Approach to Asymptomatic Carotid Disease in the ESRD Patient

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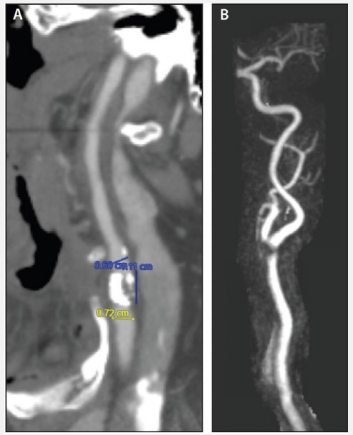
Co-Director, HVI, Aortic center, PERT



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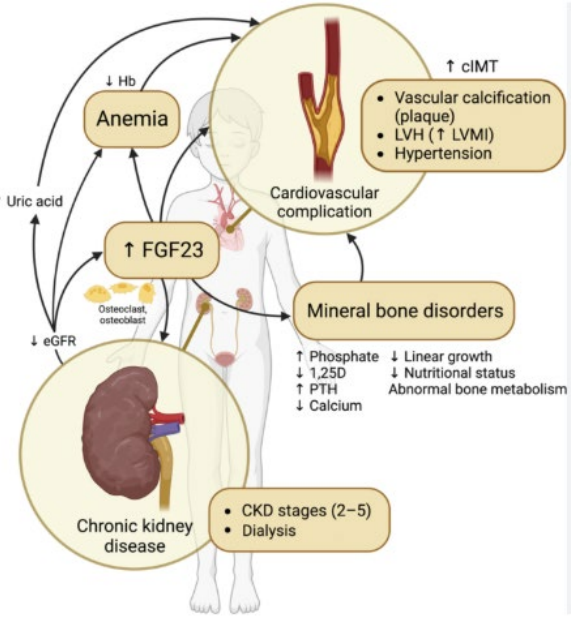
Disclosures

Medical Advisory Board. Boston Scientific

No relevant financial disclosures for this talk



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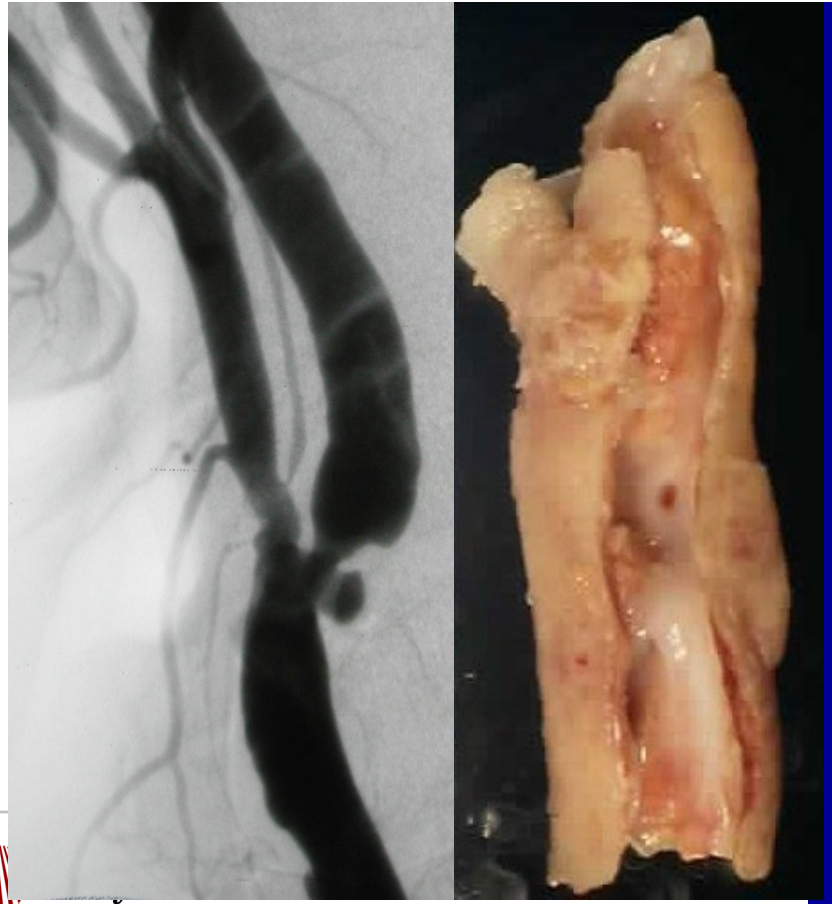
CAROTID STENOSIS



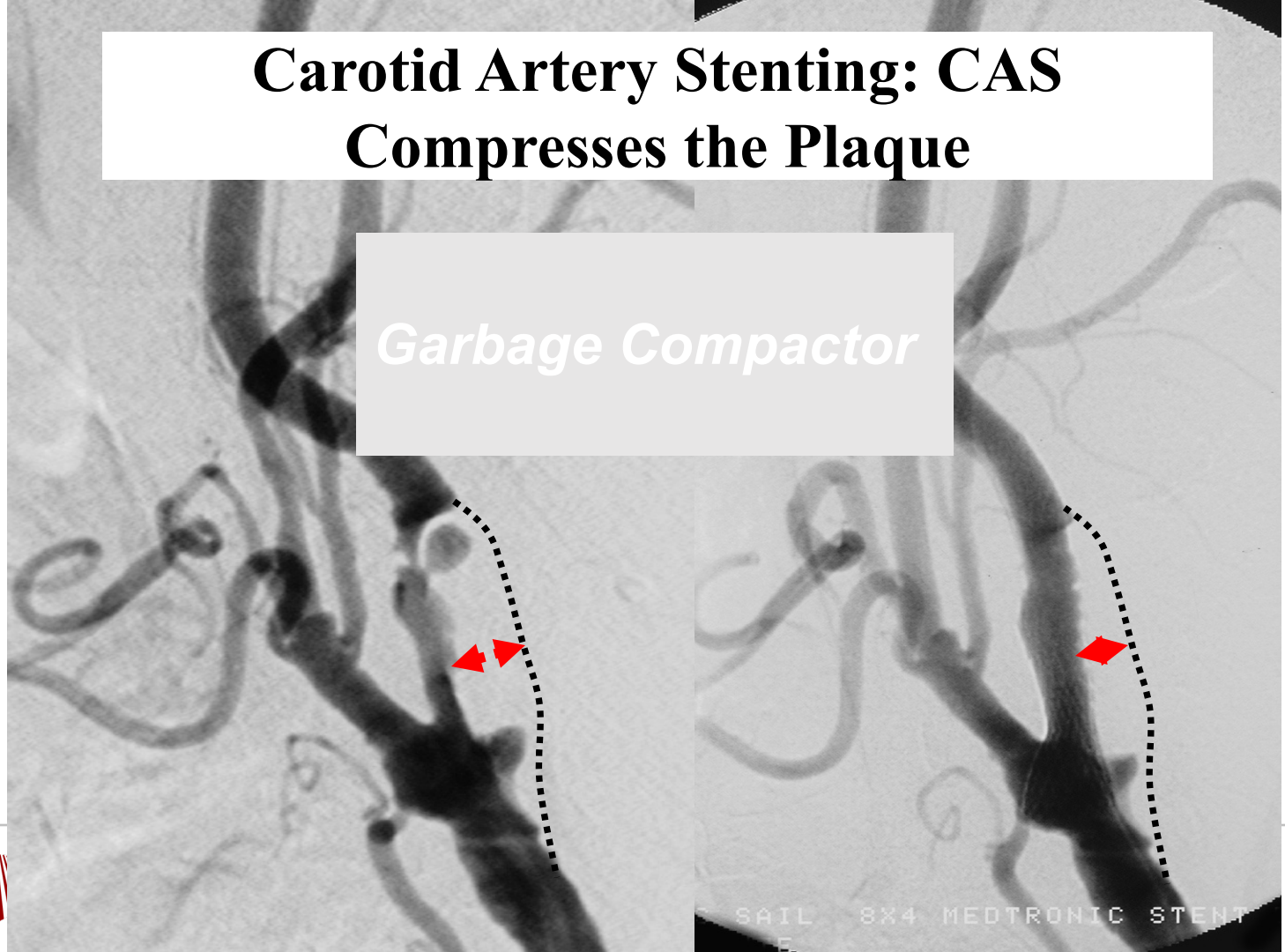
- **Carotid Bifurcation plaque and Stenosis is probably responsible for about 50% of Clinical Strokes.**
- **Mechanism:**
  1. **Embolization**
  2. **Hemodynamic Compromise**

