POLISH HEART JOURNAL

Kardiologia Polska
The Official Peer-reviewed Journal of the Polish Cardiac Society since 1957

Online first
This is a provisional PDF only. Copyedited and fully formatted version will be made available soon

ISSN 0022–9032 e-ISSN 1897–4279

The 30-day mortality and mortality-related risk factors in the Polish cohort undergoing catheter ablation of the accessory pathway between 2010 and 2020

Authors: Krzysztof Dubowski, Michał Orczykowski, Ewa Świerżyńska-Wodarska, Piotr Urbanek, Robert Bodalski, Maria Bilińska, Łukasz Szumowski

Article type: Short communication

Received: July 30, 2024

Accepted: October 21, 2024

Early publication date: October 29, 2024

This article is available in open access under Creative Common Attribution-Non-Commercial-No Derivatives 4.0 International (CC BY-NC-ND 4.0) license, allowing to download articles and share them with others as long as they credit the authors and the publisher, but without permission to change them in any way or use them commercially.

The 30-day mortality and mortality-related risk factors in the Polish cohort undergoing catheter ablation of the accessory pathway between 2010 and 2020

Short title: The safety of accessory pathway ablation in Polish electrophysiology centers

Krzysztof Dubowski*, Michał Orczykowski*, Ewa Świerżyńska-Wodarska, Piotr Urbanek, Robert Bodalski, Maria Bilińska, Łukasz Szumowski

1st Department of Arrhythmia, Cardinal Stefan Wyszynski National Institute of Cardiology, Warszawa, Poland
*Both authors equally contributed to the study.

Correspondence to:
Krzysztof Dubowski, MD,
1st Department of Arrhythmia,
Cardinal Stefan Wyszynski National Institute of Cardiology
Alpejska 42, 04–628 Warszawa, Poland,
phone: +48 22 343 44 17,
e-mail: kdubowski@ikard.pl

INTRODUCTION

Catheter ablation (CA) is the treatment of choice for patients with Wolff–Parkinson–White (WPW) syndrome. It has been proven that non-ablated WPW patients have a higher long-term mortality risk compared to those who have undergone ablation [1, 2]. Ablation in patients with asymptomatic preexcitation is based on invasive risk stratification and is a therapy of choice under certain circumstances [3]. Given the widespread indications for the ablation of accessory pathways (AP), it is crucial to analyse the risk stratification associated with these procedures.

The Polish National Health Fund covers the vast majority of accessory pathway ablation cases and all deaths nationwide, providing comprehensive data that reflects the entire Polish population. This data is unbiased by insurance status, geography, and ethnicity, offering a broad and inclusive perspective. To date, the incidence of major adverse events of WPW ablation has not been described in an extensive database in the Polish population. We retrospectively evaluated 30-day all-cause mortality associated with ablation of AP, the impact of age, sex,

number of ablations, centre volume, and comorbidities on mortality in the Polish adult population undergoing CA of the accessory pathway.

METHODS

The data of patients who underwent ablation of AP between January 2010 and August 2020 were collected retrospectively from the Polish National Health Found database. All patients were discharged from the hospital after the index procedure with preexcitation syndrome as the main diagnosis — I45.6 according to the International Statistical Classification of Diseases and Related Health Problems revision 10 (ICD-10).

Ablation procedures were identified via diagnosis-related groups encoded as E41, E42, and E43 according to International Statistical Classification of Diseases revision 9, volume 3 (ICD-9).

Patients were screened for comorbidities according to primary or secondary diagnosis at discharge from the hospital in 2 years preceding index procedure (Table 1).

Due to the frequent miscoding of ICD codes, which rarely specify the exact cause of death, we did not include ICD codes in our analysis of the cause of death. Patients under the age of 18 were excluded from the study.

This study's primary endpoint is all-cause mortality 30 days after AP ablation.

