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The sky is the limit to the number of stents

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Abstract

We present the case of a 65-year-old man with type 2 diabetes mellitus, arterial hypertension, hypercholesterolemia, salicylate allergy and diagnosed with ischemic heart disease since 2000. The patient, despite intensive pharmacotherapy according to European Society of Cardiology guidelines and the insertion of as many as 11 stents into the coronary arteries, had persistent recurrent acute coronary syndromes, including 4 myocardial infarctions (twice ST-elevation myocardial infarction, twice non-ST-elevation myocardial infarction) between 2000 and 2021. Eventually, the patient underwent left coronary artery bypass surgery. Some potential options for the pharmacological treatment of recurrent acute coronary syndromes are presented in the discussion.

Key words: acute coronary syndrome, percutaneous coronary intervention, salicylate allergy, pharmacotherapy

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Introduction

According to the Institute for Health Metrics and Evaluation (2019), coronary artery disease (CAD) has been the leading cause of death in Poland for many years [1]. These data indicate that the prevalence rate of CAD in 2019 was 4.8% (1.5 million patients) for the Polish population [2]. The death rate of patients with acute coronary syndrome (ACS) has been on a downward trend in recent years. According to a report published in 2020 by the National Health Fund, the death rate was decreasing in ACS patients from 2014 to 2018 (Figure 1) [3].

The occurrence of recurrent incidents of ACS in individual patients despite intensive pharmacotherapy in accordance with current European Society for Cardiology guidelines and interventional therapy involving implantation of antimitotic drug-eluting stents is a cause for concern. In 2010, a case of a patient who had as many as 67 stents inserted into his coronary arteries [4], which is a record number in the history of cardiology, was described. This article presents the case of a patient who required the implantation of as many as 11 stents over the 21-year course of CAD.

Case study

A 65-year-old male patient with type 2 diabetes, hypertension, hypercholesterolaemia, salicylate allergy and with a diagnosis of CAD since 2000 was admitted to Outpatient Cardiac Rehabilitation Center (OCRC) for rehabilitation treatment following arterial bypass grafting of the left anterior descending branch of the left coronary artery after previous multiple percutaneous coronary interventions. From 2000 to 2021, he had 4 myocardial infarctions (STEMI [ST-elevation myocardial infarction] — twice; NSTEMI [non-ST-elevation myocardial infarction] — twice), treated with percutaneous coronary interventions. The areas of coronary artery stenoses requiring both primary angioplasty and elective angioplasty are shown in Figure 2.

Echocardiography prior to the rehabilitation programme revealed segmental dysfunction of the left ventricle

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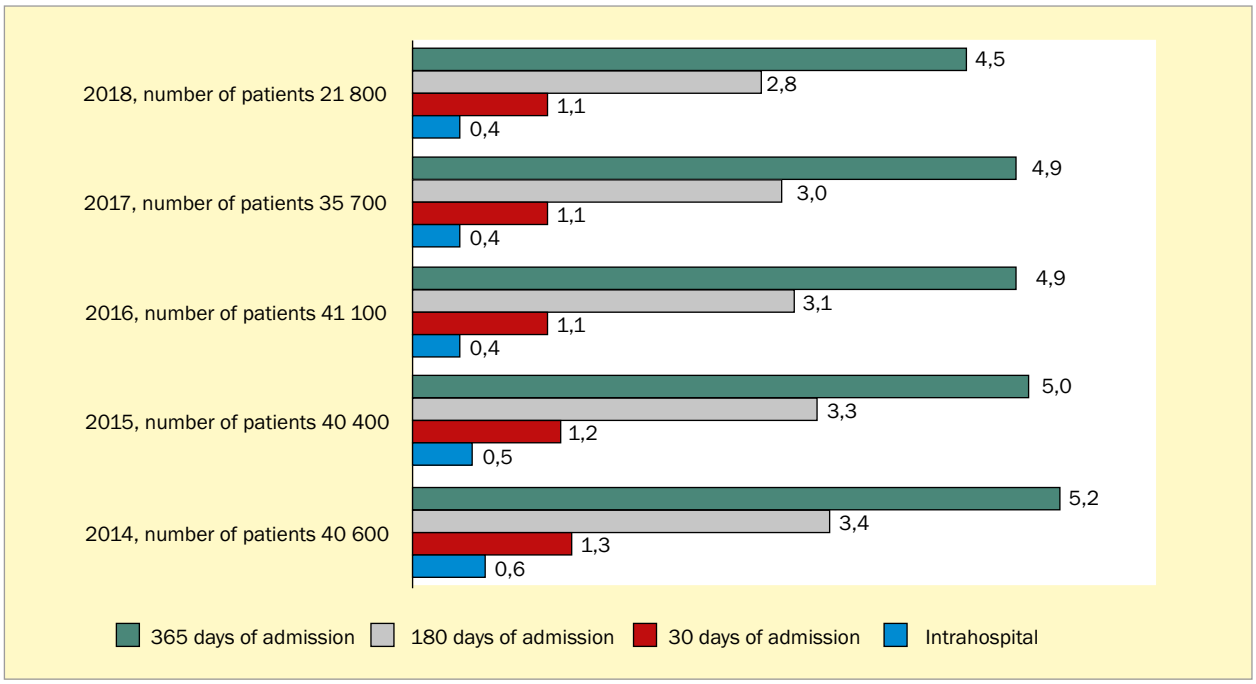

