

Bronchitis and COPD

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Impact of gaseous pollutants on COPD exacerbations in the population with cardiovascular diseases.

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Introduction

Exacerbations of chronic obstructive pulmonary disease (COPD) are serious public health issue because of associated significant mortality and morbidity. COPD exacerbations are mainly caused by viral or bacterial lower respiratory tract infections. Ambient pollution and meteorological factors are also considered among precipitating agents or cofactors.

There are far fewer data concerning impact of gaseous pollutants on COPD exacerbations than papers analyzing connections between particulate matter air pollution and course of COPD. Among gaseous pollutants four main groups of substances are primarily monitored: nitrogen oxides (NO_x), sulphur dioxide (SO₂), carbon monoxide (CO) and ozone (O₃).

Because of similar clinical presentation and different treatment it is important to differentiate COPD exacerbations and cardiovascular diseases exacerbations.

Methods

12889 hospitalizations of patients with COPD exacerbations between 2006 and 2014 were analyzed. All patients have cardiovascular comorbidities. Cardiovascular disease exacerbation was ruled out as a reason of patients complaints.

Data concerning main gaseous air pollutants and weather conditions during study period were collected.

Statistical analysis was performed using generalized linear model with logarithmic link function. Up to 90 days before hospital admission were analyzed.

Results

SO₂ concentration effect on COPD exacerbations were associated with statistically significant relative risk (RR) when at least 30 days before the hospital admission were considered (RR 1.04-1.05, p<0.05). Similar associations were observed for all nitrogen oxides beginning from the day of hospitalization (RR 1.02-1.04, p<0.05). The RR was decreasing with longer time-frames. O₃ was associated with protective effect irrespectively of analyzed period before hospital admission (RR 0.77-0.9, p<0.05). There were no statistically significant associations observed for CO.

Conclusions

Statistically significant positive impact on COPD exacerbations in population with cardiovascular comorbidities was found for NO_x and SO₂ concentrations rise. Higher O₃ concentration was associated with lower risk of COPD exacerbation.