Abstract: P6141

 Associations between atmospheric parameters and haemostatic factors: a case control study

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 Topic(s):
 Public Health

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 Background
 One of the biggest health challenges in the 21st century is global climate change. The health effect of climate change is partly mediated through atmospheric parameters. There is a growing concern that atmospheric parameters might increase cardiovascular (CV) morbidity. Increased levels of haemostatic factors are predictors of CV events. The associations between CV diseases and atmospheric parameters have been widely reported, however there are few studies of atmospheric parameters’ effects on markers of haemostasis.

 Purpose
 We examined the possible association between atmospheric parameters and several haemostatic markers.

 Methods
 The study consisted of 3800 hospitalized patients with acute CV diseases (ACVDs) and 260 healthy blood donors. We examined the relationship of haemoglobin (Hgb), white blood cells (WBC), thrombocytes (THR) and local atmospheric parameter conditions (temperature, atmospheric pressure, humidity, wind speed, atmospheric front) on a day-to-day basis in a 5-year period (2009-2013) using a General Additive Model with cubic splines of covariates, regularized by a ridge penalty, and employing generalized cross validation. Atmospheric parameters were allowed to have a lagged effect by up to 21 days.

 Results
 Among blood donors, the average of daily temperature lagged by 8-14 days had a significant effect on Hgb, exhibiting a U-shaped relationship, where higher Hgb values were associated with extremities of the observed temperature interval. For ACVD patients, all examined blood test variables has a significant association with at least some of the atmospheric parameters. Hgb was shown to have a negative linear relationship with mean daily humidity, and the average of daily temperature lagged by 15-21 days, while the average of daily temperature variation lagged by 2-7 days had highly non-linear effect. The relative strength of the association with Hgb was largest for daily temperature variation. WBC values had a slightly non-linear positive relationship with atmospheric pressure lagged by 1 day, with WBC being significantly increased above 1030 hPa. THR values decreased linearly with an increase in mean daily temperature averaged for days lagged 15-21. Atmospheric pressure lagged by 1 day also had a significant effect on THR, with a positive linear effect under 1010 and over 1020 hPa but no effect between. The relative effect of atmospheric pressure on THR was twice as large compared to temperature.

 Conclusions
 Our study showed that exposure to certain atmospheric parameters is associated with significant changes in haemostatic marker levels. In the context of global climate change, the importance of focusing on atmospheric parameters as minor CV risk factor is substantially growing. A better understanding of the fluctuation of the examined markers, in light of atmospheric parameters, appears to be of particular importance for future studies and could help establish new CV prevention strategies.
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