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IMPACT OF THE COVID-19 PANDEMIC ON ACCESS TO CORONARY ANGIOGRAPHY IN ELDERLY PATIENTS: A REGIONAL ANALYSIS FROM POLAND COVID-19 AND CORONARY ANGIOGRAPHY ACCESS

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ABSTRACT

Background: Cardiovascular diseases are a major cause of death worldwide, with myocardial infarction being one of the most critical and time-sensitive conditions requiring urgent medical intervention. Coronary angiography is the gold standard diagnostic procedure for the assessment of coronary artery diseases. However, the access to such procedures heavily relies on the efficiency of the healthcare system worldwide.

Several studies report that the COVID-19 pandemic may have contributed to a reduction in the number of cardiology procedures performed and an increase in mortality due to myocardial infarction.

Aim: To evaluate the impact of the COVID-19 pandemic on the utilization of coronary angiography among patients aged ≥ 65 years hospitalized for myocardial infarction in the Mazowieckie Voivodeship, Poland.

Methods: A retrospective analysis based on aggregated administrative data obtained from the National Health Fund (NFZ) upon request comparing 3 periods: pre-pandemic (2017-2019), pandemic (2020-2021) and post-pandemic (2022-2023).

Results: The analysis revealed a decrease in hospitalizations (11.6%) and coronary angiographies performed (12.3%), along with an increase in mortality due to myocardial infarction (8.7%) in the pandemic period.

Conclusions: Due to restrictions and fear of contracting COVID-19, patients reported symptoms and visited medical facilities less often. Other potential causes include STEMI misdiagnosis and increased use of pharmacological reperfusion due to COVID-19. The consequences of the pandemic require more investigation.

KEYWORDS

Myocardial Infarction, COVID-19, Coronary Angiography, Elderly Patients, Healthcare Access, Poland

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Introduction

Cardiovascular diseases are a major cause of death worldwide, with myocardial infarction (MI) being one of the most critical and time-sensitive conditions requiring urgent medical intervention. MI may present as an emergency leading to sudden death, as a clinically mild or atypical event, or remain undetected.

Coronary angiography is the gold standard for assessment of coronary artery disease and is routinely used in patients presenting with myocardial infarction. It enables immediate diagnosis and treatment through percutaneous coronary intervention (PCI).

However, access to such procedures depends heavily on the efficiency and capacity of the healthcare systems. The COVID-19 pandemic reduced access to healthcare services. Due to restrictions, patients reported their symptoms and visited medical facilities less often. Fear of contracting COVID-19 interfered with diagnosis and treatment. This situation resulted in fewer hospitalizations.

Despite growing evidence of the impact of the COVID-19 pandemic on cardiovascular care, data regarding the use of coronary angiography in patients with MI in Poland remain limited. Specifically, there is a lack of comprehensive analysis including pre-pandemic and post-pandemic periods. Therefore, the aim of this study was to evaluate temporal trends in the use of coronary angiography among patients hospitalized for myocardial infarction in Poland across different pandemic phases.

Materials and Methods

Study design:

Retrospective observational study.

Data source:

The analysis was based on aggregated administrative data provided by the National Health Fund (NFZ) upon request.

Study population:

Patients aged ≥ 65 years hospitalized for myocardial infarction in the Mazowieckie Voivodeship.

Study period:

2017–2023

Study groups:

- Pre-pandemic: 2017–2019
- Pandemic: 2020–2021
- Post-pandemic: 2022–2023

Variables analyzed:

- Number of hospitalizations for myocardial infarction
- Number of coronary angiography procedures
- Number of deaths during hospitalization

Statistical analysis:

Descriptive statistics and percentage changes were used to compare differences between study periods.

Table 1. Number of patients with myocardial infarction, coronary angiographies performed, and deaths recorded between 2017 and 2023.

Year	Number of hospitalizations for MI among patients aged ≥ 65	Number of coronary angiographies performed	Number of deaths due to MI among patients aged ≥ 65
2017	6,230	18,242	608
2018	6,729	18,134	565
2019	6,988	19,783	578
2020	6,018	15,015	575
2021	5,744	17,825	547
2022	6,386	21,350	568
2023	6,592	23,718	563

Results

In patients aged ≥ 65 years, the mean number of hospitalizations for myocardial infarction decreased from 6,649 in the pre-pandemic period to 5,881 during the pandemic (-11.6%). In the post-pandemic period, hospitalizations partially recovered to 6,489, remaining slightly below baseline (-2.4%).