Therapeutic Options 2026

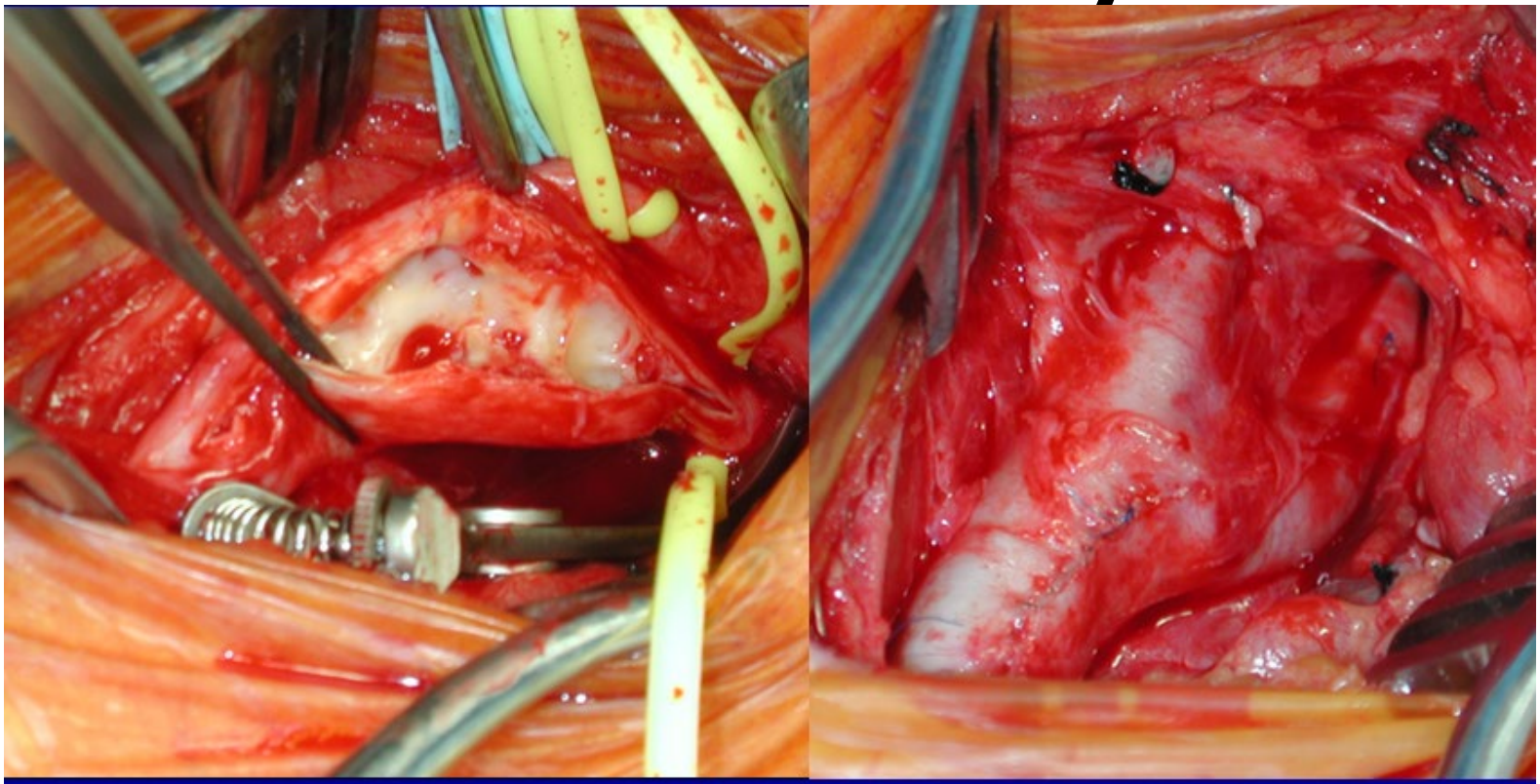
- Carotid Endarterectomy CEA
  - Standard vs Eversion
  - Local vs General Anesthesia
- Carotid Artery Stenting CAS
  - TFCAS, TCAR
- Medical Management (Natural History)
  - Anti platelet agents (clopidogrel, ASA..)
  - Statins and other lipid lowering agents
  - Antihypertensive agents (ACE inhibitors…)

CEA Removes the Plaque

Carotid Artery Stenting: CAS Compresses the Plaque

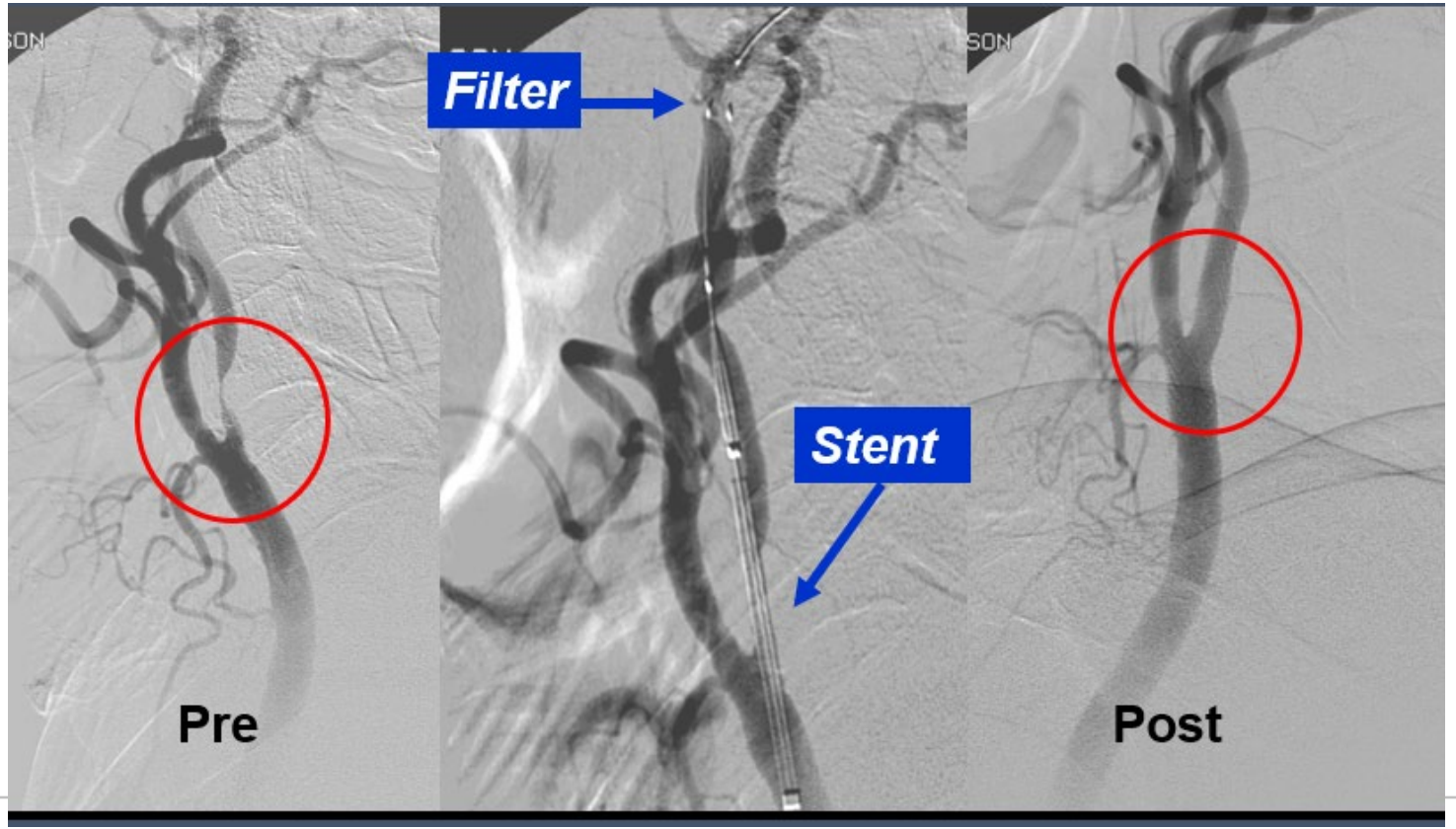


Carotid Endarterectomy CEA



Arguably one of the most studied procedure ever!

