Atherosclerotic Renovascular Disease (ARVD) in Older US Patients Starting Dialysis, 1996-2001
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Introduction
- End-stage renal disease (ESRD) and atherosclerotic renovascular disease (ARVD) are both associated with older age.
- Although the number of older incident dialysis patients and their associated comorbidity continue to grow, the burden of ARVD in current dialysis populations is unknown.
- Temporal trends regarding the epidemiology of ARVD are poorly defined.

Methods
- Patients:
  - Aged 67 years or older at initiation of maintenance dialysis therapy.
  - Medicare as primary payer for at least two years prior to the initiation of dialysis therapy.
- Coding:
  - ARVD is defined by one or more ICD-9-CM diagnosis codes 440.1 and 593.81.
  - Renal revascularization is defined by one or more ICD-9-CM procedure codes or CPT codes.
- Cardiovascular events were defined as the presence of one in-patient hospitalization, skilled nursing facility, or home health agency code, two outpatient or more physician/supplier codes, or one outpatient and one physician/supplier codes, less than one year apart.
- Analysis:
  - Logistic regression was used for multivariable comparisons of patients with and without ARVD and ARVD patients with and without revascularization.
  - Patients were followed until December 31, 2002 for death and cardiovascular events outcome, with censoring at renal transplant.
  - Multivariable Cox proportional hazard models were used to test associations between ARVD and outcome events, with adjustment for baseline characteristics.

Results
- 146,973 patients were studied.
- Although the proportion with prior ARVD rose from 7.1% in 1996 to 11.2% in 2001 (AOR 1.68), the proportion with renovascular disease listed as the cause of ESRD remained constant at approximately 5% in each annual cohort.
- Hypertension (AOR 2.21 compared to diabetes mellitus as reference category) and dialysis network (AOR varying from 2.07 for Network 13 to 1.00 for Network 1 [ref.]) were the most notable association of ARVD.
- Other associations included peripheral vascular disease (AOR 1.65), Black race (AOR 0.44), uremic cause of ESRD (AOR 0.57), age > 85 (AOR 0.58), substance dependency (AOR 0.62), and inability to ambulate or transfer (AOR 0.67).
- ARVD was associated with a greater likelihood of atherosclerotic heart disease (AHR 1.28, P < 0.0001), congestive heart failure (AHR 1.12, P < 0.0001), stroke (AHR 1.20) and peripheral vascular disease (AHR 1.54, P < 0.0001), but not with mortality (0.94, P < 0.0001).

Conclusions
- ARVD, and revascularization for ARVD, have become more common recently in older dialysis patients.
- The primary cause of ESRD listed as their primary cause of ESRD and 21.6% of these ARVD patients underwent renal revascularization.
- ARVD was associated with a greater likelihood of atherosclerotic heart disease (AHR 1.28, P < 0.0001), congestive heart failure (AHR 1.12, P < 0.0001), stroke (AHR 1.20) and peripheral vascular disease (AHR 1.54, P < 0.0001), but not with mortality (0.94, P < 0.0001).