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SESSION OF ORIGINAL ARTICLES

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Skuteczność zabiegów ablacji z użyciem systemu elektroanatomicznego bez użycia fluoroskopii u pacjentów z ekstrasystolią komorową

Efficacy of catheter ablation using the electroanatomical system without the use of fluoroscopy in patients with ventricular extrasystolic beats

Dariusz Rodkiewicz[1], Karol Momot[1, 2], Edward Koźluk[1], Agnieszka Piątkowska[1, 3], Karolina Rogala[1], Małgorzata Buksińska-Lisik[1, 4], Przemysław Kwasiborski[1, 4], Artur Mamcarz[4]

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[4]III Klinika Chorób Wewnętrznych i Kardiologii, Warszawski Uniwersytet Medyczny, Warszawa

BACKGROUND

Catheter ablation (CA) is a safe and effective treatment for patients with ventricular extrasystolic beats (VEBs). With the electroanatomic mapping (EAM) system, it is possible to reduce, or even eliminate fluoroscopy.

AIMS

The study AIMed to evaluate the efficacy of CA using the EAM system without fluoroscopy in patients with VEBs.

MATERIAL AND METHODS

104 patients with VEBs, qualified for the elective CA, were included. Demographic and clinical baseline characteristics, procedure parameters, and following complications were obtained from the medical records. Data on permanent success rate was obtained after a 6-month follow-up. Long-term success was defined as the reduction of VEBs below 1000 in 24-hour Holter.

RESULTS

From 104 consecutive patients with VEBs, CA was performed without fluoroscopy in 87 (84%) cases. There were no statistical differences between groups regarding demographic and clinical characteristics. Acute procedural success was achieved in 81 out of 87 cases (93%) in the group without fluoroscopy and in 16 out of 17 cases (94%) in the group with fluoroscopy (ns). A long-term success rate was achieved in 74 out of 87 cases (85%) in the group without fluoroscopy and in 14 cases (82%) in the group with fluoroscopy (ns). The mean procedure time (minutes) was 92 ± 39 in the no-fluoroscopy group and 134 ± 59 in the fluoroscopy group (P <0.05). Of all patients with VEBs 51 cases (49%) were found in the RVOT location, and then CA was performed without fluoroscopy in 49 cases out of 51 (96%).

CONCLUSIONS

CA of VEBs with an approach guided by EAM and without fluoroscopy is feasible and effective. The use of fluoroscopy was related to anatomical difficulties and was not related to better outcomes. RVOT is favourable location to perform CA without fluoroscopy guidance.

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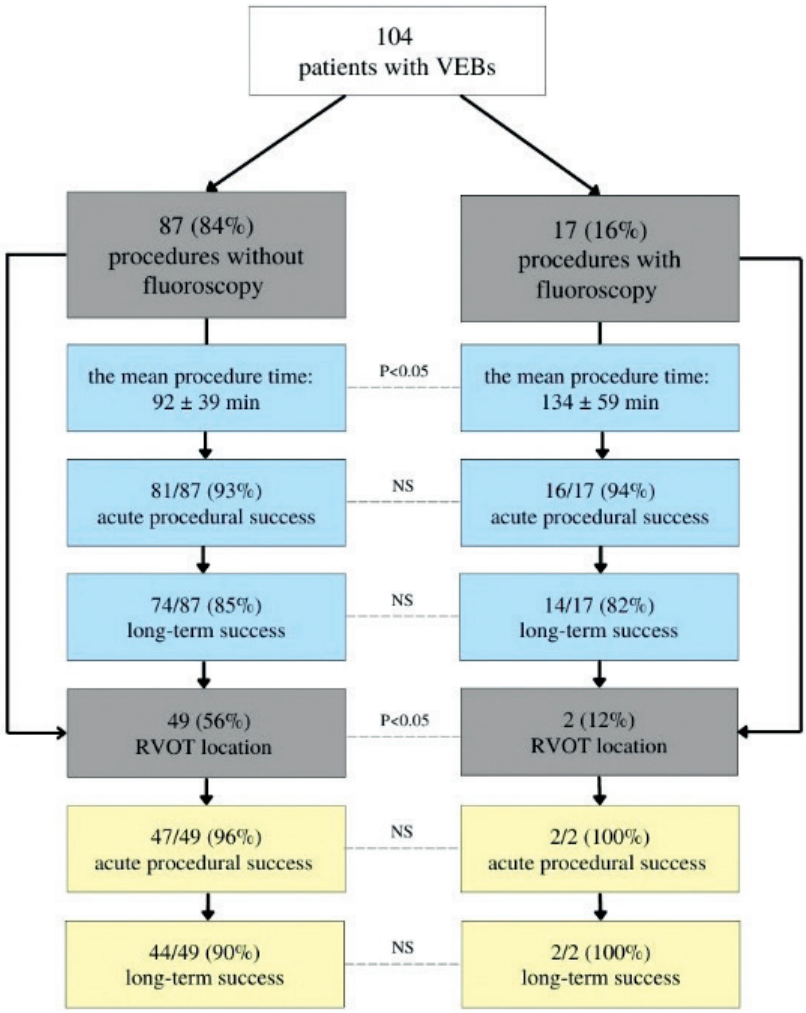


Złośliwa arytmia komorowa w zespole Leoparda

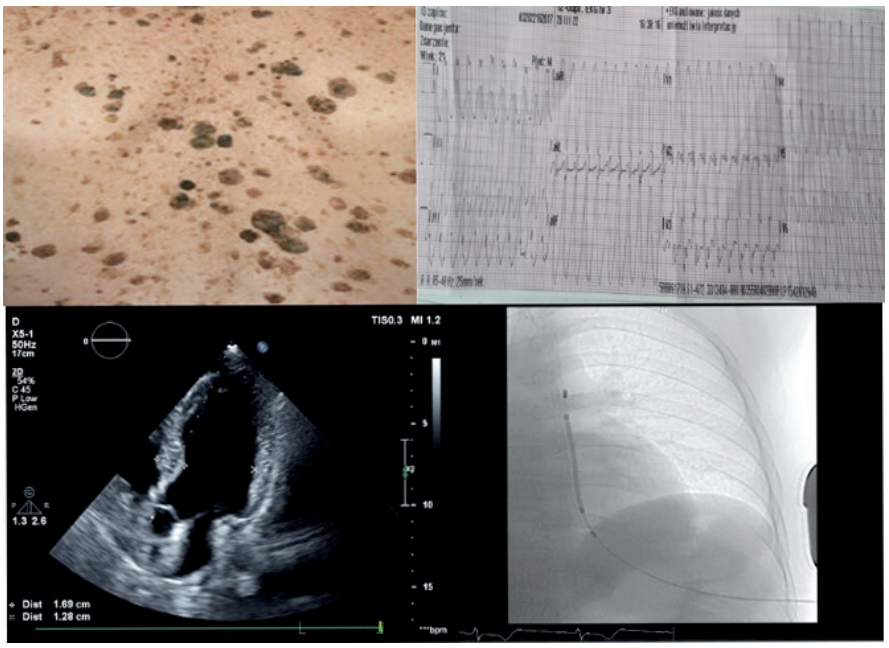
Malignant ventricular tachycardia in Leopard syndrome

Agnieszka Wojdyła-Hordyńska, Marek Gierlotka, Grzegorz Hordyński

Klinika i Oddział Kardiologii, Uniwersytecki Szpital Kliniczny, Instytut Nauk Medycznych, Uniwersytet Opolski, Opole

We present the case of a 21-year-old man with a slight mental retardation, numerous skin lesions in the course of Leopard syndrome, directed for diagnosis after fainting. In the electrocardiogram during the event, ventricular tachycardia was recorded 200/min. Imaging studies revealed asymmetric left ventricular hypertrophy with dynamic functional intraventricular and outflow tract obstruction. In the electrophysiologic examination the arrhythmia was not induced, thereby, on the basis of sudden cardiac death risk stratification, the patient had subcutaneous cardioverter-defibrillator implantation.

Leopard syndrome is an autosomal dominant inherited disease, which is manifested by numerous cutaneous birthmarks, disorders of electrical conduction in the heart, hypertelorism, pulmonary valve stenosis, mental and developmental inhibition, deafness and hypertrophic cardiomyopathy. A mutation in the non-receptor PTPN11 gene, encoding the tyrosine phosphatase protein, is also associated with progressive structural changes in the heart. The most common concomitant heart disease is hypertrophic cardiomyopathy. The reported cases of asymmetric left ventricle hypertrophy were treated by septostomy. Structural changes observed in the heart may progress with age, particularly in patients with documented mutation in exon 13 of the PTPN11 gene, and in some cases are associated with malignant ventricular arrhythmias. This case demonstrates the importance of early phenotyping of complex genetic defects and necessity to treat concomitant structural and electrical heart diseases. Hypertrophic cardiomyopathy is a heterogenous disorder with increased risk of sudden cardiac death.



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Kardioneuroablacja w leczeniu omdleń odruchowych — lewo- czy prawoprzedsionkowe podejście? Randomizowane, prospektywne badanie Roman II — wyniki wstępne

Cardioneuroablation for asystolic reflex syncope: left or right atrial approach? A randomized prospective Roman II study: preliminary results

Roman Piotrowski, Anna Żuk, Jakub Baran, Agnieszka Sikorska, Michał Niedźwiedź, Tomasz Kryński, Piotr Kułakowski

Klinika Kardiologii CMKP, Szpital Grochowski, Warszawa

BACKGROUND

Cardioneuroablation (CNA) by means of radiofrequency ablation (RFA) of ganglionated plexi (GP) has emerged as a new promising therapeutic tool in patients with asystolic reflex syncope, however, optimal procedural strategy has not been established yet.

AIMS

To compare acute efficacy of the right atrial (RA) versus left atrial (LA) approach.

METHODS

This prospective randomized study (NCT05225532) included 36 patients (age: 40 ± 13 years, 14 males) who were randomized to the RA group (n = 19) or LA group (n = 17). Intra-procedural efficacy of CNA was measured using extracardiac vagal stimulation (ECVS) (50 Hz, 0.05 ms, 1 V/kg [<70 V], 5 s). If RF applications in the RA group were ineffective (firstly, paraseptal GPs — RAGP and PMLGP, followed by Ao-SVC GP and PMLGP from coronary sinus [CS]) there was a crossover to the LA where further applications were performed. Similarly, if RF applications in the LA group (paraseptal GPs, followed by LSGP and LIGP) did not cause complete vagal denervation on ECVS, there was a crossover to the RA.

RESULTS

Both groups were comparable concerning clinical and demographic parameters. In the RA group complete vagal denervation was achieved in 7 (36%) patients *vs.* 14 (82%) patients from the LA group ($P = 0.008$). There were 7 (58%) crossovers from RA to LA due to ineffective CNA, 2 (17%) due to permanent nodal rhythm precluding accurate localization of sinus node and 2 (17%) due to earliest sinus node activation at the site of potential RF and 1 (8%) due to close earliest sinus node activation and course of the phrenic nerve. In the LA group, 3 (100%) crossovers were due to lack of vagal denervation. Finally, in all patients lack response to ECVS was achieved. Procedural time (107 ± 24 *vs.* 106 ± 24 min), X-ray dose (2.12 ± 2.72 *vs.* 2.08 ± 2,64 Gy cm^2 and 17.43 ± 20.38 *vs.* 17.22 ± 40.08 mGy), and electrophysiological parameters measured before and after CNA were similar. No complications were noted.

CONCLUSIONS

CNA in the LA is more often associated with vagal denervation than RA approach only. CNA performed in both atria (after crossovers) resulted in unresponsiveness to ECVS in all patients. Thus, biatrial CNA may be a preferable approach. Whether these RESULTS translate to long-term efficacy needs to be established.

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Analiza czynników prognostycznych wyniku rozszerzonego elektrokardiograficznego testu screeningowego u chorych kwalifikowanych do terapii SICD

The predicting factors analysis of the extended ECG screening test in patients with SICD indications

Michał Lewandowski[1], Rafał Waligóra[2], Artur Oręziak[1], Ilona Kowalik[2], Paweł Syska[1]

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BACKGROUND

A patient is considered suitable for the subcutaneous implantable cardioverter-defibrillator (SICD) implantation if at least one sense vector is acceptable for all tested postures (ECG screening test before procedure — EST). Patients who don't pass the test are regarded to be at risk of inappropriate detection of tachyarrhythmias with inappropriate interventions.

AIMS

Analysis of the failure incidence, the predicting factors and clinical importance of extended EST with right sided lead position and lying on the left and right side of the body.

METHODS

EST is performed using a manufacturer (Boston Scientific) measurement software-automated screening tool. We performed this test in 100 consecutive pts with SICD indication on the basis of standard protocol (lead at the left sternum border: sitting, standing and lying positions), and extended for right sternal lead location and additional position: lying on the left and right side (10 position for each individual). We analyzed: age, gender, body mass index (BMI), heart rate, heart rhythm (sinus/atrial fibrillation), QRS duration, PR interval, corrected QT interval (QTc), echocardiography parameters, etiology.

RESULTS

EST failure occurred in 8/100 (8%) of patients. Screening RESULTS: 1 vector failure rate with the standard device and lead positions: primary (P) 12%, secondary (S) 17%, alternative (A) 40% pts, P vs. A and S vs. A; P <0.001. Testing with an electrode positioned on the right sternum border-1 vector failure: P 10%; S 17%; A 48% pts, P vs. A and S vs. A; P <0.001. In case of failure on the left side 50%, 14% and 6% of pts passed the test with the right sided lead position for P, S and A vector respectively, P <0.001. Identified factors predicting EST passing vs. failure included: QTc interval 445.32 ± 35.4 vs. 480.6 ± 37.6 ms for any vector (P = 0.034), BMI: 26.7 ± 4.7 vs. 29.9 ± 4.7 for vector A (P = 0.008), ejection fraction: 43.3 ± 20.1 vs. 34.0 ± 16.2 for vector A (P = 0.027). Sense vector failure rate with the left sternal lead location lying on the left and right side of the body was concordant with the rate lying on the back, P = 0.05. For the right parasternal lead location the rate failure was lower lying on the right side for all sense vectors: P, S and A (P = 0.045; 0.083 and 0.020), respectively.

CONCLUSIONS

Screening failure rate for SICD is 8% in the study group. The right sternal lead location screening test before implantation enables important clinical findings: in case of failure on the left side 50%, 14% and 6% of pts passed the test with the

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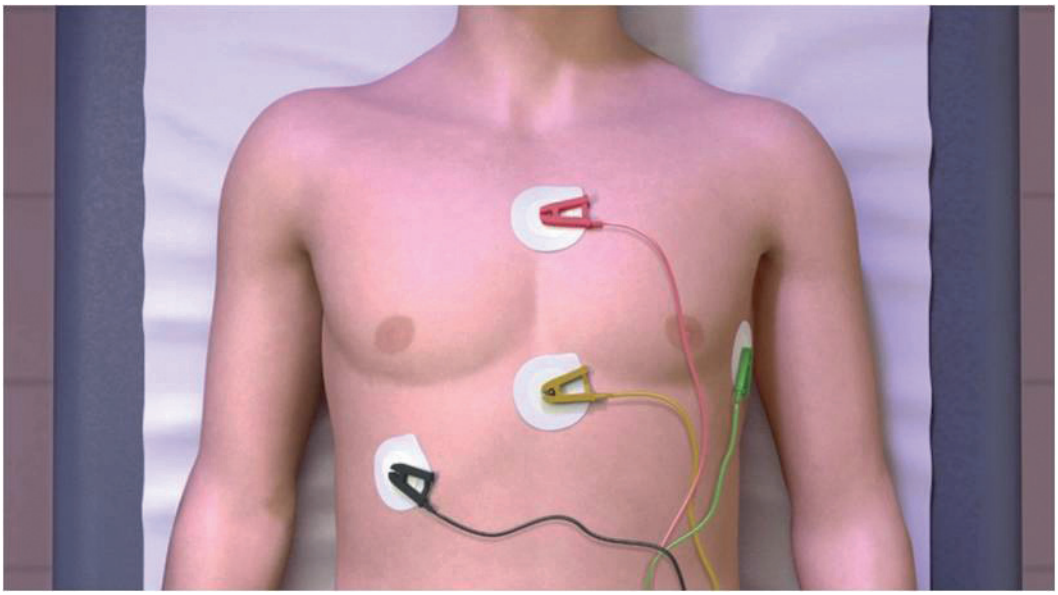
right sided lead position for primary, secondary and alternative vector respectively. The data are very important in case of lead reposition (defibrillation threshold test failure) during procedure. We recommend to screen routinely on both sternum borders. Identified factors predicting EST passing *vs.* failure included: QTc interval, BMI and ejection fraction.



