SHORT COMMUNICATION

Decline in the number of coronary angiography and percutaneous coronary intervention procedures in patients with acute myocardial infarction in Poland during the coronavirus disease 2019 pandemic

Jacek Legutko[1], Łukasz Niewiara[1], Stanisław Bartuś[2], Sławomir Dobrzycki[3], Mariusz Gąsior[4], Marek Gierlotka[5], Janusz Kochman[6], Maciej Lesiak[7], Jerzy Matysek[8], Andrzej Ochała[9], Tomasz Pawłowski[10], Robert Gil[10], Adam Witkowski[11]

1 Department of Interventional Cardiology, Institute of Cardiology, Faculty of Medicine, Jagiellonian University Medical College, John Paul II Hospital, Kraków, Poland
2 2nd Department of Cardiology, Institute of Cardiology, Faculty of Medicine, Jagiellonian University Medical College, New Seat of the University Hospital, Kraków, Poland
3 Department of Invasive Cardiology, The Medical University of Bialystok Clinical Hospital, Białystok, Poland
4 3rd Department of Cardiology, Silesian Center for Heart Diseases, Faculty of Medicine in Zabrze, Medical University of Silesia, Zabrze, Poland
5 Department of Cardiology, University Hospital, Institute of Medical Sciences, University of Opole, Opole, Poland
6 1st Department of Cardiology, Medical University of Warsaw, Warsaw, Poland
7 1st Department of Cardiology, Poznan University of Medical Sciences, Poznań, Poland
8 Clinical Department of Invasive Cardiology, Electrotherapy and Angiology, St. Raphael Hospital, Scanmed S.A., Kraków, Poland
9 3rd Department of Cardiology, Medical University of Silesia, Katowice, Poland
10 Department of Invasive Cardiology, Centre of Postgraduate Medical Education, Warsaw, Poland
11 Department of Interventional Cardiology and Angiology, The Cardinal Stefan Wyszyński National Institute of Cardiology, Warsaw, Poland

Correspondence to:
Jacek Legutko, MD, PhD, Department of Interventional Cardiology, Institute of Cardiology, Faculty of Medicine, Jagiellonian University Medical College, John Paul II Hospital, ul. Prądnicka 80, 31-202 Kraków, Poland, phone: +48 12 614 35 01, email: jacek.legutko@uj.edu.pl
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Introduction Primary percutaneous coronary intervention (PCI) is the preferred reperfusion strategy in patients presenting with ST-segment elevation myocardial infarction (STEMI). An early invasive strategy and revascularization are also recommended in patients with non–ST-segment elevation myocardial infarction (NSTEMI).[1] In Poland, there are 158 interventional cardiology centers operating in the 24/7 mode (approximately 1 center per 240 000 people), and the number of coronary angiographies (CAs) and PCI procedures for STEMI and NSTEMI per 1 million population is one of the highest in Europe.[2] In 2018, the proportion of patients with STEMI arriving in the first 12 hours after symptom onset who received primary PCI exceeded 95%.[3]

The coronavirus disease 19 (COVID-19) pandemic significantly influenced healthcare systems worldwide. To preserve resources and hospital beds to care for patients with COVID-19 and other life-threatening conditions, such as STEMI and NSTEMI, healthcare providers in numerous countries, including Poland, recommended deferral of elective hospitalizations and invasive procedures. However, in countries with the rapid spread of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) and a large number of patients with COVID-19 requiring hospitalization, a significant drop in the number of cardiac catheterization laboratory activations for STEMI has been recently reported.[4-6] Nonetheless, it remains unclear how the COVID-19 pandemic has affected the invasive assessment and treatment of patients with acute myocardial infarction (AMI) in countries with a well-developed network of catheterization laboratories and a relatively slower spread of SARS-CoV-2, such as Poland.

This study aimed to assess the influence of the COVID-19 pandemic on the number of CA and PCI procedures in patients with STEMI and NSTEMI in selected high-volume interventional cardiology centers in Poland.

Methods We retrospectively collected data on the number of CA and PCI procedures performed between January 1, 2020 and April 14, 2020 in 11 high-volume interventional cardiology centers in Poland, including John Paul II Hospital in Kraków, New Seat of the University Hospital in Kraków, St. Raphael Hospital in Kraków, Silesian Medical Center in Katowice, Silesian Center for Heart Diseases in Zabrze, University Hospital in Opole, University Hospital in Poznań, the National Institute of Cardiology in Warsaw, University Clinical Center in Warsaw, Central Clinical Hospital of the Ministry of Interior and Administration in Warsaw, and the Medical University of Bialystok Clinical Hospital. Data from particular centers were collected

