2022 MID-ATLANTIC CONFERENCE

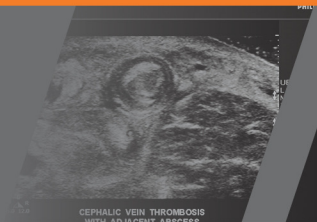
10th ANNUAL CURRENT CONCEPTS IN

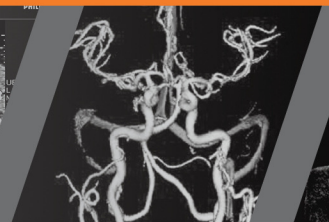
VASCULAR THERAPIES

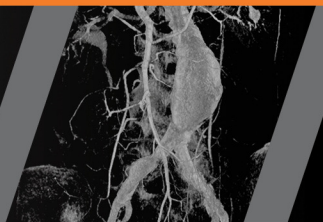
2022

Hilton Virginia Beach Oceanfront
Virginia Beach, Virginia

APRIL 28-30







Sentara Vascular Specialists

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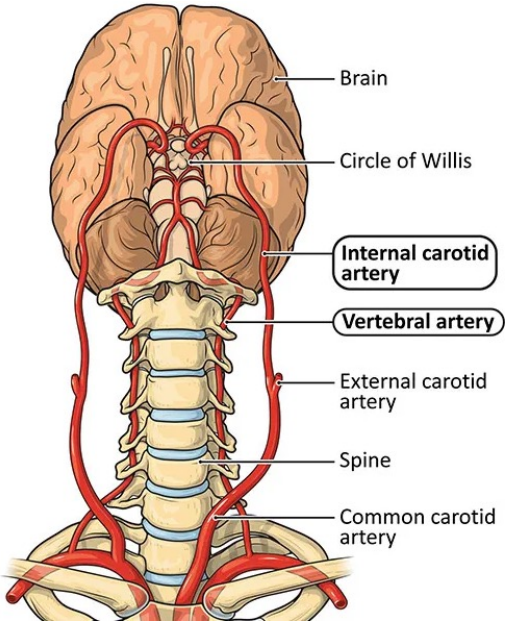
Vertebrobasilar Insufficiency



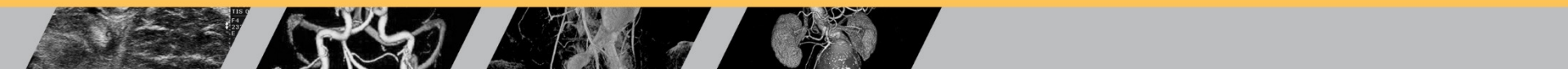
Justin Milligan MD
Sentara Vascular Specialists

Vertebrobasilar Insufficiency (VBI)