Carotid Artery Stenting (with Filter CP)



Current SVS guidelines regarding asymptomatic patients

SOCIETY FOR VASCULAR SURGERY® DOCUMENT

Updated Society for Vascular Surgery guidelines for management of extracranial carotid disease: Executive summary

John J. Ricotta, MD,[a] Ali AbuRahma, MD, FACS,[b] Enrico Ascher, MD,[c] Mark Eskandari, MD,[d] Peter Faries, MD,[e] and Brajesh K. Lal, MD,[f] *Washington, DC; Charleston, WV; Brooklyn, NY; Chicago, Ill; New York, NY; and Baltimore, Md*

"Neurologically asymptomatic patients with equal or 60% diameter stenosis, should be considered for CEA for reduction of long-term risk of stroke provided the patient has a 3- to 5-year life expectancy and perioperative stroke/death rates can be equal to or <3%"

"Neurologically asymptomatic patients deemed "high risk" for CEA should be considered for primary medical management."

stroke prevention for five decades, and has been the subject of extensive clinical investigation, including multiple controlled randomized trials. The appropriate treatment of patients with carotid bifurcation disease is of major interest to the commu-

refocused attention on the medical management of carotid bifurcation disease. The publication of these trials has prompted the SVS to update its 2008 recommendations. The current publication expands the scope of the 2008 guidelines

From the Washington Hospital Center, Georgetown University School of Medicine, Washington, DC[a]; University of West Virginia, Charleston[b]; Maimonides Medical Center, Brooklyn[c]; Northwestern University, Chicago[d]; Mount Sinai University School of Medicine, New York[e]; and University Maryland, Baltimore.[f]

Competition of Interest: none.

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literature and made recommendations after extensive discussion using the GRADE system, as has been done with other SVS guidelines documents. The recommendations made in this document represent the unanimous opinion of the committee in each instance. Recommendations are characterized as *strong* grade 1 or *weak* grade 2, based on the quality of evidence, the balance between desirable effects and undesirable ones, the values and preferences, and the resources and costs. Grade 1 recommendations are meant to identify practices where benefit clearly outweighs risk. These recommendations can be made by clinicians and accepted by patients with a high degree of confidence. Grade 2 recommendations are made when the benefits and risks are more closely matched

CLINICAL PRACTICE GUIDELINES

Check for updates

Society for Vascular Surgery clinical practice guidelines for management of extracranial cerebrovascular disease

Ali F. AbuRahma, MD,[a] Efthymios D. Avgerinos, MD, PhD,[b] Robert W. Chang, MD,[c] R. Clement Darling III, MD,[d] Audra A. Duncan, MD,[e] Thomas L. Forbes, MD,[f] Mahmoud B. Malas, MD, MHS,[g] Mohammad Hassan Murad, MD, MPH,[h] Bruce Alan Perler, MD, MBA,[i] Richard J. Powell, MD,[j] Caron B. Rockman, MD,[k] and Wei Zhou, MD,[l] *Charleston, WVa; Pittsburgh, Pa; San Francisco and La Jolla, Calif; Albany and New York, NY; London and Toronto, Ontario, Canada; Rochester, Minn; Baltimore, Md; Lebanon, NH; and Tucson, Ariz*

ABSTRACT

Management of carotid bifurcation stenosis in stroke prevention has been the subject of extensive investigations, including multiple randomized controlled trials. The proper treatment of patients with carotid bifurcation disease is of major interest to vascular surgeons and other vascular specialists. In 2011, the Society for Vascular Surgery published guidelines for the treatment of carotid artery disease. At the time, several randomized trials, comparing carotid endarterectomy (CEA) and carotid artery stenting (CAS), were reported. Since the 2011 guidelines, several studies and a few systematic reviews comparing CEA and CAS have been reported, and the role of medical management has been reemphasized. In the present publication, we have updated and expanded on the 2011 guidelines with specific emphasis on five areas: (1) is CEA recommended over maximal medical therapy for low-risk patients; (2) is CEA recommended over transfemoral CAS for low surgical risk patients with symptomatic carotid artery stenosis of ≥50%; (3) the timing of carotid intervention for patients presenting with acute stroke; (4) screening for carotid artery stenosis in asymptomatic patients; and (5) the optimal sequence of intervention for patients with combined carotid and coronary artery disease.

A separate implementation document will address other important clinical issues in extracranial cerebrovascular disease. Recommendations are made using the GRADE (grades of recommendation assessment, development, and evaluation) approach, as was used for other Society for Vascular Surgery guidelines. The committee recommends CEA as the first-line treatment for symptomatic low-risk surgical patients with stenosis of 50% to 99% and asymptomatic patients with stenosis of 70% to 99%. The perioperative risk of stroke and death in asymptomatic patients must be <3% to ensure benefit for the patient. In patients with recent stable stroke (modified Rankin scale score, 0-2), carotid revascularization is considered appropriate for symptomatic patients with >50% stenosis and should be performed as soon as the patient is neurologically stable after 48 hours but definitely <14 days after symptom onset. In the general population, screening for clinically asymptomatic carotid artery stenosis in patients without cerebrovascular symptoms or significant risk factors for carotid artery disease is not recommended. In selected asymptomatic patients with an increased risk of carotid stenosis, we suggest screening for clinically asymptomatic carotid artery stenosis as long as the patients would potentially be fit for and willing to consider carotid intervention if significant stenosis is discovered. For patients with symptomatic carotid stenosis of 50% to 99%, who require both CEA and coronary artery bypass grafting, we suggest CEA before, or concomitant with, coronary artery bypass grafting to potentially reduce the risk of stroke

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Source: Ricotta JJ, Aburahma A, Ascher E, Eskandari M, Faries P, Lal BK; Society for Vascular Surgery. Updated Society for Vascular Surgery guidelines for management of extracranial carotid disease. J Vasc Surg. 2011 Sep;54(3):e1-31.
Aburahma A et al. Society for Vascular Surgery clinical practice guidelines for management of extracranial cerebrovascular disease. J Vasc Surg 2022;75:4S-22S

ESKD

Patients with end-stage kidney disease (ESKD) on dialysis face significantly higher mortality than the general population, with survival rates much lower than those for many chronic diseases such as cancer or diabetes.
The median overall survival for all dialysis patients is around five years, and only a small percentage survive beyond ten years.

