



## Asymptomatic Carotid Artery Stenosis: Patient Information Questions

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### Abstract

Asymptomatic carotid artery stenosis (ACAS) is a pathological condition that occurs when an atherosclerotic plaque affects carotid wall in absence of cerebrovascular symptoms. Many patients come to medical attention without a clear idea of this pathology, as totally asymptomatic.

### Introduction

The purpose of this article is to present a typical case report of a patient with ACAS and to answer patient's questions regarding this particular pathological and potentially dangerous condition.

### What is Asymptomatic Carotid Artery Stenosis?

Carotid arteries are the main blood vessels of the neck, providing blood flow from the heart to the brain and face. Carotid artery stenosis is a pathological condition caused by a narrowing of these vessels (involving mainly the common carotid artery and internal carotid artery), due to atherosclerosis plaque. Reversible or irreversible brain damage given by decrease of blood flow to the brain may cause Transient Ischemic Attack (TIA) or stroke. The brain portion vascularized by a carotid is responsible for the movement and regulation of sensitivity in the opposite side of the body, so both of these conditions may cause symptoms and signs in the contralateral portion of the body. TIA involves sudden loss of motion or sensitiveness of an arm, leg or both, or changes in speech and tone and alterations of face muscles; the sight can also be affected, with abrupt and total loss of vision in the eye. The symptoms subside within 24 hours, leaving no remnants. In case of stroke, symptoms persist in several grades according to the wideness of the ischemic area involved, despite treatment efforts. Fortunately, the majority of carotid artery stenosis remains asymptomatic although they could potentially lead to a TIA or stroke and the risk becomes significant only for high degrees of stenosis (>70%), as well as only a small percentage of carotid stenosis cause symptoms.

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### Who is at Risk of ACAS?

Although there is no established benefit from screening for ACAS in general healthy population, there are groups at increased risk. Advanced age (especially over 70), male sex, history of vascular disease (such as peripheral artery disease, myocardial infarction), high systolic and low diastolic blood pressure, high total-cholesterol and High-Density Lipoprotein (HDL) levels, diabetes mellitus and smoking habits are risk factors for ACAS [1]. Among people >70 years, prevalence is estimated 12.5% in men and 6.9% in women [2]. In these groups screening is justified, especially in >60 years old patients affected by one or more risk factors.

### How is ACAS Diagnosed?

CDUS remains the first examination in the diagnosis of ACAS since it is cheap, easy to perform and does not use radiation. CDUS is a non-invasive test that allows identifying the degree of stenosis by measuring the shrinkage percentage; furthermore assessing any stenosis progression and size, internal components and profile of the atherosclerotic plaque; all of these features are important parameters to predict the risk of TIA and stroke. Another important parameter identified with CDUS is the velocity that blood reaches after passing through the stenosis: the higher the speed, the greater and more severe the stenosis. Second level analysis is Computed Tomography (CT-scan) and Magnetic Resonance Imaging (MRI) with intravenous Contrast Media (CM) and vessel reconstruction sequences. CT-scan and MRI are able to define exactly the degree of stenosis and the portion of the vessel affected. They can highlight stenosis in vessels that cannot be seen with CDUS (for example any stenosis in vessels next to heart). CM must not be used in patients with severe renal insufficiency (with high creatinine levels) and allergy. MRI is contraindicated in

patients with pacemakers and metal implants or clips. In selected cases it is possible to make an angiography, an invasive examination with CM that highlights the profile and the anatomy of the vessels to be investigated. Usually, in preparation of carotid surgery, it is also carried out an examination (using CT or MRI) of the brain, to highlight any abnormalities prior to the intervention.

### How can ACAS be Prevented?

ACAS is a sign of a multifocal disease: atherosclerosis, caused by accumulation of cholesterol within the blood vessel walls. Atherosclerosis may also lead to heart attack (when affects coronary arteries), affect the circulation of the lower limbs and intracranial vessels. It is very important to prevent atherosclerosis and treat diseases that exacerbate it. Quitting smoke habits, healthy diet, getting regular exercise, maintenance of normal blood pressure and cholesterol levels, prevention and treatment of diabetes mellitus are all measures to avoid the onset of ACAS and other cardiovascular disease. Hardly a carotid plaque may be reduced once formed; therefore prevention is the first step against ACAS.