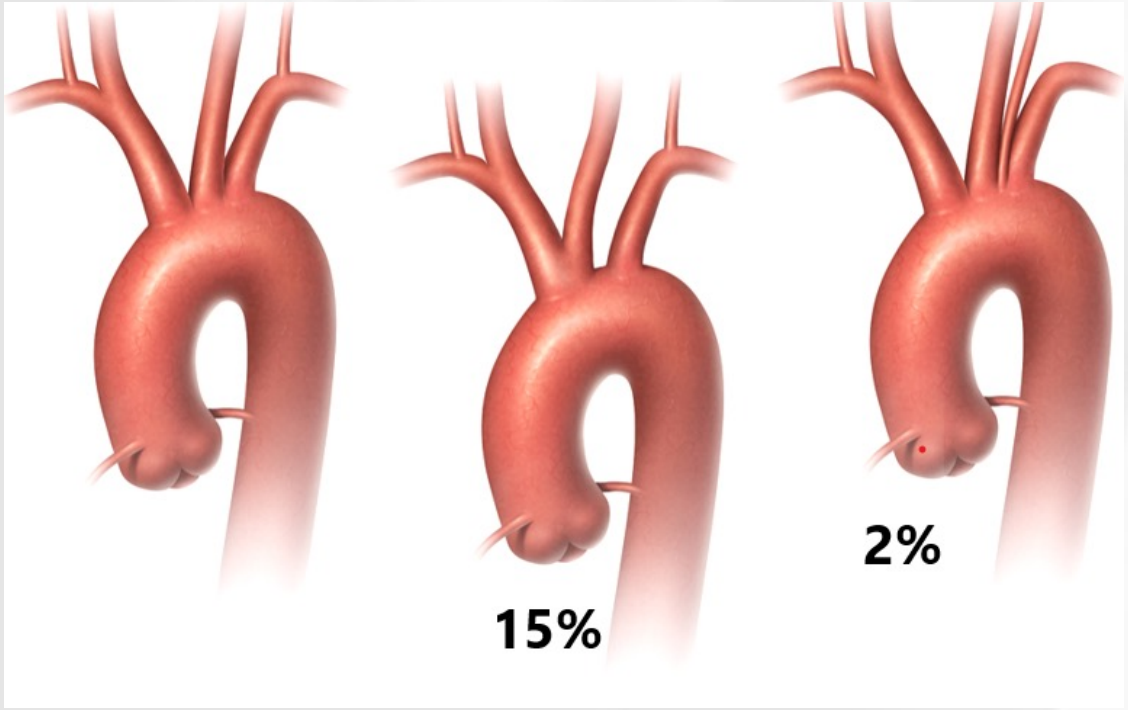
- VBI, coined in the 1950's after C. Miller Fisher used 'carotid insufficiency" to describe TIA in the carotid supplied territories
  - VBI therefore often used to describe brief episodes of transient ischemic attacks in the vertebrobasilar territory.

- Posterior circulation → brainstem, thalamus, hippocampus, cerebellum, occipital and medial temporal lobes.

- Presentation shares features with several other more common etiologies including labyrinthitis, vestibular neuritis, and benign paroxysmal positional vertigo.



