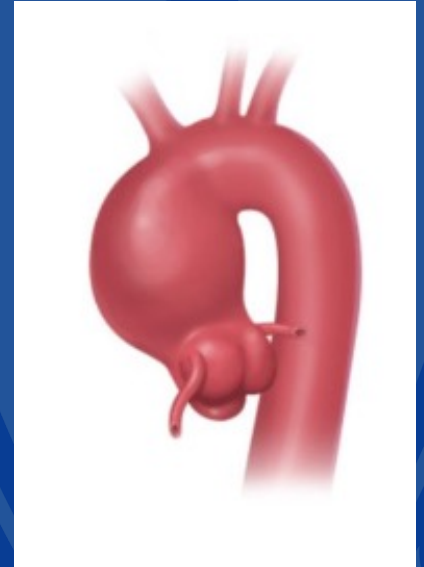# Clinical Risk Factors Contributing to Five-Year Mortality in a VA Population with Ascending Thoracic Aortic Aneurysms

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Background

- Ascending thoracic aortic aneurysm (aTAA)
  - Incidence ~ 5 to 10 /100,000 individuals/year.
  - Significant risk factor for aortic dissection or rupture.
  - Estimates of acute rupture or dissection: 1.6 – 4/100,000 individuals/year.
  - Mortality rate of untreated dissection ~50% within 48 hours.
  - Numerous risk factors contribute to aTAA development and growth over time.
  - Current guidelines recommend surgical intervention for aTAAs ≥55 mm in diameter.
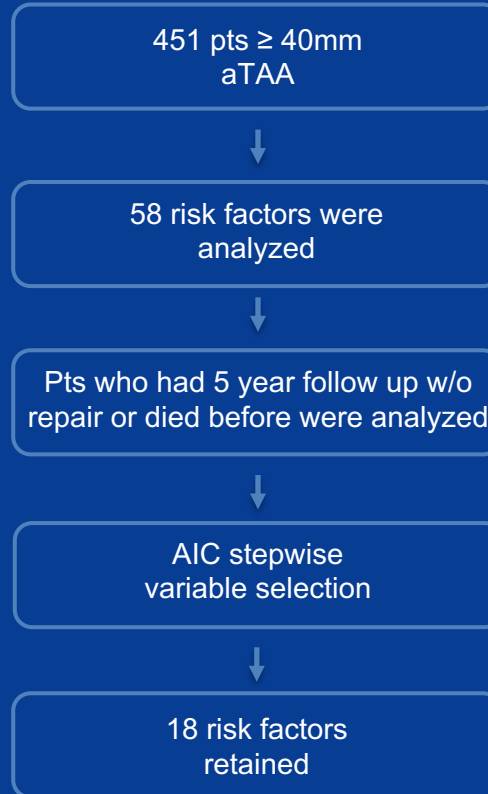
Objective

- To evaluate clinical factors contributing to or that reduce five-year all cause death in a veteran population who have dilated ascending aorta or ascending thoracic aortic aneurysm (aTAA) and who did not undergo repair within five years.

Methods

- 451 patients with ascending thoracic aortic size of at least 40 mm or greater were identified.
- 58 pertinent risk factors (including social, genetic, cardiac risk factors, comorbidities, date of diagnosis and aneurysm size, date of most recent CT scan and aneurysm size, etc.) were evaluated.
- Patients who died before repair within 5 years of aTAA identification or had 5 years of follow-up without repair were further analyzed.
- Statistical analysis used logistic regression for the outcome of five-year all-cause mortality with stepwise variable selection based on Akaike information criterion (AIC).

Methods

451 pts ≥ 40mm
aTAA

↓

58 risk factors were
analyzed

↓

Pts who had 5 year follow up w/o
repair or died before were analyzed

↓

AIC stepwise
variable selection

↓

18 risk factors
retained

Results

Baseline Characteristics	Overall Cohort (n=451)
Age at start of follow-up (median [IQR])	68.6 (IQR: 63.6-73.3)
Male sex (%)	433 (93)
Prior open or endovascular procedures (%)	211 (46.8)
Marfan disease (%)	3 (0.6)
Bicuspid aortic valve (%)	39 (8.6)
Aneurysm diameter at discovery – cm (median [IQR])	4.4cm (IQR: 4.1-4.7)
BMI (median [IQR])	28.8 (IQR: 25.3-32.6)
Smoker (%)	311 (69)
Charlson Comorbidity Index (median [IQR])	3 (IQR: 3-4)
Family history of thoracic aortic aneurysm (%)	32 (7)
Coronary artery disease (%)	153 (33.9)
Prior CABG (%)	36 (8)
Prior valve disease (%)	115 (25.5)
Prior valve replacement (transcatheter or surgical) (%)	58 (12.9)
Congestive heart failure (%)	78 (17.3)
Hypertension (%)	374 (82.9)
Hyperlipidemia (%)	331 (73.4)
Diabetes (%)	99 (21.9)
Myocardial infarction (%)	48 (10.6)

Table 1: Baseline characteristics for the full cohort.

Results

- Of 451 patients, 179 had ≥5 year follow-up without aTAA surgical repair.
- 46 out of the 179 patients (26%) died within 5 years.
- The variable selection process retained 18 of 58 covariates including.

