Abstract: P3421

**Increased air pollution expressed as PM10 concentration and winter time are related to the frequency of percutaneous coronary interventions in patients with acute coronary syndromes**

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**Topic(s):**
Environmental Aspects of Heart Disease

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Background. According to epidemiological studies, increased air pollution has negative impact on the cardiovascular system. However, the extent of the air pollution’s impact on the frequency of the occurrence of specific subtypes of coronary artery diseases (CAD) has not yet been established with absolute certainty.

Purpose. The aim of the study was to assess the relationship between increased air pollution expressed as particulate air matter (PM10) concentrations and the occurrence of acute coronary syndromes (ACSs).

Methods. Based on the data published by the Chief Inspectorate for Environmental Protection, we selected six cities (six catheter laboratories [cath labs]) with low pollution according to PM10 ("non-polluted") and five cities (six cath labs) with the highest pollution ("polluted"). These locations served as a basis for the determination of 24/7 cath labs and the frequency of percutaneous coronary interventions in patients (PCIs) with subsequent types of CAD with special outlook on the ACSs. The current study accounted 10,239 patients in the polluted area and 5,648 patients from the non-polluted region treated with PCI and included patients with stable angina and ACSs. Analysing the period of 365 days, the number of patients undergoing angioplasty in monitored cath labs and the mean daily concentration of PM10 in all selected cities were calculated for each day. In order to better visualise air pollution trends and the frequency of performing PCI in patients with ACS, we have created new time intervals for weeks. Additionally, due to the difference in pollution levels, the analysed period was divided into winter (13 weeks) and non-winter weeks (39 weeks).

Results. The annual average concentration of PM10 amounts to 50.95 µg/m³ in polluted cities and 26.62 µg/m³ in non-polluted ones, which was significantly different (p<0.01) (Fig. 1). It was proven that for both groups, the rise in PM10 pollution levels is connected with the increased frequency of PCIs in patients with ACSs (polluted p<0.01 and non-polluted p<0.01 areas). Moreover, we calculated that in the non-polluted regions, the increase in PM10 concentration by every 1 µg/m³ causes 0.22 additional ACS angioplasties per week. In polluted regions, the same increase in PM10 concentration causes 0.18 additional ACS angioplasties per week. In non-winter weeks, the mean number of ACS PCIs expressed in promiles was lower than in winter weeks in polluted (18.56 ± 2.41 vs. 21.23 ± 3.98, p=0.03) and non-polluted cities (18.68 ± 2.98 vs. 20.88 ± 2.57, p=0.02).

Conclusions. The study shows that the increase in air pollution expressed as PM10 concentration and winter time influences the frequency of ACS related PCIs.

Figure 1. Biplot chart according to the extent of pollution expressed as PM10 and sample size for selected Cathlabs.
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Results. The annual average concentration of PM10 amounts to 50.95 µg/m3 in polluted cities and 26.62 µg/m3 in non-polluted ones, which was significantly different (p<0.01) (Fig. 1). It was proven that for both groups, the rise in PM10 pollution levels is connected with the increased frequency of PCIs in patients with ACSs (polluted p<0.01 and non-polluted p<0.01 areas). Moreover, we calculated that in the non-polluted regions, the increase in PM10 concentration by every 1 µg/m3 causes 0.22 additional ACS angioplasties per week. In polluted regions, the same increase in PM10 concentration causes 0.18 additional ACS angioplasties per week. In non-winter weeks, the mean number of ACS PCIs expressed in promiles was lower than in winter weeks in polluted (18.56 ± 2.41 vs. 21.23 ± 3.98, p=0.03) and non-polluted cities (18.68 ± 2.98 vs. 20.88 ± 2.57, p=0.02).

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