Survival is initially high, with about 88% of patients surviving the first year, but declines after the first year after starting dialysis, especially for those who begin treatment urgently

ESKD Long term survival

Five-Year Survival Rates:

Hemodialysis (HD): ~42%

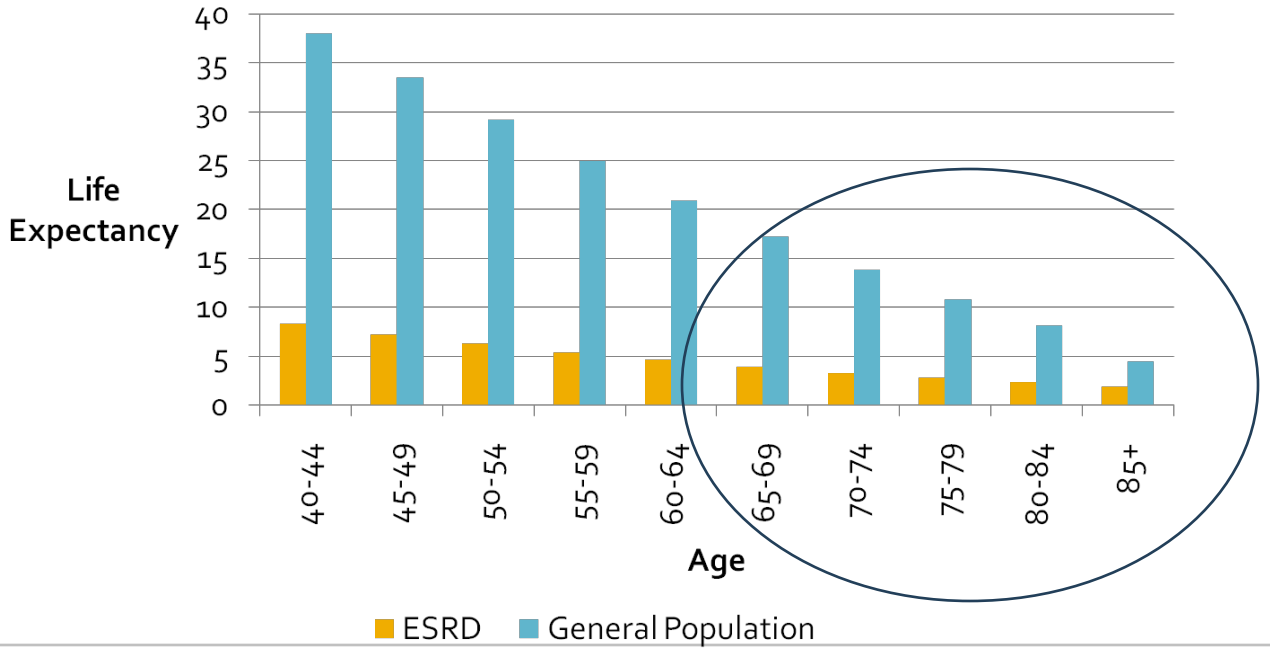
Peritoneal dialysis (PD): ~52%

Younger patients (<45 years): up to 85%

Middle-aged patients (45–64 years): ~60%

Older patients (>75 years): around 50% at one year depending on comorbidities

ESRD patients on dialysis have remarkably short life expectancy



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Source : US Renal Data System 2008 Atlas

57%

Based on the United States Renal Data System (USRDS) report, the **adjusted survival rate for patients on hemodialysis (HD) is 57% at 3 years after onset of ESKD**, compared to 68% for patients receiving peritoneal dialysis (PD). The 1-year mortality rate after dialysis initiation for older adults is approximately 30%. Between 2001 and 2016, adjusted relative mortality rates reported by USRDS declined by 29%, with a 28% reduction among HD patients and a 43% reduction among PD patients.

From the Peripheral Vascular Surgery Society

Revascularization of asymptomatic carotid stenosis is not appropriate in patients on dialysis

Theodore H. Yuo, MD, MS, Joseph Sidaoui, MD, Luke K. Marone, MD, Michel S. Makaroun, MD, and **Rabih A. Chaer, MD, MS,** *Pittsburgh, Pa*

Objective: **Outcomes of carotid endarterectomy (CEA) or carotid angioplasty and stenting (CAS) for asymptomatic disease in patients on dialysis are not well characterized, with questionable stroke prevention and survival. This study reports outcomes of carotid revascularization in asymptomatic dialysis patients in the United States.**

Methods: **Using United States Renal Data System (USRDS) databases, we identified all dialysis patients who underwent CEA or CAS for asymptomatic disease from 2005 to 2008. CEA and CAS were identified by Current Procedural Terminology (American Medical Association, Chicago, Ill) codes, and symptom status and comorbidities by International Classification of Diseases-9th Revision, Clinical Modification codes. Primary outcomes were stroke, cardiac complications, and death at 30 days and at 1 and 3 years. Predictors of death were identified using multivariate regression models.**

Results: **Of 738,561 dialysis patients, 2131 asymptomatic patients underwent carotid revascularization (1805 CEA, 326 CAS). The mortality rate was 4.7% at 30 days (4.6% CEA, 4.9% CAS; $P = .807$). Kaplan-Meier estimates of survival were 75.1% at 1 year (75.9% CEA, 70.7% CAS) and 43.4% at 3 years (43.7% CEA, 41.6% CAS). The stroke rate was 6.5% at 30 days (6.4% CEA, 6.9% CAS; $P = .774$) and 13.6% at 1 year (13.3% CEA, 15.0% CAS; $P = .490$). Cardiac complications occurred in 22.0% of patients (3.3% myocardial infarction) at 30 days (22.2% CEA, 20.6% CAS; $P = .525$). The combined stroke or death rate was 10.2% at 30 days (10.1% CEA, 10.9% CAS; $P = .490$) and 33.5% at 1 year (32.2% CEA, 39.6% CAS; $P = .025$). Age >70 years at the time of surgery and increased time on dialysis were predictive of death, whereas a history of renal transplant was a protective factor.**

Conclusions: **Patients on dialysis have high perioperative and long-term stroke or death rates after CEA or CAS for asymptomatic stenosis, with a median survival that is less than recommended by current guidelines. As a result, carotid intervention in these patients appears to be inappropriate. (J Vasc Surg 2015;61:670-4.)**

Extracranial carotid artery occlusive disease is a major cause of ischemic stroke, accounting for 10% to 20% of patients presenting with stroke.[1] Randomized controlled trials have demonstrated durable benefit from carotid endarterectomy (CEA) in symptomatic and asymptomatic patients who have been appropriately selected,[2,3] establishing CEA as the gold standard in carotid revascularization.[4]

Some patients with severe coronary, pulmonary, and

patients, carotid angioplasty and stenting (CAS) has b
used as an alternative treatment option.[6]

The benefit of carotid revascularization is predicated or
patient's life expectancy, particularly in asymptomatic pati
who are only expected to derive the full preventive advant
if they anticipate a life expectancy of at least 3 years.[7] This
expectancy may not be realized in patients with multiple n
ical comorbidities, particularly patients with end-stage renal

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Carotid Endarterectomy Should Not Be Recommended to End-Stage Kidney Disease Patients with Asymptomatic Carotid Artery Disease

Muhammad Saad Hafeez, MBBS[1], **Othman Abdul-Malak, MD MS**[1], **Mohammad H Eslami, MD MPH**[1], **Rabih A Chaer, MD MS**[1], **Theodore H Yuo, MD MSc**[1]

[1]- Division of Vascular Surgery, University of Pittsburgh Medical Center, Pittsburgh, PA

Abstract

Introduction: Carotid endarterectomy (CEA) for asymptomatic carotid artery disease is advised for patients with low perioperative stroke risk and life expectancy of three to five years. We sought to explore the role of risk stratification and postoperative medical management in identifying appropriate asymptomatic candidates for CEA in the end-stage kidney disease (ESKD) population.

Methods: We identified ESKD patients on dialysis from the United States Renal Data System (USRDS) that underwent CEA (2008 – 2014) for asymptomatic carotid artery disease. We used the Liu comorbidity index as well as a novel risk prediction model based on Cox-proportional hazards model to stratify patients. The primary outcome evaluated was three-year survival, and Kaplan-Meier methods were used to generate survival estimates.

We further conducted a sub-analysis of patients with Medicare part D data to determine postoperative usage of the following medications: statins, antiplatelets, and antihypertensives. We evaluated the association of medication utilization and three-year survival using Kaplan-Meier methods and Cox proportional hazards modelling.