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Implantowalny podskórny kardiowerter-defibrylator (S-ICD) u dzieci oraz u dorosłych ze złożonymi wrodzonymi wadami serca: doświadczenia jednoośrodkowe

Subcutaneous implantable cardioverter-defibrillators in children and adults with complex congenital heart diseases: single centre experience

Linda Litwin[1], Agata Grochowina-Major[1], Dominika Musioł[1], Sławomir Pluta[2], Adam Sokal[2], Oskar Kowalski[2, 3], Roland Fiszer[4]

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BACKGROUND AND AIM

Subcutaneous implantable cardioverter-defibrillators (S-ICD) are increasingly used in children and adults with complex congenital heart defects, however the evidence on safety and effectiveness of S-ICD is yet to be established in this populations. We report early follow-up data from single centre S-ICD registry.

METHODS

Observational follow-up study includes patients with S-ICD implanted up to 18 years of age or in case of complex congenital heart defect. We assessed the class of recommendation at the time of procedure according to 2021 PACES Expert Consensus Statement (patients <18 years of age) and the 2015 ESC Guidelines. We analyzed early and late procedural complications, inappropriate shocks, appropriate therapy, and patients' outcome.

RESULTS

From 2017 to 2022 we implanted S-ICD in 8 patients using standard 3 incisions technique, defibrillator threshold testing was abandoned in 2 patients. There was 1 minor procedural complication (subcutaneous emphysema) and no late complications. One patient received the appropriate shock (effective) and another one inappropriate shocks (reprogramming avoided further episodes). No patient required transition to transvenous device.

CONCLUSIONS

These short-term RESULTS suggest that S-ICD implantation in populations of adolescents and adults with complex congenital heart defects is safe and effective. Clinical decision on ICD implantation can be challenging due to significant discrepancies between current guidelines, especially in middle to late adolescence.

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No	Age [y]	BMI [kg/m^2]	Diagnosis	Class of recommendation		Follow--up [y]	Innapropriate shocks [No]	Apropriate shocks [No]	Outcome
				PACES 2021	ESC 2015				
1	17	25.8	DCM	IIb	I	5.1	3	0	Alive
2	18	21.6	BS	I	I	3.5	0	0	Alive
3	12	24.9	HCM	IIa	I	1.8	0	2	Alive
4	14	24.8	HCM	IIa	I	0.9	0	0	Heart transplantation
5	44	23.9	cc-TGA	–	I	0.5	0	0	Alive
6	37	24.7	PA+MAPCAs	–	IIb	0.5	0	0	Alive
7	17	17.1	DCM	IIb	I	0.3	0	0	Alive
8	18	29.7	HCM	IIb	IIb	0.3	0	0	Alive

Abbreviations: BS, Brugada syndrome; cc-TGA, congenitally corrected transplantation of the great arteries; DCM, dilated cardiomyopathy; HCM, hypertrophic cardiomyopathy; MAPCAs, major aortopulmonary collateral arteries; PA, pulmonary atresia

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EP symulator — nowe narzędzie edukacyjne dla młodych elektrofizjologów

EP simulator: novel training tool for young electrophysiologists

Maciej Koźlik[1], Jędrzej Kosiuk[1, 2], Michał Cogiel[3], Jan Kost[4], Daria Hemmerling[4], Michał Staniszewski[3], Agnieszka Szczęsna[3], Wojciech Wojakowski[1], Tomasz Jadczyk[1]

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BACKGROUND

Training in the field of invasive cardiac electrophysiology (EP) is challenging and requires interpretation of intracardiac electrograms.

AIMS

The purpose of this study was to assess a novel tool for EP training based on a fully interactive, online simulator.

METHODS

EP simulator replicates EP recording system routinely used in cardiac electrophysiology laboratories. Users are able to access a fully functional system with simulated surface electrocardiogram and intracardiac electrograms. Following cardiac arrhythmias are available for simulation: sick sinus syndrome, AV conduction blocks, atrial ectopy, atrial flutter and fibrillation, atrio-ventricular and atrio-ventricular nodal reentrant tachycardia and ventricular tachycardias. Evaluation by 35 electrophysiologists (mean experience 10 ± 6 y) from 14 countries was collected *via* online questionnaire.

RESULTS

Realism of ECG signals was described as exCELlent or very good by 88% of responders, of intracardiac signals by 80%. Realism of signal interactions and user experience was judged as exCELlent or very good by 75% and 70% accordingly. 100% of users agree definitely or mostly that EP Simulator helps to translate theoretical into practical knowledge. 97% or responders would include it in EP training programs as it is extremely or very useful for training purposes in opinion of 85%. 70% of responders think that training on EP simulator can potentially reduce the rate of complications. In 85% the overall experience was completely or mostly satisfying and would be recommended by 100% of responders.

CONCLUSION

The EP simulator is a feasible tool for training of young electrophysiologists.

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Bezpieczeństwo radioterapii u pacjentów z elektronicznymi implantami kardiologicznymi — 1-miesięczna obserwacja

Safety of radiotherapy in patients with cardiac implantable electronic devices — 1 month follow-up

Justyna Wojdyła[1], Krzysztof Boczar[1], Krzysztof Małecki[2], Elżbieta Pluta[3], Jacek Lelakowski[1, 4], Andrzej Ząbek[1, 4]

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BACKGROUND

The number of patients with cardiac implantable electronic devices (CIED) undergoing radiotherapy (RT) is increasing.

AIMS

The aim of the study was to assess the safety of radiotherapy in patients with CIEDs.

METHODS

The risk of all patients with CIEDs undergoing RT was assessed according to guidelines. Device interrogations were performed before the first and 1 month after the last RT session. In patients at high risk and/or with an implantable cardioverter-defibrillator or cardiac resynchronization therapy with defibrillator (CRT-D), all sessions were supervised by a cardiologist, and device interrogations were performed before and after every single RT session. Device parameters and events were monitored during the whole treatment.

RESULTS

The study included 18 patients (8 women and 10 men) with CIEDs who had radical (n = 12) or palliative (n = 6) RT, in median (interquartile range) — 77.5 (67.8–92.0) years. Pacemakers were implanted in 12, implantable cardioverter-defibrillators in 4, and CRT-D in 2 patients. Three patients with pacemakers were pacing-dependent (no endogenous rhythm at 30 bpm pacing). All patients were treated with a photon beam. A total of 287 cycles of RT were performed with cumulative dose up to 76 Gy per patient for the whole RT treatment and maximum energy beam up to 15 MV.
During the 1-month follow-up period, there was no event potentially related to RT.

CONCLUSIONS

RT in patients with CIED is not associated with significant risks to patients during the 1-month follow-up period, assuming the patients' management follows current guidelines.

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Wartość prognostyczna markerów sercowych u pacjentów z COVID-19 i chorobami sercowo-naczyniowymi

Prognostic value of cardiac biomarkers in patients with COVID-19 and cardio-vascular diseases

Marcin Pelc[1], Agnieszka Wojdyła-Hordyńska[2], Ewa Malaka[1], Wojciech Płonka[1], Marek Gierlotka[2]

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BACKGROUND

Severe acute respiratory syndrome-coronavirus 2 (SARS-CoV-2) is a serious disease with cardiovascular involvement. The most common biochemical parameters used in coronavirus disease 2019 (COVID-19) include inflammatory cytokines, lymphocytes counts, coagulation and hemostasis parameters, or cardiovascular failure markers.

AIMS

The purpose of the presented analysis was the assessment of biomarkers prognostic value in COVID-19 and cardiovascular diseases patients.

METHODS

The study enrolled 119 patients with cardiovascular disease admitted to the Temporary COVID Hospital in Opole. The group of patients who survived and died during the 30 days of hospitalization was compared, and regression analyses were used to determine associations between biomarker and fatal outcome. RStudio 2022.12.0 Build535 software was used for statistical analysis.

RESULTS

75 patients (58%) died during 30 days of hospitalization (Figure) The subgroups consisted of the patients who died within 30 days of hospitalization and who survived. The biomarkers in both groups were: CRP 172.9 *vs.* 49.2 mg/l (P <0.001), D-dimers 7748.3 *vs.* 2440.0 l'g/l (P <0.001), interleukin-6 (IL-6) 3220.9 pg/ml *vs.* 142.2 pg/ml (P <0.001), Kalium 4.6 *vs*. 4.15 mmol/l (P <0.001), creatinine 1.6 *vs*. 0.96 mg/dl (P <0.001), procalcitonine 7.6 *vs*. 1.53 ng/ml (P <0.001), N-terminal pro-B-type natriuretic peptide (NT-proBNP) 7005.5 pg/ml *vs*. 2784.9 pg/ml (P <0.001), respectively.
The predictive value of biomarkers (PCT, NT-proBNP, CRP, D-dimers, IL-6, age, sex) assessed by AUC was 0.943 (with the specificity 98% and the sensitivity 90%, Figure). The cut off value of NT-proBNP for predicting in-hospital death was 4839 pg/mL (with 91% specificity, 41% sensitivity), D-dimers 1604 l'g/l (with 68% specificity and 64% sensitivity), PCT 0.137 ng/ml (with 89% sensitivity, 43% specificity), IL-6 149 pg/ml (with 83 specificity, 52% sensitivity).

CONCLUSION

Cardiovascular and systemic failure biomarkers are sensitive tools for prognosis in patients with COVID-19. Close monitoring of heart function may prevent myocardial and multiorgan injury, thereby, reduce mortality

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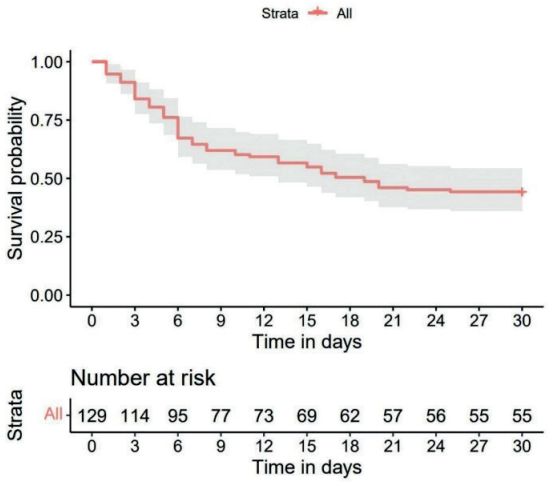
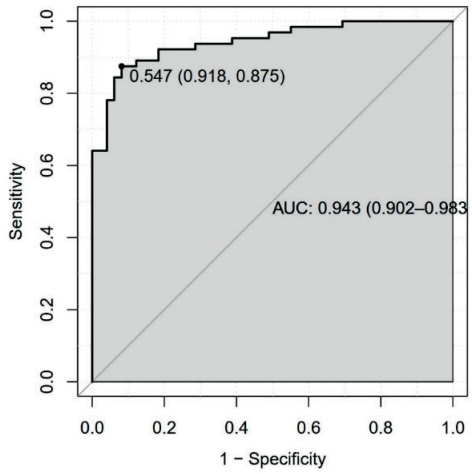
Kaplan-Meier plots showing the cumulative survival rate of COVID-19 in all the patients enrolled



ROC curve for in hospital death after adjusting for sex, age, NT-proBNP, D-dimer, Il-6, PCT, CRP



Młodzi pacjenci z przezżylnymi i podskórnymi implantowanymi defibrylatorami (ICD) do 30. roku życia — 25-letnie doświadczenie jednoośrodkowe

Young patients with transvenous and subcutaneous implantable cardioverter-defibrillator (ICD) under thirty years of age: A 25-year single-center experience

Michał Lewandowski[1], Paweł Syska[1], Joanna Zakrzewska-Koperska[1], Ilona Kowalik[2]

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BACKGROUND

Young ICD recipients present high rate of inappropriate shocks (IS) and complications.

AIM

To report on our clinical experience with transvenous (TV-ICD) and subcutaneous (S-ICD) defibrillators in pts under 30 years of age.

METHODS

We have chosen 130 pts consecutively implanted from 1996 to 2022 in our institution up to and including the age of 30 years. We retrospectively analyzed the rate of appropriate interventions (AI) and IS, lead complications, infection rate, mortality, treatment options.

RESULTS

The study group: 84 TV-ICD (age: 6–30, BMI: 16.3–22.2) and 46 S-ICD (age: 15–30, BMI; 15.6–31.1) pts. The mean follow-up in analyzed groups was 165 ± 48 and 46 ± 2 months respectively. Abnormal ventricular function: EF ≤30 in compared groups: 12/84 (14%) and 5/46 (11%); P = 0.3; 24/84 pts (28%) received ≥1 AI for VT/VF (ATP or shock) in TV-ICD and 5/46 pts (11%) in S-ICD groups. 25/84 pts (30%) received one or multiple (IS) and 1/46 pts (2.2%) in compared groups, P = 0.02. There were 18/84 (21.5%) ventricular lead dysfunctions (reimplantation of a new system) in TV-ICD and 0% in S-ICD groups, P = 0.025. An infection rate (endocarditis or device pocket) was 8/84 (10%) in TV-ICD group with complete system removal and 1 (2.2%) wound infection (staphylococcus aureus) in S-ICD group successfully treated with antibiotics. 1 left ventricular assist device was implanted in S-ICD patient with good result. There were 2 S-ICD implantations as a concomitant device i.e., conversion of TV-ICD to S-ICD due to ventricular lead dysfunction. 4/46 (8.5%) pts required generator elective replacement due to early battery depletion in S-ICD group. In 2 (4.5%) pts right sternal lead location was chosen due to better sensing RESULTS. 2 suboptimal lead position were revealed after SICD implantation. 1 patient develop the need for permanent pacing in TV-ICD group after 25 years. Mortality rate was 6/84 pts (7%), caused by ventricular lead dysfunction, end stage heart failure or heart transplantation fatal result in TV-ICD group. There was no death in S-ICD group.

CONCLUSIONS

The rate of complications in young TV-ICD recipients is high in the presented study. S-ICD recipients did not experienced lead failures or systematic infections. S-ICD appears to be a good alternative to TV-ICD in young pts from lifetime perspective, preventing from some serious lead complications and tricuspid valve regurgitation. The method and follow-up period effect is present between the TV-ICD and S-ICD in analyzed groups.

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Implantowane kardiowertery-defibrylatory w Polsce w porównaniu z innymi krajami europejskimi z perspektywy pacjenta — wyniki rejestru EHRA

Implantable cardioverter-defibrillators in Poland compared with other European countries from patient's perspective: Insights from the EHRA patient survey

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BACKGROUND

There is a paucity of data on geographic variations in patients' perspectives on ICD therapy. The aim of this study was to compare differences between Polish ICD recipients and ICD recipients from other European countries in terms of baseline characteristics, information provision before ICD implantation, and end-of-life issues.

METHODS

This is a subanalysis of the „Living with an ICD" patient survey started and organized by the European Heart Rhythm Association between April 12th 2021 and July 5th 2021 in ten European countries. The ICD recipients were asked to answer a 25-questions survey on an electronic platform.

RESULTS

There were 410 (22.7%) patients from Poland and 1399 (77.3%) from other European countries. A total of 51.0% of Polish patients reported improvement of their quality of life compared with 44.3% in other countries ($P = 0.041$). Remote monitoring was three times more often utilized in other countries than in Poland (66.8% *vs.* 21.0%, $P < 0.001$). While 78.1% of Poles felt well informed before ICD implantation compared with 69.6% of subjects from other countries ($P = 0.001$), they were less familiar with ICD deactivation process than others (38.9% *vs.* 52.5%; $P < 0.001$).

