



Bartels E, Bartels S, Poppert H (Editors):
New Trends in Neurosonology and Cerebral Hemodynamics – an Update.
Perspectives in Medicine (2012) 1, 94–99

journal homepage: www.elsevier.com/locate/permed



The role of extracranial ultrasound in the prevention of stroke based on the new guidelines

Brigitta Léránt, László Csiba*

University of Debrecen, Medical and Health Science Centre, Department of Neurology, 22 Móricz Zsigmond Str. Debrecen
4032 Hungary

KEYWORDS

Ultrasound;
Carotid stenosis;
Stroke;
Prevention;
Guideline

Abstract Extracranial ultrasonography is recommended to use as a baseline non-invasive method in the initial evaluation of either asymptomatic or symptomatic patients to define the possible stenosis on carotid artery.

The latest 2011 guidelines specify the sequence of examinations with certain classification of recommendations and level of evidence.

Carotid duplex ultrasonography plays an important role both in primary and secondary prevention of stroke and the results found determine the use of further investigations and management of patients with extracranial carotid and vertebral artery disease. In case of diagnostic uncertainty other brain imaging methods, like computed tomography angiography, magnetic resonance angiography and catheter-based angiography can be chosen to assess vascular lesions.

Carotid duplex ultrasound serves not only diagnostic purposes but can also be useful in the follow up processes. It is widely used for control examinations after revascularization procedures of the carotid or vertebrobasilar arteries.

By the establishment of indications of revascularization procedures degree of carotid stenosis is a major factor which therefore requires accuracy of the assessment. Carotid duplex ultrasound has some difficulties in this question. This diagnostic uncertainty is tried to be solved by improving the criteria system of stenosis grading in internal carotid artery.

The aim of this article is to give an overview about the importance and role of extracranial duplex ultrasonography in stroke prevention based on the latest guidelines.

© 2012 Published by Elsevier GmbH. Open access under [CC BY-NC-ND license](https://creativecommons.org/licenses/by-nc-nd/4.0/).

1. Introduction

Stroke is currently the third leading cause of death and the biggest single cause of major disability worldwide. Each year more than 700,000 people experience a new or recurrent stroke and on average someone dies every 4 min of a stroke [1]. Despite the diagnostic and treatment development in medicine the recovery rate from stroke is poor.

The well-documented and modifiable risk factors including e.g. hypertension, smoking, diabetes, obesity or dyslipidemia lead to both structural and hemodynamic

Abbreviations: CABG, coronary artery bypass graft; CAS, carotid artery stenting; CEA, carotid endarterectomy; CTA, computed tomography angiography; DSA, digital subtraction angiography; HT, hypertension; ICA, internal carotid artery; MRA, magnetic resonance angiography; NASCET, North American Symptomatic Carotid Endarterectomy Trial; US, ultrasound; PAD, peripheral artery disease; TIA, transient ischemic attack.

* Corresponding author. Tel.: +36 52 255 255; fax: +36 52 453 590.

E-mail addresses: lerant.brigi@gmail.com (B. Léránt),
csiba@dote.hu (L. Csiba).

alterations of the extra- and intracranial vessels. The most common structural consequence is the progression of atherosclerotic processes. The presence of an atherosclerotic lesion in the carotid bulb or in the extracranial internal carotid artery (ICA) is associated with elevated stroke risk [2]. Several mechanisms are attributable to the increased risk of cerebrovascular events including decrease in the blood flow resulting from critical stenosis or occlusion, or the stenotic lesion can also be the source of thromboembolic events.

Regarding the severity of the disease and the very short time for successful intervention after the attack early recognition and prevention are the only chance for patients to survive and to retain their quality of life. Prevention, monitoring of cardiovascular risk factors is therefore an important public health concern [3].

The latest 2011 guidelines specify the role of extracranial duplex ultrasound (US) in the diagnostic processes during the initial evaluation of the patients.

