

Decreased Risk of Septicemia or Bacteremia among New End-stage Renal Disease Patients Receiving Hemodialysis with Early Fistula Placement

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Background

- Previous studies suggest better outcomes among end-stage renal disease (ESRD) patients initiating hemodialysis (HD) with arteriovenous fistulae (Fistula) versus central venous catheters (Catheter) or arteriovenous grafts (Graft)
- CMS requires all dialysis providers to report vascular access type (VAT) used for HD, which was found to have a high agreement (94%) with VAT reported in medical evidence forms
- Unlike catheter starts, use of fistula at HD initiation requires pre-planning, health insurance, and time for the access to mature. Insurance coverage has been proposed as a way to reduce infections and improve outcomes

Study Objective

We looked at incident and prevalent VAT to determine the importance of starting with fistula in lowering the risk of acquiring septicemia or bacteremia

Study Design

Data Source

- Medicare Enrollment & Final Action Claims Data

Population

- 5% Medicare beneficiary sample
- Incident HD ESRD beneficiaries in 2011-2012
- Ages ≥ 67
- Full fee-for-service coverage (A+B) by Medicare for 2 years prior and 1 year after the start of ESRD
- Cohort 1- all incident HD ESRD beneficiaries (N=2,392);
- Cohort 2 - incident HD ESRD beneficiaries who survived the 1st year of ESRD (N=1608)

Models and Outcomes

1. Extended Cox proportional hazards model [Cohort 1]

Exposure: Prevalent (time-dependent) VAT

Outcome: Days to hospitalization with septicemia (ICD-9-CM 038.xx) or bacteremia (790.7) during follow up

Control variables: Incident VAT, demographics, chronic conditions, location of 1st HD, Gagne score, prior healthcare utilization

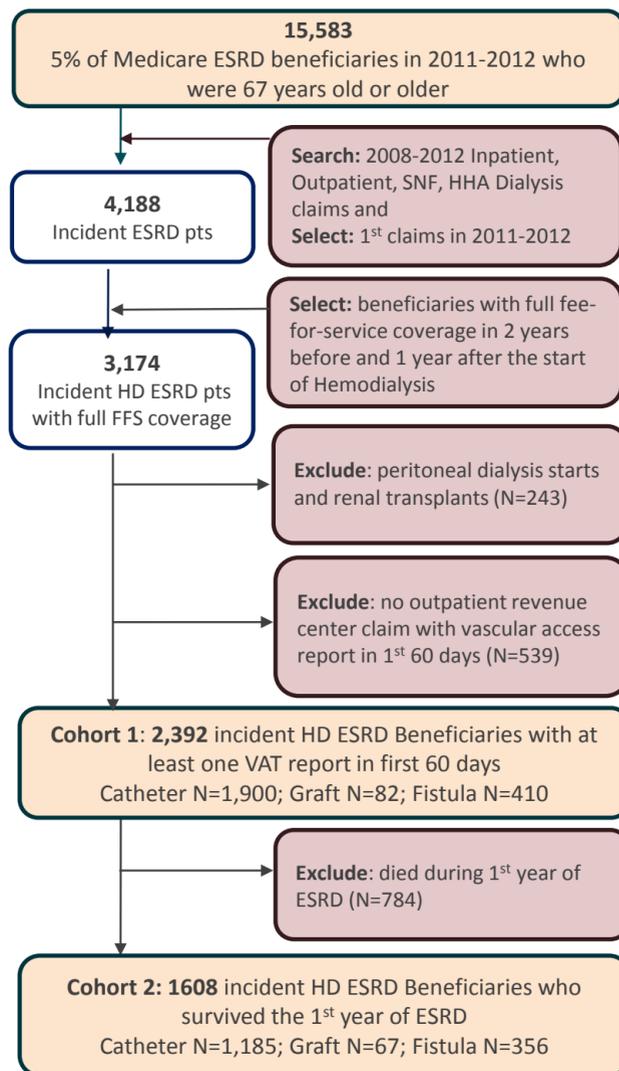
2. Multivariate logistic regression model [Cohort 2]

Exposure: Incident VAT

Outcome: Hospitalization with septicemia (ICD-9-CM 038.xx) or bacteremia (790.7)

Control variables: Demographics, chronic conditions, location of 1st HD, prior healthcare utilization

