Carotid and Cerebrovascular Imaging and Plaque Burden

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Bckground: Atherosclerosis, characterized by chronic systemic inflammation with plaque formation, is one of the major causes of cerebrovascular disease. Recent advances in imaging technologies can help further understand the overall process and biology of plaque formation and rupture. Thus, these imaging techniques can aid clinicians to make clinical decision for risk stratification, therapeutic planning, and prediction of future risk of cerebrovascular event.

Methods: Literatures of clinical studies and review articles for plaque imaging from January 2014 to March 2017 were assessed by using PUBMED database to introduce current understanding of various advanced imaging modalities and clinical application of these imaging technologies, such as 3-T MRI, positron emission tomography, and near-infrared fluorescence molecular imaging besides traditional ultrasound.

Results: In this review, we will introduce current understanding of various advanced imaging modalities and clinical application of these imaging technologies. By advances in imaging technology evaluating plaque, we can characterize the vulnerability of plaque in-vivo, understand the composition and activity of plaque, assess therapeutic response to treatment, and ultimately predict the overall risk of future cerebrovascular episodes.

Conclusion: With evolving diagnostic approach, patient-specific multimodal imaging strategies can provide more accurate visualization of culprit lesion and to help refine risk assessment models, thereby providing therapeutic guideline.