Results: We analyzed 1,813 patients meeting inclusion criteria. The population was predominantly older (mean age 70.2±9.1), White (84.8%) and had a high prevalence of cardiovascular comorbidities, such as hypertension (90.7%), diabetes (62.5%) and CHF (35.4%). Among the entire cohort, 23.0% had a Liu comorbidity index ≤ 8, 35.0% had index 9 to 12,

Results

738,561
patients with available records in USRDS databases

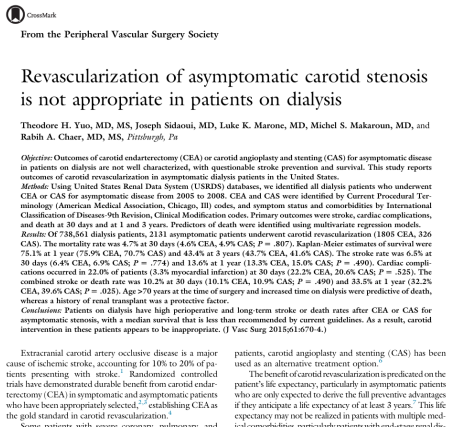
3,610
patients who underwent carotid revascularization

1,479
patients deemed symptomatic

2,131
asymptomatic patients

1,805
Carotid endarterectomy patients

326
Carotid artery stenting patients



From the Peripheral Vascular Surgery Society

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patients, carotid angioplasty and stenting (CAS) has been used as an alternative treatment option.[5]

The benefit of carotid revascularization is predicated on the patient's life expectancy, particularly in asymptomatic patients who are only expected to derive the full preventive advantages if they anticipate a life expectancy of at least 3 years.[6] This life expectancy may not be realized in patients with multiple medical comorbidities, particularly patients with end-stage renal dis-

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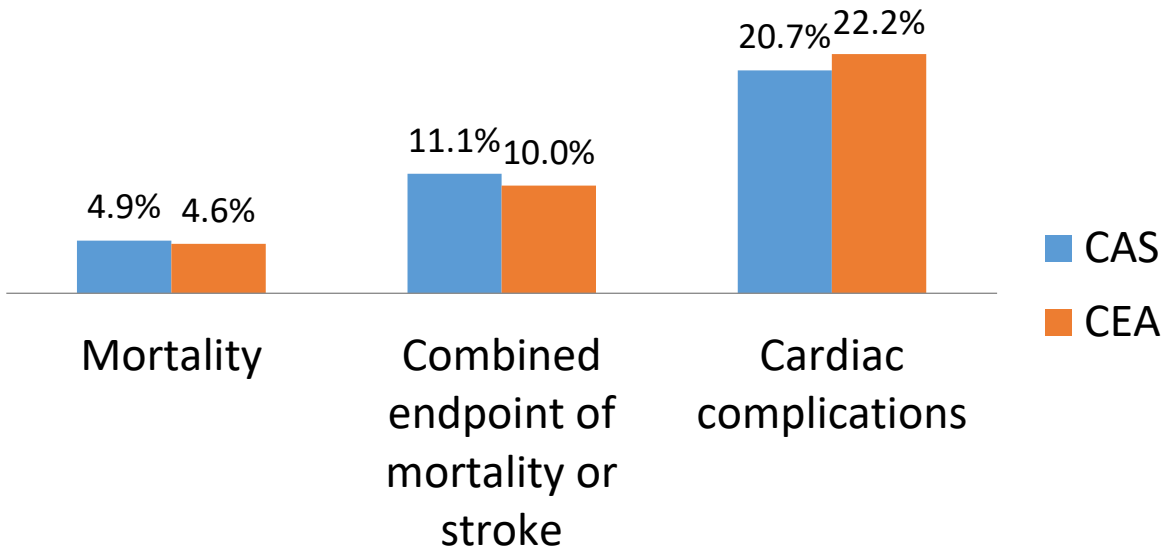
Perioperative results: Primary endpoints



P-value	0.81	0.56	0.69

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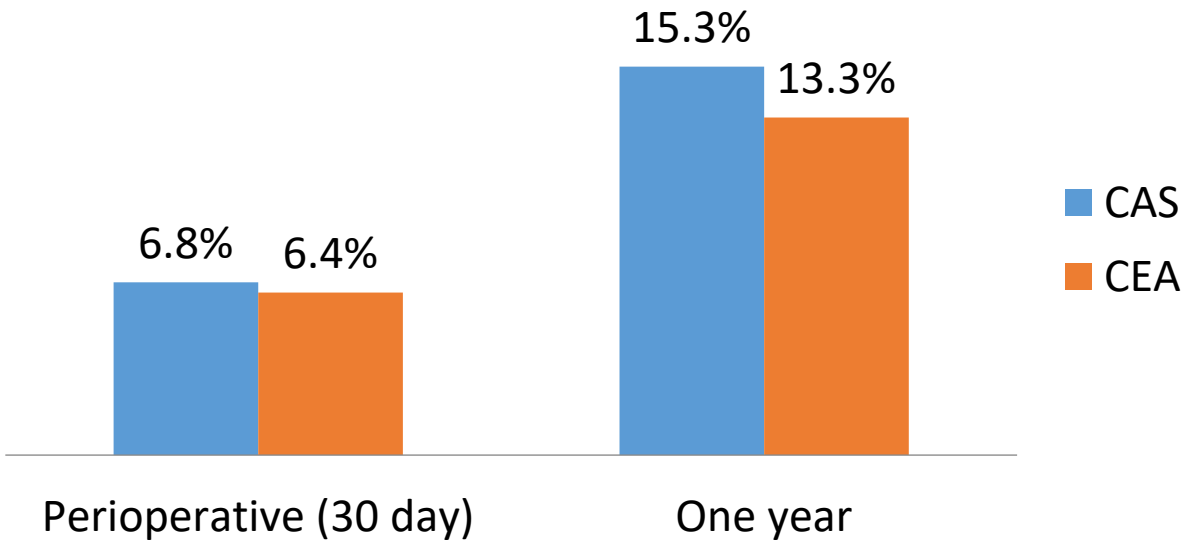
Stroke results



P-value	0.81	0.43

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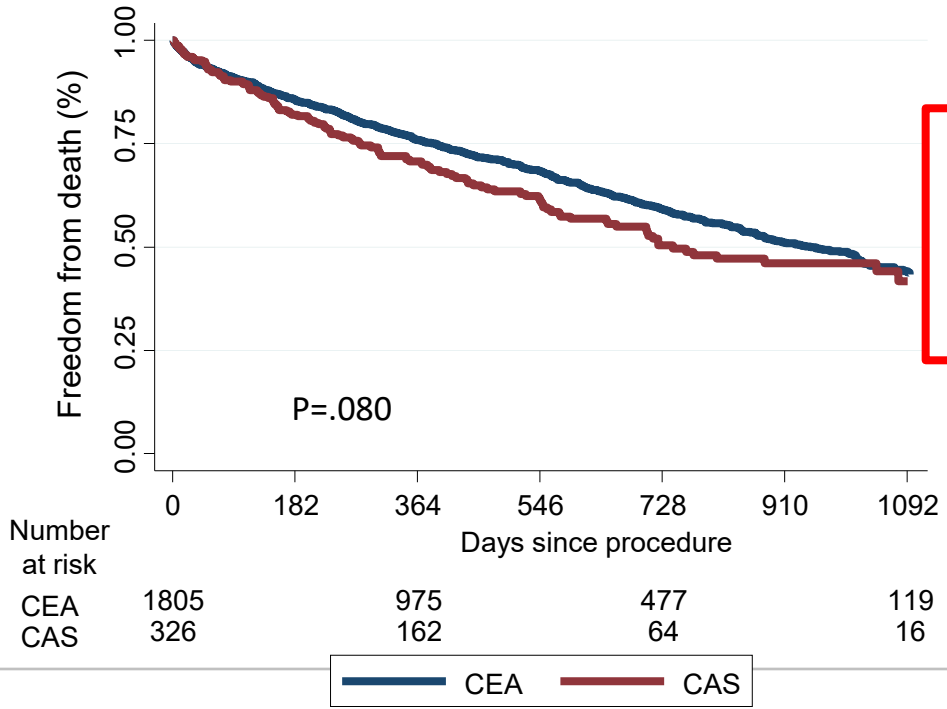
Three year Kaplan-Meier survival estimates



