

Computed tomography angiography (CTA) has higher variability than the vascular ultrasound (VU).

Background

Vascular ultrasound (VU) is a non-invasive test for extracranial carotid stenosis (ECS) imaging with better risk-cost benefit compared to magnetic resonance angiography (MRA), computed tomography angiography (CTA) and digital subtraction angiography (DSA). Despite, VU accuracy is not well established. The diagnostic value regarding VU for ECS could aid to define if some patients should undergo a carotid endarterectomy based on VU scanning alone. We aimed to establish the accuracy of VU for ECS imaging compared with CTA as reference test.

Methods

1. Accuracy study: all carotid VU performed in an University center, in 2016 and 2017.
2. Inclusion criteria: VU and CTA < 3 months of distance
3. Exclusion criteria: anything that could confuse the analysis
4. Four experts credentialed physicians (2 examiners for VU and 2 for CTA) evaluated the images. They were blinded to the original test report and results of the others examiners
5. Criteria used for VU analysis was Radiology Consensus on duplex ultrasound¹ and for CTA analysis was NASCET method².
6. Cutoffs for accuracy was stenosis \geq 50%

Key Results

- Fifty patients were included. Four patients were excluded for non-atherosclerotic disease and five arteries were excluded due previous stenting or carotid dissection. Accuracy, discordance and profile of sample is represented in the tables below.

CTA	RICA	LICA
0%	2%	23%
< 50%	47%	30%
50-69%	20%	12%
70-94%	10%	12%
95-99%	6%	7%
100%	15%	16%

Table 1. Ultrasonographic profile of the sample. RICA = Right internal carotid artery. LICA = Left internal carotid artery

Parameter	Value	Parameter	Value
Age	50-84; Mean = 67	Hypertension	89%
Men/Women	52%/48%	Smoking	72%
Diabetes	28%	Previous stroke	48%

Table 2. Epidemiologic profile of the sample

Data	Value (%)
Accuracy	77,3
Sensibility	96,7
Especificity	66,7
Positive predictive value	61,2
Negative predictive value	97,4

Table 3. Data of accuracy

Evaluators	Discordance
VU x VU	3 %
CTA x CTA	13 %

Table 4. Data of discordance

CONCLUSION:

- The **accuracy** of VU in diagnosing ECS in our service is **77%**.
- Data about discordance showed that **CTA evaluation is more dependent** of the **examiner** than VU.

Patient or healthcare consumer involvement:

The diagnostic value regarding VU for ECS could aid to define if some patients should undergo a carotid endarterectomy based on VU scanning alone. It will also contribute to the best decision making when a patient cannot undergo CTA, MRA or DSA, but would benefit from carotid revascularization.

References:

- ¹Grant EG, et al. Carotid artery stenosis: gray-scale and Doppler US diagnosis--Society of Radiologists in Ultrasound Consensus Conference. Radiology. 2003 Nov;
²NASCET Collaborators. Beneficial effect of carotid endarterectomy in symptomatic patients with high-grade carotid stenosis. North American Symptomatic Carotid Endarterectomy Trial Collaborators. N Engl J Med. 1991;325(7):445-53.

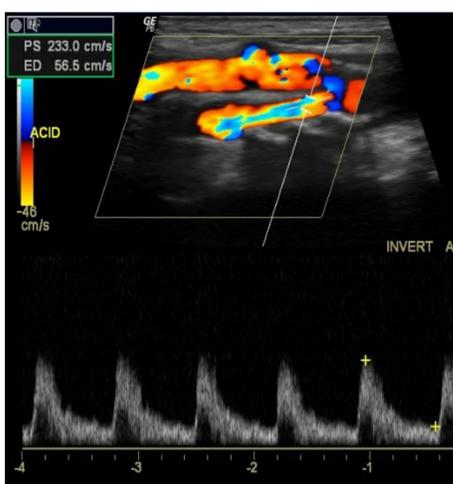


Image 1. Ultrasound of patient presenting stenosis >70%.



Image 2. 3D angioCT reconstruction of patient with stenosis > 70%

Accuracy of vascular ultrasound compared to angio-tomography for extracranial carotid stenosis imaging.

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