Title: Current AAA Screening Guidelines Are Inadequate for Preventing Rupture in Many Patients: Missed Opportunities for Early Detection and Strategies for Improvement

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Objective:
Current USPSTF and SVS screening guidelines for abdominal aortic aneurysm (AAA) rely on age and binary smoking history, potentially excluding high-risk patients such as younger heavy smokers. This study evaluated the proportion of ruptured AAA patients at a tertiary care center who would have qualified for screening and compared their risk profiles.

Methods:
We performed a retrospective chart review of all patients presenting with ruptured AAA from 2000–2025. Demographics, smoking history, aneurysm size, comorbidities, and in-hospital mortality were collected. Eligibility under USPSTF and SVS criteria was assessed. Patients with mycotic aneurysms were excluded, and none had documented connective tissue disease. Subgroup analysis compared patients <65 vs ≥65 years using chi-square and Welch's t-tests.

Results:
Among 118 rupture patients, mean age was 74.3 years (range 46–96), and 86 (72.9%) were male. Smoking history was positive in 76 (64.4%), absent in 16 (14.4%), and undocumented in 26. Of 104 patients with sufficient data, only 42 (40.4%) met USPSTF and 61 (58.7%) SVS criteria, leaving 43 (41.3%) ineligible due to age, sex, or absent smoking history. Current smoking was more common in patients <65 than ≥65 (80.0% vs 39.3%, p=0.008). Younger patients (n=21, 17.8%) were more often male (90.5% vs 69.1%, p=0.048) and had heavier smoking exposure (66.9 ± 50.4 vs 41.3 ± 23.8 pack-years, p=0.13), despite similar aneurysm diameters (7.28 ± 1.5 vs 7.57 ± 1.9 cm, p=0.49). Hypertension was also more prevalent in younger patients (76.2% vs 35.1%, p=0.001). In-hospital mortality was 30.5% (36/118), with no difference between <65 and ≥65 groups (33.3% vs 26.8%, p=0.74). Mean age did not differ between those who died (75.6 ± 11.6 years) and survivors (73.7 ± 9.4 years, p=0.38).

Conclusions:
Over 40% of rupture patients would not have met current screening criteria. Younger patients, often excluded from screening, were disproportionately male, current smokers, and had higher cumulative smoking exposure and hypertension, despite similar aneurysm diameters and mortality. These findings highlight younger heavy smokers (<65 years with substantial pack-year burden, particularly those actively smoking and with hypertension) as a high-risk population frequently missed by current guidelines. Further research with larger, national datasets is needed to define specific smoking exposure thresholds that could inform updated risk-based screening guidelines.