Coronary Artery Ectasia Database — Poland (CARED-POL). The rationale and design of the multicenter nationwide registry

Sylwia Iwańczyk[1]*, Konrad Stępień[2]*, Patrycja Woźniak[1], Aleksander Araszkiewicz[1], Mateusz Podolec[2,3], Jarosław Zalewski[2], Jadwiga Nessler[2], Maciej Lesiak[1]

[1]1st Department of Cardiology, Poznan University of Medical Sciences, Poznań, Poland
[2]Department of Coronary Artery Disease and Heart Failure, Institute of Cardiology, Jagiellonian University Medical College, Kraków, Poland
[3]Center for Innovative Medical Education, Jagiellonian University Medical College, Kraków, Poland
*Both authors equally contributed to the study.

Correspondence to:
Sylwia Iwańczyk, MD, PhD,
1st Department of Cardiology,
Poznan University of Medical Sciences,
Długa 1/2, 61–848 Poznań, Poland,
phone: +48 61 854 92 22,
e-mail: syl.iwanczyk@gmail.com

DOI: 10.33963/v.kp.98261

Received:
October 9, 2023

Accepted:
November 18, 2023

Early publication date:
December 15, 2023

INTRODUCTION

Coronary artery aneurysm or ectasia (CAAE) are a rare vascular pathology diagnosed in 0.15%–5.3% of patients undergoing coronary angiography [1]. According to the anatomy of the expanded segment, CAAE was considered a coronary artery aneurysm (CAA) or coronary artery ectasia (CAE). Giant CAAE is an even less common phenomenon observed in only 0.02% of patients after coronary angiography and usually defined as a 4-fold enlargement of the vessel diameter [1]. CAAEs are often diagnosed incidentally, while symptomatic patients experience various complications of unstable angina, acute myocardial infarction (MI), arrhythmias, or sudden cardiac death. Major adverse cardiovascular events (MACE) occur in up to 10% of CAAE patients per year [2]. MI can be caused by in-aneurysm thrombosis with artery closure or distal embolization [3–5]. As has been shown, CAAE diagnosis is associated both with increased MI incidence and risk of MI recurrence [6]. The most common etiology of CAAE is atherosclerosis, followed by Kawasaki disease or other vasculitis histories, infectious septic emboli, and connective tissue disease. Iatrogenic causes are less common [7]. Although some pathophysiological and clinical risk factors for CAAE development have been identified, detailed pathomechanisms have not yet been known [8–10]. Moreover, so far, the data on Polish patients are limited to case reports, case series, and small groups from major academic centers [8–13]. CAAEs are not analyzed in the main nationwide registers of invasive procedures either [14].

AIM OF THE REGISTRY

The primary purpose of the Coronary Artery Ectasia Database — Poland (CARED-POL) Registry is to comprehensively investigate the current prevalence, morphological characteristics, risk factors for the development and complications of CAAE as well as long-term prognosis in the Polish population.

MATERIAL AND METHODS

Study population

CARED-POL is a multicenter observational nationwide registry of CAAE conducted in cooperation with the Scientific Platform of the Polish Society of Cardiology (NCT06057987). Patients aged >18 years old will be prospectively enrolled, and after giving informed consent, they will be included ambispectively based on angiographic diagnosis of CAA or CAE. CAA is defined as a focal dilatation with a diameter of more than or equal to 1.5 times the adjacent normal coronary segment, while CAE is an analogous lesion but more diffuse, exceeding more than a third of the coronary artery length. CAAs are then classified as either saccular aneurysms (asymmetric outpouchings, transverse diameter exceeds longitudinal diameter) or fusiform aneurysms (circumferential dilations, longitudinal