Anatomy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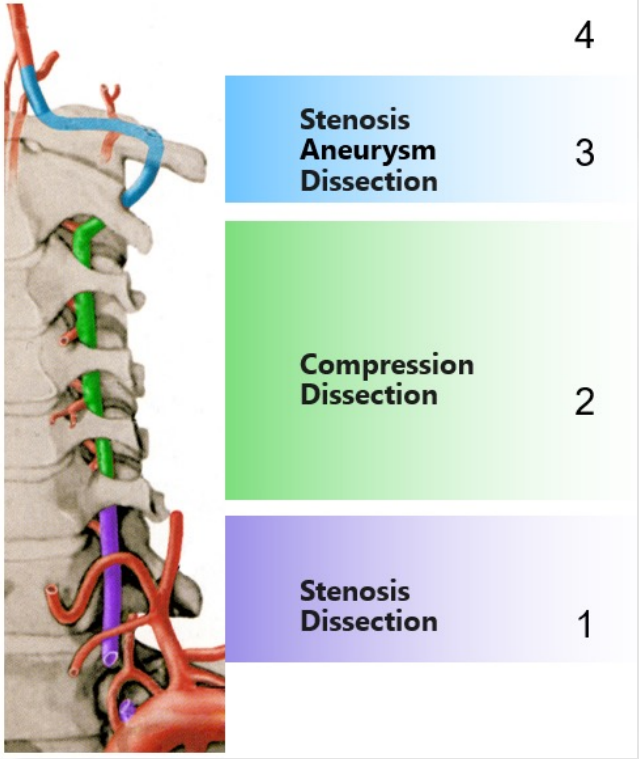
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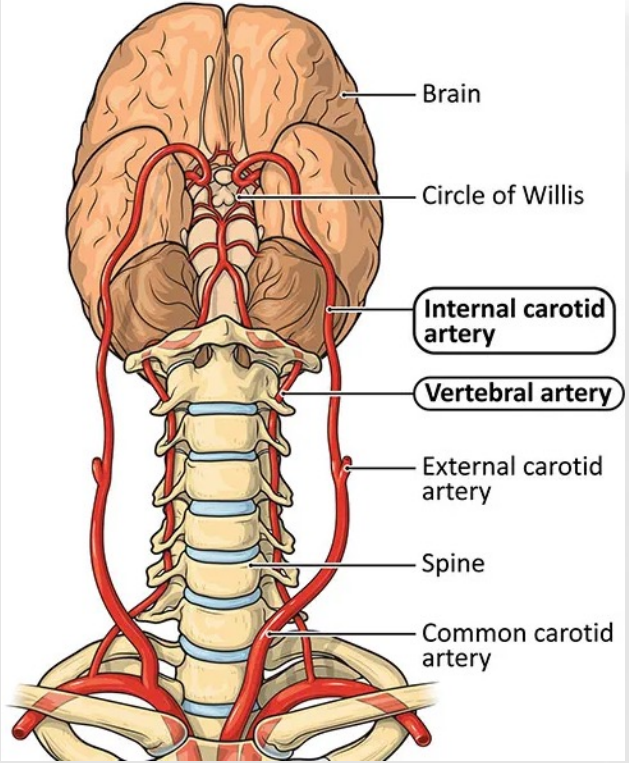
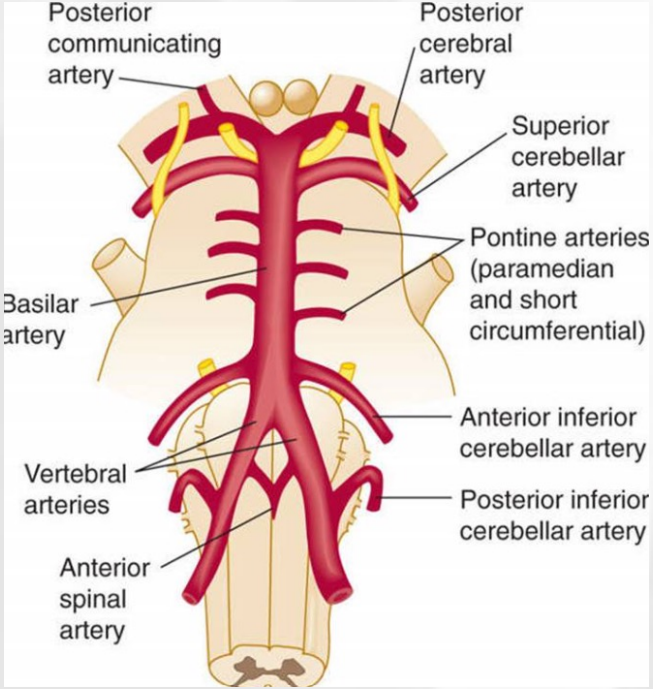
Stenosis
Aneurysm
Dissection
3
Compression
Dissection
2
Stenosis
Dissection
1

Anatomy





1st major branch:
Posterior Inferior Cerebellar Artery (PICA)

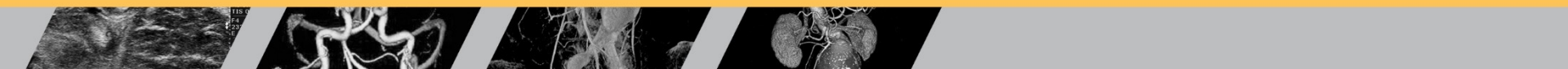
2nd major branch:
Anterior spinal Artery

Then merges to form
Basilar artery

Vertebrobasilar Insufficiency (VBI)

- As with other types of strokes, infarct can occur from either an **embolism**, **in-situ thrombosis**, or lacunar disease secondary to chronic hypertension.

