

# Treatment of arrhythmias with catheter ablation at the General “Dr. Josip Benčević” in Slavonski Brod - retrospective analysis

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Atrial fibrillation (AF) is the most common arrhythmia in the world with an increasing prevalence in the elderly. It is associated with increased morbidity and mortality in affected individuals, primarily due to heart failure (HF) and stroke.<sup>1</sup> The early rhythm control strategy showed superiority in reducing stroke, total mortality and cardiovascular mortality compared to the rate control strategy and consistent superiority in maintenance sinus rhythm in relation to treatment with antiarrhythmics.<sup>2</sup> In electrophysiology centers, the second most common arrhythmia after AF is atrioventricular nodal re-entrant tachycardia (AVNRT), then atrial flutter and atrioventricular re-entrant tachycardia (AVRT), for which catheter ablation is recommended as initial treatment.<sup>3</sup>

The success of catheter ablation with the low risks of the procedure and the availability of technology led to the opening of the first electrophysiological laboratory in Slavonia in the General Hospital “Dr. Josip Benčević” in Slavonski Brod. The first procedure that was performed was the cryoballoon pulmonary vein isolation on February 19, 2019 (**Figures 1-5**). Shortly after that, on February 28, 2019, the first electrophysiological study and radiofrequency ablation using



**FIGURE 1.** The first cryoballoon pulmonary vein isolation in Slavonski Brod on February 19, 2019. In the picture from left to right, first row: Assist. Prof. Vedran Velagić, Dr. Ivan Bitunjac, Dr. Katica Cvitkušić Lukenda, second row: Mato Čizmić, medical radiology engineer, Saša Presežnik, nurse.



**FIGURE 2.** The first cryoballoon pulmonary vein isolation in Slavonski Brod on February 19, 2019. In the picture from left to right, first row: Mato Čizmić, medical radiology engineer, Dr. Marijana Knežević Praveček, Dr. Ivan Bitunjac, Dr. Katica Cvitkušić Lukenda, second row: Assist. Prof. Vedran Velagić.

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**FIGURE 3.** Preparing the patient for the cryoballoon pulmonary vein isolation. In the picture from left to right, first row: Saša Presežnik, nurse, second row: Mato Čizmić, medical radiology engineer, Barica Stanić i Alenka Tuličić-Mihelčić, nurses.

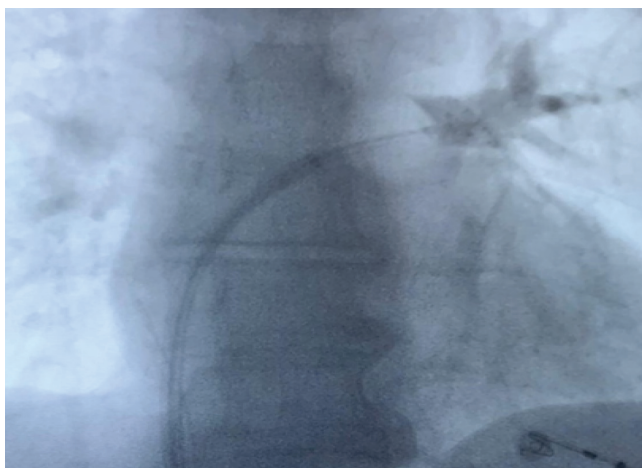


## Treatment of arrhythmias with catheter ablation at the General Hospital "Dr. Josip Benčević" in Slavonski Brod - retrospective analysis