Figure 1. Mortality due to acute coronary syndromes for patients with no previous hospitalization caused by acute coronary syndrome in the years 2014–2018. Data provided by National Heath Fund in 2020

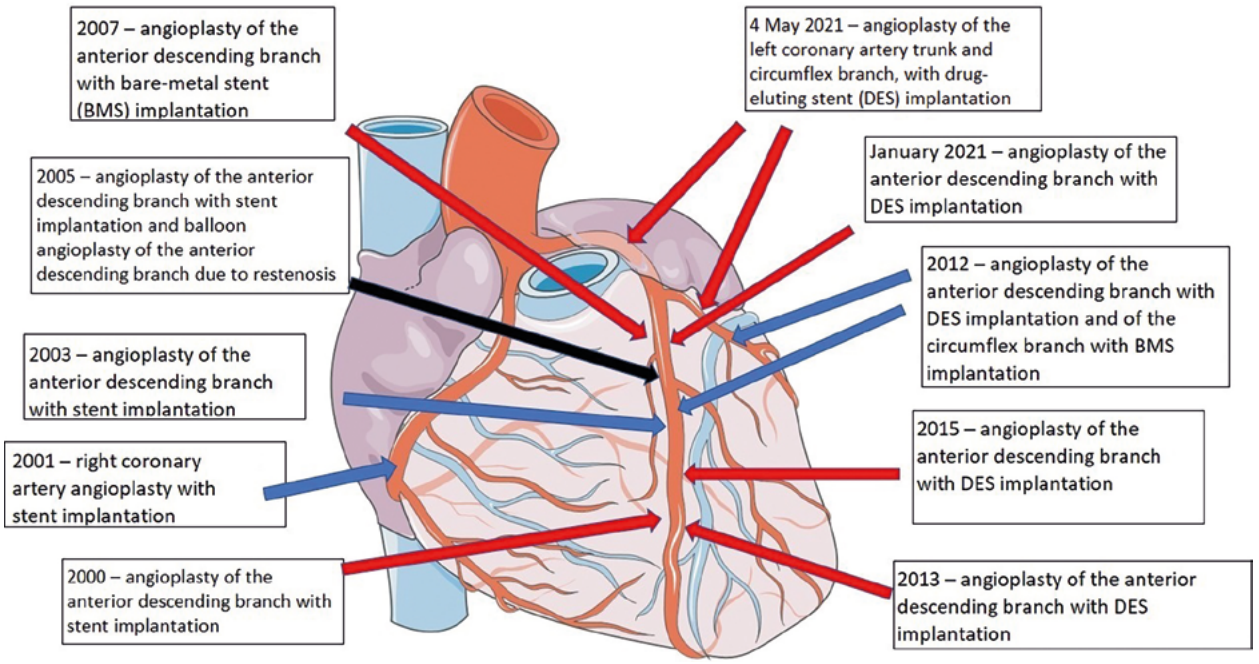

Figure 2. Location of critical narrowing in coronary arteries together with the date of the procedure. Red arrows show primary percutaneous coronary intervention (PCI), blue arrows — show elective PCI, and black arrows — PCI for in-stent restenosis

contractility with a significantly reduced ejection fraction of up to 20%. Pharmacotherapy included the following drugs (daily doses given): clopidogrel 75 mg, bisoprolol 5 mg, torasemide 5 mg, ramipril 5 mg, eplerenone 25 mg, atorvastatin 80 mg. There was also a proposal to include flozin and replace ramipril with sacubitril/valsartan; however, the