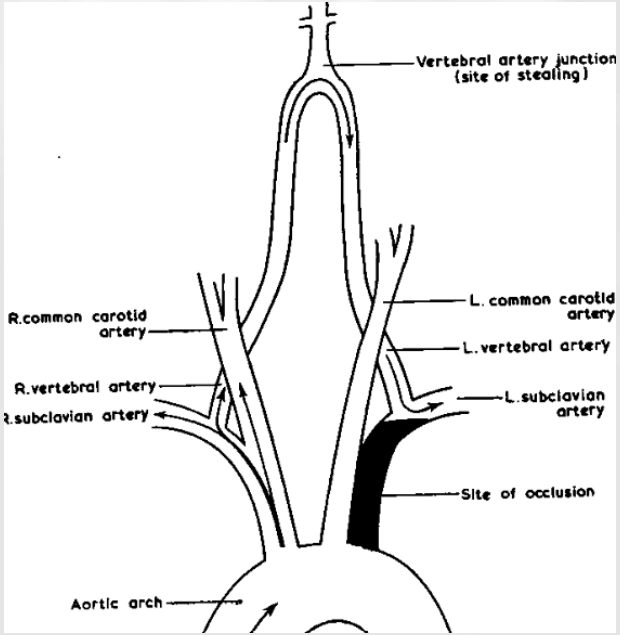
- Usually, VBI is caused by 2 processes of ischemia:
  - **Hemodynamic insufficiency**
  - **Embolism**
    - Unlike the carotid arteries, embolism via the vertebral arteries is not common.
    - Donor sites for embolism may include the aortic arch, the origin of the vertebral artery or the proximal subclavian arteries. Most cases, however, are due to atherosclerotic disease.



Vertebrobasilar Insufficiency (VBI)

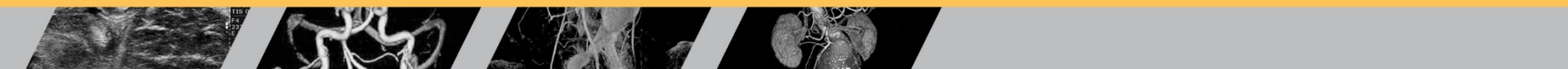
- **Hemodynamic insufficiency** →causes most VBI.
    - Inadequate blood flow through the basilar artery, especially in the elderly and diabetic populations with poor sympathetic control.
    - Symptoms tend to be reproducible and short, rarely causing infarction
    - Must be an incomplete contribution via carotid circulation via the posterior communicating artery in the circle of Willis.
- **Other causes** for a decrease in perfusion → antihypertensive medications, cardiac arrhythmia, pacemaker malfunction, and vasculitis.
- Occlusions in other blood vessels (i.e Subclavian Steal syndrome) may also cause VBI by "stealing" blood flow from the brainstem as blood flows down the path of least resistance

Subclavian Steal



Lancet (1986)

- 500 patients with asymptomatic neck bruits were followed prospectively for up to 4 years
- 9% of patients (45/500) had severe subclavian stenosis
  - 64% (32/45) positive subclavian-steal test
    - Left-sided lesions (27/32).
  - **No patients** had symptoms as a result of arm exercise during the steal test, and no patients had stroke during follow-up.
  - Reversed flow down one vertebral artery is relatively common in patients and is usually asymptomatic

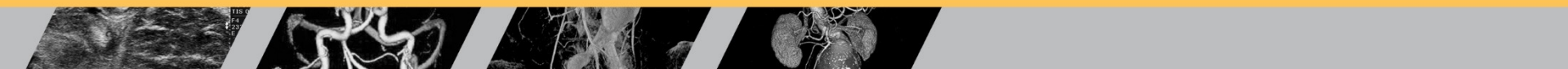


SYMPTOMS OF VBI

- Vertigo (the most common symptom)
- Dizziness/syncope (60% of VBI)
- "Drop attacks:"
- Diplopia/Loss of vision
- Dysphagia/dysarthria
- Headache
- Ataxia
- Loss of temperature and pain
- Incontinence