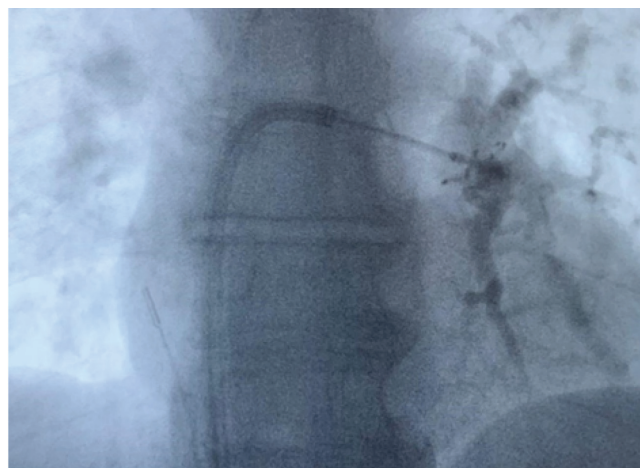
a 3D navigation system were performed on a patient with AVNRT (**Figure 6**). To date, we have performed 265 catheter ablations, 124 (46.8%) cryoballoon pulmonary vein isolations, and 141 (53.2%) radiofrequency ablation. Since the beginning, we have established two registers, one for all electrophysiological procedures and the other for pulmonary vein isolation (PVI register) in which we enter demographic data, procedure characteristics, comorbidities, procedural outcomes, and complications. Using data from the PVI register and the Hospital Information System, we conducted a retrospective analysis for the period from February 19, 2019 to February 28, 2023. A total of 105 patients, 61 men (58.1%), median age 64 years (38-79), (IQR 58.5-69). CHA<sub>2</sub>DS<sub>2</sub>-VASC score was 2 (IQR 2-3). Paroxysmal fibrillation was present in 61 (58.1%) patients. The most common comorbidities were arterial hypertension in 92 (87.6%) and dyslipidemia in 68 (64.8%) patients. 28 (26.7%) had HF, while coronary heart disease and diabetes were equally represented by 12 patients each (11.4%).

Before the procedure, 85 (81%) patients were in sinus rhythm. Electrocardioversion was performed after the procedure in 35 patients (33.3%). Echocardiographic median left ventricular ejection fraction (LVEF) was 63% (IQR 60-68), left ventricular end-diastolic diameter 51 mm (IQR 48-56) and left atrial (LA) diameter 44 mm (40-48). The total duration of the procedure was a median of 60 min (IQR 50-70), and the time of the cryoballoon in the LA was 40 min (IQR 30-45). To evaluate the effectiveness of the procedure, 77 patients were analyzed, who had 12 monthly follow-ups. After 12 months, 64 of them (83.1%) were AF-free. Of the 13 (16.9%) who had AF recurrence, the median time to recurrence was 7.5 months (IQR 4-10). We tried to determine the predictors of AF recurrence in our patient population and found that the persistent form of AF, the diameter of the LA, and the lower LVEF were associated with the occurrence of AF recurrence (**Figure 7, Figure 8**). The presence of symptoms and signs of HF was associated with the risk of AF recurrence ( $p < 0.01$ , Fisher's exact test). Of all the procedures, one case of AV fistula was recorded, which required surgical treatment, one transient paresis of n. phrenicus and one iatrogenic atrial septal defect that was closed with a percutaneous occluder in our hospital.

In this single-center retrospective analysis, cryoballoon pulmonary vein isolation is an effective and safe method for maintaining sinus rhythm 12 months after the procedure in patients with symptomatic paroxysmal and persistent AF. Heart failure, persistent type of AF, LA diameter end lower LVEF were predictors for the recurrence of AF.



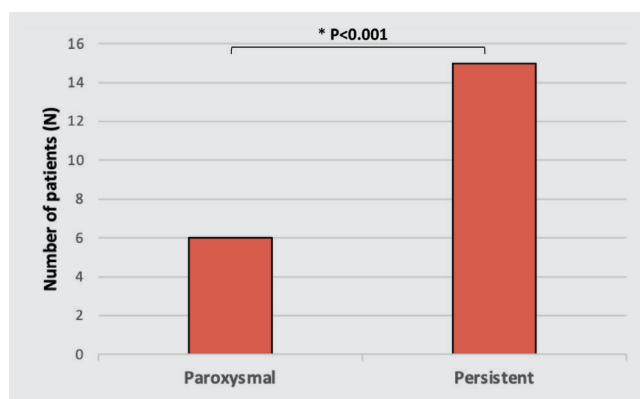
**FIGURE 4.** February 19, 2019. The first cryoballoon isolation of the left superior pulmonary vein in Slavonski Brod.