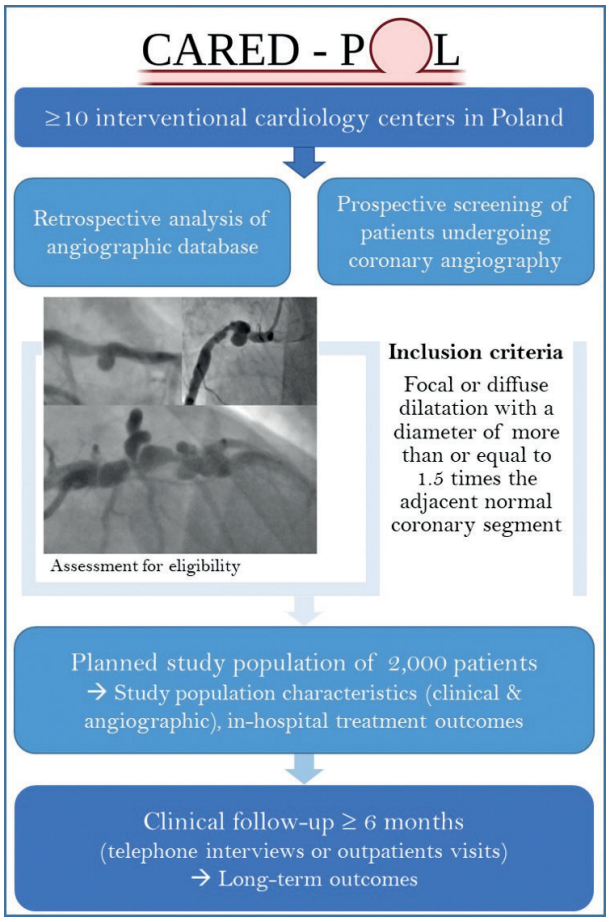

Figure 1. Flowchart of the study design

diameter exceeds transverse diameter). A giant CAAE is diagnosed when the diameter of the artery exceeds 4-fold the diameter of the reference vessel.

Each participating center will enroll patients retrospectively from their internal databases after evaluation of all consecutive coronary angiographies by an experienced interventional cardiologist using quantitative coronary angiography (QCA) [12], but also prospectively for 6 months from joining the CARED-POL Registry. The patient data will be collected from standardized and anonymous forms *via* the Scientific Platform of the Polish Society of Cardiology. We expect that 2000 patients in all participating centers will be included. The study design is summarized in Figure 1.

The study will be conducted in accordance with the Declaration of Helsinki. Ethical approval was granted by the local Bioethics Committee of the Poznan University of Medical Sciences (approval number 687/23).

Data collection and endpoints

The CARED-POL Registry will involve clinical data, angiographic quantitative evaluation of aneurysms, their intracoronary imaging, treatment methods, periprocedural complications in patients undergoing revascularization or invasive aneurysm treatment, and MACE during the in-hospital period. A minimum of 6-month follow-up *via* outpatient visits, medical records, or telephone interviews will be assessed. The primary study endpoints will be all-cause death, re-hospitalization for unstable angina, and MI. The secondary endpoints will be heart failure, bleeding, stroke, embolic events, and any cause for repeat coronary angiography.

The development of a new aneurysm or progression of an existing one will be assessed in patients who underwent repeat coronary angiography. Aneurysm progression is diagnosed as an increase in size demonstrated by at least two orthogonal angiographic views.

Statistical analysis

A standard descriptive statistic will be used in the analysis. Depending on the normal distribution, continuous data will be compared with the t-test or the Mann–Whitney test. Categorical variables will be compared with the χ^2 test. A logistic regression analysis will assess determinants of CAAE occurrence and progression. The Kaplan–Meier method will present the event rates at follow-up. Moreover, a Cox proportional regression model will be used to determine the influence of clinical and angiographic variables on clinical outcomes. The observation period will include the time from the CAAE diagnosis to the end of the study (censored observation). All statistical analyses will be conducted with PQStat Software (PQStat v.1.8.0.476, Poland).

EXPECTED BENEFITS AND DISCUSSION

Data obtained from the CARED-POL Registry will enable the selection of morphological risk factors for the unfavorable course of CAAE, including the development and progression of giant aneurysms, aneurysm clotting with vessel occlusion, and thromboembolic complications. Independent predictors of CAAE progression and complications in long-term follow-up will be determined using artificial intelligence algorithms. In turn, comparing the safety and effectiveness of available CAAE treatment methods in individual patient subgroups will allow individualization of treatment, including anticoagulant therapy. The analyses will be performed for the overall study population and in subgroups of patients with giant CAAEs, isolated CAAEs of the left main coronary artery, a positive family history of CAAEs, other associated coronary artery anomalies, and aneurysms in other locations [15].

Current data on the prevalence and predictors of CAAE development, as well as population characteristics and risk factors for complications, are limited. So far, the largest CAAE registry focused on the clinical and angiographic characteristics of the CAAE population is the Coronary Artery Aneurysm Registry (CAAR) (NCT02563626), which ultimately included 1565 patients, mainly from Spanish and Italian centers [2]. The established incidence of CAAE in the CAAR Registry was estimated at 0.35%. The worse prognosis in this group of patients compared to those without CAAE has been confirmed, including the incidence of thromboembolic complications of the aneurysm, requiring proper anticoagulant therapy [2]. It is noteworthy

that recently a Jordanian Coronary Artery Ectasia Registry (JoCAER) has been initiated with objectives similar to the CAAR Registry (NCT05213429).

Article information

Conflict of interest: None declared.

Funding: None.

