

Influence of Weather and Air Constituents on Aortic Ruptures in the South of Germany

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Objective: To present the influence of meteorology and air pollutants on ruptured aortic aneurysm (rAAAs) in southern Germany.

Methods: In a retrospective German dual-center study (University Augsburg, University Munich) we analyzed meteorology and air pollution in 152 patients (114 men), from January 2010 to December 2019 with rAAAs. In contrast to previous studies, our work takes into account highly resolved seasonal relationships, a time-lagged effect relationship of up to two weeks, and furthermore, potential confounding influences between the meteorological and air-hygienic variables which are considered and eliminated using a cross-over procedure. The residence of patients, and a radius of 20 km around the weather-measuring station were used.

Results: Typical weather situations that have an influence on the occurrence of rAAAs in southern Germany could be identified. These consisted of rainy northwest wind in spring, humid weather in the summer, and warm southwest wind in the autumn and winter, which highly correlated with rAAAs. The incidence rate of rAAAs from Augsburg and Munich was 24.3% in the winter, 20.4% in the spring, 26.3% in the autumn, and 28.9% in the summer. Indeed, in Augsburg, rAAAs occurred most often in winter months (32%), whereas Munich saw most cases in the summer (32%).

Conclusion: We have developed a methodology to test the influence of weather and air pollutants on rAAAs in a statistically correct and meaningful way. This allows for a very detailed seasonal analysis that also includes a period (14 days) before the rupture occurred.

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