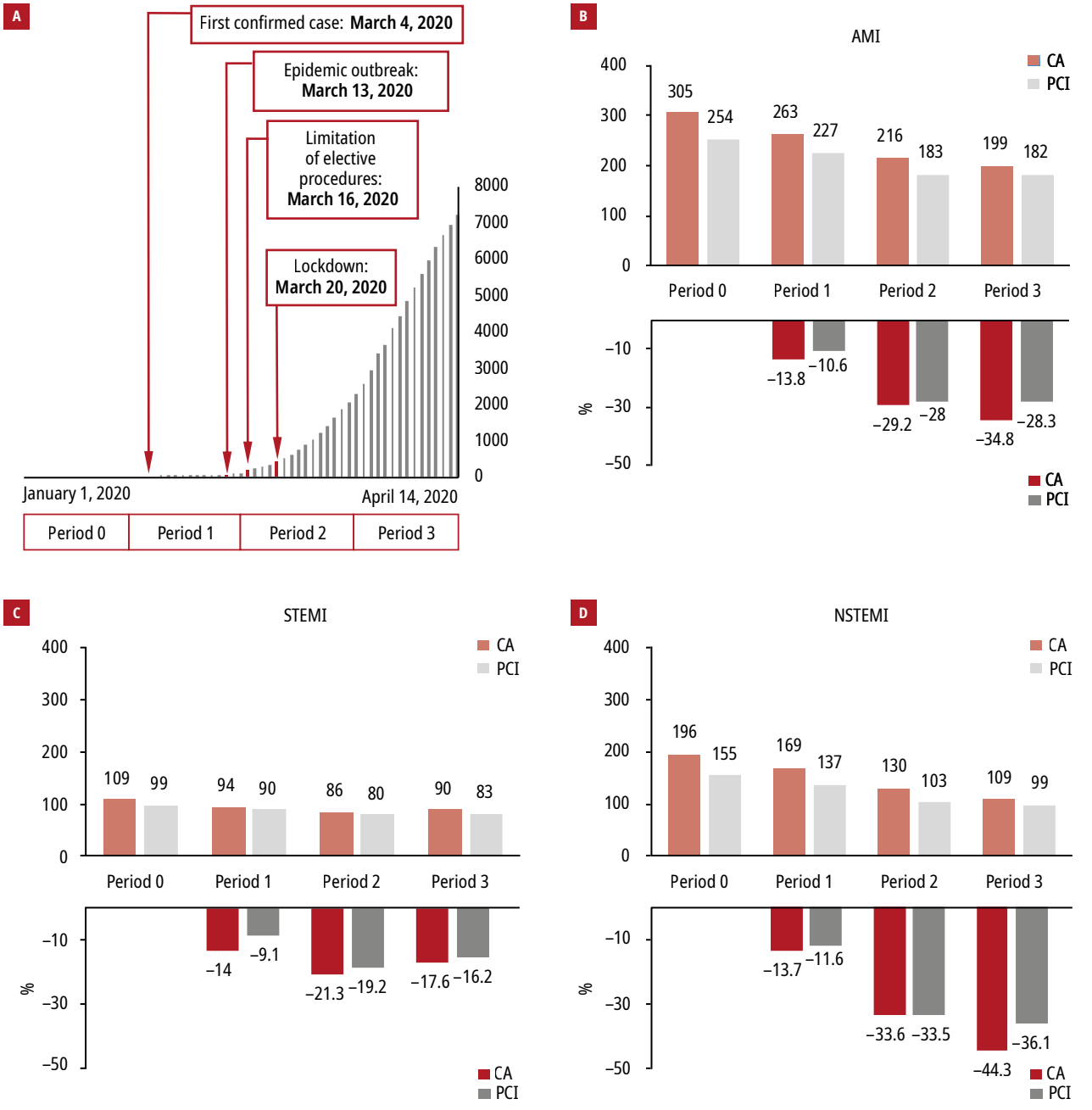

FIGURE 1 Changes in the total number of coronary procedures with a relative decrease during the COVID-19 epidemic: **A** – the number of confirmed SARS-CoV-2 infections in Poland with the timeline of major lockdown measures; **B** – the total number of CAs and PCIs performed in the setting of AMI (light red and gray); percentage change in the number of procedures as compared with period 0 (dark red and gray); **C** – the total number of CAs and PCIs performed in the setting of STEMI (light red and gray); percentage change in the number of procedures as compared with period 0 (dark red and gray); **D** – the total number of CAs and PCIs performed in the setting of NSTEMI (light red and gray); percentage change in the number of procedures as compared with period 0 (dark red and gray).
Period 0—from January 1, 2020 to February 29, 2020; period 1—from March 1, 2020 to March 14, 2020; period 2—from March 15, 2020 to March 31, 2020; period 3—from April 1, 2020 to April 14, 2020
Abbreviations: AMI, acute myocardial infarction; CA, coronary angiography; COVID-19, coronavirus disease 19; NSTEMI, non–ST-segment elevation myocardial infarction; PCI, percutaneous coronary intervention; SARS-CoV-2, severe acute respiratory syndrome coronavirus 2; STEMI, ST-segment elevation myocardial infarction

following local reporting procedures. Acute myocardial infarction (AMI) was defined according to the Fourth Universal Definition of Myocardial Infarction.[7] The total number of AMI cases was calculated as a sum of STEMIs and NSTEMIs. The approval of an ethics committee was not required for this study.