CONCLUSIONS

Despite less frequently used remote monitoring and gaps in end-of-life issues Polish ICD recipients reported more favorable quality of life and a higher level of information received before device placement than patients in other European countries.

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Ultrakrótkoterminowa zdolność spowolnienia rytmu zatokowego oraz zmienność rytmu serca jako wskaźniki denerwacji przywspółczulnej przed i po izolacji żył płucnych

Ultra-short-term deceleration capacity and heart rhythm variability as indicators of vagal denervation before and after pulmonary vein isolation

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BACKGROUND

Pulmonary vein isolation (PVI) is a well-established treatment of atrial fibrillation (AF). PVI can impact vagal innervation of the heart, nevertheless methods of periprocedural assessment of parasympathetic activity are lacking.

AIMS

To determine impact on PVI on ultra-short-term deceleration capacity (UST-DC) and ultra-short-term heart rhythm variability (UST-HRV).

METHODS

24 consecutive patients (8 females, age 54 ± 11) with paroxysmal AF were enrolled into the study. UST-DC and UST-HRV were calculated from 1-minute ECG recordings performed before and after PVI.

RESULTS

There was a significant difference between UST-DC before vs after PVI (pre-PVI *vs.* post-PVI, 7.6 ms *vs.* 2.8 ms; $P = = 0.0000018$). There were also significant differences in UST-HRV: standard deviation of normal-to-normal (SDNN) (pre-PVI *vs*. post-PVI, 37.8 ms *vs.* 18.4 ms; $P = 0.00005$), root mean square of successive differences (rMSSD) (pre-PVI *vs.* post-PVI, 25.3ms *vs.* 12.2ms; $P = 0.00083$) and proportion of success NN intervals differing more than 50 ms divided by total number of NNs (pNN50) (pre-PVI *vs.* post-PVI, 8.4% *vs.* 2%; $P = 0.045$). UST-DC correlated with SDNN and rMSSD (r-value 0.67 and 0.69, respectively) but did not correlate with HR and pNN50 (r-value 0.38 and –0.02, respectively).

CONCLUSIONS

PVI leads to significant changes in UST-DC and UST-HRV.

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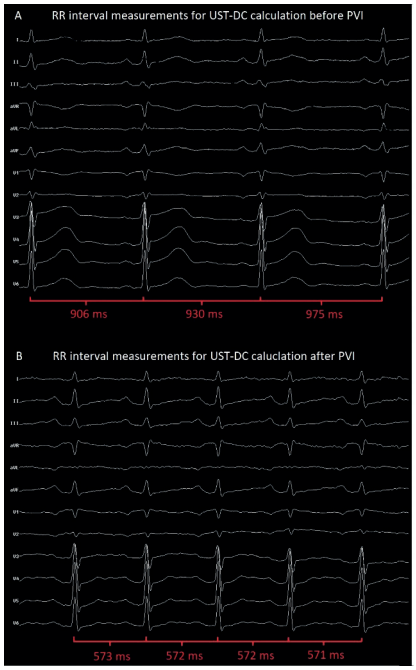

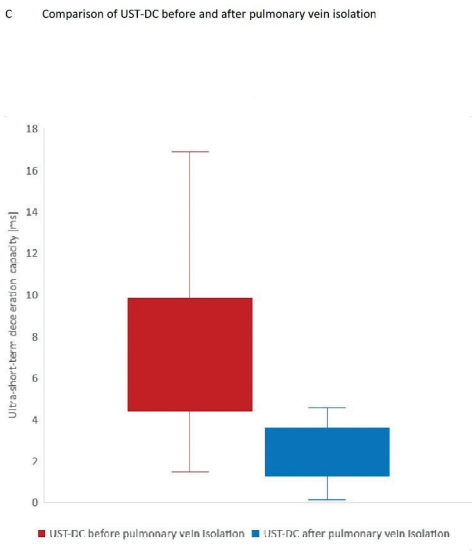

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Ocena bezpieczeństwa i skuteczności ablacji z zastosowaniem wysokoenergetycznych aplikacji o krótkim czasie trwania u pacjentów z migotaniem przedsionków

Safety and effectiveness of very-high-power, short-duration ablation in patients with atrial fibrillation

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WSTĘP

Izolacja żył płucnych (PVI, *pulmonary vein isolation*) prądem o częstotliwości radiowej jest jedną z dostępnych metod leczenia migotania przedsionków (AF, *atrial fibrillation*). Wprowadzenie nowego cewnika ablacyjnego Qdot MicroTM (Biosense Webster), umożliwiającego pracę w trybie opartym na aplikacji o wysokiej energii w krótkim czasie (90W/4s; vHPSD, very high power short duration), ma na celu skrócenie czasu trwania zabiegu przy zachowaniu skuteczności oraz bezpieczeństwa.

CEL BADANIA

Ocena skuteczności i bezpieczeństwa PVI z wykorzystaniem cewnika Qdot Micro u pacjentów z AF.

METODYKA PRACY

W badaniu obserwacyjnym włączono 148 pacjentów z rozpoznanym objawowym napadowym lub przetrwałym AF, poddanych pierwszorazowemu zabiegowi PVI w okresie od grudnia 2019 do lipca 2022. Siedemdziesiąt siedem zabiegów (średnia wieku 59,7 ± 12,0 lat; 61,0% stanowili mężczyźni; 74,0% napadowe AF) wykonano z zastosowaniem cewnika QDot MicroTM (grupa badana). Pozostałe 71 zabiegów (średni wiek 58 ± 11,6 lat; 70,4% stanowili mężczyźni; 67,6% napadowe AF), przeprowadzono cewnikiem ThermoCool SmarttouchTM SF (grupa kontrolna). Po 3 oraz po 6 miesiącach od zabiegu oceniono obecność nawrotu arytmii. Przeanalizowano wystąpienie wczesnych powikłań okołozabiegowych, dawki leków przeciwbólowych użytych podczas zabiegu oraz różnice w czasie aplikacji, fluoroskopii oraz całkowitym czasie zabiegu w zależności od rodzaju użytego cewnika.

WYNIKI

Po 3 i 6 miesiącach nawrót AF wystąpił odpowiednio u 14,29% (11/77) i 18,31% (13/71) pacjentów w grupie badanej oraz u 30,99% (22/71) i 32,73 % (18/55) pacjentów w grupie kontrolnej ($P = 0,02$; $P = 0,09$). Nie wykazano istotnej statystycznie różnicy w częstości powikłań okołozabiegowych (3,9% [3/77] *vs.* 2,8% [2/71]; $P = 1.00$). Średnia dawka leku przeciwbólowego była znamiennie niższa podczas zabiegów z użyciem cewnika QDot MicroTM ($P < 0,0001$). Izolacja oparta na protokole vHPSD wiązała się z krótszym czasem aplikacji ($P < 0,0001$), krótszym czasem fluoroskopii ($P < 0,0001$), jak również krótszym całkowitym czasem zabiegu ($P < 0,0001$).

WNIOSKI

W krótkoterminowej obserwacji zabiegi PVI wykorzystujące wysokoenergetyczne aplikacje o krótkim czasie są równie skuteczne i bezpieczne w porównaniu do zabiegów wykonanych za pomocą konwencjonalnych cewników chłodzonych. Zastosowanie trybu vHPSD wiąże się z redukcją zapotrzebowania na leki przeciwbólowe podczas znacznie krótszych zabiegów.

Analiza wyników leczenia i czynników predykcyjnych krwawień i zdarzeń zakrzepowo-zatorowych oraz śmiertelności w długoterminowej perspektywie u chorych z migotaniem przedsionków na różnych stadiach przewlekłej niewydolności nerek — wyniki badania CRAFT

Analysis of clinical outcomes and predictors of long-term mortality, hemorrhagic and thromboembolic events in atrial fibrillation patients at different stages of chronic kidney disease: The CRAFT trial

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BACKGROUND

Chronic kidney disease (CKD), while coexisting with atrial fibrillation (AF) increases the risk of both hemorrhage and ischemic stroke. The study AIMed to determine the relationship between different CKD stages and clinical outcomes of patients suffering from both CKD and AF and to determine the predictors of negative and/or positive outcome.

METHODS

The data was derived from multicenter CRAFT trial (NCT02987062). We have conducted a retrospective analysis of hospital records of 2663 AF patients divided in three groups according to their estimated glomerular filtration rate (eGFR) which was <30 ml/min/1.73 m^2 in the group I, >30 and <60 ml/min/1.73 m^2 in the group II and >60 ml/min/1.73 m^2 in the group III. The primary study endpoint was major adverse event (MAE; all-cause death, thromboembolic and hemorrhagic event) during the mean four-year follow-up period. The predictors of MAE in multivariate logistic regression analysis were determined.

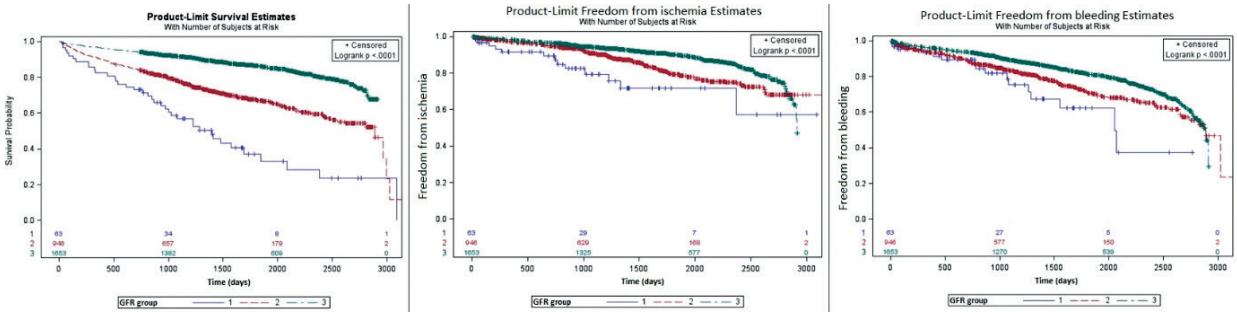
RESULTS

The study included 63 patients in group I, 947 and 1653 respectively in group II and III. The highest rate of MAE was observed in group I followed by group II and III in each of the three components. In four-year follow-up the rate of all-cause death was 60% in group I, 32% in group II and 15% in group III (P <0.001). In the same period bleeding complications occurred in 25% of patients from group I, 23% from group II and 21% from group III (P = 0.14). Thromboembolic events occurred in groups I, II, and III at the rate of 21%, 14% and 12% respectively (P = 0.011). Our analysis of MAE predictors showed that the risk of death was 5 times higher in patients with eGFR <30 treated with vitamin K antagonists (VKA) (HR 5.016; 95% CI, 1.533; P = 0.007), while therapy with ACE inhibitors or ARB reduced the risk of ischemia in those patients (HR 0.023; 95% CI, 0.002; P = 0.0004). Moreover, in patients from group II and III, hypertension was associated with lower mortality (HR 0.646; 95% CI, 0.465; P = 0.016 and HR 0.607; 95% CI, 0.395; P = 0.022, respectively).

CONCLUSIONS

AF patients with CKD are at higher risk of MAE including all-cause death, thromboembolic and bleeding events and that risk depends on the CKD stage. VKA treatment was linked to a higher mortality in AF patients with the lowest eGFR

values. Hypertension in AF patients with eGFR >30 is associated with better prognosis which may be due to antihypertensive pharmacotherapy received by this population.



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Czy KOS-Zawał zmniejsza ryzyko zgonu u pacjentów po zawale z implantowanym urządzeniem antyarytmicznym?

Does Comprehensive Care after Myocardial Infarction (CCMI) reduce the risk of death in post-MI patients with an implanted antiarrhythmic device?

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CEL

Celem pracy była ocena częstości występowania zgonów wśród pacjentów z zawałem mięśnia sercowego i implantowanymi urządzeniami antyarytmicznymi w zależności od implantacji urządzenia w ramach programu KOS-Zawał lub poza KOS-Zawał.

METODYKA

Do analizy włączono 215 380 (42% kobiet) pacjentów leczonych z powodu zawału mięśnia sercowego w przedziale czasowym od października 2017 r. do listopada 2022 r. Badaną grupę podzielono na 2 podgrupy w zależności od uczestnictwa w programie KOS-Zawał i poza KOS-Zawał. U wszystkich pacjentów implantowano urządzenie antyarytmiczne pod postacią stymulatora serca, kardiowertera defibrylatora lub urządzenia resynchronizującego.

WYNIKI

Zgon w okresie obserwacji wystąpił u 23,5% pacjentów włączonych do badania. Zgon występował istotnie statycznie częściej u pacjentów u pacjentów poza KOS-Zawał: 24% w porównaniu do pacjentów w ramach programu KOS-Zawał: 17% (P = 0,00001). W podziale na płeć zgony występowały istotnie statystycznie częściej u mężczyzn poza KOS-Zawał w porównaniu do pacjentów z programu KOS-Zawał (P = 0,00001). Takiej obserwacji nie wykazano w grupie kobiet (P = 0,08046). Zgon nie wystąpił u żadnego pacjenta podczas hospitalizacji z programu KOS-Zawał.

WNIOSKI

Udział pacjentów po zawale serca z implantowanym urządzeniem antyarytmicznym w programie KOS-Zawał zmniejszał występowanie zgonów. Mężczyźni z implantowanym urządzeniem antyarytmicznym odnoszą większe korzyści w zakresie prewencji zgonu w ramach uczestnictwa w programie KOS-Zawał.

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Przedwczesne wyczerpanie baterii ICD — realne zagrożenie czy Yeti? Wyniki akcji serwisowej prowadzonej w ośrodku referencyjnym

Premature ICD's battery depletion: A real danger or a Yeti? ICD recall results in the reference center

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BACKGROUND

In March 2021 Biotronik released a notice informing about the possibility of premature battery depletion in implantable cardioverters-defibrillators (ICDs). According to the provided information the potential fault could apply to as many as 0.1% of devices implanted since 2013. A similar message regarding the premature depletion of batteries in subcutaneous cardioverter-defibrillators (S-ICDs) was published by Boston Scientific in December 2020. In addition, the message concerned the possibility of an unexpected failure of the subcutaneous defibrillation lead.

AIM

The aim of the retrospective, single-center, observational study was to evaluate the RESULTS of a service campaign carried out at the Department of Cardiology and Electrotherapy, Medical University of Gdansk, in patients with ICDs manufactured by Biotronik and Boston Scientific.

The study included patients with transvenous-ICDs (T-ICDs) and S-ICDs, implanted in our center from 2014 to 2020, identified as potentially susceptible to premature battery depletion or lead failure.

MATERIAL AND METHODS

In 504 patients, 474 Biotronik devices and 41 Boston Scientific leads and devices have been identified as a potentially threatening dysfunction. In 98.4% of cases, it was possible to identify patients by the serial number of the device, amongst them 161 patients (31.9%) died and 229 patients (45.4%) were eventually included in remote monitoring (RM).

RESULTS

Mean age of the identified patients was 68 years old. Patients with dual-chamber T-ICDs predominated (n = 151; 30.0%). 35.2% of patients were implanted in secondary prevention. In 85.5% of cases, patients suffered from chronic heart failure. The mean left ventricular ejection fraction was 32%. At the time of the enrollment visit, 3 T-ICDs required replacement due to battery depletion. During the follow-up period, an elective replacement indicator was found in another 5 cases. In total, premature battery depletion was found in 3.5% of patients included in RM, which is significantly higher than the estimate suggested by the manufacturer.

CONCLUSIONS

To summarize, patients from recall group — especially those with ICD implanted in secondary prevention — should be closely monitored, due to potentially life-threatening consequences of the device failure.