A similar trend was observed for coronary angiography. The mean number of procedures declined from 18,720 before the pandemic to 16,420 during the pandemic (-12.3%). In the post-pandemic period, a significant increase was noted, with a mean of 22,534 procedures ($+20.4\%$ compared with pre-pandemic levels).

The absolute number of in-hospital deaths slightly decreased during the pandemic. However, the mortality rate increased from 8.8% in the pre-pandemic period to 9.5% during the pandemic. In the post-pandemic period, mortality declined to 8.7%.

Discussion

This study demonstrates the impact of the COVID-19 pandemic on access to coronary angiography in patients aged ≥ 65 years hospitalized for myocardial infarction in the Mazowieckie Voivodeship. The results indicate significant changes in the number of hospitalizations, coronary angiographies performed, and mortality rate during the analyzed periods.

During the pandemic period, the number of hospitalizations for myocardial infarction decreased by 11.6%, while the number of coronary angiographies performed declined by 12.3% compared with the pre-pandemic period. In parallel, the mortality rate increased from 8.8% to 9.5%. These results are consistent with Solomon et al.'s [2] study, where the authors noted a 48% reduction in the number of hospitalizations due to MI during the early pandemic period, which was likely associated with limitations in healthcare access during this period, rather than a real decline in cardiac incidents.

Similar results were observed in De Rosa et al.'s study [3], which reported a significant drop in the number of hospitalizations due to STEMI and NSTEMI. The authors reported a greater decline in seeking hospital care in NSTEMI incidents, a prolonged time from symptom onset to first contact with the healthcare system and an increased mortality rate in STEMI patients. De Rosa et al. also noted an increase in the in-hospital mortality rate during the pandemic period, which may indicate delayed diagnosis and treatment.

The same phenomenon was described in Metzler et al.'s [4] study, defining it as "cardiac collateral damage". The authors also suggested that the reduction in hospitalizations for acute coronary syndromes was primarily due to patients' avoidance of contact with the healthcare system.

In terms of invasive procedures, Garcia et al. [5] and Kwok et al. [6] reported a significant decrease in catheterization laboratory activation and in the number of primary PCI procedures for STEMI treatment in the United States and the United Kingdom. These results show that the pandemic affected life-saving procedures, which is consistent with this study's observation about a decrease in the number of coronary angiographies by 12.3% during the pandemic period.

Similar events were observed in Poland by Legutko et al. [7] and Gąsior et al. [8], who demonstrated a decline in the number of coronary angiographies and PCIs nationwide. Additionally, Gąsior et al. indicated regional differences in these changes, suggesting an uneven impact of the pandemic on access to healthcare services. In the present study, analyzing the Mazowieckie Voivodeship, these changes were also observed at the local level and reflect the actual limitations of the healthcare system during the pandemic.

It is also worth noting that an increase in the number of invasive cardiac procedures was observed (+20.4% compared with the pre-pandemic period) while the number of hospitalizations simultaneously returned to values close to baseline. A comparable trend was described in Siudak et al.'s [9] study, pointing to a gradual recovery of interventional cardiology centers in Poland in 2022.

In conclusion, the results of the present study indicate that the COVID-19 pandemic significantly influenced the number of hospitalizations and coronary angiographies performed in patients aged ≥ 65 years with myocardial infarction in the Mazowieckie Voivodeship. This finding is consistent with national and international observations. At the same time, the increase in the in-hospital mortality during the pandemic period may suggest a worse patient prognosis, likely resulting from delays in diagnosis and treatment as well as limited access to medical services.

Limitations

The study is based on aggregated administrative data and lacks patient-level clinical information. Another constraint is that the analysis was limited to Mazowieckie Voivodeship, and it may not be fully representative of the entire population.

Conclusions

The COVID-19 pandemic had a major impact on healthcare systems worldwide. Patients aged ≥ 65 years were affected the most not only by the SARS-CoV-2 itself but also by social restrictions. Ensuring access to treatments remains a challenge that needs to be addressed in the future. Although post-pandemic recovery was observed, further research is required.

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Conflict of Interest: The authors declare no conflict of interest.

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