

CAROTID BRUIT

Dr. Yadav

January, 2009

1. **A 50 year old African American male is seen in you clinic for a routine annual physical examination and follow up. Past medical history is significant for hypertension for the past 5 years. The patient is on HCTZ 25mg and Benazepril 10mg for his hypertension. He smokes 1 pack of cigarettes everyday for the past 10 years. On examination, BP is 150/110mm of Hg. A right sided carotid bruit is appreciated. What would be the screening test of choice (with respect to safety, expense, sensitivity and specificity) in order to evaluate the carotid bruit?**
 - a. **Intra-arterial angiography**
 - b. **Carotid duplex USG**
 - c. **CT angiography**
 - d. **MRA**

2. **Contrast enhanced magnetic resonance imaging is much more sensitive and specific than Doppler USG/CT angiography in detecting carotid stenosis T/F?**

3. **A carotid duplex is scheduled for the patient. This reveals 70% stenosis of the right internal carotid artery. What would be your modality of management of the carotid stenosis for this patient?**
 - a. **Carotid endarterectomy**
 - b. **Serial monitoring with Carotid duplex USG once a year to monitor for progression**
 - c. **Risk factor modification**
 - d. **Antiplatelet agents**
 - e. **c& d**

4. **Would you recommend screening all your clinic patients for carotid stenosis whether symptomatic or not?**

5. **Is the detection of a carotid bruit a good predictor of underlying carotid stenosis in asymptomatic individuals?**

- 6. A 64 year old man is evaluated for loss of vision in his right eye for about 10 minutes yesterday. He is requesting a referral to an ophthalmologist. He has a past medical history of hypertension, diabetes mellitus and is a former smoker. BP is 142/90 mm of hg. Carotid USG shows a 80-90% stenosis of the right internal carotid artery and a 70-80% stenosis of the left ICA. What is the most appropriate next step in management?**

 - a. Switch ASA to warfarin**
 - b. Add clopidogrel to ASA**
 - c. Right carotid endarterectomy**
 - d. Left carotid endarterectomy**
 - e. Left carotid angioplasty with stenting.**

- 7. What is the most appropriate timing for the surgery?**

 - a. 3 months after the event**
 - b. 6 months after the event**
 - c. Within the first 2-4 weeks of the event.**

- 8. If the same patient in Question 6 presents to the clinic with the same complaints and the carotid USG showed a stenosis of 40% of the right ICA and no stenosis in the left ICA—what would be your modality of treatment?**

 - a. Management of risk factors**
 - b. Carotid endarterectomy as he is symptomatic**
 - c. Add warfarin**

CAROTID BRUIT - ANSWER KEY

**Dr. Yadav
January, 2009**

- 1. A 50 year old African American male is seen in you clinic for a routine annual physical examination and follow up. Past medical history is significant for hypertension for the past 5 years. The patient is on HCTZ 25mg and Benazepril 10mg for his hypertension. He smokes 1 pack of cigarettes everyday for the past 10 years. On examination, BP is 150/110mm of Hg. A right sided carotid bruit is appreciated. What would be the screening test of choice (with respect to safety, expense, sensitivity and specificity) in order to evaluate the carotid bruit?**

- a. Intra-arterial angiography**
- b. Carotid duplex USG**
- c. CT angiography**
- d. MRA**

1. b .Carotid Doppler USG is a noninvasive, safe and relatively inexpensive test to detect a significant stenosis (i.e.>50%) of the Internal Carotid artery. It is 81-98% sensitive and 82-89% specific in detecting a significant stenosis of the internal carotid artery. The general approach to patients with suspected carotid stenosis is to first perform carotid duplex ultrasound. Those with stenoses less than 50 percent are followed with serial examinations, usually on an annual basis to determine if there is progression. If there is greater than 50 percent stenosis suspected, the patient is evaluated with transcranial Doppler examination and MRA. Intra-arterial angiography is the gold standard test—it is however associated with a risk of stroke.

- 2. Contrast enhanced magnetic resonance imaging is much more sensitive and specific than Doppler USG/CT angiography in detecting carotid stenosis T/F**

- a. True** .A contrast enhanced MRA (with gadolinium) uses a vascular contrast which produces higher quality images that are less prone to artifacts. It is much more accurate than the other noninvasive tests. The combination of a carotid Doppler USG and MRA can be substituted for the gold standard test (i.e. conventional angiography) in the presurgical assessment of patients with the carotid disease.

- 3. A carotid duplex is scheduled for the patient. This reveals 70% stenosis of the right internal carotid artery. What would be your modality of management of the carotid stenosis for this patient?**

- a. Carotid endarterectomy**

b. Serial monitoring with Carotid duplex USG once a year to monitor for progression

c. Risk factor modification

d. Antiplatelet agents

e. c& d

No direct answer to this question. The decision should be based on evaluating the risk/benefit ratio for each individual patient.