Median survival approximately 2.7 years

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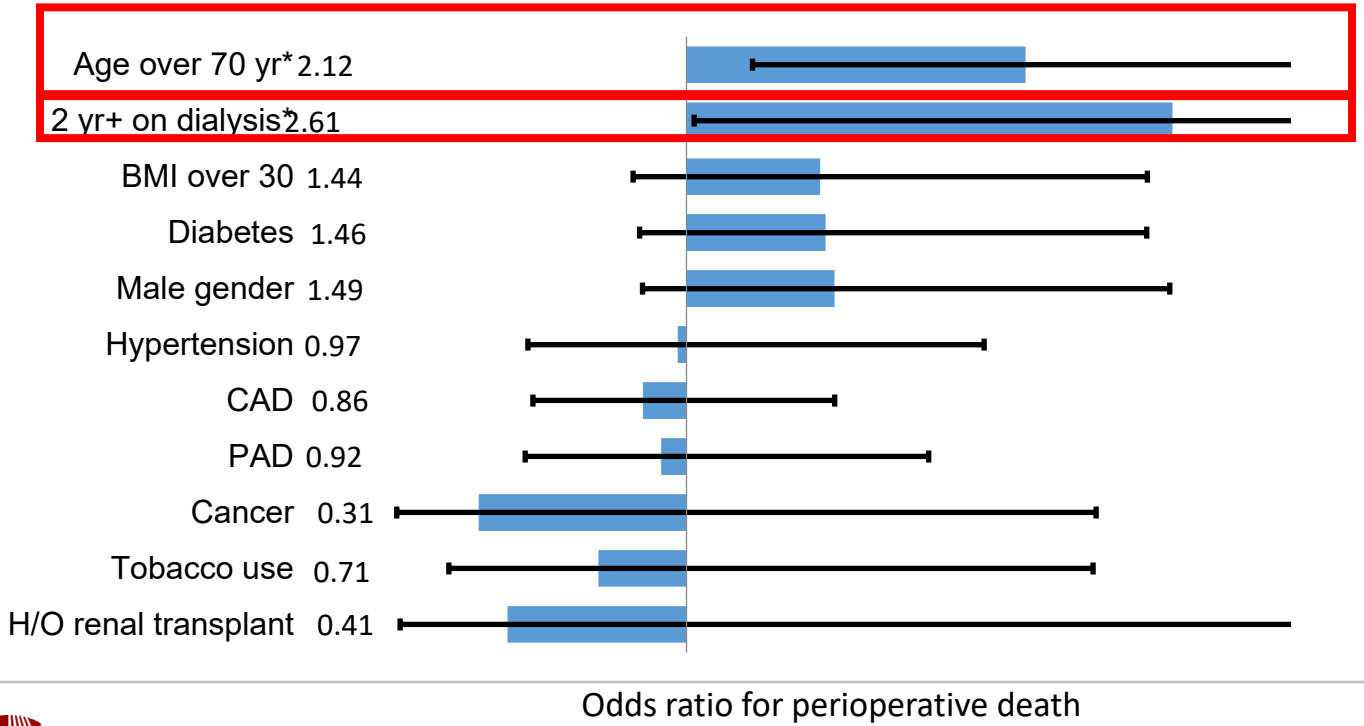
In multivariate analysis, age and time on dialysis remained as predictors of perioperative death



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* Significant at P<.05

NSQIP CEA, CAS data. J Vasc Surg 2021;74:195-202.

From the Society for Vascular Surgery

Check for updates

Perioperative outcomes for carotid revascularization on asymptomatic dialysis-dependent patients meet Society for Vascular Society guidelines

Christopher A. Latz, MD, MPH,[a] Laura T. Boitano, MD, MPH,[a] Linda J. Wang, MD, MBA,[a] Charles DeCarlo, MD,[a] Anna A. Pendleton, MD,[a] Harold D. Waller, MD,[a] Cheong J. Lee, MD,[b] *and* Anahita Dua, MD, MS, MBA,[a] *Boston, Mass; and Evanston, Ill*

ABSTRACT

Objective: The current Society for Vascular Surgery practice guidelines recommend carotid revascularization for asymptomatic disease in patients with at least a 3-year life expectancy and stenosis >60% when the expected perioperative stroke and death rate is <3%. Based on this recommendation, it was previously determined that asymptomatic patients who require dialysis would not meet the perioperative stroke and death thresholds nor the long-term survival benchmarks to justify carotid surgery. To determine whether carotid surgery for patients requiring dialysis is appropriate, the present study compared the perioperative outcomes after carotid revascularization for dialysis-dependent patients relative to nondialysis patients in a contemporary, national cohort.

Methods: The targeted vascular module from the American College of Surgeons National Surgical Quality Improvement Program was queried to identify patients who undergone carotid endarterectomy or carotid artery stenting for asymptomatic carotid disease from 2011 to 2018. The cohort was categorized as requiring or not requiring dialysis. The primary 30-day outcomes included mortality and the composite of stroke/death and stroke/death/myocardial infarction (MI). Univariate analyses were performed using the Fisher exact test and Wilcoxon rank sum test. Multivariable analyses were used to assess the independent associations of the estimated glomerular filtration rate and dialysis dependence with the stroke/death rate.

Results: A total of 17,579 patients met the inclusion criteria. Of these patients, 226 (1.3%) required dialysis at revascularization. No difference was found in the degree of severe stenosis (80%-99%) demonstrated by 69% of the dialysis cohort and 72% of the nondialysis cohort ($P = .9$). Of the dialysis and nondialysis cohorts, 5% and 3.6% underwent carotid artery stenting ($P = .3$). The dialysis-dependent patients were younger (68 vs 71 years; $P < .001$) and were more likely to have insulin-dependent diabetes (47% vs 12%; $P < .001$), congestive heart failure (8.4% vs 1.4%; $P < .001$), and severe chronic obstructive pulmonary disease (15% vs 10%; $P = .03$). In the dialysis and nondialysis cohort, 2 (0.9%) and 88 (0.5%) patients died ($P = .3$); 4 (1.8%) and 247 (1.4%) experienced strokes ($P = .6$); and 3 (1.3%) and 185 (1.1%) patients experienced MI ($P = .5$), respectively. The composite outcomes of stroke/death and stroke/death/MI was 2.2% (n = 5) and 1.8% (n = 319; $P = .6$) and 3.5% (n = 8) and 2.8% (n = 479; $P = .4$) in the dialysis and nondialysis cohorts, respectively. After multivariable analysis, neither the estimated glomerular filtration rate (adjusted odds ratio, 1.0; 95% confidence interval, 1.00-1.01; $P = .26$) nor dialysis dependence (adjusted odds ratio, 0.21; 95% confidence interval, 0.03-1.57; $P = .13$) was independently associated with the composite outcome of stroke/death.

Conclusions: The 30-day carotid revascularization outcomes for asymptomatic disease in dialysis-dependent patients met the Society for Vascular Surgery guidelines in this national cohort and might be better than previously surmised.

Stroke/death and stroke/death/MI: 2.2% and 1.8% and 3.5% and 2.8% in the dialysis and nondialysis cohorts, respectively.

Only the 30-day portion of the SVS guidelines were evaluated??

VQI data. CEA vs TCAR vs TFCAS: J Vasc Surg 2024;80:1464-74.