PHYSICAL EXAM OF VBI

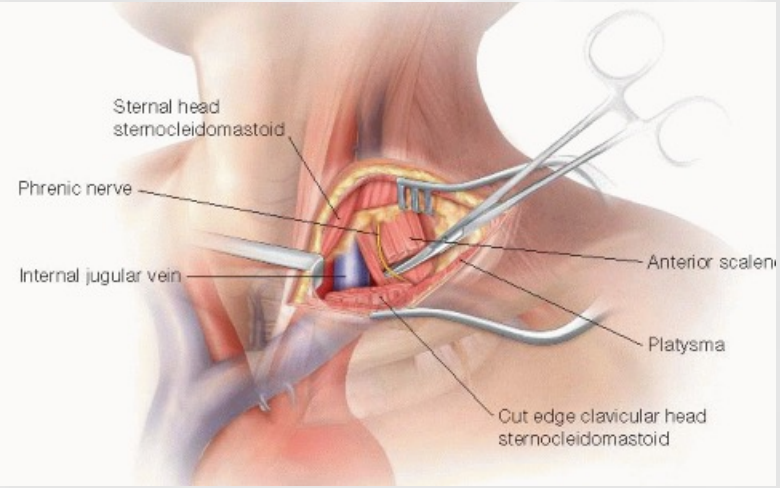
- Alteration in pupil size and reactivity (CNIII)
- Horizontal gaze palsy (CN VI lesion)
- Facial nerve (CN VII) paralysis
- Bulbar palsy (CN IX, XI, XII) w/ dysarthria, dysphonia, dysphagia, dysarthria, facial weakness
- Contralateral hemianopsia with macular sparing (posterior cerebral artery involvement)
- Ipsilateral temperature loss and facial pain (CN V)



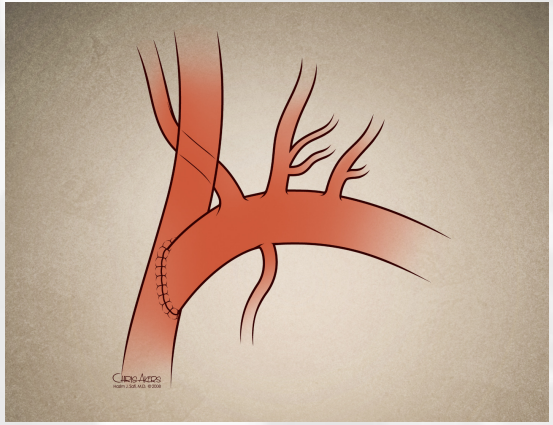
VERTIGO

- Benign conditions that may also cause similar symptoms such as labyrinthitis, vestibular neuritis, and most commonly benign paroxysmal positional vertigo.
- Vertigo is a common symptom in VBI.
- Vertigo in the presence of brainstem signs or symptoms will be diagnostic of vertebrobasilar territory TIA.
- Look for brainstem signs or cranial nerve abnormalities

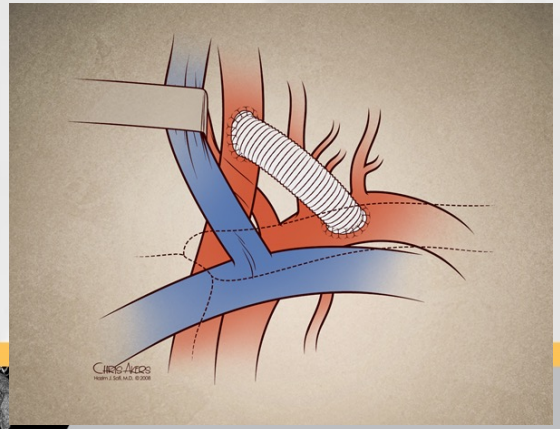
SCA Revascularization



Subclavian-Carotid Transposition

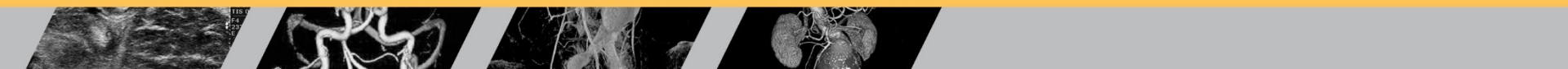


Carotid – Subclavian Bypass



Cervical Bypass

SERIES	N	MORTALITY	STROKE	MI	SURVIVAL (5Y)	SURVIVAL (10Y)	PATENCY (5Y)	PATENCY (10Y)
Crawford (1983)	99	1	2	NA	NA	NA	NA	NA
Salam (1993)	31	0	0	0	NA	NA	NA	NA
Salam (1994)	41	0	0	0	NA	NA	73	NA
Berguer (1999)	182	0.5	3.8	3	72	41	91	82
Byrne (2007)	143	0.7	1.4	4.3	NA	NA	92	NA