The aim of this article is to summarize the indications of duplex US and the recommended sequence of examinations both in primary and secondary stroke prevention based on 2011 ASA/ACCF/AHA/AANN/AANS/ACR/ASNR/CNS/SAIP/SCAI/SIR/SNIS/SVM/SVS Guideline on the Management of Patients With Extracranial Carotid and Vertebral Artery Disease [4].

2. Primary vascular prevention

2.1. Classification of recommendations and level of evidence

Table 1 shows the classification of recommendations and level of evidence used in the latest guidelines.

2.2. The role of carotid ultrasound in primary prevention

The presence of hemodynamically significant atherosclerotic lesion on carotid artery is often identified in the background of ischemic stroke. Regarding the long process of the development of atherosclerosis, recognition of subclinical forms is of great importance in the primary prevention of cerebrovascular events.

The latest guideline [4] recommends the use of carotid duplex US in asymptomatic patients with the following limitations and conditions.

The routine screening of asymptomatic patients with carotid duplex US is not recommended if no clinical signs or risk factors for atherosclerosis can be detected (Class III, Level of Evidence: C).

The examination is also not beneficial in case of patients with neurological and psychiatric conditions which are unrelated to focal ischemic lesions, such as brain tumours, motor neuron diseases, infection and inflammation of the brain, epilepsy (Class III, Level of Evidence: C).

Standard physical examination contains auscultation of the cervical arteries. If during the examination of an asymptomatic patient presence of carotid bruit is revealed, it is reasonable to perform the measurement to detect the

hemodynamically significant carotid stenosis (Class IIa, Level of Evidence: C).

In asymptomatic patients with 2 or more risk factors including hypertension (HT), smoking, hyperlipidemia, family history of manifested atherosclerosis before the age of 60 years and ischemic stroke in a first-degree relative, duplex US may be considered (Class IIb, Level of Evidence: C).

The same recommendation can be applied in case of asymptomatic patients with symptomatic peripheral artery disease (PAD), coronary artery disease or atherosclerotic aortic aneurysm (Class IIb, Level of Evidence: C).

Fig. 1 summarizes the diagnostic approach of asymptomatic patients.

Beside the diagnostic aim of carotid duplex US, this method is proven to be useful in the follow up as well. In case of a stenosis greater than 50% it is reasonable to repeat the examination annually to assess the progression or regression of the vascular alteration and the effect of therapeutic interventions. Less frequent control measurements are acceptable after stability establishment or in case of a change of patient's candidacy for further intervention (Class IIa, Level of Evidence: C).

The establishment of the degree of carotid stenosis by duplex US and angiography (magnetic resonance angiography – MRA, computed tomography angiography – CTA, digital subtraction angiography – DSA) is an important part of the indication of carotid reconstruction surgery in asymptomatic patients. Prophylactic carotid revascularization may be considered in highly selected asymptomatic patients if the degree of stenosis reaches at least 60% by angiography and 70% by duplex US (Class IIb, Level of Evidence: B) [5,6].

Elective coronary artery bypass graft (CABG) surgery makes previous carotid duplex US reasonable in patients with the following conditions: older than 65 years, history of cigarette smoking, PAD, left main coronary stenosis, history of stroke, TIA or carotid bruit (Class IIa, Level of Evidence: C).

3. Secondary vascular prevention

3.1. Carotid duplex US in secondary stroke prevention

Among survivors of ischemic stroke or TIA after the immediate management further investigations should be performed to assess the cause and pathophysiology of the event. The possible origin of ischemic stroke includes intra- or extracranial-artery atherosclerotic infarction, cardiac embolism, small-vessel disease, hypercoagulable state, dissection, sickle cell disease or it can be an infarct of undetermined cause.

As initial evaluation all patients with the symptoms of TIA or ischemic stroke should have non-invasive brain imaging (Class I, Level of Evidence: C).

As a first step duplex US is recommended to detect carotid stenosis for patients with acute, focal neurological symptoms, which reflect the insufficient supply of certain brain territories from the left or right ICA (Class I, Level of Evidence: C).

Download English Version:

<https://daneshyari.com/en/article/331787>

Download Persian Version:

<https://daneshyari.com/article/331787>

[Daneshyari.com](https://daneshyari.com)