### How is ACAS Treated?

Once ACAS has been found the choice of treatment is between Medical Therapy Alone (MTA), surgical Carotid Endarterectomy (CEA) or Carotid Artery Stenting (CAS). It is important to note that any interventional therapeutic choice (CEA, CAS or angioplasty) is necessarily accompanied by an adequate drug therapy after and before the procedure. The main drugs used are acetylsalicylic acid (ASA) and statin: the first makes the blood more fluid, the latter prevents the growth of plaque and decrease cholesterol levels. After CAS it is also used clopidogrel, a drug with effects similar to ASA but a greater effect. Antihypertensive and hypoglycemic treatments should be taken if necessary, because they contribute to the prevention of cardiovascular complications related to atherosclerosis.

#### Medical therapy alone

MTA is reserved for patients with ACAS that does not need an interventional correction. It is also indicated if the benefits from CEA, CAS or angioplasty are less than the risk of complications associated with the procedures.

#### Carotid endarterectomy

CEA is performed in the operating room under general or local anesthesia. A vertical incision of variable length is made on the neck depending on the length and position of the carotid plaque. Carotid artery is opened and atherosclerotic plaque is removed. At the end of the procedure is left in place a tube for blood drainage that is removed on the following day. In some cases the carotid artery may be closed by interposition of a patch for vessel enlargement. The average length of stay in hospital following CEA is 2-3 days. Potential complications are neck anesthesia, hoarseness, deviation of the mouth, neck hematoma, stroke, myocardial infarction and recurrent carotid stenosis.

#### Carotid artery stent

CAS is an endovascular procedure in which the carotid plaque is crushed on the walls of the carotid artery by a small steel mesh tube, called stent. It is inserted with a puncture in the groin or arm and brought to the desired area by guides and catheters. Once arrived, stent is open in correspondence of the plaque. The operation is performed in the operating room, under local anesthesia and under X-ray views and injection of CM. The average length of stay in hospital is 1-2 days. No scars remain. Complications are hypotension, bradycardia,

complications at the site of the vascular access such as hematoma and pseudoaneurysm, embolic neurological events (stroke or TIA), intracranial hemorrhage, acute stent thrombosis and recurrence of carotid stenosis.

### How Often Should I do Checks for ACAS?

In patients treated only with medical therapy, a CDUS must be done at least each 6 months for the first 2 years and lately, if the ACAS remains stable over time, every 12 months. Patients who have undergone surgery, both with CEA, CAS or angioplasty, must be checked with CDUS one month after the procedure and then every 6 month for the first 2 years, then annually [3]. Blood analysis, endocrinological and cardiological consult are necessary to assess the worsening of those predisposing conditions we have mentioned before. At the time of every control with CDUS the patient must be seen by a vascular surgeon performing a physical examination and collecting recent medical history, in order to assess if the treatment is giving the expected results or if the therapeutic and surveillance strategy has to be changed.

### There are Particular Lifestyle Conditions or Drugs Modification after ACAS Interventions?

There are no particular behaviors to maintain after surgery.

However, risk factors (hypertension, diabetes and dyslipidemias) should be monitored to prevent the recurrence of a carotid plaque. In case of CAS it is necessary to assume a double antiplatelet therapy regimen (e.g. Acetylsalicylic-acid and Clopidogrel) for about three months.

### What about Controlateral Stenosis?

Adverse events in patient's candidate to CEA and with controlateral Asymptomatic Carotid Artery Stenosis (c-ACAS) is a subject of intense debate. Some Authors showed an increase in perioperative stroke and death [4], although other studies demonstrated that the presence of a c-ACAS was not predictive of postoperative events [5]. However, you need always to check both carotid arteries, even after surgery, to evaluate also the contralateral stenosis presence or progression.

### Is it Possible a Plaque Regression?

No. We can prevent progression. Cases of discrepancy between two CDUS report are often due to inadequate stenosis measurements or CDUS settings.

### Conclusion

Asymptomatic carotid artery stenosis is a medical condition that develops in time leading to an increased risk of stroke or TIA. As other atherosclerotic events can be prevented with an adequate lifestyle (healthy diet, no smoking, regular exercise) and regular examinations (glycaemia, blood pressure, cholesterol levels). The treatment of this condition can be carried out with medical therapy alone or medical therapy and surgery or endovascular techniques, in relation with the single patient's condition and degree of stenosis. Periodic clinical examinations and imaging should be carried out to develop the appropriate treatment strategy over time.

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