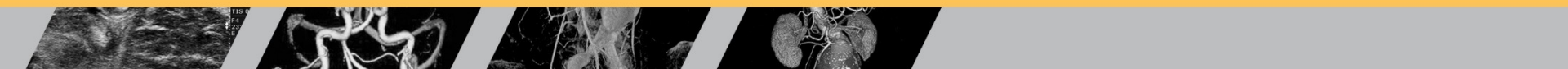


SCA Revascularization
ENDO VS OPEN

- Primary patency rates (1, 3, and 5 yr)
  - Endo: 93%, 78%, and 70%
  - Open: 100%, 98%, and 96%

- Major complication rate: 5.8% vs. 5.9%
- Stroke <1% in endovascular series
- Cumulative endo 5-yr patency: 77-89%.

AbuRahma AF, Bates MC, Stone PA, et al. J Endovasc Ther 2007;14:698-704.



Vertebral Revascularization

- V1: carotid-vertebral transposition. Also bypass and endarterectomy.
  - 1% stroke / death
  - RLN palsy, Horner's syndrome, chylothorax
  - 5-yr patency 95%
- V2: not easily accessible – proximal/distal ligation +/- bypass if symptoms.
- V3: saphenous bypass
  - 4% stroke /death
  - 8% immediate graft thrombosis
  - 5-yr patency: 87%
- Vertebral angioplasty +/- stent
  - 6.4% stroke / death
  - No long-term data

Vertebral artery stenting to prevent recurrent stroke in symptomatic vertebral artery stenosis: the VIST RCT

- Symptomatic vertebral stenosis of at least 50% resulting from presumed atheromatous disease.
- Participants were randomly assigned (1 : 1) to either vertebral angioplasty/stenting plus BMT (*n* = 91) or BMT alone (*n* = 88). A total of 182 patients were initially enrolled
- The primary end point was the occurrence of fatal or non-fatal stroke in any arterial territory during follow-up.
- Median follow-up was 3.5 years
  - 61 patients who were stented
    - 48 (78.7%) had extracranial stenosis
    - 13 (21.3%) had intracranial stenosis.

Vertebral artery stenting to prevent recurrent stroke in symptomatic vertebral artery stenosis: the VIST RCT

- The primary end point was the occurrence of fatal or non-fatal stroke in any arterial territory during follow-up.
  - No perioperative complications w/ extracranial stenting; 2 CVA w/ intracranial stenting.
  - 5 /91 (including one fatal stroke) in the stent group
  - 12/88 patients (including two fatal strokes) in the medical group
  - Hazard ratio of 0.40, 95% confidence interval 0.14 to 1.13; $p = 0.08$)
  - Absolute risk reduction of 25 strokes per 1000 person-years.
- The study was underpowered because it failed to reach target recruitment.
- **Conclusions:** The trial found no significant difference in risk of the primary end point between the two groups.

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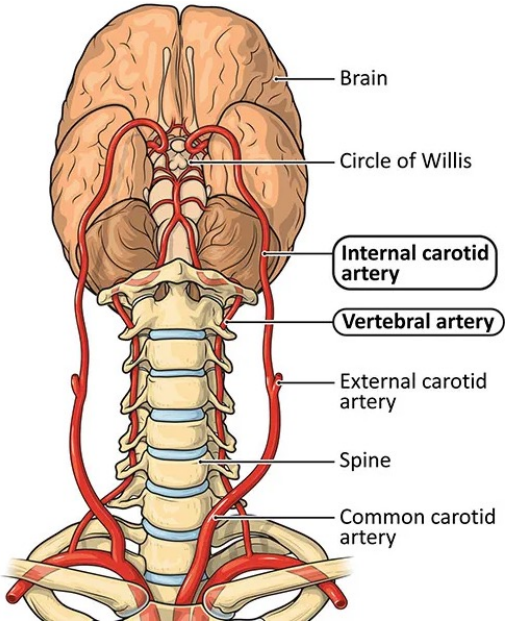
Thank You!



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