Statistical analysis

The Shapiro–Wilk test was used to test the hypothesis of a normal distribution for a numerical variable and mean value with standard deviation were reported. For qualitative variables the Fisher's exact test or the likelihood-ratio χ^2 test was applied. *P*-value of 0.05 or less was considered statistically significant. . All calculations were performed using Stata/IC 11.0

RESULTS AND DISCUSSION

The data of 5012 patients who underwent 5565 ablations of AP between January 2010 and August 2020 were collected retrospectively from the Polish National Health Found database. The mean (SD) age of patients was 40 (14) years old, 58.9% were male. The detailed characteristics of the cohort are included in Table 1. Electrophysiology labs were categorized into subgroups based on the number of procedures performed annually. The majority of procedures (59%) were performed at the highest-volume centers.

The overall 30-day all-cause mortality rate in the entire cohort was 0.06% (3 patients). No deaths occurred on the day of the procedure or the day after. One death occurred within 7

days post-procedure and two between 8 and 20 days post-procedure. In univariate statistical analysis, multiple CA procedures ($P = 0.03$) and heart failure ($P = 0.002$) increased the risk of death.

This comprehensive dataset includes almost all of nationwide CA procedures for accessory pathways and captures 100% of deaths, offering a unique and previously unpublished perspective.

Numerous comprehensive studies have proven the ablation of supraventricular tachycardias safe. Our results are consistent with these findings.

Holmqvist et al. [4] published data from a large Swedish cohort of 4034 patients treated with CA for AP. The study population was young, mean age was 41, 62% were male. The acute success was 91%; redo ablation was performed in 6.3% of patients within 1 year and in 7% within 3 years. The incidence of any adverse event was low (1.5%). Three patients (0.07%) died within 30 days after ablation. None of these deaths were in causal relationship to the index procedure.

Another study, based on the German Ablation Registry by Brado et al. [5], analyzed the medical history of 789 out of 12 566 patients enrolled in the registry from 2007 to 2010 who underwent AP ablation. Patients were mainly male, on average 42.8 years old. 9.6% of patients presented for redo procedures. The complication rate was low (2.5%). No serious complications, defined as death, stroke, major bleeding, or myocardial infarction were noticed within the observation period.

The low mortality rates observed in our cohort are consistent with previous studies, affirming the safety of AP ablation [4–6]. Our cohort shares a similar age and health status to those in the studies mentioned above. The re-ablation rate of 9.9% corresponds closely with findings reported in another research [4, 5]

A statistically significant increase in mortality was observed, specifically among patients diagnosed with heart failure and those who underwent multiple CA procedures.

Two out of 3 deceased patients were diagnosed with heart failure prior to the ablation. Though patients with heart failure have a generally worse life expectancy, our findings highlight the need for thorough pre-procedural assessment and risk stratification.

Although we lack specific data on the causes of death in patients who have undergone multiple ablation procedures in our cohort, this group presents an intriguing target for further study. Redo procedures are often associated with challenging localizations, such as septal, para-hisian, or epicardial regions, or with multiple accessory pathways. The study by Brado et al. [5]

shows that the overall complication rate in these patients was higher, but no fatal complications were reported in this group.

Limitations

This retrospective study, utilizing a nationwide database, presents several significant limitations. Firstly, a major limitation is the assessment of 30-day mortality following AP ablation without a comparative group of patients matched for age and comorbidities, thereby restricting the interpretation of the results. Secondly, compliance with the General Data Protection Regulation in the European Union prevented us from accessing raw data from the National Health Fund. Therefore, we received only numerical and/or percentage results based on our queries, limiting our ability to conduct multivariate analysis.

Analysing administrative data may be susceptible to miscoding of ICD codes. However, the absence of procedure codes is improbable due to their impact on hospital reimbursement. Furthermore, the precise cause of death remains uncertain, as ICD codes often lack specificity in defining exact causes. Consequently, we did not specifically request ICD codes for the cause of death from the National Health Found. Nonetheless, investigating the presumed underlying cause of death would be beneficial.

