Factors Associated With Small Abdominal Aortic Aneurysm Expansion Rate

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IMPORTANCE Because of the high mortality rate after rupture of small abdominal aortic aneurysms (AAAs), surveillance is recommended to detect aneurysm expansion; however, the effects of clinical risk factors on long-term patterns of AAA expansion are poorly characterized.

OBJECTIVE To identify significant clinical risk factors associated with the AAA expansion rate for both constant and accelerated expansion trajectories.

DESIGN, SETTING, AND PARTICIPANTS A multivariate mixed-effects model was established to identify clinical risk factors associated with the AAA expansion rate. Separate shape factor analysis was used to characterize steady vs accelerated expansion over time. Five hundred sixty-seven patients hospitalized at Veterans Affairs medical centers were randomized to the surveillance arm of the Aneurysm Detection and Management (ADAM) study conducted by the Veterans Affairs Cooperative Studies Program from 1992 to 2000. The patients had an AAA with a maximum diameter from 3.0 to 5.4 cm, which was monitored until a 5.5-cm maximum diameter was reached or the aneurysm became symptomatic. Thirty-three participants were not included in this analysis owing to missing or extraneous values in key predictor variables. The mean (SD) follow-up time was 3.7 (2.0) years.

MAIN OUTCOMES AND MEASURES The primary outcome measure was the AAA expansion rate, determined by measurement of the maximum diameter by ultrasonography at regular intervals. The objective to assess the association of clinical variables with the expansion of the AAA was formulated after data collection.

RESULTS The mean (SD) linear expansion rate of AAAs was 0.26 (0.01) cm/y. Current smoking was associated with a 0.05 (0.01)-cm/y increase in the linear expansion rate (95% CI, 0.25–0.28; P < .001), diastolic blood pressure with a 0.02 (0.01)-cm/y increase per 10 mm Hg (95% CI, 0.01–0.04; P = .001), and diabetes mellitus with a 0.11 (0.02)-cm/y decrease (95% CI, 0.07–0.16; P < .001). Diastolic blood pressure and baseline AAA diameter were associated with accelerated AAA expansion (P = .001 and P < .001, respectively).

CONCLUSIONS AND RELEVANCE Smoking cessation and control of diastolic blood pressure are direct actions that should be taken to reduce the rate of AAA expansion. Other clinical risk factors, except for diabetes, were not associated with the AAA expansion rate. This study also provides evidence of differing trajectories in AAA expansion over time, a finding that merits further investigation.