

IMAGES IN INTERVENTION



First-in-Man Use of Intravascular Near-Infrared Spectroscopy in the Carotid Arteries to Characterize Atherosclerotic Plaque Prior to Carotid Stenting

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Lipid-core plaque (LCP) detected by near-infrared spectroscopy (NIRS) in the coronary arteries is associated with acute coronary syndromes (ACS) (1,2). Analogous to its role in acute coronary syndromes, LCP in the carotid arteries has been implicated in the pathogenesis of stroke (3). It has not been previously demonstrated whether NIRS, which was developed to identify LCP in the coronary arteries, can also detect LCP in the carotid arteries.

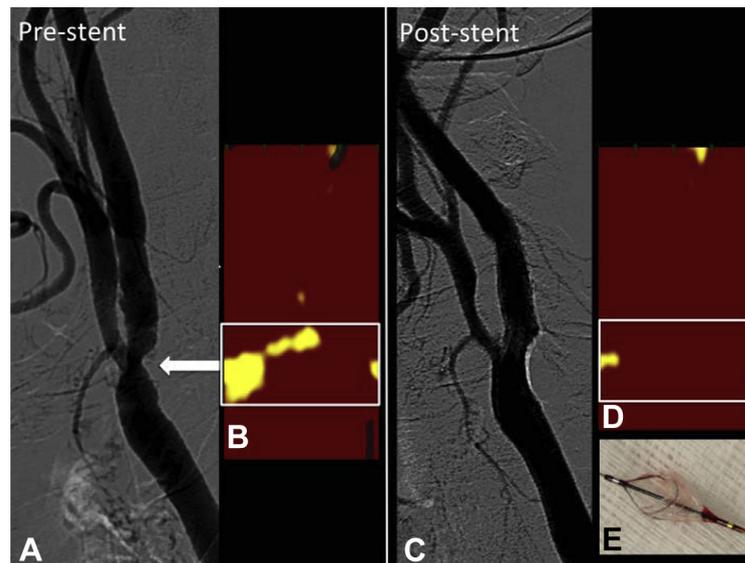
We performed NIRS in the carotid arteries of patients with severe carotid stenosis after deployment of a distal embolic protection device but prior to stenting. The present observations represent the

first-in-man use of NIRS to characterize carotid artery plaque in vivo and demonstrate the feasibility of carotid NIRS imaging (Figures 1 and 2). Future studies are needed to determine whether NIRS can predict procedural complications during carotid stenting, influence the selection of patients for stenting or endarterectomy, and predict future neurologic events.

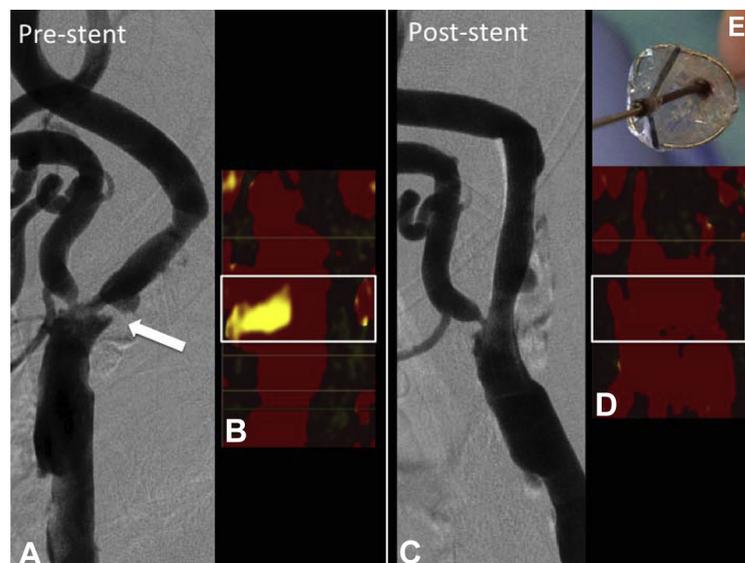
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FIGURE 1 Angiographic and NIRS Findings Before and After Carotid Stenting in a Patient With Symptomatic Carotid Artery Stenosis

An 80-year-old woman suffered a recent left hemispheric transient ischemic attack due to severe stenosis of the proximal left internal carotid artery (**arrow, A**). After filter deployment, baseline near-infrared spectroscopy (NIRS) revealed a large lipid core plaque at the stenosis (**white box, B**) with a maximum lipid core burden index in 4-mm of 356 (**B**). After successful stenting (**C**), repeat NIRS demonstrated dramatic reduction in the lipid signal at the stenosis (**D**) and a maximum lipid core burden index in 4-mm of 129. There were no neurological complications, and there was embolic material in the filter after its retrieval (**E**).

FIGURE 2 Angiographic and NIRS Findings Before and After Stent Placement in an Asymptomatic Patient With Severe Carotid Artery Stenosis

A 75-year-old patient developed an asymptomatic severe stenosis in the proximal right internal carotid artery (**arrow, A**). After filter deployment, near-infrared spectroscopy (NIRS) demonstrated a large lipid core plaque at the stenosis with a maximum lipid core burden index in 4-mm of 413 (**white box, B**). After successful stenting (**C**), repeat NIRS demonstrated no lipid signal at the stenosis (**D**). There were no neurological complications, and there was embolic material in the filter after its retrieval (**E**).

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KEY WORDS carotid artery stenosis, lipid-core plaque, near-infrared spectroscopy