, cryoenergy<sup>[4]</sup> or robotic navigation.<sup>[5]</sup> In our case report, because of ICE-assisted transseptal puncture and the use of an electroanatomical mapping system, short procedure duration and low X-ray exposure were achieved. Catheter and long sheath manipulations are complex in cases of heart inversion

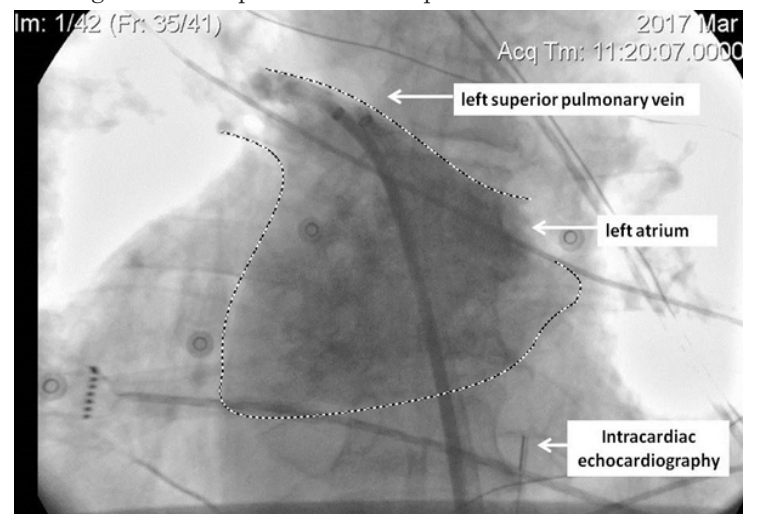


Figure 1: Angiography of left atrium from long sheath, positioned in left superior (anatomical right) pulmonary vein

since the positions of the tools are opposite to those for the case of common anatomy. The use of the SmartTouch catheter can facilitate the procedure performance, especially in the left atrial ridge area.

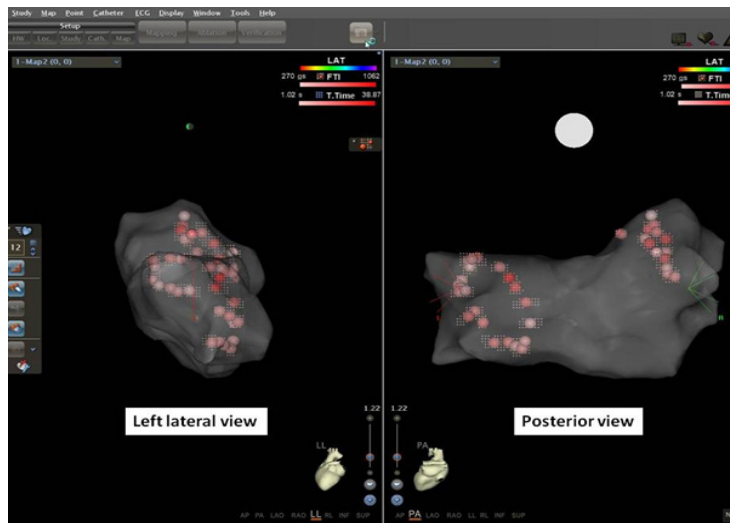
### Key Words

Atrial fibrillation, Pulmonary veins isolation, Dextrocardia.

Corresponding Author  
Grigorii Gromyko  
gromyko2010@list.ru

The right-sided position of the left atrial appendage makes it more difficult to achieve good catheter-to-tissue contact in the left atrial ridge area.

arteries. *Eur. Heart J.* 2011;32 (6).



**Figure 2:** Reconstruction of left atrium from electroanatomical mapping system with ablation points

## Conclusions

Pulmonary vein isolation for the treatment of drug-refractory paroxysmal atrial fibrillation can be safely performed in patients with situs inversus totalis.

## Conflict Of Interests

None.

## Disclosures

None.

## References

1. Kirchhof Paulus, BenussiStefano, KotechaDipak, AhlssonAnders, AtarDan, CasadeiBarbara, CastellaManuel, DienerHans-Christoph, HeidbuchelHein, HendriksJeroen, HindricksGerhard, ManolisAntonis S, OldgrenJonas, PopescuBogdan Alexandru, SchottenUlrich, Van PutteBart, VardasPanagiotis, AgewallStefan, CammJohn, Baron EsquiviasGonzalo, BudtsWerner, CarerjScipione, CasselmanFilip, CocaAntonio, De CaterinaRaffaele, DeftereosSpiridon, DobrevDobromir, FerroJosé M, FilippatosGerasimos, FitzsimonsDonna, GorenekBulent, GuenounMaxine, HohnloserStefan H, KolhPhilippe, LipGregory Y H, ManolisAthanasios, McMurrayJohn, PonikowskiPiotr, RosenhekRaphael, RuschitzkaFrank, SavelievaIrina, SharmaSanjay, SuwalskiPiotr, TamargoJuan Luis, TaylorClare J, Van GelderIsabelle C, VoorsAdriaan A, WindeckerStephan, ZamoranoJose Luis, ZeppenfeldKatja. 2016 ESC Guidelines for the management of atrial fibrillation developed in collaboration with EACTS. *Eur. Heart J.* 2016;37 (38):2893–2962.
2. YamadaTakumi,McElderryHughThomas,DoppalapudiHarish,PlatonovMichael, EpsteinAndrew E, PlumbVance J, KayGeorge Neal. Successful catheter ablation of atrial fibrillation in a patient with dextrocardia. *Europace.* 2008;10 (9):1120–2.
3. Chong Eric, ChangShih-Lin, ChenShih-Ann. Pulmonary vein isolation in a patient with dextrocardia. *Europace.* 2012;14 (12).
4. Yoshiga Yasuhiro, ShimizuAkihiko, UeyamaTakeshi, OnoMakoto, FumimotoTomoko, IshiguchiHironori, YanoMasafumi. Successful cryoballoon pulmonary vein isolation in a patient with situs inversus and dextrocardia. *J Arrhythm.* 2016;32 (6):493–495.
5. Tilz Roland Richard, RilligAndreas, WissnerErik, KivelitzDietmar Eduard, OuyangFeifan. Successful robotic pulmonary vein isolation in adverse anatomy: dextrocardia with situs solitus, D-loop ventricles, and normally related great