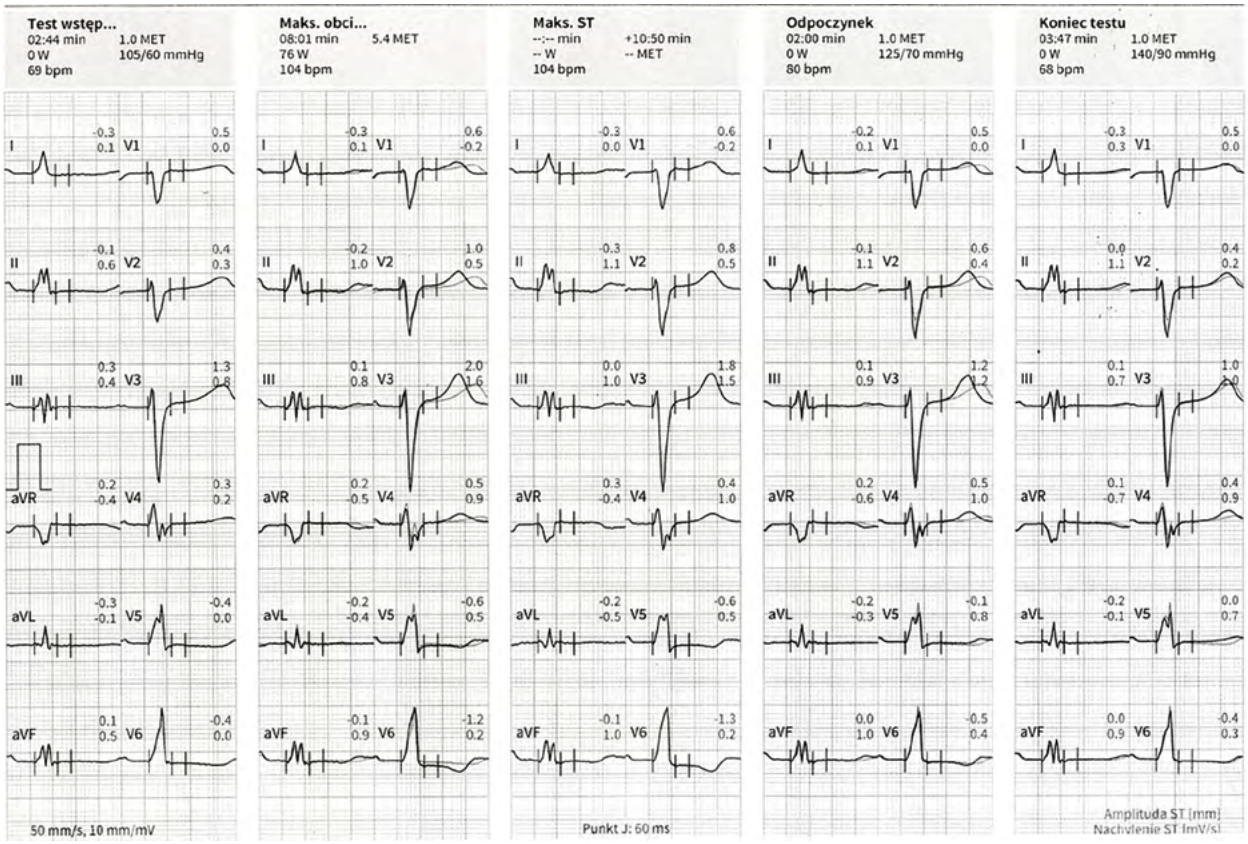

Figure 3. Electrocardiogram changes induced by physical effort were observed during stress test performed after the rehabilitation programme — the 1.3 mm isolated ST-segment depression was observed at the peak of the exercise

patient did not accept this option. The patient was made aware of the possibility of primary prevention of sudden cardiac death; however, at the time of discharge from the centre, he did not opt for the option of preventing the consequences of dangerous ventricular arrhythmias by implanting a cardioverter-defibrillator. Due to the period of SARS-CoV-2 epidemic risk, the rehabilitation programme was in the form of telerehabilitation — the patient received 18 sessions of 20–30 minutes, consisting of walking training with remote monitoring of electrocardiogram signals, body weight and blood pressure. The initial and final cardiac diagnostic tests were performed according to the Naughton protocol — their durations were 07'03" and 08'01", respectively, and the exercise load in both cases was 4.5 metabolic equivalent, which was 51% of the load by sex and age. ST-segment changes at peak exercise are shown in Figure 3.

Discussion

The leading problem of the patient in question was recurrent incidents of ACS. Inflammation plays a major role in their atherosclerotic pathogenesis. In terms of the drugs used, statins have anti-inflammatory potential — as shown in Figure 4, the patient did not achieve treatment goals with this group of drugs during the initial treatment period. Recent studies have shown that anti-inflammatory drugs such as colchicine or canakinumab (not previously used in the treatment of CAD) are highly effective in the prevention of recurrent ACS. The description of the COLCOT clinical trial, published in 2020, reveals that recent (up to 30 days) post-myocardial infarction patients who took colchicine at a dose of 0.5 mg per day had a significantly reduced rate of myocardial ischemia incidents [6]. A trial with the acronym CANTOS used canakinumab in post-myocardial infarction patients, as well as a monoclonal antibody that specifically binds interleukin 1 beta (IL-1β), and a cytokine that promotes the progression of atherosclerosis [7]. Patients who received standard treatment and canakinumab at a subcantenous dose of 150 mg per quarter had a lower incidence rate — by 15% — of ACS or stroke compared to those who received standard treatment and placebo. The patient in question participated at OCRC in a trial evaluating polymorphisms of the IL-1β gene and its natural receptor antagonist. The analysis of the patient's DNA revealed that he had a rare combination of variants at *loci* -31 and -511