Some of the factors include-

- A. Delay to benefit. The degree of benefit is not as great as that for a symptomatic patient. (2 year risk reduction of stroke from 26% to 9% for symptomatic patients in comparison to 5 year risk reduction from 11% to 5% in asymptomatic patients). CEA is considered a long time investment in asymptomatic patients. This is because the perioperative morbidity is found to be higher in asymptomatic patients.
- B. Perioperative complications
CEA should only be considered in institutions where the perioperative stroke and death rate are less than 3%
- C. Gender
The benefit appears to be greater for men than women.
Medical management is suggested for asymptomatic women than CEA
- D. Contralateral carotid occlusion
There was no long term benefit for patients with contralateral carotid occlusion. This was based on the study -Effect of contralateral occlusion on long-term efficacy of endarterectomy in the asymptomatic carotid atherosclerosis study (ACAS)
- E. Advances in medical therapy
It is suggested that rigorous and compliant treatment for lipids, glucose, hypertension, and cigarette smoking, along with appropriate antiplatelet treatment, can narrow the gap between medical and surgical treatment of carotid disease. Data is however not very clear on this.
CEA (carotid endarterectomy) is recommended for medically stable men between the ages of 40 and 75 years with asymptomatic carotid stenosis of 60 to 99 percent who have a life expectancy of at least five years, provided the perioperative risk of stroke and death for the surgeon or center is less than 3 percent. This is a grade 2A recommendation. This was based on a consensus statement published from the stroke council in 2001 of the American Heart Association and on an evidence based review of CEA published by the American academy of Neurology in 2005.
The NNT (number needed to treat) to prevent 1 stroke is 33 and the degree of benefit is not as great as that for a symptomatic patient.(2 year risk reduction of stroke from 26% to 9% for symptomatic patients in comparison to 5 year risk reduction from 11% to 5% in asymptomatic patients)

The perioperative morbidity is also found to be higher in asymptomatic patients.

4. Would you recommend screening all your clinic patients for carotid stenosis whether symptomatic or not?

No

- The United States Preventive Services Task Force (USPSTF) recommends against screening for asymptomatic carotid artery stenosis in the general population
- Joint guidelines on primary prevention of stroke from the American Heart Association and American Stroke Association acknowledge that "screening of general populations for asymptomatic carotid stenosis is unlikely to be cost-effective"
- The American Society of Neuroimaging suggests that, while screening for the general population is not recommended, screening might be considered for patients ≥ 65 years with significant risk factors for cardiovascular disease.

5. Is the detection of a carotid bruit a good predictor of underlying carotid stenosis in asymptomatic individuals?

No

This was demonstrated by the Systolic Hypertension in the elderly program (SHEP) and the Framingham Study.

- i. The SHEP study showed that there was no significant risk of stroke in patients with a carotid bruit over a 4.2 year follow up.
- ii. The Framingham Heart study showed that there was a risk of stroke but it was in a different vascular territory thereby indicating that detection of a carotid bruit was more an indication of generalized atherosclerosis rather than an underlying significant carotid stenosis

6. A 64 year old man is evaluated for a loss of vision in his right eye for about 10 minutes yesterday. He is requesting a referral to an ophthalmologist. He has a past medical history of hypertension, diabetes mellitus and is a former smoker. BP is 142/90 mm of hg. Carotid USG shows a 80-90% stenosis of the right internal carotid artery and a 70-80%

stenosis of the left ICA. What is the most appropriate next step in management?

- a. Switch ASA to warfarin**
- b. Add clopidogrel to ASA**
- c. Right carotid endarterectomy**
- d. Left carotid endarterectomy**
- e. Left carotid angioplasty with stenting.**

c. What this patient experienced is basically amaurosis fugax and therefore is considered to have symptomatic carotid stenosis. CEA would be the treatment of choice in this patient. CEA is recommended for patients with recently symptomatic carotid stenosis of 70 to 99 percent who have a life expectancy of at least five years, provided that the perioperative risk of stroke and death for the surgeon or center is less than 6 percent (grade 1A). The number needed to treat (NNT) to prevent one stroke over five years for this group is 6.3

7. What is the most appropriate timing for the surgery?

- a. 3 months after the event**
- b. 6 months after the event**
- c. within the first 2-4 weeks of the event.**

c. The benefit is found to be maximum if CEA is performed within 2-4 weeks of the cerebrovascular event

8. If the same patient in Question 6 presents to the clinic with the same complaints and the carotid USG showed a stenosis of 40% of the right ICA and no stenosis in the left ICA—what would be your modality of treatment?

- a. Management of risk factors**
- b. Carotid endarterectomy as he is symptomatic**
- c. Add warfarin**

CEA is not beneficial for symptomatic carotid stenosis of 30 to 49 percent, and CEA is harmful for symptomatic patients with less than 30 percent stenosis. Medical management is recommended rather than CEA for patients with symptomatic carotid stenosis that is less than 50 percent. This was demonstrated by the two major trials, the North American Symptomatic Carotid Endarterectomy Trial (NASCET) and the European Carotid Surgery Trial (ECST)

Aggressive risk factor modification –

HTN- BP goal of <130/80 mm of Hg.

DM-HbA1C of <7%

Dyslipidemia-LDL<100 and HDL>40mg/dl

Lifestyle modification- cessation of smoking, limit alcohol consumption, weight control (maintain BMI between 18-24), regular physical activity (30 minutes most days of the week), diet rich in fresh fruits and vegetables.

Antiplatelet agents- ASA, ASA and dipyridamole or clopidogrel as first line agents following the TIA

The answers for questions 6, 7 &8 were based on data from clinical studies, an evidenced-based review of CEA published by the American Academy of Neurology in 2005, guidelines for the prevention of stroke published by the American Heart Association/American Stroke Association in 2006, and guidelines published in 2008 by the National Institute for Health and Clinical Excellence in the United Kingdom.