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Czy istnieje uniwersalny, optymalny moment wypisu po implantacji CIED? Analiza czasu wystąpienia wczesnych powikłań po zabiegach implantacji CIED

Is there a universal optimal discharge time after CIED implantation? Analysis of the timing of early complications after CIED implantation procedures

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BACKGROUND

Despite many publications on early complications of cardiac implantable electronic device (CIED) implantations, there are no specific recommendations on the suggested time of discharge after such procedures.

AIM

The aim of this retrospective, pilot observation was to evaluate the time of occurrence of early complications following CIED implantations, which could determine the optimal post-procedural patient management and timing of discharge.

MATERIAL AND METHODS

From January to June 2021 219 consecutive patients who underwent new CIED implantation or upgrade were included in the study. The practice adopted in our department is to check the parameters of the device and perform a routine chest X-ray on the first day, and then discharge the patient on the second day after the procedure.
Pacemakers were implanted in 176 cases (80%) and implantable cardioverter-defibrillators (ICDs) in the remaining cases. The median time of hospitalization was 5 days, while the median time to discharge after CIED implantation was 2 days. In 96 cases (43.8%), hospitalization was prolonged beyond 48 hours following the CIED implantation. There was a negative correlation between time to discharge after the procedure and the LVEF ($P = 0.05$), and a positive correlation between time to discharge and BNP concentration ($P < 0.01$).

RESULTS

Complications related to CIED implantation were found in 23 patients (10.5%), with lead dislocations being the most prevalent (n = 8). The majority of complications (95.7%) were detected within the first 24 hours after the procedure, and only a pocket hematoma was found later. Patients with complications were more likely to suffer from chronic heart failure ($P = 0.02$) and were significantly more often implanted with ICDs than pacemakers ($P = 0.04$). Excluding complications, prolonged hospitalization resulted most often from the timing of the CIED implantation itself (procedures performed on Thursday or Friday required a hospital stay over the weekend due to the discharge policy of the department). In some cases, however, the rationale for the prolonged hospitalization was not clear.

CONCLUSIONS

Complications after CIED implantation occur mainly in the first day after the procedure. Taking into account the growing costs of hospitalization and the prolonged waiting time for elective electrotherapy procedures, it seems safe and justified to discharge patients on the first day after CIED implantation. Early check-ups at the hospital outpatient clinic could detect rare delayed complications.

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Podsumowanie rocznych doświadczeń z implantacji klasycznych elektrod w okolicy lewej odnogi pęczka Hisa bez wykorzystania dedykowanych koszulek

Summary of one-year experience with the implantation of classic electrodes in the left bundle branch area without the use of dedicated sheaths

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BACKGROUND

The vast majority of reports on left bundle branch area pacing (LBBAP) concern the implantation of electrodes using dedicated sheaths. The aim of the study is to summarize the almost one-year experience of a single center in the field of implantation with the use of classic active fixation leads, but without the use of dedicated sheaths.

METHODS

The study included routine pacemaker, cardioverter-defibrillator, and CRT-D implantation procedures performed in a single center between February 2022 and January 2023, in which an attempt was made to implant Abbott's Tendril STS electrode to LBBA. In all procedures, only a suitably shaped mandrill was used, without the use of dedicated sheath.

RESULTS

The study included procedures performed on 135 patients aged 72.8 ± 13.3, 50 women. Successful LBBA implantation was achieved in 127 (94.1%) patients, including 18 patients initially qualified for CRT-D. LBBA implantation failed in 8 cases, mainly due to difficulties in finding the optimal implantation site. Average stimulation threshold: 0.59 ± 0.35 V, sensing: 9.2 ± 4.4 mV, impedance: 462 ± 130 Ohm, RWPT: 73.9 ± 12.0 ms, interpeak (time between peak V6 and V1): 46.8 ± 14.6 ms. The average X-ray time during the whole procedure was 10:24 ± 5:52 min, X-ray dose: 53.3 ± 41.0 mGy. There were no significant adverse events or problems with stimulation during the procedure or follow-up.

CONCLUSIONS

The presented RESULTS of LBBAP with the use of classic electrodes and only appropriately profiled guidewires are similar to those achieved with the use of dedicated sheaths, which may facilitate the use of LBBPA as a routine stimulation method in most patients.

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Porównanie czasu zabiegu, dawki promieniowania i czasów mrożenia poszczególnych żył po zmianie na nowy cewnik do krioablacji balonowej

Comparison of procedure time, X-ray dose and veins freezing times after switching to the novel cryoballoon catheter

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BACKGROUND

Cryoballoon isolation of pulmonary veins (PV) is a very popular ablation technique in treatment of atrial fibrillation. For many years there was only one manufacturer that has released a few versions of the cryoballoon catheter. In the last years a novel cryoballoon catheter was introduced produced by another manufacturer. In this study we compare whether switching to the new cryoballoon platform affect procedure time, X-ray dose and veins freezing times when performed by an experienced operator.

METHODS

Study group of 20 first patients ablated with POLARx (Boston Scientific) catheter were compared to 20 previous, consecutive patients ablated with Arctic Front Advance Pro (AFAP) (Medtronic) catheter. All procedures were performed in a single center by an experienced operator that has performed over 600 cryoballoon procedures before. We have compared the total procedure time, X-ray dose, total freezing time per each vein and freezing time per all veins.

RESULTS

Both groups consisted of 11 men and 9 women. Mean age nor the BMI did not differ significantly between groups (61.3 ± 8.8 years, 30.7 ± 3.8 kg/m^2 for the POLARx and 64.3 ± 10.7 years, 28.8 ± 3.9 kg/m^2 for AFAP group). Mean procedure time did not differ between groups (61.3 ± 7.0 *vs.* 62.3 ± 7.2 min; $P = 0.66$) nor the X-ray dose (175 ± 75.7 *vs.* 175.3 ± 137.9 mGy; $P = 0.99$). Total ablation time was comparable in both groups (905.1 ± 113.4 *vs.* 893 ± 82.9 s; $P = 0.70$). Mean ablation time per vein also did not differ significantly: LSPV 208.8 ± 27 *vs.* 230 ± .26 s; $P = 0.11$; LIPV 231 ± 77.66 *vs.* 201 ± 27.7 s; $P = 0.12$; RSPV 238.3 ± 77.8 *vs.* 248 ± 69.56 s; $P = 0.68$; RIPV 227 ± 52.41 *vs.* 214 ± 30.8 s; $P = 0.35$)

CONCLUSIONS

The balloon cryoablation of PV is a reproducible procedure even taking into account different cryoballoon catheters. Switching to the novel cryoablation catheter does not significantly affect the procedure time, veins freezing time, nor the X-ray dose when performed by an experienced operator and does not require passing the learning curve.

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Echokardiograficzne czynniki predykcyjne obszarów niskowoltażowych w lewym przedsionku podczas migotania przedsionków

Echocardiography predictors of low-voltage areas in the left atrium during atrial fibrillation

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BACKGROUND

The aim of the study was to test echocardiographic parameters measured during atrial fibrillation (AF) as predictors of low voltage areas (LVA) in the left atrium (LA).

METHODS

Consecutive patients undergoing AF ablation with ongoing AF during echocardiography were included (regardless of the AF type). All the patients underwent transthoracic (including LA strains) and transesophageal echocardiography. During AF ablation all the patients underwent LA electroanatomical mapping. LVA were defined as area over 2 cm^2 with voltage below 0.3 mV (measured during AF).

RESULTS

A total of 114 patients were included in the analysis. In 45 patients (39.5%) LVA were found. Patients with LVA were older, had lower LA reservoir strain (LASr, 8.47 *vs.* 10.31%; $P = 0.009$), lower LA conduit strain (7.42 *vs.* 9.58%; $P = 0.007$), higher LA volume index (LAVI, 55.9 *vs.* 45.2 ml/m^2; $P < 0.001$), higher E/e' (12.5 *vs.* 9.4; $P = 0.001$), lower LA appendage emptying velocity (LAAV, 28.1 *vs.* 41.7 cm/s; $P < 0.001$). In multivariable logistic regression analysis only age and LAAV remained significant predictors of the presence of LVA (odds ratio for LAAV 0.94, 95% confidence interval, 0.89–0.99; $P = 0.028$). A receiver operating characteristic curve (ROC) analysis found a LAAV threshold of 26 cm/s with 55% sensitivity and 89% specificity (c-statistics = 0.77).

CONCLUSIONS

LAAV was significantly lower and LA strains measured during AF were slightly lower in patients with LVA; while LAVI was higher. Among echocardiographic parameters in multivariable analysis the only significant predictor of LVA in patients tested during AF was LAAV.

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Analiza wyników krioablacji balonowej cewnikiem PolaRx u pacjentów z migotaniem przedsionków

Analysis of the results of PolaRx catheter cryoballoon ablation in patients with atrial fibrillation

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BACKGROUND AND AIMS

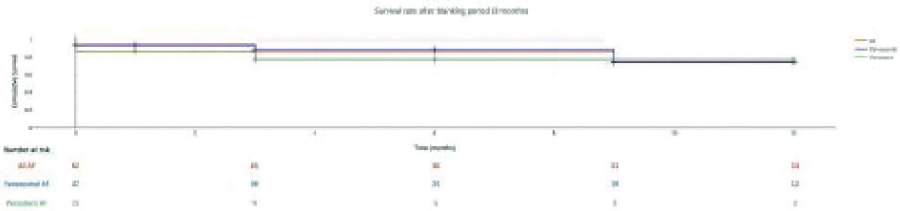
To analyze and present the direct results and annual follow-up in patients (pts) with atrial fibrillation (AF) treated with pulmonary vein (PV) isolation using cryoballoon PolaRx (Boston Scientific), verified by Polarmap circular catheter (Boston Scientific).

MATERIALS AND METHODS

Eighty-one patients (age 59.4 ± 9.62 yr, 60 M) underwent cryoballoon ablation. Paroxysmal AF 61 pts, persistent AF 14 pts, long-term persistent AF — 6 pts (13–36 mth). Comorbidities hypertension 44 (54.3%), hypercholesterolemia 26 (32.1%), obesity 14 (17.3%), coronary artery disease 7 (8.6%), type 2 diabetes/prediabetes 20 (24.7%), history of thyroid diseases 8 (9.9%), obstructive sleep apnea 4 (4.9%), smoking 9 (11.1%), history of stroke/TIA 4 (4.9%)/2 (2,5%). Qualification for the procedure was based on angiography (n = 75), CT (n =3) or MRI (n = 3). Mean left atrial diameter was 42 ± 5 mm, LVEF was 56 ± 10% (30 seconds were found in 12 pts, one of whom underwent another ablation procedure.

CONCLUSIONS

Cryoballoon ablation with the PolaRx catheter verified with the Polarmap catheter is an effective and safe method of treating AF in both paroxysmal and persistent form.



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Fizjologiczna stymulacja serca — doświadczenia własne

Conduction system pacing: A single-center experience

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WSTĘP

Pierwsze stymulatory serca zaczęto implantować przed 60 laty, technika zabiegu pozostała niezmieniona do czasu pierwszych prób implantacji elektrody w okolicę pęczka Hisa, a następnie do lewej odnogi pęczka Hisa. Udowodniono, że niefizjologiczna stymulacja, jaką jest stymulacja prawej komory serca, może prowadzić do niewydolności serca, a problem nasila się wraz ze zwiększonym odsetkiem stymulacji. Jest to główny powód, dla którego w ośrodku od października 2022 roku wykonuje się już tylko zabiegi fizjologicznej stymulacji serca. Na podstawie retrospektywnej analizy 245 wykonanych zabiegów przedstawiono WYNIKI, jak wyglądała krzywa uczenia nowej techniki implantacji na podstawie czasu trwania zabiegu, czasu skopii RTG czy uzyskanych parametrów wystymulowanych zespołów QRS.

MATERIAŁ I METODY

Wszystkie zabiegi zostały wykonane po uzyskaniu pisemnej zgody pacjenta. Stosowano leczenie przeciwbólowe dożylne fentanylem oraz sedację dożylną midazolamem. Po 4-krotnym zdezynfekowaniu skóry Skinsept Colorem znieczulano skórę miejscowo 1% Lignocainą 400 mg w okolicy podobojczykowej lewej. Skórę oraz tkanki podskórne nacinano wzdłuż bruzdy ramienno-piersiowej. Preferowano dostęp naczyniowy poprzez punkcję żyły podobojczykowej lewej. Przy użyciu dedykowanej koszulki C315HIS (Medtronic) wprowadzano elektrodę 3830 SelectSecure (Medtronic) w okolicę pęczka Hisa lub LBB. W przypadku stymulacji LBB optymalne miejsce wkręcenia elektrody ustalane było anatomicznie w odległości 1,5–2cm od pęczka Hisa oraz na podstawie morfologii wystymulowanych zespołów QRS (przeciwstawne wychylenie zespołów QRS w II oraz III, zazębienie w kształcie litery „W" w V1). Wszystkie zabiegi wykonane były z wykorzystaniem systemu elektrofizjologicznego. Analizie retrospektywnej obejmującej okres 16 miesięcy (10.2021–02.2023) poddano czas trwania zabiegu, czas skopii rtg oraz parametry wystymulowanych zespołów QRS: LVAT, RV6–RV1, czas trwania zespołu QRS (mierzony od piku stymulacji). Dane porównano dla czterech czteromiesięcznych okresów CELem analizy krzywej uczenia.

WYNIKI

W okresie 16 miesięcy wykonano 245 (114 kobiet, 131 mężczyzn) zabiegów fizjologicznej stymulacji serca (27 HIS, 218 LBB). Selektywną/nieselektywną stymulację pęczka Hisa oraz stymulację LBB spełniającą warunki (LVAT <80 ms, R'/r' w V1) osiągnięto w 95,5% zabiegów. Nieudane zabiegi obserwowano w ciągu pierwszego (5 zabiegów) oraz drugiego (6 zabiegów) 4-miesięcznego okresu obserwacji.

Okres	Czas trwania zabiegu	Czas skopii RTG	LVAT	RV6-RV1	Szerokość QRS	Zabiegi stymulacji pęczka Hisa	Zabiegi nieudane
I	139	24,6	b.d.	b.d.	b.d.	8	5
II	114	13,4	73	35	132	15	6
II	115,9	15,2	74	37,7	139,8	2	
IV	98,4	10,5	73	35,7	129	2	

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WNIOSKI

Uzyskane wyniki są zbieżne z aktualnymi trendami promującymi stymulacje LBB nad stymulacja pęczka Hisa. Stymulując LBB uzyskujemy fizjologiczną stymulację, pozbawioną jednak wad stymulacji pęczka Hisa, takich jak niski sensing czy narastające progi stymulacji. Jedynie 11% stanowiły zabiegi stymulacji pęczka Hisa, z wyraźną tendencją spadkową w kolejnych okresach. Czas trwania zabiegu oraz skopii RTG były wyraźnie dłuższe w pierwszym okresie, z ciągłą tendencją spadkową w kolejnych okresach, zbliżając się do czasów osiąganych podczas klasycznej implantacji elektrod do PMK. Nieudane zabiegi obserwowano jedynie w dwóch pierwszych okresach. Parametry zespołów QRS świadczące o stymulacji LBB były podobne we wszystkich badanych okresach. Zabiegi były podzielone między 3 doświadczonych operatorów. Wyznaczenie krzywej uczenia wymaga przedłużenia czasu obserwacji, natomiast można zauważyć osiągnięcie akceptowalnych czasów zabiegu już po wykonaniu 168 zabiegów (średnio po 56 zabiegach na jednego operatora). Technika zabiegu niewątpliwie wymaga dłuższego czasu uczenia w porównaniu do klasycznej techniki implantacji, natomiast uzyskanie czasów trwania wystymulowanych zespołów QRS na poziomie 129 ms, co przekłada się na korzyści kliniczne dla pacjenta, utwierdza nas w przekonaniu o słuszności podjętej decyzji o przestawieniu się ze stymulacji klasycznej na fizjologiczną. Analizując badanie MELOS, uzyskane wyniki oraz ilość wykonanych przez nasz ośrodek zabiegów są zbieżne i porównywalne z czołowymi europejskimi ośrodkami elektroterapii.