Study Cohorts Selection



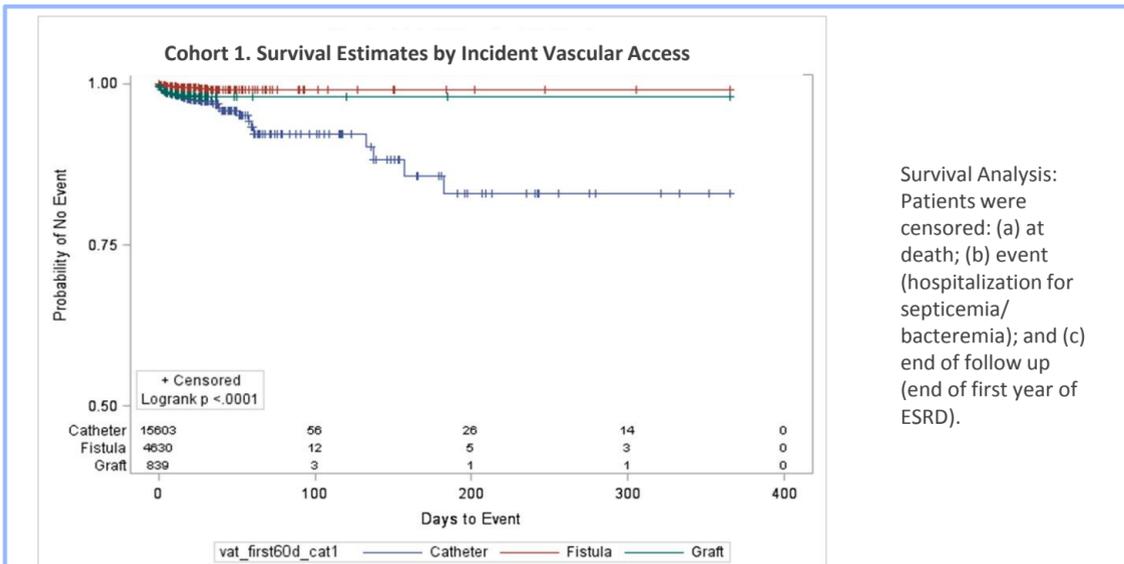
Results

Cohort 1. Hazards of Hospitalization with Septicemia or Bacteremia by Prevalent VAT

	Hazard Ratio (95% CI)
Catheter (time-dependent) - ref	
Graft (time-dependent)	HR: 0.43 95% CI: 0.25-0.69
Fistula (time-dependent)	HR: 0.37 95% CI: 0.25-0.53

Cohort 2. Risk of Hospitalization with Septicemia or Bacteremia by Incident VAT

	Relative Risk (95% CI)
Catheter - referent	
Graft	RR: 0.86 95% CI: 0.3-1.71
Fistula	RR: 0.40 95% CI: 0.27-0.64



Cohort 2. Selected characteristics of Cohort 2 by Incident Vascular Access Type

	Catheter N=1,185 (74%)	Graft N=67 (4%)	Fistula N=356 (22%)
Total number of VAT reports during FU - Median (min, max)	12 (1, 65)	13 (1, 22)	13 (1, 59)
No change in VAT during FU	380 (32%)	50 (75%)	294 (82%)
Location of first HD: inpatient (vs. outpatient)	978 (82%)	30 (45%)	148 (41%)
Baseline Healthcare utilization (Median reimbursement across health care settings)	\$35,341	\$27,944	\$17,998
Hospitalizations with septicemia or bacteremia during FU	251 (21%)	12(17.9%)	25 (6.9%)
Time to event (median number of days b/n HD start and hospitalization)	124	172	190

Summary

- Among beneficiaries who survived the first year of ESRD, those who initiated maintenance HD with fistula had a 60% lower risk of hospitalization with septicemia/bacteremia as compared with those who started HD with catheter (Cohort 2)
- Among all incident HD ESRD beneficiaries, independent of the first VAT, staying on or transitioning to fistula during the course of HD was associated with 63% risk reduction in preventing hospitalization with septicemia/bacteremia (Cohort 1)
- A high proportion (74%) of the fully covered Medicare ESRD beneficiaries initiated their maintenance HD with catheters, of which 32% continued to use catheters throughout the first year of ESRD treatment (Cohort 2)
- Majority of catheter starts obtained their first HD in an inpatient setting (82%) as compared with 41% of fistula starts (Cohort 2)

Implications

- Reducing delays in placing a fistula as a permanent VAT for HD could prevent significant infection-related morbidity and, subsequently, costs associated with preventable hospitalizations
- Persistently low use of fistulae at HD initiation among those with full health care coverage prior to ESRD points to the need for better strategies to optimize vascular access in new ESRD patients

Limitations

- Limited generalizability due to a select cohort in terms of age and health insurance
- Unable to exclude patients who were not candidates for permanent VAT due to age, comorbidities, or life expectancy
- Reliance on health insurance claims to ascertain VAT

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