From the Society for Vascular Surgery

Check for updates

Outcomes of car
patients with an
dialysis patients

Elisa Caron, MD,[a] Sai Divya
Tim J. Mandigers, MD,[a] Jo
Grace J. Wang, MD, MSCE,
and Portland, ME

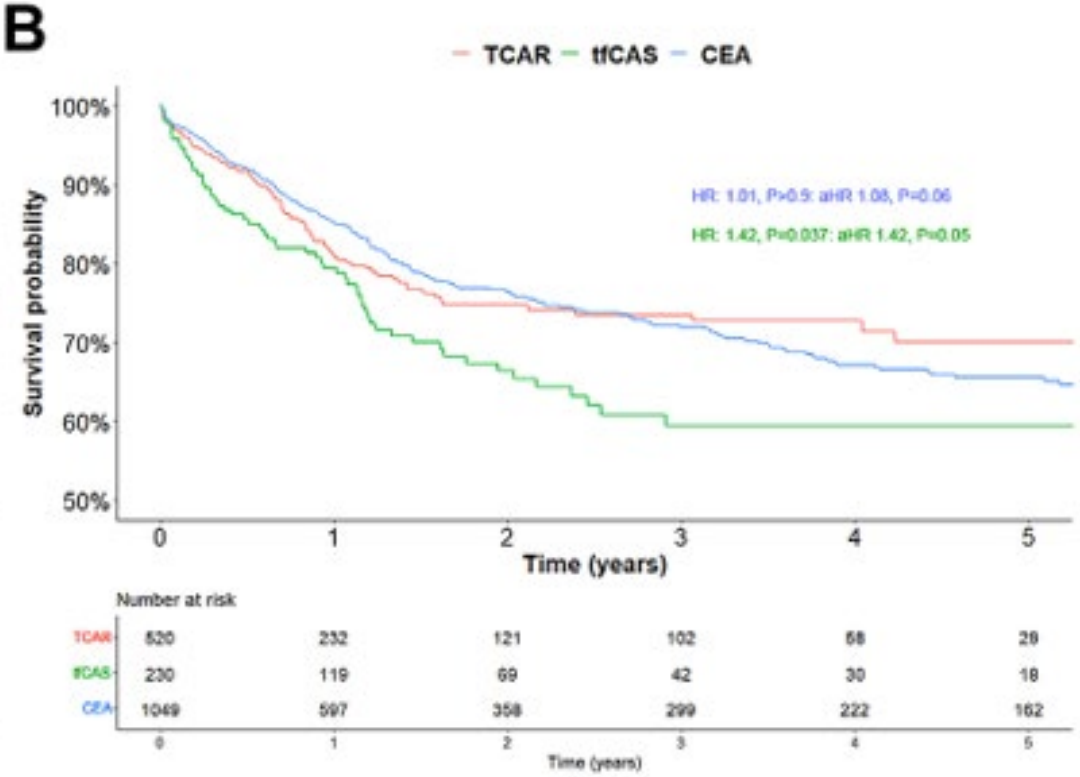
ABSTRACT

Objective: Renal failure is a pr
the benefit of revascularizatio

Methods: Patients in the Vasc
carotid artery stenting (tfCAS
of <30 mL/min/1.73 m^2 or on
analyses were performed for p
death/myocardial infarction (M
and stroke/death. Inverse pro
tfCAS, and CEA patients and
multivariable logistic regressio
the weighted cohort. Five-yea

Results: In the weighted coh
dialysis), tfCAS (1975; 393 on dia
higher odds of SDM (2.8% vs 3
(0.7% vs 1.5%; aOR, 2.00; 95% C
and death (0.9% vs 2.4%) were
1.3%; aOR, 1.85; 95% CI, 1.15-2.97
the primary analysis, asympto
CEA patients demonstrated n
odds of death, stroke, MI, str
(eGFR <30, 75.1% vs 74.2%; aHR, 1.06; $P = .3$) and lower for tfCAS (eGFR <30, 75.1% vs 70.4%; aHR, 1.44; $P < .001$).

Conclusions: CEA and TCAR had similar odds of stroke and death and are both a reasonable choice in this population; however, TCAR may be better in patients with an increased risk of MI. Additionally, tfCAS patients were more likely to



CEA and TCAR had similar odds of stroke
atients with

atients, the 5-
or CEA and
% for TCAR in
g-term
nd worse

HD there
ces in 5-year

Impact of ESRD

- CKD is a known physiological high-risk factor associated with higher stroke and death after CEA.
- The increased occurrence of MI after CEA compared with TCAR is in concordance with prior literature and could be attributed to the minimally invasive nature of the procedure:

Shorter procedure time

Less extensive dissection

May result in lower physiological stress and thereby reduced postoperative cardiac events

2024 USRDS CEA cohort. Hafeez et al

1,813 patients: (mean age 70.2±9.1), White (84.8%) and had a high prevalence of cardiovascular comorbidities, such as hypertension (90.7%), diabetes (62.5%) and CHF (35.4%).

Among the entire cohort, 23.0% had a Liu comorbidity index ≤ 8, 35.0% had index 9 to 12, and 42.0% had index >12. Increasing Liu comorbidity index was associated with worse survival (p<0.01)

Even in the group with Liu index≤8, survival was poor and was 58.8% at 3 years

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Carotid Endarterectomy Should Not Be Recommended to End-Stage Kidney Disease Patients with Asymptomatic Carotid Artery Disease

Muhammad Saad Hafeez, MBBS[1], **Othman Abdul-Malak, MD MS**[1], **Mohammad H Eslami, MD MPH**[1], **Rabih A Chaer, MD MS**[1], **Theodore H Yuo, MD MSc**[1]

[1] Division of Vascular Surgery, University of Pittsburgh Medical Center, Pittsburgh, PA

Abstract

Introduction: Carotid endarterectomy (CEA) for asymptomatic carotid artery disease is advised for patients with low perioperative stroke risk and life expectancy of three to five years. We sought to explore the role of risk stratification and postoperative medical management in identifying appropriate asymptomatic candidates for CEA in the end-stage kidney disease (ESKD) population.

Methods: We identified ESKD patients on dialysis from the United States Renal Data System (USRDS) that underwent CEA (2008 – 2014) for asymptomatic carotid artery disease. We used the Liu comorbidity index as well as a novel risk prediction model based on Cox-proportional hazards model to stratify patients. The primary outcome evaluated was three-year survival, and Kaplan-Meier methods were used to generate survival estimates.

We further conducted a sub-analysis of patients with Medicare part D data to determine postoperative usage of the following medications: statins, antiplatelets, and antihypertensives. We evaluated the association of medication utilization and three-year survival using Kaplan-Meier methods and Cox proportional hazards modelling.

Results: We analyzed 1,813 patients meeting inclusion criteria. The population was predominantly older (mean age 70.2±9.1), White (84.8%) and had a high prevalence of cardiovascular comorbidities, such as hypertension (90.7%), diabetes (62.5%) and CHF (35.4%). Among the entire cohort, 23.0% had a Liu comorbidity index ≤ 8, 35.0% had index 9 to 12,

Liu comorbidity index

Tool used to quantify comorbidity in chronic dialysis patients, capturing baseline comorbidities from days 91 through 270 after dialysis initiation
The index consists of 11 comorbidity covariates, creating a 24-point scale, and is used to predict post-operative survival in kidney recipients older than 55 years.
Validated using large databases and has been shown to have much greater statistical power than previous indices.

<u>11 comorbid conditions used by the USRDS:</u>
Diabetes, ASHD, CHF, PVD, CVA/TIA, dysrhythmia, other cardiac diseases (including pericarditis, endocarditis, myocarditis, other complications of heart disease, heart transplant, heart valve replacement, and cardiac devices), cancer, liver disease, GI bleeding, and COPD.

