

Blood pressure levels for treatment of uncomplicated diabetes in primary care

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In this issue, there is an important article by Sundström *et al.* [1] which details the findings of a survey of the associations of blood pressure and first outcome (hospitalization or death from acute myocardial infarction, stroke, or heart failure) over a maximum of 11 years (median 4.5–4.9 years) in a representative sample of 34009 consecutive uncomplicated type-2 diabetic patients over age 35 (13667 treated for hypertension, 20332 untreated at baseline) seen in 84 primary care centres in central Sweden (51 publicly owned, 33 private) between 1999 and 2008. A secondary endpoint was all-cause mortality. There were slightly more women than men in the survey.

This survey is not a randomized trial, but it is more representative than the prior data which has usually been solely from hospital practice. These results were obtained retrospectively from the uniquely linked individual patient data from the Swedish national registries of hospitalization or death. However, we should also realize that the 34 009 people in this database come from an original sample of just over 58 000 people. The authors excluded about 2000 under age below 35 years, and another 8527 with known cardiovascular problems at baseline. But also a rather large number (about 14 000) were excluded for less clear reasons such as failing 'logistical checks'. The 'baseline' values collected were actually the average of values obtained for 6 months before and 6 months after the index date. Blood pressure was measured either automatically or manually (proportion of each not given)

As might well be expected these data differ greatly from hospital-based figures. The average age was 64 years, blood pressure 146/81 (143/81 and 146/81 mmHg for untreated and treated hypertension, with age 62 and 66 years, respectively). There were several other significant

baseline differences in those treated – lipids, glucose tolerance, renal function, marital status.

Up to 11 years of follow-up, 18.7% had a first event and 18.3% died. During follow-up, there were 2720 myocardial infarctions, 2205 strokes and surprisingly few hospitalizations for heart failure – 138. There were 4023 cardiovascular deaths. As has been found before, the risk curve was U-shaped in both hypertension-treated and untreated people. The nadir for SBP was 135–139 mmHg, for DBP 74–76 mmHg.

The statistical methods (e.g. 'spline models – a piecewise fitting of polynomial equations') are likely to be hard going for clinically based readers, and may account for the somewhat differing curves from previous data (these new analyses show a steep rise in events below the nadir of pressure, compared with a rather flatter relation at pressures higher than the nadir than was seen in earlier analyses). The authors also adjusted the relations between BP and events for a number of other factors such as no antidiabetic treatment versus oral agents versus insulin, but found no substantial differences. Complex adjustments were made in different models for sex, age, level of education, smoking, type of antihypertension drug, and BMI.

However, these new values of the BP at which the risk of events is lowest are important and should impact on future guidelines for treatment targets for BP in patients with diabetes, as they are considerably higher than targets in many current guidelines. Previous data from nonrandomized studies which questioned some of the guideline recommendations of BP targets for particular nondiabetic patients, for example, those with coronary disease [2,3], and targets which were even lower for diabetic patients [4] have been criticized on the grounds of 'reverse causation', that is, the higher mortality in patients with lower pressures might be because these pressures were low due to prior cardiac damage. Sundström *et al.* [1] considered this possibility but think it unlikely on two grounds; first, that this explanation is much less applicable to the nonhospitalized event-free population they studied, and second, that the U-shaped curves were unchanged when they excluded the first 2 years of follow-up from the analyses (25 744 patients).

But of course, we need proper data from randomized trials in order to be certain of this. Fortunately, one such trial, the SHOT trial, is now starting and should help in

Journal of Hypertension 2013, 31:1527–1528

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J Hypertens 31:1527–1528 © 2013 Wolters Kluwer Health | Lippincott Williams & Wilkins.

DOI:10.1097/HJH.0b013e328362ff43

answering this question [5]. In the mean time, the study by Sundström *et al.* [1] adds to the evidence suggesting some caution regarding untested lower targets for blood pressure in patients with diabetes.

ACKNOWLEDGEMENTS

Conflicts of interest

There are no conflicts of interest.

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