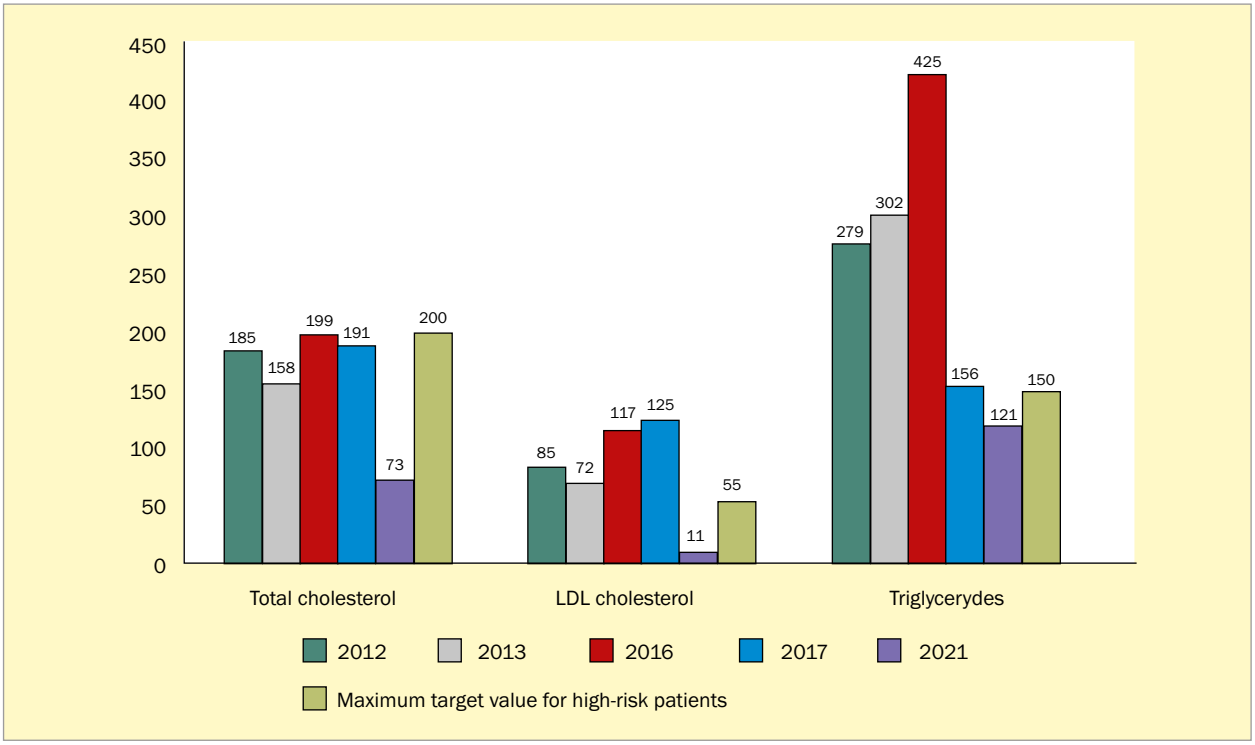

Figure 4. The comparison of lipidogram results in 2012, 2013, 2016, 2017 and 2021. The target value for low-density lipoprotein cholesterol according to ESC/EAS Guidelines for management in dyslipidemias published in 2019 is shown in green [5]

in the IL-1 gene and a tandem repeat polymorphism variant in the natural IL-1 antagonist gene — (-31TT, -511CC, IL-RN 12). However, these characteristics were not associated with an increased incidence rate of coronary incidents in the group studied at OCRC [8]. The latest pharmacotherapy that improves prognosis in high-risk patients also includes the combination of low-dose rivaroxaban (2 times 2.5 mg/day) and low-dose acetylsalicylic acid (ASA) (100 mg/day) used in the COMPASS trial. When comparing dual therapy (rivaroxaban + ASA) with ASA monotherapy, the risk of stroke or myocardial infarction was significantly reduced in this study group [9]. Due to salicylate allergy, the use of a treatment regimen as in COMPASS would not have been possible in this patient, and there is no sufficiently reliable experience of therapy combining clopidogrel and rivaroxaban to date.

Conclusions

In the patient in question, the use of conventional pharmacotherapy and interventions in the prevention of ACS was not fully effective. The possibility of future use of anti-inflammatory drugs or dual therapy with rivaroxaban to prevent further cardiovascular events opens up the possibility of more effective treatment for patients with similarly severe CAD.

Conflict of interest

None declared.

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