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CZĘŚĆ II

SESJA PRZYPADKÓW KLINICZNYCH

SESSION OF CLINICAL CASES

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Prawostronna implantacja podskórnego kardiowertera–defibrylatora u pacjenta z dekstrokardią

Right-sided implantation of subcutaneus cardioverter defibrillator in a patient with dextrocardia

Anna Rydlewska, Adrian Stanek, Jakub Machejek

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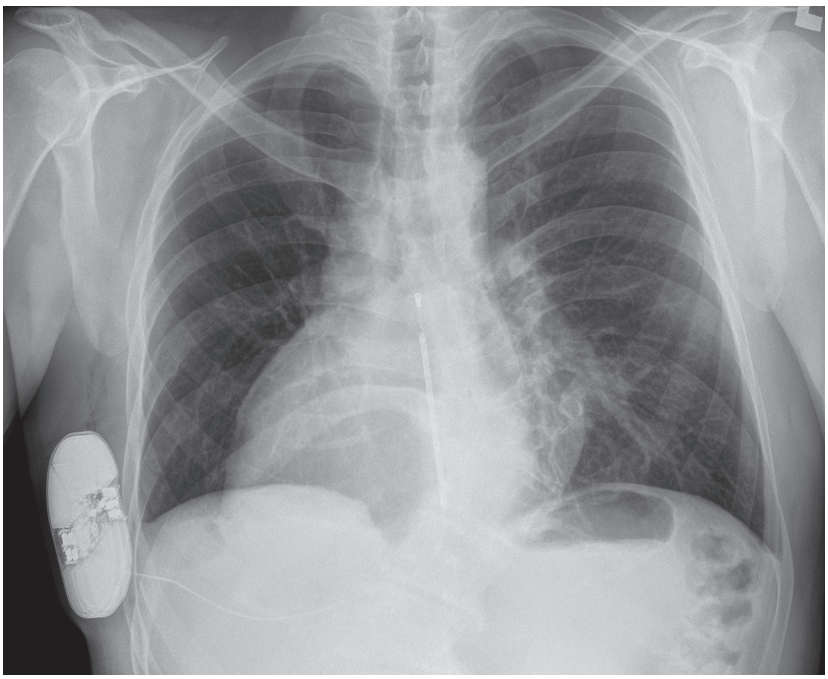
A 50-year-old man with dextrocardia, dilated cardiomyopathy, chronic heart failure with reduced ejection fraction (EF 18%) was admitted for subcutaneus implantable cardioverter defibrillator (S-ICD) implantation as part of the primary prevention of sudden cardiac death. The patient had no indication for atrial/ventricular pacing or cardiac resynchronization therapy. An electrocardiographic screening was performed by placing the electrodes in the same manner but on the right hemithorax. The patient successfully passed sitting, supine and standing screening position required for S-ICD placement. Also additional scrennning positons (left-sided and right-sided) were correct. A S-ICD (Emblem A219, Boston Scientific) was successfully implanted on the right hemithorax under general anesthesia. The pulse generator was placed at the right midaxillary line, and the S-ICD electrode was placed on the right parasternal area using two-incision technique. The S-ICD analysis at the end of the procedure revealed acceptable three sensing factors (primary, secondary, and alternate). Defibrillation threshold test (DFT) was successful in our patient with a single shock at the usual 65 J setting. The chest X-ray showed a correct device and lead position. There were no complications related to the procedure until the end of hospitalization.



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Wielowymiarowy przypadek pacjentki z zaburzeniami przewodzenia i masywnym krwiakiem w obrębie jamy brzusznej. Co było pierwsze — jajko czy kura?

A multidimensional case of conduction block and massive abdominal hematoma: Is it not a hen and an egg situation?

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A 56-year-old patient with hypertension and diabetes history presented to the Emergency Department with chest pain radiating to the epigastrium and advanced second-degree atrioventricular block recorded on the ECG 30–40/min with periodic intraventricular conduction disturbances of the LBBB type. Successive screening echocardiography showed no segmental contractility disorders or hemodynamically significant valvular or structural heart defects. Cardiospecific markers were not elevated.

Nevertheless, coronary angiography was performed based on the symptoms character and conduction disturbances to exclude their reversible cause. However, no significant stenoses in the coronary arteries were found. Due to progressive conduction disorders to the third-degree AV block, the patient was secured with temporary endocavitary pacing.

Regarding the patient's severe clinical condition, imaging studies were extended, revealing a large hematoma in the abdominal cavity, approximately 160 × 114 × 111mm, with visible, active bleeding from one of the branches of the splenic artery. The patient was qualified for urgent surgical treatment.

The day following the procedure, the sinus rhythm with LBBB resumed spontaneously. Throughout further management, AV blocks varied from I degree to II degree 2:1 (HR ~45/min), with a subsequent incident of polymorphic ventricular tachycardia- most likely bradycardia-induced. Endocavitary stimulation was reapplied.

During further hospitalization (~2 months), the patient required numerous reoperations due to wound dehiscence and abdominal abscesses complicated by septic shock, respiratory failure with sudden cardiac arrest in asystoly, and successful resuscitation.

However, after approximately 5 weeks of treatment, AV conduction disturbances resolved. Because a potentially reversible cause of the conduction abnormalities regarding cardiac autonomic regulation could not be ruled out at this stage with simultaneous significant infectious complications of surgical treatment, as well as no AV block recurrence in the last 4 weeks of hospitalization, the extended outpatient evaluation was recommended.

In further follow-up Holter-ECG after 3 months, paroxysmal AV III block with symptoms of pre-MAS was observed. A pacemaker was implanted.

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Bezelektrodowa stymulacja komorowa z zachowaniem synchronii przedsionkowo-komorowej u pacjenta z blokiem przedsionkowo-komorowym i podwyższonym ryzykiem infekcji loży rozrusznika

Leadless atrioventricular synchronous ventricular pacing in a patient with atrioventricular block at increased risk of pacemaker pocket infection

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BACKGROUND

Delivery of atrioventricular synchronous ventricular pacing may be beneficial in patients with atrioventricular block (AVB) and normal sinus rhythm. The Micra AV transcatheter pacing system (TPS) is a leadless cardiac pacemaker (LCPM) having acCELerometer-based rate response and mechanical atrial sensing functions. Thus it may function, among others, in VVIR and VDD pacing modes.

CASE REPORT

We present the case of a 73-year-old male patient who previously underwent dual chamber pacemaker implantation due to second-degree atrioventricular block with concomitant right bundle branch block and left anterior fascicular block. Unfortunately, the device pocket infection occurred and the pacemaker was removed. At the same time, a temporary cardiac pacing lead was implanted. Previously performed transthoracic echocardiography studies have shown E/A ratios in this patient of 0.6 and 1.0

Considering clinical characteristics of the patient, past medical history and the patient's life expectancy, the Micra AV TPS implantation was performed. Afterwards, the temporary pacing lead was removed. Obtained parameters of LCPM were satisfactory (right ventricular capture threshold of 0.25 V/0.24 ms, electrode impedance of 580 ohms and R-wave amplitude of 10.7 mV) and proper performance of the cardiac pacemaker was verified. The procedure was performed without any complications and the patient was discharged from hospital in good general condition.

In the ambulatory follow-up about 2 months after LCPM implantation, parameters of LCPM were stable (right ventricular capture threshold of 0.5 V/0.24 ms, electrode impedance of 540 ohms and R-wave amplitude of 10.4 mV), remaining device longevity was estimated to be >8 years, right ventricular pacing reached 99.6%, including atrial mechanical (AM) — ventricular pacing (VP) sequences of 59.8% and VP only of 39.9%. It was decided to reduce the A4 threshold from 1.7 m/s(2) to 0.8 m/s(2) and the patient was scheduled for further follow-up.

CONCLUSIONS

LCPM with atrioventricular synchronous pacing may be a valuable therapeutic option in selected patients at high risk of device pocket infection. The management of these patients requires specific knowledge on troubleshooting and device programming.

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Zawiłe losy CRT-D, czyli węzeł na elektrodach jako powikłanie zabiegu implantacji układu resynchronizującego serce

Don't get too attached: The node on the electrodes as a complication of the cardiac resynchronization defibrillator (CRT-D) implantation

Joanna Popiołek-Kalisz[1, 2], Tomasz Chromiński[2], Piotr Błaszczak[2]

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[2]Oddział Kardiologii z Pododdziałem Intensywnego Nadzoru Kardiologicznego i Pododdziałem Rehabilitacji Kardiologicznej, Wojewódzki Szpital Specjalistyczny im. Stefana Kardynała Wyszyńskiego w Lublinie

BACKGROUND

Electrotherapy procedures, such as the implantation of a resynchronization system, carry a potential risk of complications. They may depend on the operator or the patient, and concern both the pocket and the further parts of the electrodes.

CASE REPORT

We present the case of a 78-year-old patient with a cardiac resynchronization defibrillator (CRT-D) implanted in May 2021 in another hospital, as part of the cardiac sudden death primary prevention, in whom left ventricular (LV) pacing disturbances occurred in August 2022. The observed malfunctions included phrenic nerve stimulation at the threshold of stimulation in vectors from LV1 and LV2 and no effective stimulation in other vectors. As a result of the lack of satisfactory pacing parameters, a decision to reposition the LV lead was made. During the procedure, it was revealed that all electrodes were sewn with one common suture outside the anchoring sleeves and looped to form a knot. The X-ray images from the primary implantation procedure were not available, so it was not possible to clearly determine whether the LV lead was dislocated, which could have been the reason for pacing disturbances. In the course of the procedure, the electrodes were released, then the LV electrode was replaced. This way, effective LV pacing in the LV2-LV3 vector without accompanying stimulation of the phrenic nerve was obtained.

CONCLUSIONS

The technique of electrode fixation and their arrangement within the pocket may be a source of potential complications after the CRT-D implantation procedure, such as electrode dislocations and related stimulation disorders. This part of the implantation procedure should also receive special attention from the operator.

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Trzepotanie przedsionków w przeszczepionym sercu, nietypowy obraz typowej arytmii

Atrial flutter in a transplanted heart, an atypical picture of a typical arrhythmia

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WSTĘP

Arytmie u pacjentów po przeszczepieniu serca mogą być związane z substratem arytmii w przeszczepionym sercu jak droga dodatkowa czy dualizm przewodzenia w łączu przedsionkowo-komorowym. Opisywane były również arytmie spowodowane techniką zabiegu operacyjnego lub poszerzeniem jam serca czego przykładem jest trzepotanie przedsionków zależne od cieśni trójdzielnej.

MATERIAŁ I METODY

Autorzy opisują przypadek 65 letniego pacjenta 9 lat po bi-atrialnym przeszczepie serca (OHT). W ostatnim okresie przed przyjęciem miał kilkukrotnie wykonywaną kardiowersję elektryczną z powodu objawowej arytmii nadkomorowej. Na podstawie zapisu EKG w trakcie arytmii podejrzewano częstoskurcz przedsionkowy jako przyczynę dolegliwości (Rycina 1A).

Pacjenta zakwalifikowano do inwazyjnej diagnostyki i leczenia zabiegowego arytmii. W wykonanym badaniu elektrofizjologicznym wyzwolono częstoskurcz przedsionkowy o typie makro-*reentry* z pętlą dookoła zastawki trójdzielnej odpowiadający klinicznej arytmii.

Stymulacją związaną potwierdzono związek arytmii z cieśnią prawego przedsionka. Wykonano linię aplikacyjną w cieśni łączącą zastawkę trójdzielną z linią wszycia przeszczepionego serca, uzyskując ustąpienie arytmii i blok przewodzenia w cieśni. W miejscu ustąpienia arytmii doskonale uwidoczniono zapisy zarówno z natywnego jak i przeszczepionego przedsionka (Rycina 1B). W 10-miesięcznej obserwacji po zabiegu arytmia nie nawracała.

PODSUMOWANIE

Nawracające arytmie mogą stanowić istotny problem kliniczny u pacjentów z przeszczepionym sercem. Zapis powierzchniowego EKG w trakcie arytmii może nie przynieść istotnych wskazówek odnośnie pochodzenia arytmii z uwagi na znacznie zmieniony zapis EKG po operacji. Wykonanie badania elektrofizjologicznego i ablacji podłoża arytmii może pozwolić na postawienie diagnozy i wyleczenie pacjenta. W przedstawianym przypadku stosowana podczas OHT technika operacyjna, bi-atrialna, mogła przyczynić się do wytworzenia substratu arytmii krążącej wokół pierścienia trójdzielnego.

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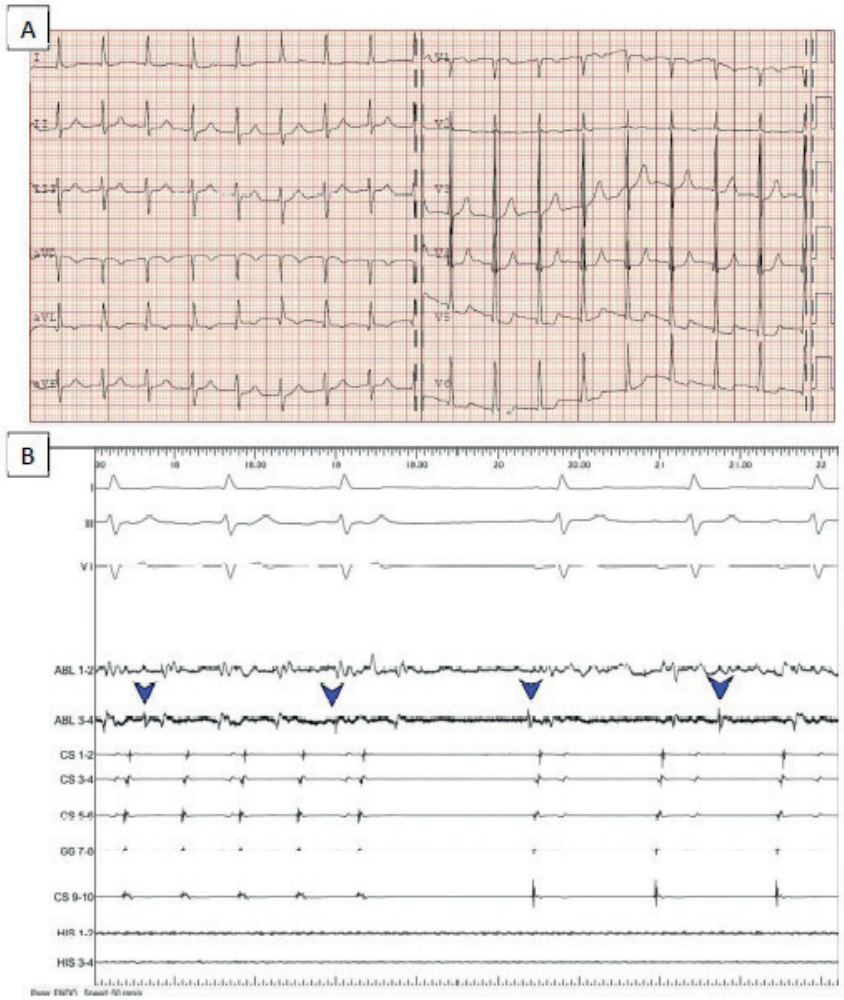

Rycina 1. **A.** Kliniczny częstoskurcz nadkomorowy u pacjenta po OHT. **B.** Zapis wewnątrzsercowy w trakcie ablacji. Moment przerwania arytmii w trakcie aplikacji widoczny pośrodku zapisu. Niebieskimi markerami zaznaczono zapis na elektrodzie ablacyjnej (ABL 3-4) z przedsionka biorcy. Zapis z przeszczepionego przedsionka doskonale widoczny w odprowadzeniach z zatoki wieńcowej (CS) i elektrody ablacyjnej

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Skuteczna, wieloetapowa ablacja przetrwałego migotania przedsionków u pacjenta z tłuszczakowatym przerostem przegrody międzyprzedsionkowej, znaczną rozstrzenią lewego przedsionka i kardiomiopatią tachyarytmiczną

Successful, multi-stage ablation of persistent atrial fibrillation in a patient with lipomatous hypertrophy of interatrial septum, severe left atrium dilatation and tachycardia induced cardiomyopathy

Bartosz Żuchowski, Mateusz Dziarmaga, Andrzej Wykrętowicz

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BACKGROUND

We present a case of a patient with lipomatous hypertrophy of interatrial septum (LHIS) in whom many years of atrial fibrillation (AF) led to tachycardia-induced cardiomyopathy (TIC) with reduced ejection fraction (EF) of 37%.