Covariate	Odds Ratio	Confidence Interval (95%)	P-value
Age (years)	1.2204	1.10, 1.38	0.0003
Weight (kg)	1.0212	0.99, 1.05	0.1394
Glucose	1.0194	1.01, 1.03	0.0056
Sodium	1.1653	0.95, 1.44	0.1417
Chloride	0.8259	0.69, 0.98	0.0322
Creatinine	2.7347	0.97, 9.68	0.0981
Charlson Comorbidity Index	0.2119	0.07, 0.56	0.0040
Aneurysm Size (cm)	3.1309	1.12, 9.85	0.0370
History of ARB Use	0.1293	0.02, 0.50	0.0076
History of Open or Endovascular Procedures	5.1829	1.81, 16.23	0.0030
History of any Valve Disease	9.3335E-11	NA, 3.7885E+100	0.9906
History of any Valve Replacements	4.0862E-08	1.59E-237, 3.43E+32	0.9926
History Myocardial Infarction	4.7228	0.5, 43.60	0.1574
History of Obstructive Sleep Apnea	0.0618	0.01, 0.34	0.0034
History Thyroid Disease	0.2157	0.03, 1.12	0.0919
History of any Malignancy	0.3327	0.11, 1.00	0.0529
History of COPD	2.7367	0.98, 8.10	0.0585
History of Stroke	5.6137	0.97, 40.70	0.0655

Table 2: Covariates retained after AIC stepwise variable selection.

Results

- Variables of clinical interest and statistical significance in the adjusted model were:
    - Age (odds ratio **1.22** per year, p<0.001)
    - History of prior open or endovascular procedures (OR **5.18**, p=0.003)
    - Aneurysm size (OR **3.13** per cm, p=0.037)
    - History of angiotensin receptor blocker (ARB) use (OR **0.13**, p=0.008)
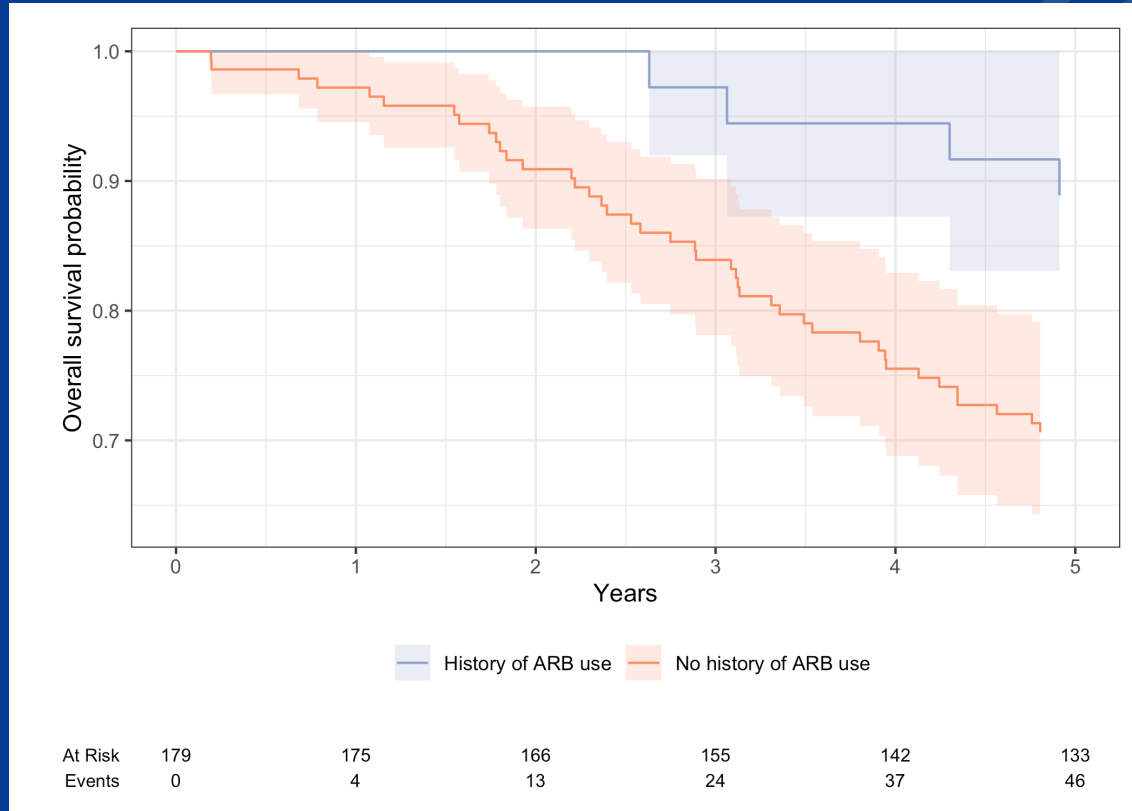
Results

Figure 1: Overall survival probability in patients with history of ARB use and those without history of ARB use.

Conclusion

- Age, history of prior open or endovascular procedures, and aneurysm size increased the risk of all-cause death at 5 years.

- Among modifiable risk factors, only the use of ARBs reduced five-year mortality (11% mortality compared to 29% mortality in those without history of ARB use) and should be further investigated.

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