Statistical analysis We evaluated the mean 2-week number of CAs and PCIs performed in patients with AMI, STEMI, and NSTEMI in 4 different time periods, selected according to the development of the COVID-19 pandemic in Poland: period 0—from January 1, 2020 to February 29, 2020 (prepandemic); period 1—from March 1, 2020 to March 14, 2020 (beginning of the pandemic); period 2—from March 15, 2020 to March 31, 2020 (gradual introduction of pandemic restrictions); and period 3—from April 1, 2020 to April 14, 2020 (pandemic lockdown) (FIGURE 1A). Finally, we assessed the percentage change in the number of CAs and PCIs in AMI, STEMI, and NSTEMI in periods 1 to 3 in comparison with period 0 as a prepandemic reference.

Results and discussion Between January 1, 2020 and April 14, 2020, there were 1898 CAs and 1608 PCIs performed in patients with AMI in all centers included in the study. In comparison with period 0, we found a slight decrease in the number of CA and PCI procedures for AMI performed in period 1 (–13.8% and –10.6%, respectively) as well as a significant decrease in period 2 (–29.2% and –28%, respectively) and period 3 (–34.8% and –28.3%, respectively) (FIGURE 1B). The percentage drop in the number of CA and PCI procedures was more pronounced in patients with NSTEMI than in those with STEMI (period 3 vs period 0: CA, –44.3% vs –17.6%, respectively; PCI, –36.1% vs –16.2%, respectively) (FIGURE 1C and 1D).

The new COVID-19 pandemic has a huge impact on current clinical practice, which is particularly notable in the diagnosis and treatment of acute coronary syndromes. A recent report has shown a decrease of over 39% in admissions for acute coronary syndromes after the COVID-19 outbreak in Austria.[6] Similarly, a 40% decline was observed in the number of PCIs in STEMI in Spain.[5] A report from the United States showed a 38% decline in the number of catheterization laboratory activations for STEMI in 9 high-volume centers after the emergence of COVID-19.[4] An even greater decline (over 5-fold) in the number of STEMI procedures was reported in Hong Kong.[8] Our study showed consistent results, with a decline of around 30% in the number of both CAs and PCIs in the setting of AMI after the beginning of the COVID-19 pandemic in Poland. Similarly to Austria, a decrease in the number of procedures occurred just after the first identified case of the disease was reported in period 1, and was even more evident after epidemic lockdown, which strongly affected medical operations (periods 2 and 3). A smaller decrease in the number of STEMI procedures can be attributed to a severe symptomatic course of the disease, forcing patients to search medical assistance. On the contrary, when symptoms are milder, as in most NSTEMI cases, patients may postpone medical contact for fear of infection with SARS-CoV-2 in emergency rooms and other medical facilities. Nevertheless, this issue requires further research.

Limitations We included 11 high-volume centers in our study, but we did not cover the entire Polish population. The influence of COVID-19 on the total number of procedures was clearly visible; however, the dynamics of the pandemic might have differed from region to region, and this possible effect was not accounted for in our analysis.

Conclusions The COVID-19 pandemic in Poland is associated with a large decline in the performance of CA and PCI procedures in the setting of AMI. The greater decline is observed in the number of procedures for NSTEMI than in those for STEMI.

ARTICLE INFORMATION

CONFLICT OF INTEREST None declared.

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REFERENCES

1 Neumann FJ, Sousa-Uva M, Ahlsson A, et al. 2018 ESC/EACTS Guidelines on myocardial revascularization. Eur Heart J. 2019; 40: 87-165.

2 Legutko J, Siudak Z, Parma R, et al. Poland: coronary and structural heart interventions from 2010 to 2015. EuroIntervention. 2017; 13: Z51-Z54.

3 Hudzik B, Budaj A, Gierlotka M, et al. Assessment of quality of care of patients with ST-segment elevation myocardial infarction. Eur Heart J Acute Cardiovasc Care. 2019 Nov 25. [Epub ahead of print].

4 Garcia S, Albaghdadi MS, Meraj PM, et al. Reduction in ST-segment elevation cardiac catheterization laboratory activations in the United States during COVID-19 pandemic. J Am Coll Cardiol. 2020 Apr 9. [Epub ahead of print].

5 Rodríguez-Leor O, Cid-Álvarez B, Ojeda S, et al. Impact of the COVID-19 pandemic on interventional cardiology activity in Spain. REC Interv Cardiol. 2020; 2: 82-89.

6 Metzler B, Siostrzonek P, Binder RK, et al. Decline of acute coronary syndrome admissions in Austria since the outbreak of COVID-19: the pandemic response causes cardiac collateral damage. Eur Heart J. 2020; 41: 1852-1853.

7 Thygesen K, Alpert JS, Jaffe AS, et al. Fourth universal definition of myocardial infarction (2018). Eur Heart J. 2019; 40: 237-69.

8 Tam CCF, Cheung KS, Lam S, et al. Impact of coronavirus disease 2019 (COVID-19) outbreak on ST-segment-elevation myocardial infarction care in Hong Kong, China. Circ Cardiovasc Qual Outcomes. 2020; 13: e006631.