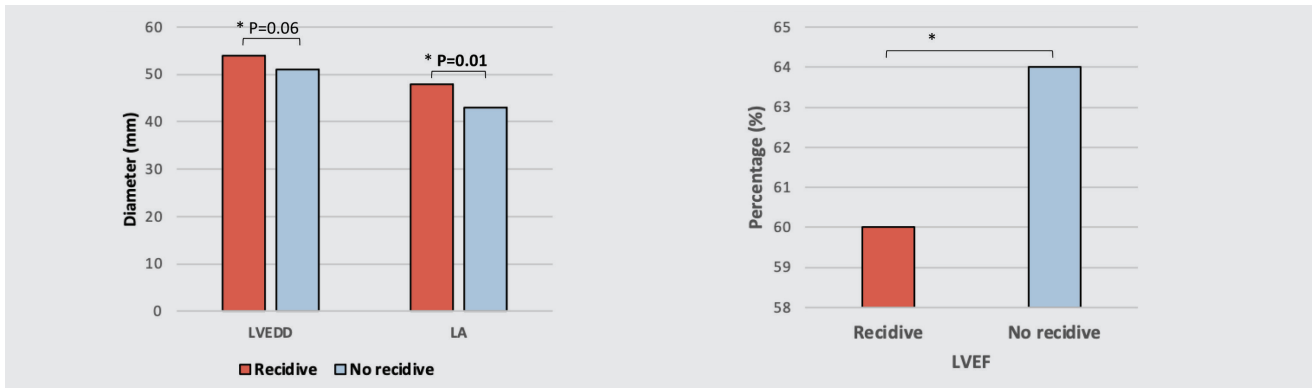
**FIGURE 5.** February 19, 2019. The first cryoballoon isolation of the left inferior pulmonary vein in Slavonski Brod.



**FIGURE 6.** February 28, 2019. The first electrophysiological study and radiofrequency ablation using a 3D navigation system in Slavonski Brod.



**FIGURE 7.** Recurrence of atrial fibrillation based on the type of atrial fibrillation.



**FIGURE 8.** Recurrence of atrial fibrillation based on the echocardiographic parameters.  
 LVEDD = left ventricular end-diastolic diameter; LA = left atrium; LVEF = left ventricular ejection fraction.

#### LITERATURE

1. Liu YY, Du X, He L, Liu T, Chen N, Hu R, et al. Evaluation of Safety and Effectiveness of Catheter Ablation of Atrial Fibrillation in Patients Aged  $\geq 80$  Years. *Heart Lung Circ.* 2022 Jul;31(7):1006-1014. <https://doi.org/10.1016/j.hlc.2022.02.003>
2. Kirchhof P, Camm AJ, Goette A, Brandes A, Eckardt L, Elvan A, et al; EAST-AFNET 4 Trial Investigators. Early Rhythm-Control Therapy in Patients with Atrial Fibrillation. *N Engl J Med.* 2020 Oct 1;383(14):1305-1316. <https://doi.org/10.1056/NEJMoa2019422>
3. Brugada J, Katritsis DG, Arbelo E, Arribas F, Bax JJ, Blomström-Lundqvist C, et al; ESC Scientific Document Group. 2019 ESC Guidelines for the management of patients with supraventricular tachycardia The Task Force for the management of patients with supraventricular tachycardia of the European Society of Cardiology (ESC). *Eur Heart J.* 2020 Feb 1;41(5):655-720. <https://doi.org/10.1093/eurheartj/ehz467>