REFERENCES

1. Pinar Bermúdez E, López Palop R, Lozano Martínez-Luengas I, et al. Coronary ectasia: prevalence, and clinical and angiographic characteristics [article in Spanish]. Rev Esp Cardiol. 2003; 56(5): 473–479, doi: 10.1016/s0300-8932(03)76902-4, indexed in Pubmed: 12737785.
2. Núñez-Gil IJ, Cerrato E, Bollati M, et al. Coronary artery aneurysms, insights from the international coronary artery aneurysm registry (CAAR). Int J Cardiol. 2020; 299: 49–55, doi: 10.1016/j.ijcard.2019.05.067, indexed in Pubmed: 31378382.
3. Devabhaktuni S, Mercedes A, Diep J, et al. Coronary artery ectasia — a review of current literature. Curr Cardiol Rev. 2016; 12(4): 318–323, doi: 10.2174/1573403x12666160504100159, indexed in Pubmed: 27142049.
4. Krawczyk K, Stepien K, Nowak K, et al. ST-segment re-elevation following primary angioplasty in acute myocardial infarction with patent infarct-related artery: impact on left ventricular function recovery and remodeling. Postepy Kardiol Interwencyjnej. 2019; 15(4): 412–421, doi: 10.5114/aic.2019.90215, indexed in Pubmed: 31933657.
5. Stepien K, Nowak K, Szlosarczyk B, et al. Clinical characteristics and long-term outcomes of MINOCA accompanied by active cancer: a retrospective insight into a cardio-oncology center registry. Front Cardiovasc Med. 2022; 9: 785246, doi: 10.3389/fcvm.2022.785246, indexed in Pubmed: 35669480.
6. Doi T, Kataoka Yu, Noguchi T, et al. Coronary artery ectasia predicts future cardiac events in patients with acute myocardial infarction. Arterioscler Thromb Vasc Biol. 2017; 37(12): 2350–2355, doi: 10.1161/ATVBAHA.117.309683, indexed in Pubmed: 29051141.
7. Saglam M, Karakaya O, Barutcu I, et al. Identifying cardiovascular risk factors in a patient population with coronary artery ectasia. Angiology. 2007; 58(6): 698–703, doi: 10.1177/0003319707309119, indexed in Pubmed: 18216379.
8. Iwańczyk S, Borger M, Kamiński M, et al. Inflammatory response in patients with coronary artery ectasia and coronary artery disease. Kardiol Pol. 2019; 77(7-8): 713–715, doi: 10.33963/KP.14812, indexed in Pubmed: 31066726.
9. Iwańczyk S, Lehmann T, Cieślewicz A, et al. Circulating miRNA-451a and miRNA-328-3p as potential markers of coronary artery aneurysmal disease. Int J Mol Sci. 2023; 24(6): 5817, doi: 10.3390/ijms24065817, indexed in Pubmed: 36982889.
10. Iwańczyk S, Lehmann T, Cieślewicz A, et al. Circulating microRNAs in patients with aneurysmal dilatation of coronary arteries. Exp Ther Med. 2022; 23(6): 404, doi: 10.3892/etm.2022.11331, indexed in Pubmed: 35619635.
11. Matrejek A, Stępień K, Nowak K, et al. Genetic background assessment with whole exome sequencing in a giant coronary artery ectasia: A pilot study. Kardiol Pol. 2023, doi: 10.33963/v.kp.97684, indexed in Pub-med: 37997853.
12. Chmiel J, Natorska J, Ząbczyk M, et al. Fibrin clot properties in coronary artery ectatic disease: Pilot data from the CARE-ANEURYSM Study. Kardiol Pol. 2023; 81(11): 1145–1148, doi: 10.33963/v.kp.96983, indexed in Pubmed: 37660376.
13. Sylwia I, Araszkiewicz A, Borger M, et al. Endocan expression correlated with total volume of coronary artery dilation in patients with coronary artery ectasia. Postepy Kardiol Interwencyjnej. 2020; 16(3): 294–299, doi: 10.5114/aic.2020.99264, indexed in Pubmed: 33597994.
14. Siudak Z, Hawranek M, Kleczyński P, et al. Interventional cardiology in Poland in 2022. Annual summary report of the Association of Cardiovascular Interventions of the Polish Cardiac Society (AISN PTK) and Jagiellonian University Medical College. Postepy Kardiol Interwencyjnej. 2023; 19(2): 82–85, doi: 10.5114/aic.2023.129205, indexed in Pubmed: 37465633.
15. Lichota E, Stępień K, Nowak K, et al. Optical coherence tomography-guided percutaneous coronary intervention in a myocardial infarction patient. One more argument for a wider use of now reimbursed optical coherence tomography. Kardiol Pol. 2022; 80(5): 616–618, doi: 10.33963/KP.a2022.0100, indexed in Pubmed: 35403697.