Winner of EUROSON 2012 Young Investigator Award

Dose-Dependent Artefact in the far Wall of the Carotid Artery with Dynamic Contrast Enhanced Ultrasound

Introduction

 \blacksquare

Dynamic contrast enhanced ultrasound (DCE-US) is an emerging technology to assess neovascularization in atherosclerosis. The aim of this study was to quantify a pseudo-enhancement phenomenon observed during DCE-US of the carotid in other studies.

Methods

V

Ethical approval was obtained for this prospective case series and each patient gave written informed consent. 31 patients with 50–99% internal carotid artery stenosis underwent DCE-US imaging of the carotid bifurcation using 2 ml of intravenous SonoVue™. In the final 10 patients, a further 1 ml bolus was administered after 15 minutes. Raw linear DICOM data was analysed offline. Regions of interest were drawn within the common carotid lumen and immediately adjacent in the near and far wall adventitia. Peak intensity was measured. In addition, an in vitro experiment, using a single channel flow phan-

tom was performed. SonoVue $^{\text{TM}}$ concentrations of 0.02, 0.1, 0.5, 1, and 2 % were pumped into the tube. Regions of interest were drawn in a similar fashion and the peak intensity measured.

Results



The carotid far wall was significantly more echogenic than the near wall at $2\,\text{ml}$ (p<0.0001, n=31) and the far wall intensity rose synchronously with that of the lumen. The intensity difference was a factor of $4\,\text{at}$ 1 ml and $12\,\text{at}$ 2 ml. In vitro, the phantom demonstrated a similar pattern and magnitude of enhancement in an area without vasa vasorum.

Conclusion



A dose-dependent, non-linear propagation artefact occurs in the far wall adventitia of the carotid artery, which should not be mistaken as a marker of plaque vulnerability.



Ankur Thapar (UK) BSc, MBBS, MRCS

Ankur Thapar is a year 1 vascular surgery trainee with an interest in novel ultrasound techniques for imaging the carotid artery and jugular vein. Ankur trained at Imperial College London and is currently completing his PhD

	Recent Awards
2010	Royal College of Surgeons Mary Dunhill Fellowship
2010	Circulation Foundation Mary Davies Fellowship
2011	UK Venous Forum Travelling Fellowship
2011	London Surgical Symposium 1 st Prize
2012	EUROSON Young Investigator Award EFSUMB
2012	Graham-Dixon Prize for Cardio- vascular Surgery