CASE REPORT

71-years old patient suffered from severe heart failure symptoms NYHA III/IV due to TIC. Long-term AF caused severe dilatation of left atrium (LA) (LAVI 73 ml/m^2; 50 mm). Despite the LHIS, with the assistance of transesophageal echocardiography (TEE) successful transseptal puncture and cryoablation of pulmonary veins (PV) were performed. Due to AF recurrences after 6 months second stage of ablation — modification of arrhythmogenic substrate in LA was performed. Once again the hypertrophic septum was successfully punctured with TEE guidance. In high-density mapping the PV were found to be isolated and severe LA fibrosis was noticed: scar on the whole posterior wall ; only a small area of active myocardium in the middle of the roof; many small scars, with a large scar in the middle on the anterior wall. Tailored ablation lines were conducted: a) between mitral valve and left superior PV; b) between mitral valve and anterior scar; c) between anterior scar and right superior PV; d) partial roof line.

The cardioversion following ablation successfully restored sinus rhythm (SR). During the 5-months follow up, the patient remained in SR. He did not feel any cardiac palpitations. The EF increased to 55% and the heart failure symptoms subsided.

CONCLUSIONS

Patients with TIC secondary to chronic AF are often a challenge due to accompanying severe LA damage. However, they should be given the option to take advantage of the rhythm control strategy and ablation. Despite successful AF limitation often requires a few procedures, the SR domination is achievable in many patients. Multi-stage ablation is feasible and safe in patients with LHIS with TEE guidance.

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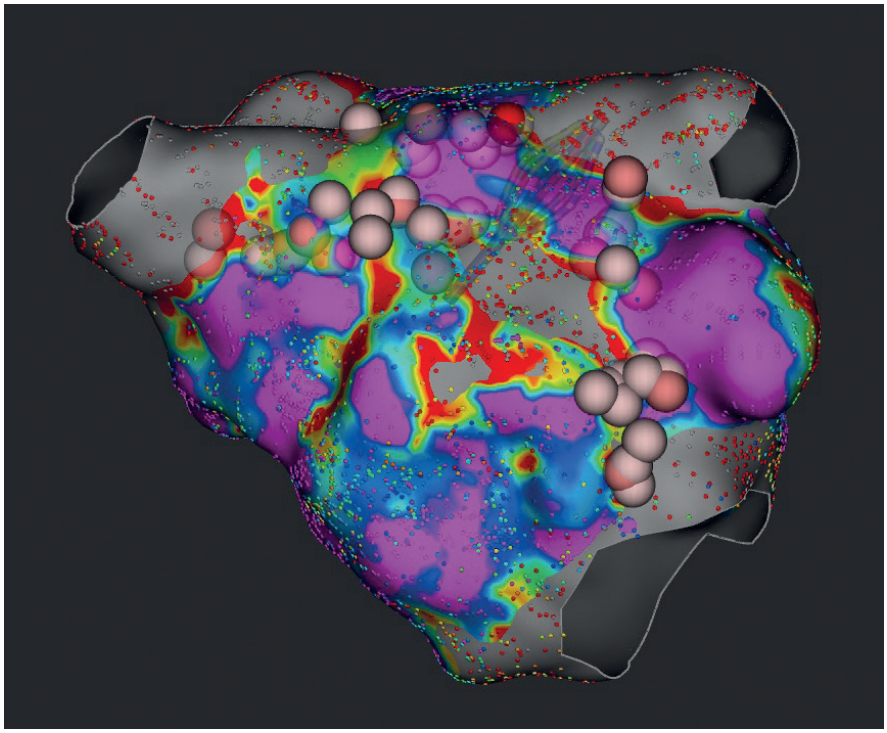

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Arytmia komorowa o rzadkiej lokalizacji po średnio-ciężkim przebiegu COVID-19

Ventricular arrhythmia originating from a rare location after moderate-severe COVID-19 course

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BACKGROUND

The latest scientific research based i.a. on magnetic resonance imaging, shows that SARS-CoV-2 infection is associated with nonischemic myocardial injury in up to 20% of patients. Inflammation-mediated myocardial fibrosis may be a predisposing factor as well as the basis for ventricular arrhythmias.

CASE REPORT

A 45-year-old woman was referred for a Holter ECG due to heart palpitations. Symptoms appeared in 2020 after SARS-CoV-2 infection with a medium-severe clinical course, treated at home. During the diagnostics, over 22 000 premature ventricular contractions (PVCs) with atypical morphology suggesting origin from the right ventricle were found. Due to the symptoms significantly reducing the quality of life and poor response to pharmacological treatment, the patient was qualified for cardiac ablation.

Using three-dimensional (3D) electroanatomical navigation system a large area of early potentials was identified in the lateral wall of the right ventricle. In sinus rhythm, low and fragmented potentials were found at this location, which may correspond to a scar. Extensive RF ablation with a irrigated-tip catheter resulted in complete elimination of PVCs.

SUMMARY

Post COVID-19 patients are a new group of patients that pose a challenge in many fields of medicine. In the field of arrhythmology, we observe i.a. increase of ventricular arrhythmias. Many of them may be related to scars after myocarditis in the course of SARS-CoV-2 infection. In patients with onset of ventricular arrhythmia after COVID-19, the atypical location of the source of the arrhythmia should be considered.

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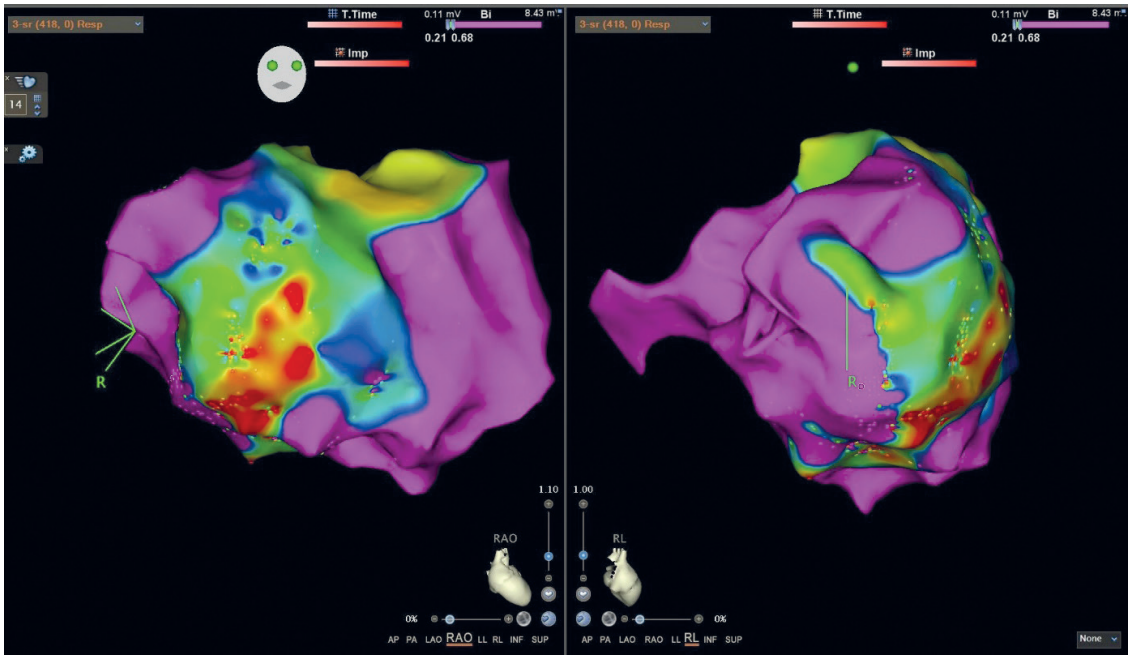

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Gdy standardowa diagnostyka kardiologiczna jest bezsilna — kluczowa rola Apple Watch w potwierdzeniu uszkodzenia elektrody w stymulatorze dwujamowym

When standard cardiac diagnostics are powerless: The key role of Apple Watch in confirming the lead dysfunction in dual chamber pacemaker

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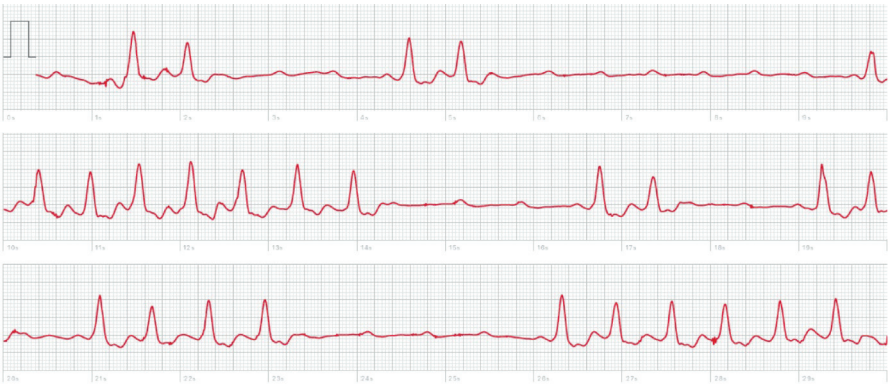
A 63-year-old female with a dual chamber pacemaker, implanted due to paroxysmal Mobitz type 2 atrioventricular block in June 2012, for several months had been experiencing a slowly increasing feeling of weakness and dizziness. Performed Holter monitoring, exercise treadmill test, and echocardiographic exam showed no abnormalities. After syncope episode in a sitting position, she reported herself to the emergency department. A pacemaker check-up revealed all the parameters normal. The rate of ventricular pacing was 100% due to pacemaker-dependency. The patient was discharged without a final diagnosis.

After that the patient began wearing Apple Watch Series 6, which allowed to capture a 1-lead ECG during another episode of presyncope (Figure). This tracing confirmed ineffective ventricular pacing without an escape ventricular rhythm. She was urgently admitted to the cardiology department. Upon inspection, the parameters of the device were still normal, with only a noticeable impedance spikes in ventricular lead channel. Ultimately, the patient was qualified for ventricular lead replacement.

There is a robustness of medical literature proving the usefulness of wearables, including the Apple Watch with ECG recording function, which facilitates the everyday practice of cardiologists. Their importance was appreciated mainly in the detection of atrial fibrillation, but also other short-term arrhythmias that are often difficult to capture in regular Holter monitoring. To the best of our knowledge, this is the first recorded case of an Apple Watch application for the diagnosis of ventricular lead dysfunction. It shows the usefulness of mHealth solutions also in patients with implanted CIEDs.



25 mm/s, 10 mm/mV, Odprowadzenie I, 512 Hz, iOS 16.2, watchOS 9.0, Watch6,14, Wersja algorytmu 2 — Ten zapis jest podobny do bazowego zapisu odprowadzenia I EKG. Aby uzyskać więcej informacji, zapoznaj się z instrukcją obsługi.

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To samo, ale nie takie samo — dwa przypadki nadczułości

The same but different: two cases of oversensing

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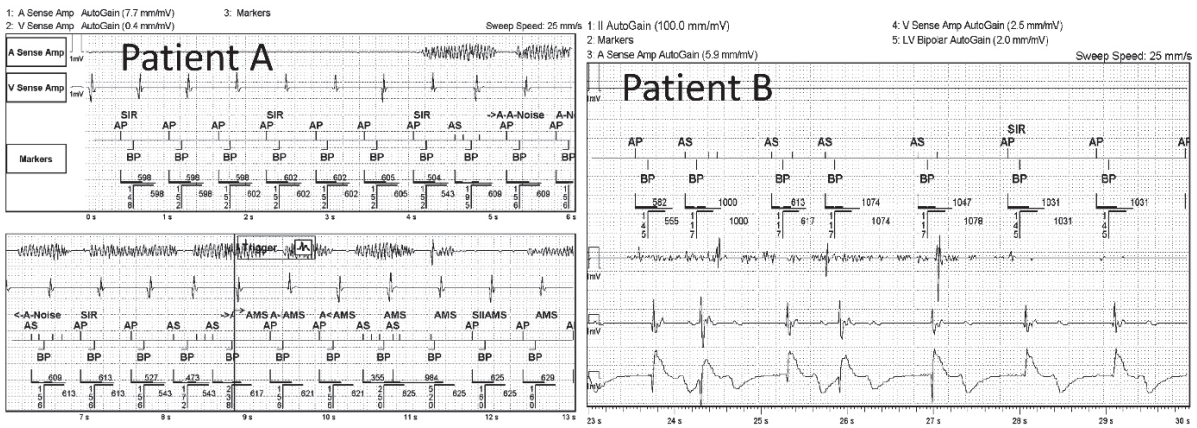
Two patients with implanted CRT-D (both from St Jude/Abbott) underwent device interrogation. In both patients phenomenon of oversensing on atrial channel was registered.
We would like to present the comparative diagnostics of cases.

Oversensing in Patient A is due to **electromagnetic interference (EMI)** with its typical presentation:
- inputs signal on all ICD channels;
- uniform, high-frequency pattern;
- rapid, noncyclic signals on multiple channels;
- history of exposure at the time of the stored episode (patent was using household utensil drill).

Oversensing in Patient B is due to **lead failure** with its typical presentation:
- signals are intermittent and have a high dominant frequency;
- at least one signals are not cyclic;
- some intervals are nonphysiological;
- ignal amplitude may exceed the range of the sensing amplifier and thus appear truncated.

Moreover, pathological signals in patents B were reproduced by physical maneuvers (moving the can). There after, during CRTD replacement an insulation breaches on atrial channel was revealed.

We would like to remind once again the oversensing differential diagnosis between EMI and lead failure. In most cases the final diagnosis is straight but distinguishing atypical EMI may be challenging.



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Arytmogenny prolaps mitralny — od stratyfikacji ryzyka do podejmowania decyzji klinicznych

Arrhythmogenic mitral valve prolapse: Clinical challenge from risk stratification to decision making

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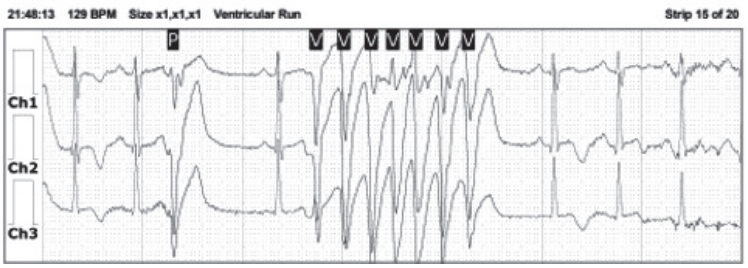
Mitral valve prolapse (MVP) is a benign pathology; however, sudden cardiac death (SCD) episodes were documented, raising a question on risk stratification in that patients, while the underlying mechanisms of SCD remain unclear. Some morphological features, such as mitral annulus disjunction (MAD) seem to increase the risk of SCD. Additionally, a rapid non-sustained ventricular tachycardia (NSVT) should be taken into consideration.

A 20-year-old female was admitted due to multiple polymorphic premature ventricular contractions (PVCs) and NSVT (230–245 bpm). Medical history revealed heart palpitations with syncopes. Echocardiography revealed MVP with MAD (up to 16 mm). In the further diagnosis, an electrophysiological study with rapid and programmed ventricular pacing was performed, and no sustained ventricular tachyarrhythmias, but NSVT was inducted. Despite no precise recommendations for SCD primary prevention, due to disquieting symptoms with recurrent polymorphic rapid NSVT, we decided to implant an S-ICD system. Due to the multiple PVCs morphologies, the ablation procedure was not considered initially. Propafenone and bisoprolol were taken in pharmacological treatment.In a 1.5-year follow-up, no ICD interventions were noticed, but the number of PVCs with polymorphic NSVT remained at the same level regardless of pharmacological treatment.