Survival estimate for groups on the basis of Liu score

Liu Score Category	Survival Estimates, (%)		
	One-Year	Two-Year	Three-Year
≤ 8	87.7 (84.1 – 90.5)	73.7 (69.2 – 77.7)	58.8 (53.9 – 63.4)
9 to 12	80.3 (77.0 – 83.2) *	65.1 (61.2 – 68.7) *	50.4 (46.4 – 54.3) *
>12	71.1 (67.7 – 74.2) *	52.2 (48.5 – 55.8) *	35.7 (32.2 – 39.2) *

2024 USRDS CEA cohort. Novel Risk Index Logistic Regression

Variable	Multivariate Cox: aHR [95% C.I.]	Logistic Regression Model, aOR [95% C.I.]	Points Assigned
Age at operation: 60 to 80	1.55 [1.21 – 1.99]	1.82 [1.33 – 2.50]	+1
Age at operation: More than 80	2.49 [1.87 – 3.33]	3.22 [2.13 – 4.83]	+2
Congestive heart failure	1.31 [1.14 – 1.51]	1.45 [1.17 – 1.80]	+1
Institutional care	1.44 [1.03 – 2.03]	1.40 [0.78 – 2.53]	+1
Nephrology care before dialysis initiation	1.21 [1.02 – 1.43]	1.48 [1.17 – 1.87]	+1
Liu comorbidity score: >12	1.89 [1.56 – 2.28]	1.97 [1.60 – 2.43]	+1.5

Factors independently associated with survival

Carotid Endarterectomy Should Not Be Recommended to End Stage Kidney Disease Patients with Asymptomatic Carotid Artery Disease
Ann Vasc Surg. 2024 April ; 101: 53–61.

Survival based on risk score category

Risk Score Category	Survival Estimates, (%)		
	One-Year	Two-Year	Three-Year
≤ 2	85.7 (83.1 – 88.0)	72.1 (68.8 – 75.1)	58.5 (54.9 – 61.9)
2 to 4	75.1 (71.8 – 78.1) *	58.2 (54.6 – 61.7) *	40.6 (37.0 – 44.1) *
>4	64.7 (58.7 – 70.1) *	41.3 (35.3 – 47.2) *	26.4 (21.2 – 31.9) *

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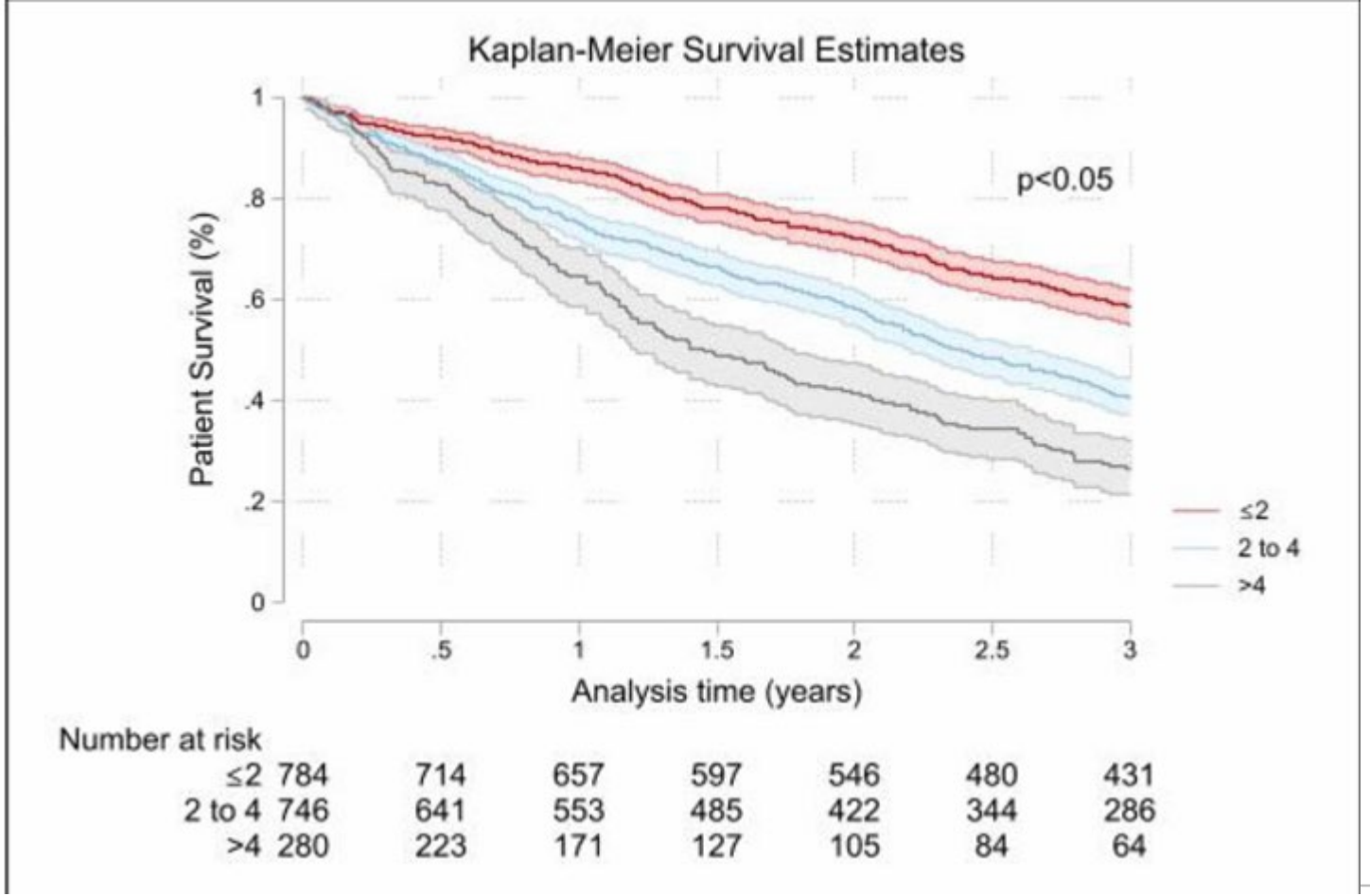

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Carotid Endarterectomy Should Not Be Recommended to End Stage Kidney Disease Patients with Asymptomatic Carotid Artery Disease
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2024 USRDS CEA cohort. Logistic regression. Hafeez et al.

- Poor survival at 3 years even in patients with Liu index <8, and in low-risk group
- We were unable to identify good-risk patients with adequate three-year survival, suggesting that endarterectomy for asymptomatic disease is not suitable in the ESKD population.

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Life expectancy on dialysis

- Survival is highly individual and can range from 1 year to >30 years
- Factors influencing survival:
  - **Age: <45, >65**
  - **Overall health: comorbidities**
  - **Treatment type: PD>HD**
  - **Compliance/adherence: timely sessions, diet, fluid restriction, etc**
  - **Kidney transplant**

Increased Longevity on dialysis

- Technical advancements: modern HD machines and better PD techniques have increased safety and efficacy of therapy
- New medications: anemia management
- Uptake of clinical practice guidelines: decreased catheter use
- Increased access to transplant
- Improved allograft survival
- Decreased hospitalization rate among patients with ESRD for CV and infectious events

Increased Longevity on dialysis

- Fistula First Initiative and use of autogenous access
- Pre ESRD care and earlier nephrology consultation >3months before ESRD
- Improved medical management: anemia, mineral bone disease, blood pressure, CV care, nutritional management, mental health support
  - **Comprehensive care approach**
- Widespread adoption of clinical protocols to standardize care
- AI application: input specific scenario, performs calculations and displays estimated probability of mortality based on the entered parameters.
- Risk report to explain the factors that contribute to the predicted risk in individualized cases.

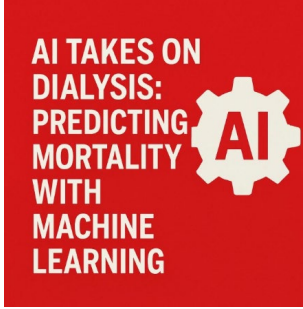
My Conclusions 10 years ago

End-stage renal disease patients are a fragile patient population

Life expectancy is less than advocated by current guidelines for revascularization of asymptomatic carotid occlusive lesions

Carotid revascularization appears to be inappropriate in this group of patients

My Conclusions today



In recent years, the life expectancy for patients on dialysis has increased and is currently 5-10 years (USRDS)

As a result of improvements in care for renal failure patients, coupled with improvement in carotid revascularization, patients on dialysis ***can*** benefit from carotid revascularization, with CEA or TCAR

Individualized decision making for predicting longevity on dialysis: younger age, comorbidities, time on dialysis, transplant candidates?

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