

RELATIVE CHANGE IN TEMPERATURE AND ATMOSPHERIC PRESSURE ARE CRITICAL MECHANISTIC FACTORS IN ACUTE AORTIC SYNDROME OCCURRENCE

Guillaume Guimbretière¹ and Simon Nusinovici², Thomas Sénage³, Yann Goueffic¹, Pierre-Antoine Gourraud², Blandine Maurel¹

¹ Department of Vascular Surgery, Institut du Thorax, CHU Nantes, France

² Cellule d'Epidémiologie Clinique / Clinique des données - CIC de Nantes, France

³ Department of Cardiovascular and Thoracic Surgery, Institut du Thorax, CHU Nantes, France

Background

- Acute aortic syndromes (AAS) have been related to circadian and seasonal conditions.
- Characterizing and understanding these variations is essential to ensure an optimal management of medical resources and treatment strategy during vulnerable periods.

Objective

We used time series analyses to precisely assess the impact of meteorological disturbances on AAS occurrence, while accounting for possible confounding factors.

Methods

- Retrospective evaluation of 160 patients presenting consecutively with AAS (type A or B acute aortic dissection, ruptured aortic aneurysm) over a 10-year period in a French university hospital center.
- Average daily temperature (T) and atmospheric pressures (AP) at the location of the event were collected, and their association with AAS investigated with generalized additive models.

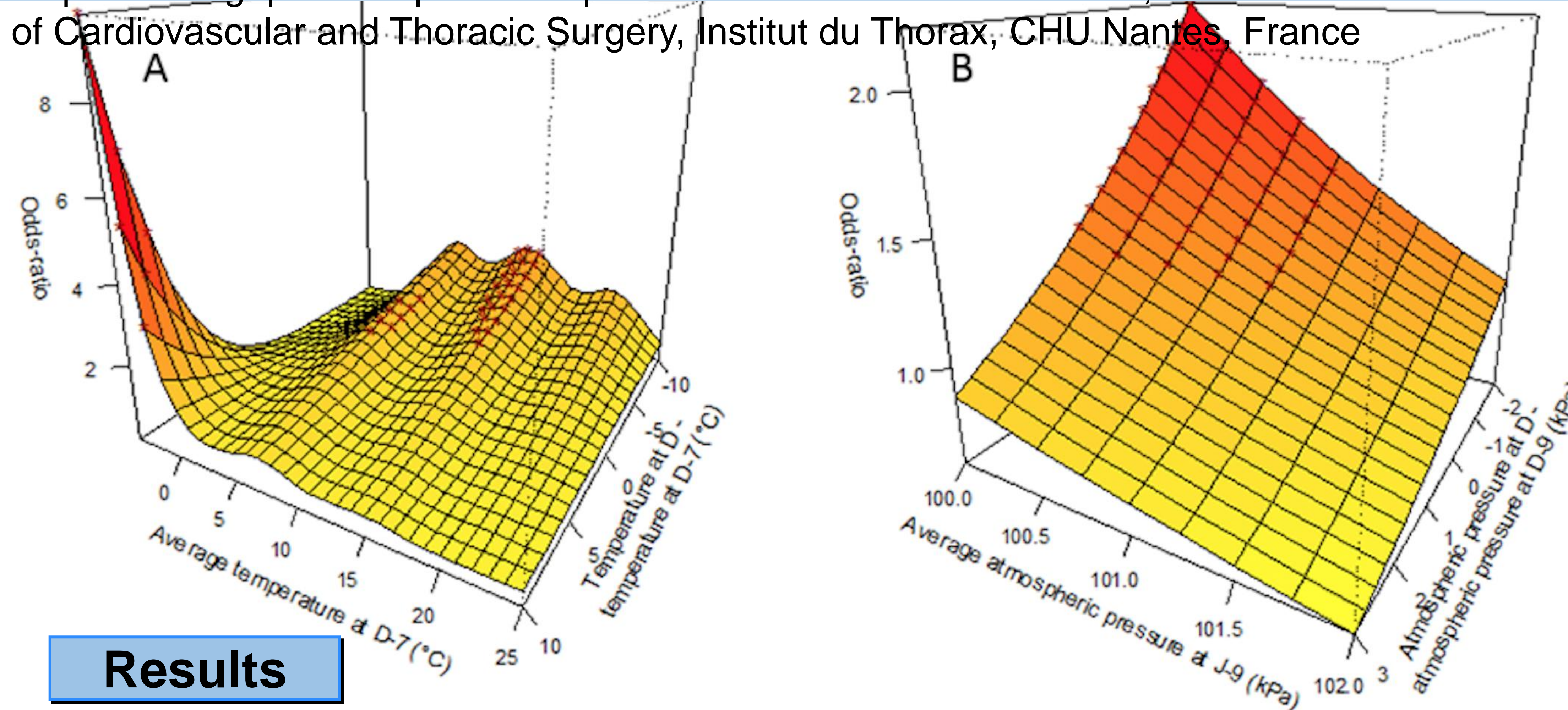


Figure 1. Variations of risk of AAS (OR, 95%) associated with:
- (A) the difference between temperature at day 0 and day-7 and the average temperature at day-7;
- (B) the difference between atmospheric pressure at day 0 and day-9 and the average atmospheric pressure at day-9

* Corresponded to significant increase (red) or decrease (yellow) in risk of acute aortic events

Results

TEMPERATURE:

- A decrease in T (between 5 and 10°C) within the previous 7 days was associated with an increased risk of AAS when the initial temperature at day-7 was between 4 and 25°C (OR = 1.50 [1.07; 2.10])
- An increase in T was associated with a reduced risk of AAS (average OR = 0.65 [0.46; 0.93]).
- When the initial temperature at day-7 was below 4°C, an increase (between 5 and 10°C) within the 7 previous days was associated with an increased risk of AAS

ATMOSPHERIC PRESSURE:

- A decrease (between 2 and 4hPa) within the previous 3 days was associated with an increased risk of AAS (OR = 1.76 [1.05; 2.98])
- An increase (between 2 and 4hPa) within the previous 3 days was associated with a decreased risk of AAS (OR = 0.57 [0.35; 0.94])

Conclusion

- The relative change in T and AP according to the initial value during the previous days may be one of the trigger mechanism for AAS.
- Time series models represent a modern approach to study the impact of meteorological disturbances on the occurrence of AAS.
- Future studies with larger scale are required to validate these associations and confirm our promising approach.