The presented case reveals the difficult risk stratification decision in MVP patient. Recurrent, rapid and polymorphic NSVT and unexplained syncope with the occurrence of morphological risk factors classify patients to the high SCD risk group where ICD implantation must be strongly considered.



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Trudności terapeutyczne u pacjentki z zespołem Ehlersa–Danlosa i licznymi objawowymi przedwczesnymi pobudzeniami komorowymi

Therapeutic difficulties in a patient with Ehlers–Danlos syndrome and numerous symptomatic premature ventricular contractions

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A 28-year-old female patient diagnosed with Ehlers-Danlos syndrome type III (hypermobile EDS, hEDS) was admitted due to a 3-year history of symptomatic ventricular arrhythmia in the form of multiple premature ventricular contractions (PVCs). Attempts at antiarrhythmic treatment with beta-blockers, propafenone, and verapamil were unsuccessful. Regardless of the treatment, Holter recordings repeatedly revealed numerous PVCs (from 6 to 20 thousand per 24-hour registrations), often arranged into ventricular bigeminy and trigeminy episodes. The ECG showed PVCs with a morphology pointing to the right ventricle outflow tract (RVOT) origin, indicating a potential possibility of radiofrequency ablation (RF) with a positive effect (Figure 1). However, due to hEDS diagnosis and the high risk of vascular complications related to the ablation procedure in that patients, invasive treatment was abandoned, and it was decided to implement flecainide. After the flecainide treatment initiation (100 mg twice daily), a spectacular improvement in the number of PVCs was observed, along with the disappearance of the complaints previously reported by the patient. To the best of our knowledge, this is the first described case of spectacular flecainide antiarrhythmic effect in a patient with numerous PVCs also diagnosed with EDS. Flecainide treatment in the EDS group could be a successful alternative to ablation, which can lead to serious vascular and even life-threatening complications, especially after the failure of propafenone and beta-blockers treatment.

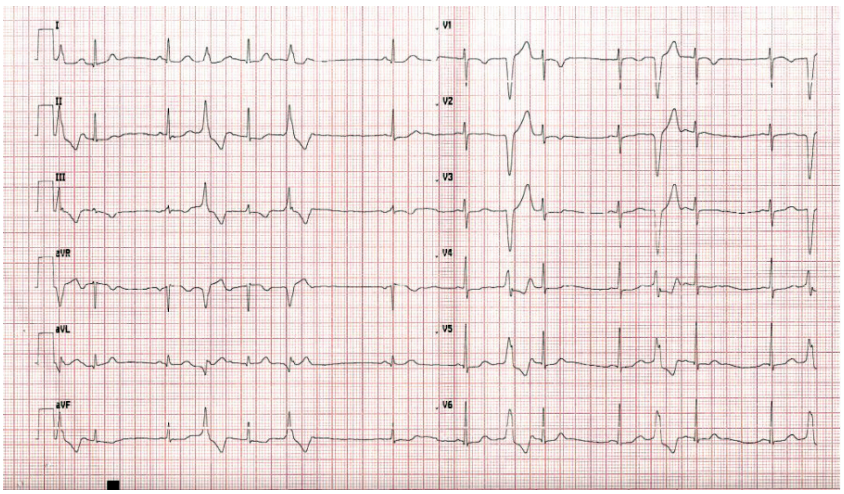

Figure 1. A 12-lead ECG showing ventricular premature contractions with right ventricular outflow tract morphology forming a ventricular bigeminy

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Ablacja bipolarna nawracających częstoskurczów komorowych u pacjenta po wielokrotnych nieskutecznych zabiegach

Bipolar ablation of recurrent ventricular tachycardia in a patient after multiple failed ablation attempts

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BACKGROUND

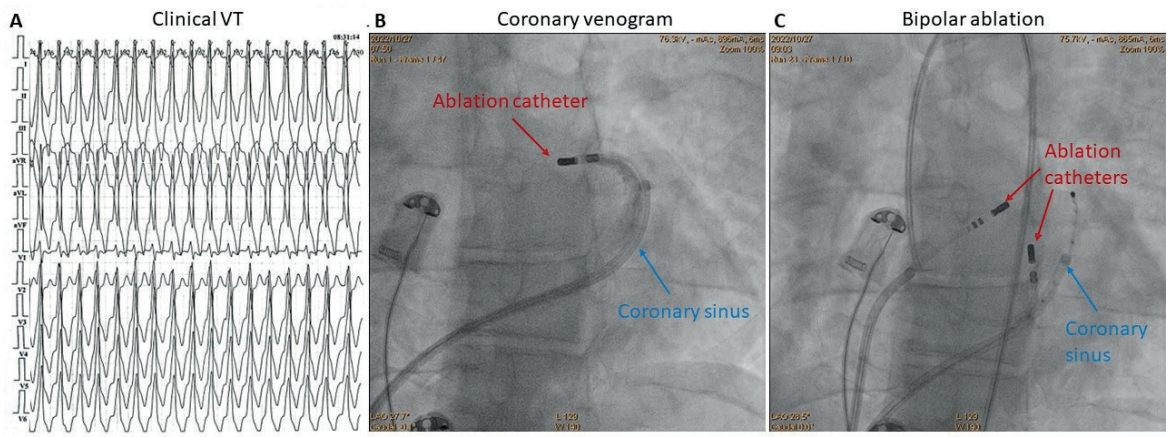
There's a limited effectiveness of classic radiofrequency catheter ablation (RFCA) in cases of intramural source of ventricular tachycardia (VT). Advanced ablation techniques such as bipolar RFCA (Bi-RFCA) or alcohol ablation can be helpful, however clinical course can sometimes complicate diagnostic and therapeutic decisions.

CASE REPORT

A 39-year-old male suffered from recurrent outflow tract VT. Despite multiple ablation attempts using diffrent approaches performed at diffrent centers between 2015–2021 and subsequent failure of all available antiarrhythmic drugs (amiodarone, werapamil, sotalol, bisoprolol, metoprolol, propafenone and mexiletine) the patient remained symptomatic. Thus, another procedure was scheduled with a backup of alcohol ablation and Bi-RFCA. However, coronary venogram revealed no accessible coronary veins available for alcohol ablation. Several sequential Bi-RFCA applications up to 40 W conducted between right and left ventricular outflow tracts led to elimination of clinical VT and no recurrence during 4-month follow up.

SUMMARY

Failure of classic approaches should prompt therapeutic decisions towards more advanced ablation techniques. Bi-RFCA can be an effective option in patients with VT recurrences who are not eligible for alcohol ablation.



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Czy negatywny *screening* zawsze wyklucza implantację S-ICD?

Does negative screening always rule out S-ICD implantation?

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The 64-year-old female patient was transferred to the Department of Cardiology from the Intensive Care Unit (ICU) for ICD implantation in secondary prevention. She was admitted to ICU after sudden cardiac arrest caused by ventricular fibrillation. Urgent coronary angiography and IVUS revealed no significant findings. The ICU hospitalization was complicated by multiple organ failure, rhabdomyolysis, iatrogenic tracheal rupture, tracheal stents migration, pneumomediastinum, mediastinitis, inflammation of the soft tissues of the neck and jugular veins thrombosis. Eventually, her condition improved after ICU treatment. Mild to moderate coordination and cognitive deficits persist. In the ECG LBBB (QRS 170 ms) was observed. Transthoracic echocardiography revealed the left ventricular dyssynchrony with ejection fraction 45%–50%. However, the pre-implantation venography showed high-grade post-thrombotic stenosis of both subclavian veins with impaired flow and collateral circulation through the intercostal veins, the attempt to TV-ICD implantation was performed. Unfortunately the lesions were forced neither by the 0.035 nor 0.014 inch guidewire. Both axillary and subclavian access failed. The patient was qualified for S-ICD implantation. Unfortunately, none of vectors was judged ineligible for S-ICD during pre-implant screening. Different sternal lead positions were evaluated. Nevertheless, taking into account all therapeutic options and the potential risk, S-ICD was implanted. The procedure was performed under general anesthesia using a laryngeal mask. Profuse bleeding was noted during the procedure, although no hematoma and no significant anemia was observed after procedure. The successful defibrillation test was performed. During the first follow-up, vectors eligibility were assessed at rest and during light exercise. Automatic vector selection process considered alternate vector as available. During manual evaluation, proper sense without R-wave double counting was observed in all three vectors. In this case, the decision to implant S-ICD, although difficult, seems right.

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Arytmogenna żyła główna górna u pacjentki z napadowym migotaniem przedsionków

Arrhythmogenic superior vena cava in a patient with paroxysmal atrial fibrillation

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70-years old female was admitted to the hospital to perform redo procedure due to recurrent atrial fibrillation (AF). Fifteen months earlier she had undergone pulmonary vein isolation. There were no significant improvement after the procedure. She continued to have episodes of AF every 2–3 days, lasting up to 18 hours. In her medical history there was hypertension and diabetes, both well controlled. Echocardiography showed no significant abnormalities, left and right ventricular function normal, left atrial (LA) antero-posterior dimension was 38 mm, LA area was 20.3 cm^2.

In the repeat procedure, the left atrial was mapped using a 10-polar circular catheter and an ablation catheter. No potentials were recorded in the pulmonary veins, entrance and exit block was confirmed. No low-voltage areas were observed. During the procedure active firing was noticed, with positive deflections in leads I, II and III negative in V1. The circular mapping catheter was placed in the superior vena cava (SVC), showing active firing deep in the vein (Figure).

Isolation of SVC restored stable sinus rhythm.

After a 12-month follow-up the patient is free of AF episodes.

CONCLUSIONS

Despite inconsistent results of clinical trials of SVC ablation, there are patients in whom SVC isolation might be helpful.

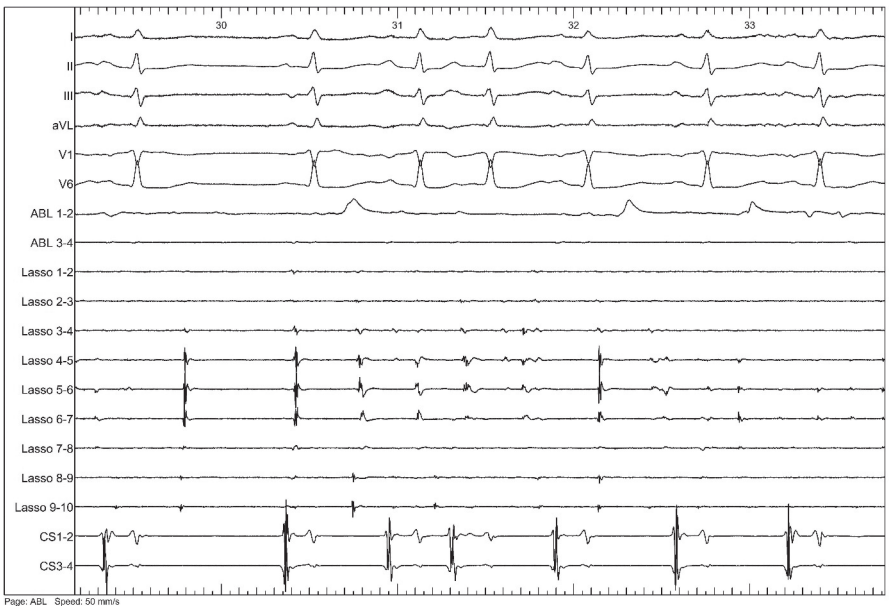

Figure. Circular mapping catheter in the SVC. Firings in the vein resulted in the short runs of AF

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Stymulator bezelektrodowy jako metoda lecznicza u chorej z blokiem całkowitym, wywiadem wielozastawkowych operacji naprawczych — w tym w obrębie zastawki trójdzielnej i pooperacyjną stenozą biologicznej zastawki trójdzielnej

The leadless pacemaker as a therapeutic option in a patient with complete atrioventricular block, a history of multivalve repair procedures including tricuspid valve and with post-repair tricuspid bioprosthesis stenosis

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Classic pacemakers (PM) have been used for many years in the treatment of bradyarrhythmic disorders. However, its use is associated with an increased risk and spectrum of complications in long-term observation. An alternative to the PM is the leadless (LP) pacemaker, which has no venous lead and is implanted via a catheter directly into the right heart ventricle.

We present the case of a 63-year-old woman with permanent atrial fibrillation, complete atrioventricular block, after several surgical interventions since 1979 through 1996 and 2014 including: mitral, aortic and tricuspid valve replacements. Patient was considered to be at high risk of mechanical and infectious complications for permanenet pacing and presently diagnosed tricuspid bioprosthesis stenosis should have been taken into account in decision making.

LP — Micra TPS was implanted to the right septal position through the tricuspid valve bioprosthesis. After being hooked at first attempt with 2 of 4 tines in stable position with pacing threshold 0.38 V/0.24 ms/800 ohms and R-wave 11.7 mV, LP was released. Direct and mid-term follow-up confirmed its stable position (Figure) and function.

As a CONCLUSION of the submitted case it is to emphasize that leadless pacemaker is a valuable treatment option for patients with an increased risk of different complications of permanent classical pacing — mainly infectious or vascular — but current guidelines do not reffer this method to tricuspid valve function. In patients with post-repair tricuspid bioprosthesis stenosis, leadless pacing may be safe and effective option to minimize the risk of further valve dysfunction and may be an alternative to epicardial or transcoronary techniques.

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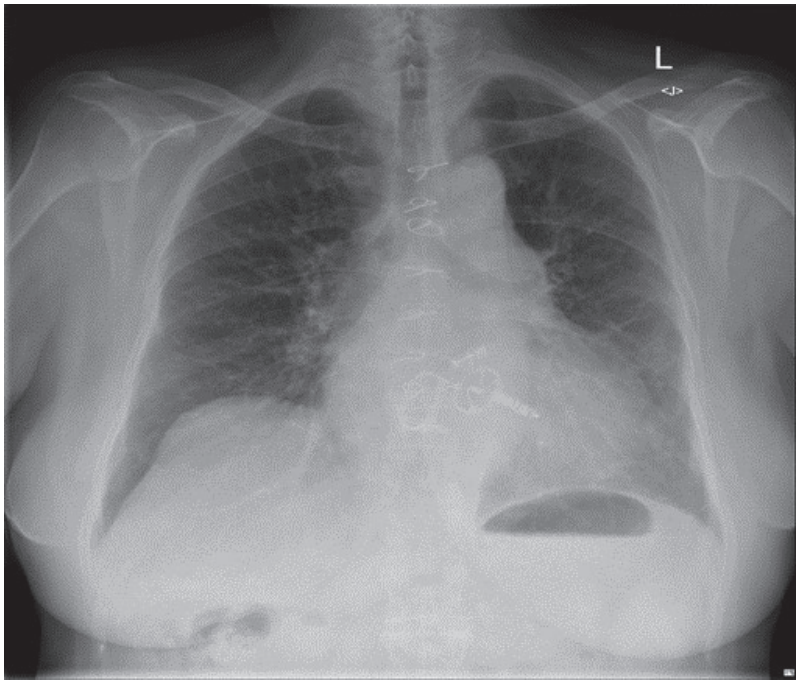

Figure. Chest X-ray, PA projection. Placement of the MICRA TPS pacemaker in the heart; visible valve rings: aortic, mitral and tricuspid

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Objawowy zespół Brugadów czy niejednoznaczne fakty diagnostyczne

Symptomatic Brugada syndrome or diagnostic mishaps

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Brugada syndrome (BS) is aninherited autosomal dominant disease, more frequent in males in the age of 30–40. It is usually diagnosed based on permanent or spontaneous ECG changes and ventricular arrhythmias. The first and lethal clinical manifestation of BS might be sudden cardiac arrest (SCA). Secondary prevention indicates need of implantation of implantable cardioverter-defibrillator (ICD).