We also recognize that not all deaths within 30 days post-ablation may be directly linked to the procedure. Nevertheless, obtaining the ICD code for the cause of death may not necessarily provide clarity regarding the exact underlying cause.-

CONCLUSIONS

The mortality rate after accessory pathway ablation remains low and may be considered safe. According to current American Heart Association and European Society of Cardiology Guidelines, it is important to spread these findings among physicians as the EP study for preexcitation and ablation of AP remains the therapy of choice. Further study is needed to evaluate risk stratification in patients undergoing redo procedures.

Article information

Conflict of interest: None declared.

Funding: None.

Open access: This article is available in open access under Creative Common Attribution-Non-Commercial-No Derivatives 4.0 International (CC BY-NC-ND 4.0) license, which allows downloading and sharing articles with others as long as they credit the authors and the publisher,

but without permission to change them in any way or use them commercially. For commercial use, please contact the journal office at polishheartjournal@ptkardio.pl

REFERENCES

1. Bunch TJ, May HT, Bair TL, et al. Long-term natural history of adult wolff-parkinson-white syndrome patients treated with and without catheter ablation. Circ Arrhythm Electrophysiol. 2015; 8(6): 1465–1471, doi: 10.1161/CIRCEP.115.003013, indexed in Pubmed: 26480930.
2. Calkins H, Yong P, Miller JM, et al. Catheter ablation of accessory pathways, atrioventricular nodal reentrant tachycardia, and the atrioventricular junction: final results of a prospective, multicenter clinical trial. The Atakr Multicenter Investigators Group. Circulation. 1999; 99(2): 262–270, doi: 10.1161/01.cir.99.2.262, indexed in Pubmed: 9892593.
3. Brugada J, Katritsis DG, Arbelo E, et al. 2019 ESC Guidelines for the management of patients with supraventricular tachycardiaThe Task Force for the management of patients with supraventricular tachycardia of the European Society of Cardiology (ESC). Eur Heart J. 2020; 41(5): 655–720, doi: 10.1093/eurheartj/ehz467, indexed in Pubmed: 31504425.
4. Holmqvist F, Kesek M, Englund A, et al. A decade of catheter ablation of cardiac arrhythmias in Sweden: ablation practices and outcomes. Eur Heart J. 2019; 40(10): 820–830, doi: 10.1093/eurheartj/ehy709, indexed in Pubmed: 30452631.
5. Brado J, Hochadel M, Senges J, et al. Outcomes of ablation in Wolff-Parkinson-White-syndrome: Data from the German Ablation Registry. Int J Cardiol. 2021; 323: 106–112, doi: 10.1016/j.ijcard.2020.08.102, indexed in Pubmed: 32890614.
6. Pappone C, Vicedomini G, Manguso F, et al. Wolff-Parkinson-White syndrome in the era of catheter ablation: Insights from a registry study of 2169 patients. Circulation. 2014; 130(10): 811–819, doi: 10.1161/CIRCULATIONAHA.114.011154, indexed in Pubmed: 25052405.

Table 1. Baseline characteristic of the cohort

Baseline data	Mortality n/N	*P*-value
Sex, male	1/2932	

Sex, female		2/2080	0.57
Age			
0–17		0/40	
18–34		0/2125	
35–49		0/1453	
50–64		1/1088	
65–79		2/296	
80+		0/10	0.06
Comorbidities (ICD-10 codes)			
Heart failure (I50.0–I50.9)			
	Yes	2/135	
	No	1/4877	0.002
Coronary artery disease (I20.0–I25.9)			
	Yes	0/662	
	No	3/4350	1
Hypertension (I10)			
	Yes	2/1108	
	No	1/3904	0.13
Stroke or transient ischaemic attack I63.0–I64			
	Yes	0/25	
	No	3/4987	1
Renal failure (N17.0–N19)			
	Yes	0/19	
	No	3/4822	1
Diabetes mellitus (E10–E14)			
	Yes	1/175	
	No	2/4837	0.10
No of procedures			
	1	1/4516	
	>1	2/496	0.03
Center volume (no of all ablations performed annually)			
0–49		0/336	

50–99	1/591	
100–199	0/1103	
>200	2/2977	0.47