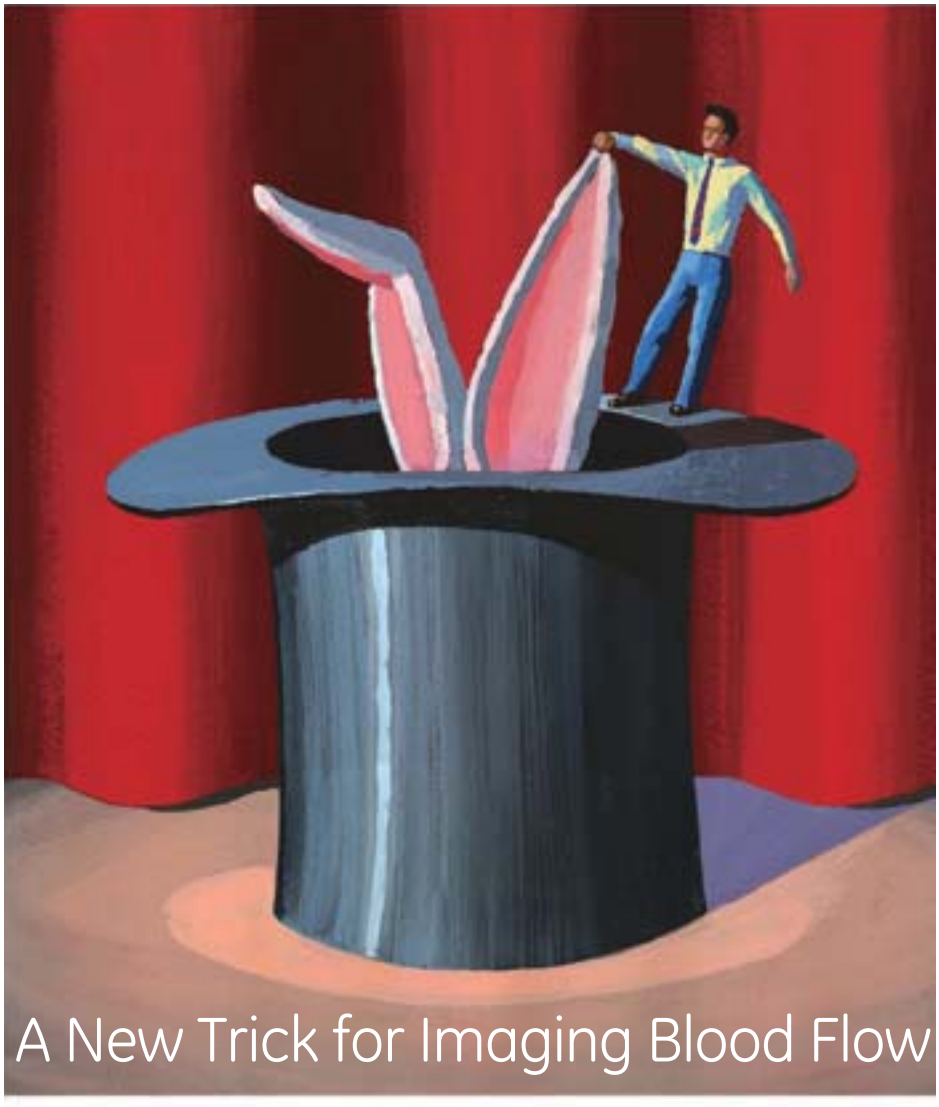

Dr. Lawrence N. Tanenbaum

Lawrence N. Tanenbaum, MD, FACR, Director of MRI, CT and Outpatient/Advanced Development, Mount Sinai School of Medicine (MSSM). The school opened its doors in the fall of 1968 and has since become one of the world's foremost centers for medical and scientific training. Located in Manhattan, MSSM works in tandem with The Mount Sinai Hospital to facilitate the rapid transfer of research developments to patient care and clinical insights back to the laboratory for further investigation.

A New Trick for Imaging Blood Flow in MRA Studies

By Lawrence N. Tanenbaum, MD, FACR

The limited ability of MR angiography to image physiological information inherent in blood flow has long hampered the clinical acceptance/utility of this technique. Recent improvements in MR scanner gradients enable repetitive data capture and reduce echo times (TE) and repetition times (TR) for higher spatial resolution imaging and wider anatomic coverage.

Yet, converting an MR acquisition from single-phase high resolution (SPHR) to TR involves serial scan repetition as the contrast travels to the organ. For faster image capture, a brute force approach reduces both the spatial resolution of the acquisition phase and frequency matrix and generates fewer and/or thicker slices, limiting use in clinical practice.

TRICKS™ (Time Resolved Imaging of Contrast Kinetics) reduces this effect by sampling the center of k-space more often than the periphery to produce multiple physiologic snapshots during each full pass through. This increases temporal resolution by a factor of four at a given scan resolution and coverage without reducing signal to noise ratio (SNR). Adding parallel imaging to this protocol doubles temporal resolution and significantly reduces acquisition time.

Multiple snapshots increase accuracy by reducing the possibility of missed timing of an SPHR study. Time resolved MRA also eliminates timing runs or bolus tracking. The result is close-to-perfect reliability in the capture of the ideal arterial phase of contrast passage for dynamic depiction of flow physiology.

TRICKS overcomes the limitations of SPHR that can miss or obscure information such as reduced flow due to stenosis, vascular occlusion and collateral flow. It also delivers clinically useful information on bilateral studies typically hampered by asymmetrical flow due to proximal occlusive disease. ■