

COMMENTS AND RESPONSES

Response to Comment on: Rogers et al. Blood Pressure Trajectories Prior to Death in Patients With Diabetes. Diabetes Care 2011;34:1534-1539

We thank van Hateren et al. for their comments (1) and the additional information from the Zwolle Outpatient Diabetes project Integrating Available Care (ZODIAC)-12 study (2). We revisited the dataset for our study (3) and found that 70.8% of the patients were receiving ACE inhibitors or angiotensin receptor blockers (ARBs) in 2005. This percentage was 72.7% in 2006, 72.0% in 2007, and 72.6% in 2008. Unfortunately, information regarding dosage was not available in the dataset. As can be seen in the graphs in the article (2), both systolic and diastolic blood pressure tended to decrease over time in patients who died as well as in those who remained alive. Overall, the mean systolic blood pressure was 132.2 mmHg in 2005, 131.3 in 2006, 130.4 in 2007, and 129.8 in 2008. The corresponding diastolic blood pressures were 69.8 mmHg, 69.3, 68.3, and 67.7. We reran the multilevel

mixed-effects linear regression models in patients who did not receive any ACE inhibitors or ARB therapy during the entire time period under observation. In patients not receiving any ACE/ARB medication, diastolic blood pressure declined by 0.54 mmHg per year in patients who remained alive and declined by 2.09 mmHg per year in those patients who died ($P = 0.013$ for the difference in slopes). Systolic blood pressure increased by 0.28 mmHg per year in those who did not receive any ACE/ARB therapy and remained alive, while systolic blood pressure decreased by 2.81 mmHg per year in those patients not receiving ACE/ARB therapy who died ($P = 0.002$ for the difference in slopes). Therefore, the decline in both systolic and diastolic blood pressure prior to death was still evident in those patients with diabetes who were not using ACE/ARB medications. Unfortunately, information regarding all medications was not available in this dataset, and therefore we could not assess whether these trends correlated with the use of all antihypertensive drugs.

It is important to mention that the analytic methods used in earlier studies (i.e., Cox proportional hazards models) answer a slightly different research question than that of the investigation of blood pressure trajectories. The former addresses survival over time and compares different groups of patients with respect to the survival curves. The latter looks at the pattern of blood pressures over time and compares different groups of patients according to the patterns. In an investigation of blood pressure trajectories, it is not necessary to categorize blood pressure into three, four, or five groups or to

combine blood pressures taken during different time periods for the same patient. However, we encourage both approaches since they may provide complementary information. Our results suggest that there is a decline in blood pressure before death in patients with diabetes, but the reasons for this decline require further investigation.

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References

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