The case depicts a 48-year-old man admitted for SQ-ICD implantation in BS-SCA secondary prevention.

Exercise tolerance normal, negates fainting and syncope, palpitations. Family history of BS and SCA negative. General condition was good, no angina complaints, no features of overt heart failure.

Careful history showed a brief selfterminating episode of wide QRS tachycardia with concomittant near-pulseless hypotensia during surgery after anesthesia with local use of lignocaine 1% and epinephrine,. Due to persistent ST-T changes in apr. V1, V2 suggestive of BS, first provocative test with ajmaline was performed, and ST-segment elevation in apr. V2 up to 5 mm was observed.

On physical examination: HR approximately 60/min, BP 120/70 mm Hg. Exercise test clinically and ECG negative. Arrhythmogenic right ventricular cardiomyopathy was excluded on cardiac MRI. In ECHO of the heart, preserved systolic function of the left and right ventricular muscles LVEF — 60%, S' –11 cm/s, without significant valvular defect. In the 72-h Holter ECG performed, no complex ventricular arrhythmia was registered. No ventricular arrhythmia was induced in the electrophysiological study. The provocative test with flecainide has been repeated: a significant ST-segment elevation of up to 2.7 mm was observed in the V2 striatum, confirming the diagnosis of BS.

Though Brugada syndrome could have not be ruled out; BS ECG diagnostic pattern is still disputable. No ICD indication has been established as no confirmed arrhythmic event but anaesthesia side effect rather has been observed and patient history remains event-free. Further observation is recommended.

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Arytmiczne epizody u wyczynowej kolarki — częstoskurcz komorowy indukowany wysiłkiem w strukturalnie zdrowym sercu, po przebytych ablacjach

From cycle race to arrhythmic seizures: exertion-induced ventricle tachycardia in the normal heart with a history of ablations

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BACKGROUND

Ventricular tachycardia (VT) occurs rarely in patients without structural heart disease. Data on exercise induced VT in those subject is limited. Both polymorphic and monomorphic VTs may lead in rare circumstances to sudden cardiac arrest (SCA) and cardiac death.

We report a case of a young female athlete who developed arrhythmic seizures, despite previous two ablations.

CASE REPORT

A 25-year-old woman after ablation of the slow pathway due to induced atrioventricular nodal reentry tachycardia (AVNRT), was admitted to hospital after recurrent syncopies during competitive cycling training. Holter ECG, revealed polymorphic ventricular ectopic beats (VEBs) of LVOT morphology. No evidence of structural heart disease has been found.

During the cardiac exercise stress test at the beginning monomorphic VEBs occurred and faded away at the peak of exercise. There was a recurrence of ventricular bigeminy at recovery. As competitive athlete patient was qualified for LVOT VEBs ablation. No arrhythmia was induced nor observed with and without Isuprel induction.

Nevertheless patient reported the new syncope with palpitations at the next appointment and long-term ECG monitoring revealed episodes of self-terminating VTs what was confirmed in exercise test. Previous levothyroxine administration for hypothyroid should have been taken into account. Those facts legitimated HeartTeam to suggest exercise restriction and to withdraw competitive cycling.

CONCLUSIONS

In cases of focal or reentrant tachyarrhythmias originating in structurally normal hearts even successful outcome of ablation procedures might be not enough to legitimate final approval for competitive sport.

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Odelektrodowe zapalenie wsierdzia u pacjentki we wstrząsie septycznym

Cardiac device-related infective endocarditis in a patient with septic shock

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BACKGROUND

Cardiac device-related infective endocarditis (CDRIE) is challenging in clinical practice. We present the case of a patient with a dual-chamber (DDD) pacemaker (PM) in septic shock.

CASE REPORT

An 18-year-old female with congenital third-degree atrioventricular block, after PM implantation (in the abdomen) with an epicardial lead in 2009, after transvenous PM DDD in 2014. In 2019, she presented with a local device infection. The pocket revision was performed, a new generator was implanted into a subpectoral pocket. The culture of the pocket swab was positive (*E. coli*); 14 days of targeted antibiotic therapy was implemented.

The patient was admitted to the ICU due to septic shock on 8/02/2023. No focus of infection was found in transthoracic echocardiography and computed tomography (CT) of the chest, abdomen, and head. Empiric antibiotic therapy was implemented. The patient was PM-dependent, with no signs of pocket infection. In transesophageal echocardiography: several large vegetations (34 mm) in connection with the leads, partially balloting.

On 10/02/2023, the device extraction was performed in a hybrid operating room. The tip of the remaining epicardial lead was attached with a new single-chamber PM and inserted into the abdominal pocket. The subpectoral pocket was opened; purulent secretion was aspirated. The leads were dissected and secured with a locking stylet. The vegetations were aspirated using the ANGIOVAC system. The leads were removed entirely using Byrde tubes without complications.

The cultures of the lead tips and pocket swabs were positive (*St. aureus*). In the chest CT scan, lung inflammation was observed. Due to respiratory failure, the patient was intubated and is in severe condition in the ICU.

CONCLUSIONS

Pocket revision in the case of suspected infection, even with "negative" blood cultures, carries the risk of severe complications in the future. CDRIE should be suspected in a patient with a cardiac implantable device and septic shock. Percutaneous removal of large vegetation is feasible.

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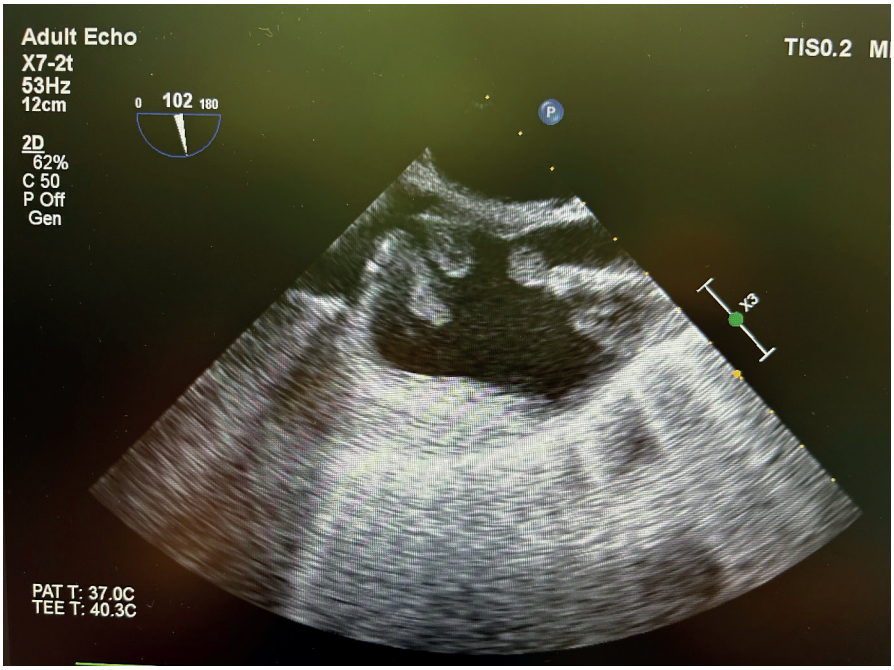

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Implantacja stymulatora serca u pacjentki z anomalią naczyniową w obrębie dużych naczyń żylnych klatki piersiowej

Implantation of a pacemaker in a patient with vascular anomaly involving the major chest veins

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WSTĘP

Anomalie dużych żył klatki piersiowej nie są częstym zjawiskiem. Najpowszechniej spotykana przetrwała lewa żyła główna górna występuje u 0,3% populacji ogólnej. Opisany przypadek dotyczy zwężonej żyły ramienno-głowowej lewej. W literaturze opisywane są przypadki zakrzepicy po wprowadzeniu długoterminowych cewników naczyniowych czy elektrod wewnątrzsercowych, ucisku przez inne struktury anatomiczne, jak np. tętniak aorty wstępującej, rzadkością są natomiast pierwotne zwężenia.

MATERIAŁ I METODY

Opis przypadku dotyczy 92-letniej pacjentki z nowotworem złośliwym piersi prawej zakwalifikowanym do leczenia radykalnego. Z powodu bloku przedsionkowo-komorowego 2:1 pacjentka została przekazana do naszego ośrodka w celu implantacji stymulatora serca.

Zabieg przeprowadzono z wykorzystaniem dostępu naczyniowego przez żyłę podobojczykową lewą. Po umieszczeniu w żyle prowadnika J stwierdzono opór oraz brak możliwości przeprowadzenia prowadnika na prawą stronę klatki piersiowej. Po wprowadzeniu koszulki naczyniowej do żyły podobojczykowej wykonano wenografię, która ujawniła ciasne zwężenie w obrębie żyły ramienno-głowowej lewej oraz główny nurt przepływu kontrastu od żyły podobojczykowej lewej, poprzez żyłę nieparzystą krótką dodatkową łączącą się z żyłą nieparzystą uchodzącą do żyły głównej górnej. Podjęto decyzję o udrożnieniu zwężenia w obrębie żyły ramienno-głowowej lewej. Po kilkukrotnych próbach z wykorzystaniem prowadnika hemodynamicznego uzyskano dostęp do żyły głównej górnej. Z powodu ciasnego zwężenia na długim odcinku implantowano jednojamowy stymulator serca. Nie obserwowano powikłań w okresie okołozabiegowym.

WNIOSKI

Analizując powyższy przypadek, operator ma do wyboru kilka rozwiązań: 1. implantację elektrody przez dodatkowy spływ, co w tej sytuacji nie było możliwe ze względu na długi, kręty odcinek do pokonania; 2. wykonanie wenografii po stronie prawej oraz implantację układu po stronie prawej, co w opisywanym przypadku również nie było wskazane ze względu na planowaną mastektomię; 3. implantację układu bezelektrodowego; 4. próbę odzyskania dostępu naczyniowego.

Obecność anomalii naczyniowych wymaga zastosowania dodatkowych narzędzi oraz niestandardowych metod, co wiąże się ze zwiększoną trudnością, wydłużonym czasem zabiegu oraz ryzykiem powikłań okołozabiegowych.

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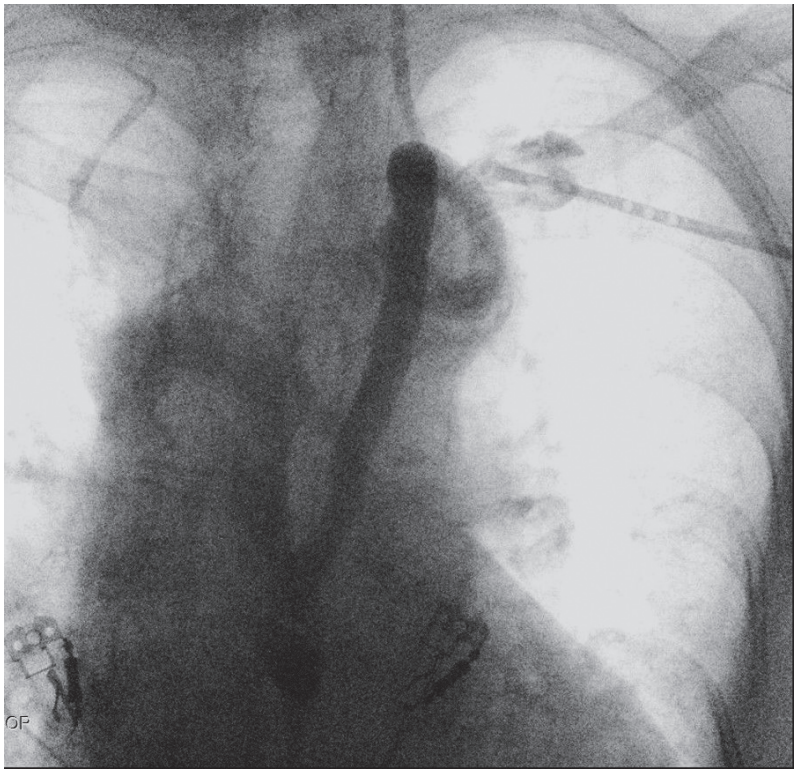

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Skuteczna ablacja częstoskurczu komorowego u pacjenta po przebytej przezcewnikowej plastyce zastawki mitralnej

Successful elimination of left ventricular arrhythmias by radiofrequency ablation in patient with previous transcatheter mitral valve repair

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A 75-year-old patient with severe progressive ischemic heart failure after ICD implantation for secondary prevention of SCD (hemodynamically unstable VT) in 2009, upgrade to CRT-D in 2020, and 2 MitraClips placed in 2020 was urgent admitted to the clinic due to recurrent ventricular tachycardias, including VTs and VFs episodes. Despite the implementation of subsequent stages of treatment of patients with heart failure in accordance with the guidelines, the arrhythmia recurred, and the patient required treatment for an invasive arrhythmia substrate. In March 2021, a VT ablation using a 3D electroanatomical system was performed. Due to the presence of MitraClips, retrograde access via the aorta was chosen. A scar tissue and potentially arrhythmogenic areas were found in the LV apex and apical segments of the septum and the anterior wall. During ventricular pacing, two morphologies of VT were induced, one of which degenerated to ventricular flutter. RF applications were performed in critical areas of slow conduction, including exit of induced arrhythmias in the apex and IVS, and then the scar was homogenized to obtain a non-excitable area. None of VTs were induced with programmed ventricular stimulation after ablation.

Treatment of ventricular arrhythmias can be distinguished into acute and long-term. At each stage, it is crucial to ensure complete coronary revascularization and optimal treatment of heart failure (including device implantation and pharmacotherapy). ICD implantation alone does not solve the arrhythmia problem. Recurrent VTs, especially those requiring high-energy therapy, worsen the prognosis. Due to the presence of MitraClips, the decision of vascular access should be made with great care and consideration the risk of damaging the MitraClips. On the other hand, retrograde approach is associated with difficult access to selected segments of LV and may limit the effectiveness of the procedure.

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Uporczywe migotanie przedsionków napędzane obecnością dwóch dróg dodatkowych — jawnej prawostronnej i utajonej lewostronnej. Nietypowa kolejność leczenia — ablacja 3 w 1

Incessant atrial fibrillation driven by the presence of two accessory pathways: overt right-sided and concealed left-sided. Uncommon sequence of the ablation „3 in 1" therapy

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Here we describe a challenging case of obese 56-year-old male transferred to our center with incessant atrial fibrillation (AF) refractory to antiarrhythmic drugs and with the immediate recurrence of AF after the electrical direct-current cardioversion (DCC). Electrocardiogram recorded at hospital admission reported AF conducted through overt accessory pathway (AP) resulting in heart rate of more than 200 bpm. He was priorly hospitalized due to the wide QRS tachycardia, previously terminated by the DCC and remained in the sinus rhythm (SR).

Typical approach in such patients is AP ablation to prevent attacks of atrioventricular tachycardia and AF. In our case we were not able to terminate AF that started almost immediately at the beginning of the electrophysiological study (EPS) refractory for pharmacotherapy with its very early and repeatedly recurrence after DCC. Concerning patient's comorbidities (obesity, dilated left atrium, age) we decided to convert ablation scheme and start with pulmonary vein isolation (PVI) by cryobaloon ablation, which restored the sinus rhythm and allowed us for further AP mapping. Surprisingly EPS revealed 2 APs: one left-lateral concealed and the second overt right postero-septal, which were subsequentially successfully ablated.

There are small studies suggesting that adding PVI to ablation of AP may be of additional value in preventing AF recurrence, especially in older patients' group. AF during EPS can be "a nightmare" for operator making precise AP exit site mapping extremally challenging and prolonging the procedure time for its needed to restore the SR.

CONCLUSIONS

Our case presents the intentional reverse sequence of therapy in a rare and dangerous conditions of AF conducted through AP with short refraction time in a middle-aged obese male, refractory to antiarrhythmic agents and DCC. In this rare condition redefining the classic scheme of ablation strategy (AP first to PVI first) allowed us to finish this challenging case with the successful APs ablation.

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